

**MICHIGAN FISH CONTAMINANT MONITORING PROGRAM**  
**2008 ANNUAL REPORT**

TABLE OF CONTENTS

List of Tables..... iii  
List of Figures ..... iv  
List of Appendices..... x  
List of Acronyms ..... xi

**SECTION 1.0..... 1**  
**INTRODUCTION ..... 1**  
**SECTION 2.0..... 3**  
**METHODS..... 3**

**2.1 EDIBLE PORTION AND WHOLE FISH COLLECTION AND PROCESSING ..... 3**

        2.1.1 Edible Portion Monitoring ..... 3  
        2.1.2 Whole Fish Trend Monitoring..... 3  
        2.1.3 Special Projects..... 4

    2.2 CAGED FISH BIOCONCENTRATION STUDIES..... 4  
    2.3 CHEMICAL ANALYSES ..... 5  
    2.4 SUMMARY STATISTICS..... 6  
    2.5 FISH CONSUMPTION ADVISORY TRIGGER LEVELS ..... 7

        2.5.1 Fish Consumption Advisory Trigger Levels for Chlorinated Organic  
            Contaminants Other Than PCBs..... 8  
        2.5.2 Fish Consumption Advisory Trigger Levels for Total PCBs ..... 8  
        2.5.3 Fish Consumption Advisory Trigger Levels for Mercury ..... 9

**SECTION 3.0..... 10**  
**RESULTS AND DISCUSSION..... 10**

**3.1 EDIBLE PORTION MONITORING ..... 10**

        3.1.1 General Highlights ..... 10  
        3.1.2 Comparison to the MDCH Sport Fish Consumption Advisory Trigger Levels  
            ..... 10

            3.1.2.1 General Highlights of the Trigger Level Comparisons ..... 11  
            3.1.2.2 Lake Erie Watershed ..... 11  
            3.1.2.3 Lake Michigan Watershed ..... 17  
            3.1.2.5 Lake Superior Watershed ..... 25

        3.1.3 Summary of Recommendations ..... 29

            3.1.3.1 Summary of Recommendations for Relaxed Advisories..... 29  
            3.1.3.2 Summary of Recommendations for Expanded Advisories ..... 30  
            3.1.3.3 Summary of Recommendations for Additional Monitoring..... 30  
            3.1.3.4 Summary of WQS Attainment Status ..... 31

    3.2 CAGED FISH BIOCONCENTRATION STUDIES..... 32

        3.2.1 Black River Caged Fish Study ..... 32  
        3.2.2 Chippewa River Caged Fish Study ..... 33  
        3.2.3 Looking Glass River Caged Fish Study ..... 33  
        3.2.4 Maple River Caged Fish Study..... 33  
        3.2.5 Pine River Caged Fish Study ..... 34

    3.3 TREND MONITORING..... 34

        3.3.1 USEPA - Great Lakes Whole Fish Trend Monitoring..... 35

TABLE OF CONTENTS cont.

|             |                                                                    |    |
|-------------|--------------------------------------------------------------------|----|
| 3.3.2       | Federal-State Chinook and Coho Salmon Fillet Trend Monitoring..... | 36 |
| 3.3.3       | Michigan's Whole Fish Trend Monitoring .....                       | 36 |
| 3.4         | SPECIAL STUDIES .....                                              | 39 |
| 3.4.1       | Contaminant Concentrations in MDNR Fish Hatchery Stock.....        | 39 |
| 3.4.2       | Se Concentrations in Marquette County Aquatic Biota.....           | 40 |
| SECTION 4.0 | .....                                                              | 41 |
| REFERENCES  | .....                                                              | 41 |

## LIST OF TABLES

|          |                                                                                                                                            |    |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------|----|
| Table 1  | Standard edible portions of Michigan's sport and commercial fishes.....                                                                    | 43 |
| Table 2  | Whole fish trend monitoring locations, target species, and years monitored .....                                                           | 44 |
| Table 3  | Halogenated organic chemicals and mercury quantified in edible portion and whole fish tissue samples.....                                  | 45 |
| Table 4  | PCB structure and corresponding identification number of congeners quantified in fish tissue samples .....                                 | 46 |
| Table 5  | Chlorinated dibenzo-p-dioxin and chlorinated dibenzofuran congeners quantified in fish tissue samples .....                                | 47 |
| Table 6a | Halogenated organic chemicals and mercury analyzed in caged fish tissue samples .....                                                      | 48 |
| Table 6b | Polybrominated diphenyl ether congeners analyzed in selected caged fish tissue samples .....                                               | 48 |
| Table 7  | Trigger levels used by the MDCH to establish sport fish consumption advisories ..                                                          | 49 |
| Table 8  | Summary of chemicals quantified in edible portion fish tissue samples.....                                                                 | 50 |
| Table 9  | Edible portion fish tissue samples with total PCB concentrations exceeding the MDCH's sport fish consumption advisory trigger levels ..... | 51 |
| Table 10 | Edible portion fish tissue samples with mercury concentrations exceeding the MDCH's sport fish consumption advisory trigger level .....    | 53 |
| Table 11 | Dioxin TEQ concentrations in edible portion samples .....                                                                                  | 56 |
| Table 12 | Fish consumption water quality attainment categories for water bodies assessed for the 2008 report.....                                    | 57 |
| Table 13 | Average net uptake of contaminants in caged fish tissue samples collected in 2007. ....                                                    | 59 |
| Table 14 | A comparison of the concentrations of major contaminants measured in caged fish samples from Great Lakes tributaries.....                  | 60 |
| Table 15 | Annual rates of change in contaminant concentrations measured in whole fish collected from fixed station trend monitoring sites.....       | 61 |

## LIST OF FIGURES

|           |                                                                                                                                                    |    |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Figure 1  | Edible portion fish sample locations .....                                                                                                         | 63 |
| Figure 2  | Whole fish trend monitoring sites .....                                                                                                            | 64 |
| Figure 3  | Black River 2007 caged fish monitoring locations .....                                                                                             | 65 |
| Figure 4  | Chippewa and Pine River 2007 caged fish monitoring locations.....                                                                                  | 66 |
| Figure 5  | Looking Glass River 2007 caged fish monitoring location.....                                                                                       | 67 |
| Figure 6  | Maple River 2007 caged fish monitoring location.....                                                                                               | 68 |
| Figure 7  | Total length versus total mercury concentration in northern pike collected from Middle Straits Lake, Oakland County, in 2007 .....                 | 69 |
| Figure 8  | Total length versus total PCB concentration in walleye collected from White Lake, Oakland County, in 2007 .....                                    | 70 |
| Figure 9  | Total length versus total mercury concentration in walleye collected from White Lake, Oakland County, in 2007 .....                                | 70 |
| Figure 10 | Total length versus total PCB concentration in lake whitefish collected from Lake Huron, Thunder Bay, in 1992, 1996, 1998, 1999, and 2007 .....    | 71 |
| Figure 11 | Total length versus total mercury concentration in lake whitefish collected from Lake Huron, Thunder Bay, in 1992, 1996, 1998, 1999, and 2007..... | 71 |
| Figure 12 | Total length versus total PCB concentration in freshwater drum collected from Saginaw Bay, Charity Island, in 2007.....                            | 72 |
| Figure 13 | Total length versus total mercury concentration in freshwater drum collected from Saginaw Bay, Charity Island, in 2007.....                        | 72 |
| Figure 14 | Total length versus total PCB concentration in carp collected from the Black River, Sanilac County, in 1989 and 2007 .....                         | 73 |
| Figure 15 | Total length versus total mercury concentration in largemouth bass collected from Budd Lake, Clare County, in 2007 .....                           | 73 |
| Figure 16 | Total length versus total mercury concentration in rock bass collected from Caribou Lake, Chippewa County, in 1986 and 2006.....                   | 74 |
| Figure 17 | Total length versus total mercury concentration in smallmouth bass collected from Caribou Lake, Chippewa County, in 2006.....                      | 74 |
| Figure 18 | Total length versus total mercury concentration in largemouth bass collected from Cranberry Lake, Clare County, in 2007.....                       | 75 |
| Figure 19 | Total length versus total mercury concentration in walleye collected from Hubbard Lake, Alcona County, in 1989 and 2006.....                       | 75 |

LIST OF FIGURES cont.

|           |                                                                                                                                                           |    |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Figure 20 | Total length versus total mercury concentration in smallmouth bass collected from Long Lake, Montmorency County, in 2006.....                             | 76 |
| Figure 21 | Total length versus total mercury concentration in largemouth bass collected from Lost Lake, Presque Isle County, in 2007.....                            | 76 |
| Figure 22 | Total length versus total mercury concentration in northern pike collected from Murphy Lake, Tuscola County, in 2007 .....                                | 77 |
| Figure 23 | Total length versus total mercury concentration in walleye collected from Otsego Lake, Otsego County, in 2007 .....                                       | 77 |
| Figure 24 | Total length versus total PCB concentration in carp collected from the Tobico Marsh, Bay County, in 1996 and 2007 .....                                   | 78 |
| Figure 25 | Total length versus total mercury concentration in largemouth bass collected from the Tobico Marsh, Bay County, in 2007 .....                             | 78 |
| Figure 26 | Total length versus total PCB concentration in northern pike collected from the Tobico Marsh, Bay County, in 1996 and 2007 .....                          | 79 |
| Figure 27 | Total length versus total mercury concentration in northern pike collected from the Tobico Marsh, Bay County, in 1996 and 2007 .....                      | 79 |
| Figure 28 | Total length versus total mercury concentration in northern pike collected from Bass Lake (East), Marquette County, in 2007.....                          | 80 |
| Figure 29 | Total length versus total mercury concentration in largemouth bass collected from Crockery Lake, Ottawa County, in 2006.....                              | 80 |
| Figure 30 | Total length versus total mercury concentration in northern pike collected from Dodge Lake, Schoolcraft County, in 2006.....                              | 81 |
| Figure 31 | Total length versus total PCB concentration in carp collected from the Galien River, Berrien County, in 1992 and 2007 .....                               | 82 |
| Figure 32 | Total length versus total chlordane concentration in carp collected from the Galien River, Berrien County, in 1992 and 2007.....                          | 82 |
| Figure 33 | Total length versus total PCB concentration in rainbow trout collected from Glen Lake, Leelanau County, in 2007.....                                      | 83 |
| Figure 34 | Total length versus total mercury concentration in rainbow trout collected from Glen Lake, Leelanau County, in 2007 .....                                 | 83 |
| Figure 35 | Total length versus total PCB concentration in channel catfish collected from the Grand River, at Lansing, in 1989 and Ionia in 2006 .....                | 84 |
| Figure 36 | Total length versus total PCB concentration in northern pike collected from the Grand River, below the 6 <sup>th</sup> Street dam, in 1998 and 2007 ..... | 84 |

LIST OF FIGURES cont.

|           |                                                                                                                                                                    |    |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Figure 37 | Total length versus total mercury concentration in northern pike collected from the Grand River, below the 6 <sup>th</sup> Street dam, in 1998 and 2007 .....      | 85 |
| Figure 38 | Total length versus total PCB concentration in white sucker and redhorse sucker collected from the Grand River at Ionia in 2006 .....                              | 85 |
| Figure 39 | Total length versus total mercury concentration in northern pike collected from Klinger Lake, St. Joseph County, in 2006 .....                                     | 86 |
| Figure 40 | Total length versus total mercury concentration in walleye collected from Lake Margrethe, Crawford County, in 1995 and 2007 .....                                  | 86 |
| Figure 41 | Total length versus total mercury concentration in rock bass collected from Lake Michigamme, Marquette County, in 1984 and 2006.....                               | 87 |
| Figure 42 | Total length versus total mercury concentration in walleye collected from Lake Michigamme, Marquette County, in 1984 and 2006.....                                 | 87 |
| Figure 43 | Total length versus total mercury concentration in walleye collected from Long Lake, Iron County, in 2007 .....                                                    | 88 |
| Figure 44 | Total length versus total mercury concentration in largemouth bass collected from Long Lake, Kent County, in 2006.....                                             | 88 |
| Figure 45 | Total length versus total PCB concentration in walleye collected from the Manistique River, downstream of Manistique Papers Dam, in 2003, 2004, and 2007 .....     | 89 |
| Figure 46 | Total length versus total mercury concentration in walleye collected from the Manistique River, downstream of Manistique Papers Dam, in 2003, 2004, and 2007 ..... | 89 |
| Figure 47 | Total length versus total PCB concentration in carp collected from the Maple River, upstream of Matherton, in 2006 .....                                           | 90 |
| Figure 48 | Total length versus total mercury concentration in carp collected from the Maple River, upstream of Matherton, in 2006 .....                                       | 90 |
| Figure 49 | Total length versus total mercury concentration in walleye collected from Milakokia Lake, Mackinac County, in 1985, 1994, and 2007 .....                           | 91 |
| Figure 50 | Total length versus total mercury concentration in rock bass collected from Millecoquins Lake, Mackinac County, in 2006.....                                       | 91 |
| Figure 51 | Total length versus total PCB concentration in northern pike collected from Muskegon Lake, Muskegon County, in 1986 and 2006 .....                                 | 92 |
| Figure 52 | Total length versus total mercury concentration in northern pike collected from Muskegon Lake, Muskegon County, in 1986 and 2006 .....                             | 92 |

LIST OF FIGURES cont.

|           |                                                                                                                                                                         |     |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Figure 53 | Total length versus total mercury concentration in largemouth bass collected from Osterhout Lake, Allegan County, in 2007.....                                          | 93  |
| Figure 54 | Total length versus total PCB concentration in northern pike collected from the Randall Lake Chain; Craig and Randall Lakes (1990) and Morrison Lake (2007) ..          | 93  |
| Figure 55 | Total length versus total mercury concentration in northern pike collected from the Randall Lake Chain; Craig and Randall Lakes in 1990 and Morrison Lake in 2007 ..... | 94  |
| Figure 56 | Total length versus total mercury concentration in walleye collected from Silver Lake, Grand Traverse County, in 2007 .....                                             | 94  |
| Figure 57 | Total length versus total PCB concentration in carp collected from White Lake, Muskegon County, in 1991, 2004, and 2007.....                                            | 95  |
| Figure 58 | Total length versus total PCB concentration in northern pike collected from White Lake, Muskegon County, in 2007 .....                                                  | 95  |
| Figure 59 | Total length versus total mercury concentration in northern pike collected from White Lake, Muskegon County, in 1984 and 2007.....                                      | 96  |
| Figure 60 | Total length versus total PCB concentration in lake herring collected from Lake Superior in 1994, 1995, 2000, and 2007 .....                                            | 96  |
| Figure 61 | Total length versus total PCB concentration in siscowet collected from Lake Superior in 1996, 2001, 2003, and 2007 .....                                                | 97  |
| Figure 62 | Total length versus total mercury concentration in siscowet collected from Lake Superior in 1996, 2001, 2003, and 2007 .....                                            | 98  |
| Figure 63 | Total length versus total chlordane concentration in siscowet collected from Lake Superior in 1996, 2001, 2003, and 2007 .....                                          | 99  |
| Figure 64 | Total length versus dioxin TEQ concentration in siscowet collected from Lake Superior in 1995, 2001, 2003, and 2007 .....                                               | 100 |
| Figure 65 | Total length versus total PCB concentration in whitefish collected from Lake Superior in 1996, 2000, 2002, and 2007 .....                                               | 101 |
| Figure 66 | Total length versus total PCB concentration in burbot collected from Lake Superior in 2007 .....                                                                        | 102 |
| Figure 67 | Total length versus total PCB concentration in livers of burbot collected from Lake Superior in 2007 .....                                                              | 102 |
| Figure 68 | Total length versus total mercury concentration in burbot collected from Lake Superior in 2007 .....                                                                    | 103 |
| Figure 69 | Total length versus total mercury concentration in yellow perch collected from Blind Sucker Flooding, Luce County, in 2007.....                                         | 103 |

LIST OF FIGURES cont.

|           |                                                                                                                                                                        |     |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Figure 70 | Total length versus total mercury concentration in northern pike, smallmouth bass, walleye, and yellow perch collected from Marion Lake, Gogebic County, in 2003 ..... | 104 |
| Figure 71 | Total length versus total mercury concentration in walleye collected from Marion Lake, Gogebic County, in 1987 and 2003 .....                                          | 104 |
| Figure 72 | Total length versus total PCB concentration in walleye collected from Portage Lake, Houghton County, in 1988, 1998, and 2007 .....                                     | 105 |
| Figure 73 | Total length versus total mercury concentration in walleye collected from Portage Lake, Houghton County, in 1988, 1998, and 2007 .....                                 | 105 |
| Figure 74 | Total length versus total PCB concentration in northern pike collected from Torch Lake, Houghton County, in 1988, 2000, and 2007 .....                                 | 106 |
| Figure 75 | Total length versus total mercury concentration in northern pike collected from Torch Lake, Houghton County, in 1988, 2000, and 2007 .....                             | 106 |
| Figure 76 | Total length versus total PCB concentration in walleye collected from Torch Lake, Houghton County, in 1988, 2000, and 2007 .....                                       | 107 |
| Figure 77 | Total length versus total mercury concentration in walleye collected from Torch Lake, Houghton County, in 1988, 2000, and 2007 .....                                   | 107 |
| Figure 78 | Total length versus total PCB concentration in white sucker collected from Torch Lake, Houghton County, in 2007 .....                                                  | 108 |
| Figure 79 | Total length versus total mercury concentration in white sucker collected from Torch Lake, Houghton County, in 2007 .....                                              | 108 |
| Figure 80 | Net uptake of total PCB in caged fish from mouths of selected Michigan rivers ....                                                                                     | 109 |
| Figure 81 | Net uptake of lipid-normalized total PCB in caged fish from mouths of selected Michigan rivers .....                                                                   | 111 |
| Figure 82 | Comparison of mean net uptake of lipid-normalized total DDT across years at six sites on the Pine River .....                                                          | 113 |
| Figure 83 | Comparison of mean net uptake of lipid-normalized total PCB across years at six sites on the Pine River .....                                                          | 114 |
| Figure 84 | Natural log of average total PCB concentrations in whole lake trout from the Great Lakes, 1970-2000.....                                                               | 115 |
| Figure 85 | Natural log of average total DDT concentrations in whole lake trout from the Great Lakes, 1970-2000.....                                                               | 116 |
| Figure 86 | Natural log of average total chlordane concentrations in whole lake trout from the Great Lakes, 1986-2000.....                                                         | 117 |

LIST OF FIGURES cont.

|           |                                                                                                                                                   |     |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Figure 87 | Natural log of average apparent toxaphene concentrations in whole lake trout from the Great Lakes, 1986-2000 .....                                | 117 |
| Figure 88 | Natural log of average total PCB, total DDT, and total chlordane concentrations in whole walleye from Lake Erie 1986-2000.....                    | 118 |
| Figure 89 | Natural log of average total PCB, total DDT, and total chlordane concentrations in coho and chinook salmon fillet samples from Lake Michigan..... | 119 |
| Figure 90 | Natural log of average total PCB, total DDT, and total chlordane concentrations in coho and chinook salmon fillet samples from Lake Huron .....   | 119 |
| Figure 91 | Temporal changes in mercury concentrations at selected whole fish trend monitoring sites .....                                                    | 120 |
| Figure 92 | Temporal changes in total PCB concentrations at selected whole fish trend monitoring sites .....                                                  | 121 |
| Figure 93 | Temporal changes in total DDT concentrations at selected whole fish trend monitoring sites .....                                                  | 122 |
| Figure 94 | Temporal changes in total chlordane concentrations at selected whole fish trend monitoring sites .....                                            | 123 |
| Figure 95 | Temporal changes in 2,3,7,8 TCDD TEQ concentrations at selected whole fish trend monitoring sites .....                                           | 124 |

## LIST OF APPENDICES

- A. INVENTORY OF FISH CONTAMINANT MONITORING SITES AND SPECIES; 1980-2006
- B. INVENTORY OF WHOLE FISH TREND MONITORING SITES AND SPECIES
- C. INVENTORY OF CAGED FISH BIOCONCENTRATION STUDIES
- D. INVENTORY OF CONTAMINANT MONITORING SITES AND SPECIES SUMMARIZED IN THE MICHIGAN FISH CONTAMINANT MONITORING 2007 ANNUAL REPORT
- E. CONTAMINANT DATA SUMMARIZED IN THE MICHIGAN FISH CONTAMINANT MONITORING 2007 ANNUAL REPORT

## LIST OF ACRONYMS

|         |                                                              |
|---------|--------------------------------------------------------------|
| %       | Percent                                                      |
| BCCs    | Bioaccumulative Chemicals of Concern                         |
| CWA     | Clean Water Act                                              |
| DDD     | 1,1-bis(4-chlorophenyl)-2,2-dichloroethane                   |
| DDE     | Dichlorodiphenyl dichloroethane                              |
| DDT     | Dichlorodiphenyl trichloroethane                             |
| DL      | Detection Level                                              |
| FAWCAC  | Fish and Wildlife Contaminant Advisory Committee             |
| FCMP    | Fish Contaminant Monitoring Program                          |
| GLEAS   | Great Lakes and Environmental Assessment Section             |
| MDA     | Michigan Department of Agriculture                           |
| MDCH-AC | Michigan Department of Community Health-Analytical Chemistry |
| MDEQ-WB | Michigan Department of Environmental Quality-Water Bureau    |
| MDNR    | Michigan Department of Natural Resources                     |
| PBDE    | Polybrominated diphenyl ether                                |
| PCB     | Polychlorinated biphenyl                                     |
| PPB     | Parts per billion                                            |
| PPM     | Parts per million                                            |
| QL      | Quantification Level                                         |
| RPC     | Research Productivity Council                                |
| Se      | Selenium                                                     |
| TCDD    | Total 2,3,7,8-tetrachlorodibenzo-p-dioxin                    |
| TEQ     | Toxic equivalent                                             |
| TMDL    | Total Maximum Daily Load                                     |
| USEPA   | United States Environmental Protection Agency                |
| WQS     | Water Quality Standards                                      |
| WWTP    | Wastewater Treatment Plant                                   |

## 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 (WQS), 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), MDCH, MDA, United States Environmental Protection Agency (USEPA), United States Fish and Wildlife Service, Grand Traverse Bay Band of Chippewa and Ottawa, Chippewa Ottawa Resource Authority, Keweenaw Bay Indian Community, and the Great Lakes Indian Fish and Wildlife Commission. Camp, Dresser & McKee collected samples from several sites in the Kalamazoo River watershed at the request of the MDEQ, Remediation and Redevelopment Division. 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 (FCMP) 2008 Annual Report are as follows:

- 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 water bodies monitored in 2007 that are supporting and not supporting the fish consumption designated use described in the WQS, and identify contaminant trends where possible.
- Summarize the results of whole fish tissue analyses and identify any spatial or temporal contaminant trends.
- Identify spatial or temporal trends that can be attributed to specific pollution control activities.

Prior to 1986, Michigan conducted fish contaminant studies on an as needed 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 have been compiled into a large database and are available online at [www.deq.state.mi.us/fcmp](http://www.deq.state.mi.us/fcmp). The FCMP database, along with several other Michigan water quality databases, is also available online through the Michigan Surface Water Information Management System at <http://mcgiga.mcgi.state.mi.us/miswims/>. Contaminant data are also available in staff reports (MDNR, 1986a, 1986b, and 1989; Duling, 1988; Duling and Benzie, 1989 and 1990; Saalfeld et al., 1991; Waggoner, 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; Day et al., 2004; Day and Bohr, 2005; and Bohr and Zbytowski, 2006, 2007, and 2008). In addition, inventories of fish contaminant monitoring locations sampled between 1980 and 2007 are provided in Appendices A, B, and C.

## **SECTION 2.0**

### **METHODS**

The FCMP 2008 Annual Report includes the analytical results available by December 31, 2008, which were not presented in earlier annual reports. A list of water bodies 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 843 fish were collected from inland lakes, rivers, and the Great Lakes and connecting channels during 2007 and analyzed for this report. Results of the analyses of 163 fish collected prior to 2007 and 360 fish collected for a special project in 2008 are also included. Many of these fish were combined into composite samples, and a total of 811 samples were analyzed. The samples included 33 species collected from 61 locations. Approximately 64 percent (%) of the samples were processed as edible portions to support the development and review of fish consumption advisories, and to determine WQS attainment status. The remaining samples were collected to support the other goals of the FCMP.

#### **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 to be appropriate for individual water bodies. 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 the Great Lakes and Environmental Assessment Section (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. Composite samples comprised of whole fish were prepared for certain special projects.

##### **2.1.1 Edible Portion Monitoring**

This report summarizes the analyses of edible portion samples of 361 fish collected from 30 locations in 2007, 150 fish collected from 12 locations in 2006, and 4 fish collected from 1 location in 2003. In all, 15 species of fish were analyzed as edible portion samples for this report. The 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 180 fish tissue samples collected from 15 trend sites in 2007 (Appendix E) were analyzed for this report. In addition, 9 samples collected from 1 site in 2006 are included. Carp were collected from the Detroit River, Lake Michigan at Little Bay de Noc, Lake St. Clair, the St. Clair River, Grand River, St. Joseph River, Kalamazoo River, and Muskegon River; lake

trout were collected from Lake Michigan at Grand Traverse Bay, Lake Huron at Thunder Bay, and Lake Superior at Keweenaw Bay; largemouth bass were collected from Gull Lake and Gun Lake; and walleye were collected from Lake Huron at Saginaw Bay and Thunder Bay, Lake Michigan at Little Bay de Noc, Lake St. Clair, the St. Marys River, and South Manistique Lake. All 15 trend sites have been sampled at least 6 times since 1990. 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 8 times; Lake Gogebic, Houghton Lake, and Pontiac Lake were sampled 6 times; Higgins Lake was sampled 5 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 9 times; the Muskegon River was monitored 8 times; the St. Joseph and Grand Rivers were monitored 7 times; the River Raisin was monitored 6 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 have been monitored at 9 locations, and were sampled at Little Bay De Noc (Lake Michigan) 6 times, Grand Traverse Bay (Lake Michigan) 4 times, Saginaw Bay (Lake Huron) 7 times, Thunder Bay (Lake Huron) 7 times, Lake St. Clair 7 times, Lake Erie 7 times, the St. Marys River 4 times, the St. Clair River 4 times, and the Detroit River 8 times. Walleye have been monitored at 8 locations, and were sampled at Little Bay De Noc 7 times, Saginaw Bay 8 times, Thunder Bay 6 times, Lake St. Clair 7 times, Lake Erie 6 times, the St. Marys River 7 times, the St. Clair River 1 time, and the Detroit River 7 times. Lake trout have been monitored at 3 locations, and were sampled at Grand Traverse Bay 7 times, Thunder Bay 8 times, and Keweenaw Bay (Lake Superior) 7 times.

### **2.1.3 Special Projects**

At the request of the MDNR-Fisheries Division, contaminant concentrations were measured in samples of hatchery-reared brown trout, chinook salmon, and coho salmon from 2 state hatcheries. A total of 80 fish were analyzed as 5 composites of whole fish, and the results are discussed in this report.

Because of concerns about selenium (Se) in Marquette County mining facility effluents, waste rock seeps, and nearby surface waters, fish and benthic macroinvertebrate tissue samples from several locations were analyzed (wet weight) for Se. The results are summarized in this report and discussed fully in a separate staff report (Selenium Monitoring Workgroup, 2009).

Polybrominated diphenyl ether (PBDE) was analyzed in 57 edible portion and 110 whole fish trend samples collected in 2007. Michigan began monitoring PBDE in selected fish tissue samples collected in 2006 to evaluate the spatial distribution and potential human and ecological impacts of the contaminant. Analytical results for PBDE will be presented and discussed in a separate staff report.

## **2.2 CAGED FISH BIOCONCENTRATION STUDIES**

The MDEQ-WB uses caged fish to identify sources of bioaccumulative contaminants and 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 the 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. At the end of the test period the fish were removed from the cages and divided into composite samples of whole fish. Each sample had a minimum total weight of 40 grams, and the number of composites and 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 Black River (Sanilac/St. Clair Counties), Chippewa River (Midland County), Looking Glass River (Ionia County), Maple River (Ionia County), and Pine River (Gratiot/Midland Counties) watersheds in 2007. Funds from the Clean Michigan Initiative were used to support analyses of caged fish tissue samples at a private laboratory.

Three sites were monitored in the Black River (Figure 3). One site each was monitored in the Chippewa, Looking Glass, and Maple Rivers (Figures 4, 5, and 6), and 3 sites were monitored in the Pine River (Figure 4).

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

### **2.3 CHEMICAL ANALYSES**

Analytical results for this report were produced by several laboratories, including the MDCH-Analytical Chemistry (AC) Laboratory, Pace Laboratories (formerly Eno River Laboratories), and the Research Productivity Council (RPC). Each of these analytical laboratories has quality assurance programs and uses peer-reviewed methods of digestion, extraction, and quantification.

A total of 796 samples collected for this report were submitted to the MDCH-AC for analysis. Of those, 236 edible portion samples were analyzed for mercury only, and a total of 72 samples were analyzed for Se only. The remaining fish tissue samples submitted to the MDCH-AC were analyzed for mercury, percent lipids, 25 organic chemicals (Table 3), and polychlorinated biphenyl (PCB) congeners (Table 4). The results are summarized in Section 3.1.

In 2007, the MDCH-AC began analyzing samples for PBDE congeners in selected fish tissue samples. The analyses were conducted, in part, as a test of methodology; the results were not quantified since the lab did not have suitable quality control material. The MDCH-AC has since developed in-house PBDE quality control materials and delivered quantified results for selected fish tissue samples for this report. A total of 68 edible portion samples and 109 whole fish trend samples were analyzed for PBDE. The samples were analyzed for 8 PBDE congeners (BZ# 28, 47, 66, 77, 99, 100, 153, and 154). For purposes of between species and between site comparisons, total PBDE for these samples was estimated by summing the 8 congeners.

Analyses of chlorinated dioxin and dibenzofuran (Table 5) were performed on a subset of edible portion and whole fish trend samples. Pace Laboratories analyzed dioxin and dibenzofuran congeners in 39 samples and the results are summarized in Sections 3.1 and 3.3.

The RPC analyzed mercury and organic contaminants in 20 caged fish tissue samples collected in 2007, including 4 day-0 control samples. The results of the 2007 caged fish analyses conducted by the RPC are summarized in Section 3.2. The 2007 samples were analyzed for the contaminants listed in Table 6a. In addition, the RPC analyzed a total of 13 caged fish samples for PBDE congeners (Table 6b).

A total of 90 chinook salmon were collected from 6 Lake Huron and Lake Michigan tributaries in 2007 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 Clarkson University 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.

Se samples were analyzed by the MDCH-AC using techniques based on the USEPA Method 200.11 and reported as wet weight concentrations.

Toxaphene is referred to as "apparent toxaphene" throughout the report. The MDCH-AC 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-AC does not report concentrations below the quantification level (QL), but above the detection level (DL) for mercury and the organic parameters listed in Table 3. As a result, concentrations of these parameters that are below the QL are coded with a "K" in Appendix E. In these cases, the "K" coded concentrations represent the MDCH-AC's QLs. However, "K" codes assigned to dioxin, furan, and PCB congeners indicate that concentrations were below the DL while "J" or "NQ" codes indicate that concentrations were above the DL, but did not meet all of the quantification requirements. The "J" code was used when analytical laboratory scientists decided the divergence from quantification requirements was not significant; in these cases, the "J" coded concentrations are treated the same as uncoded results. The "NQ" coded concentrations are treated as null results.

## **2.4 SUMMARY STATISTICS**

Total PCB concentration was estimated by summing the concentrations of PCB congeners. Individual congeners below the DL 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 other 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 DL, then the total PCB concentration was reported as less than the highest DL of the individual congeners (1 part per billion [ppb]).

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 QL. Individual isomers below the QL were assigned a concentration equal to 0 for the purpose of calculating a total chlordane concentration. If all 5 isomers were below the QL, then the total chlordane concentration was reported as less than the QL 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, Dichlorodiphenyl dichloroethane (DDE), and 1,1-bis(4-chlorophenyl)-2,2-dichloroethane (DDD). Individual chemicals below the QL were assigned a concentration equal to 0 for the purpose of calculating a total DDT concentration. If all 6 components were below the QL, then the total DDT concentration was reported as less than the lowest QL of the metabolites.

Total 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) toxic equivalents (TEQs) were calculated using the 2005 World Health Organization toxic equivalency factors for 7 dioxins, 10 dibenzofurans, and 12 dioxin-like PCB congeners (Van den Berg et al., 2006). The concentrations of individual dioxin, dibenzofuran, and dioxin-like PCB congeners in a fish sample were multiplied by toxic equivalency factors; the resulting products were summed to calculate a 2,3,7,8-TCDD TEQ concentration. Beginning with the 2008 Fish Consumption Advisory, the MDCH included the 12 dioxin-like PCB congeners in the calculation of TEQs. Any individual congener concentrations less than the DL were assigned a value of 0 for the purpose of calculating the dioxin TEQ. To be consistent with past calculations, the dioxin-like PCBs are not included in the calculation of TEQ for the whole fish trend samples.

The average and median contaminant concentrations were calculated for each species from each site (Appendix E). In some cases, one or more samples from a particular site had contaminant concentrations that were less than the QL (DL for dioxin TEQ and total PCBs). In these cases, calculating the true average contaminant concentration was not possible. Therefore, average contaminant concentrations were calculated using half of the QL (DL for dioxin TEQ and total PCBs) in place of the sample concentrations that were below the QL (or DL). 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 QL (DL for dioxin TEQ and total PCBs) the mean was reported as half of the QL (DL for dioxin TEQ and total PCBs) and the median was reported as less than the QL (DL for dioxin TEQ and total PCBs).

Summary statistics were not generated for individual dioxin, furan, or PCB congeners.

Calculated values presented in Appendix E were not rounded to significant figures. All calculated values are identified in Appendix E.

## **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 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 these 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 Chlorinated Organic Contaminants Other Than PCBs**

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 range 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 PCBs**

The MDCH uses the United States Food and Drug Administration’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 PCBs. Fish are placed into the consumption advisory categories according to species and size, 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.

In 1988, the MDCH issued a statewide advisory covering certain predator species from all inland lakes and reservoirs, based on a preponderance of data indicating mercury concentrations were elevated in those species in most lakes and impoundments. 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.

Lastly, the MDCH is planning to revise the protocol for determining fish consumption advisories based on mercury concentrations. The revision will most likely result in changes in advice for all water bodies, and most of the changes will result in more restrictive advice for women of child bearing age and children under age 15. Since this revision will probably affect the 2010 advisory, the MDCH decided not to institute any relaxations of the current advice based on elevated mercury concentrations. The decision was made in order to avoid possible confusion resulting from relaxing advisories in 2009 only to provide more restrictive advice in 2010. For this reason, recommendations for advisory changes made in this report do not include suggestions for the relaxation of mercury-based advisories where such changes would be indicated under the existing protocol. However, recommendations for advisory changes were made when mercury concentrations indicated more restrictive advice was appropriate.

## SECTION 3.0

### RESULTS AND DISCUSSION

#### 3.1 EDIBLE PORTION MONITORING

The FCMP 2008 Annual Report includes the analytical results available by December 31, 2007, for edible portion fish samples collected primarily in 2006 and 2007. A total of 515 edible portion fish tissue samples are summarized in this report. This includes samples of 15 species from 40 locations (Figure 1).

##### 3.1.1 General Highlights

- Several chemicals analyzed were not quantified in any of the fish samples, including aldrin, heptachlorostyrene, lindane, pentachlorostyrene, terphenyl, and toxaphene. However, dieldrin, a breakdown product of aldrin, was quantified in fish tissue samples from 16 of 20 locations where chlorinated organic compounds 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 and impoundments.
- Dioxin TEQ concentrations were quantified in every sample from the 1 location where samples were analyzed for dioxin and dibenzofuran congeners (Table 8). However, the QLs for dioxin and dibenzofuran congeners are 3 to 4 orders of magnitude lower than the QLs 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). White Lake (Muskegon County) carp and Lake Superior siscowet had the highest concentrations of several organic contaminants.
- Sampling results indicate that total PCB concentrations may be declining in fish from several water bodies, and additional sampling may lead to the relaxation of consumption advisories for those locations.

##### 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 contaminant concentrations exceeded trigger levels, or where 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:

- Total DDT, dieldrin, heptachlor/heptachlor epoxide, and mirex trigger levels were not exceeded in any samples analyzed for this report.
- Total PCB concentrations were greater than or equal to the women and children trigger level in 112 of 275 (41%) samples. Concentrations were greater than or equal to the women and children trigger levels in fish from 15 of 17 (88%) locations (Table 9). The 2008 MDCH *Fish Consumption Advisory* includes women and children advisories due to elevated PCBs for 13 of the 15 locations.
- Total PCB concentration was greater than or equal to the general population trigger level in 1 of 275 (.4%) samples at 1 of 17 (6%) locations (Table 9). The 2008 MDCH *Fish Consumption Advisory* includes a general population advisory at that location.
- Mercury concentrations were greater than or equal to the “restrict consumption” trigger level in 129 of 515 (25%) samples from 24 of 40 (60%) locations (Table 10). The 2008 MDCH *Fish Consumption Advisory* includes either statewide or specific advisories due to elevated mercury concentrations for 20 of the 24 locations.
- One sample analyzed for this report had a mercury concentration exceeding the “no consumption” trigger level (Table 10).
- Dioxin TEQ concentrations were assayed in siscowet taken from Keweenaw Bay in Lake Superior in 2007. The TEQ concentrations exceeded the “no consumption” trigger level in 1 sample from the site (Table 11). The 2008 MDCH *Fish Consumption Advisory* includes an advisory due to elevated dioxin TEQ concentrations in Lake Superior siscowet.
- Based on the following site-specific trigger level comparisons, the MDCH should consider relaxing fish consumption advisories at 5 sites and adding or expanding advisories at 8 sites. Also, additional monitoring is recommended for 6 water bodies.

### 3.1.2.2 Lake Erie Watershed

#### **Middle Straits Lake, Oakland County (ID 2007240) *Northern Pike***

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

Comparison to Trigger Levels: Ten northern pike ranging in length from 24 to 34 inches were collected from Middle Straits Lake in 2007 and analyzed for mercury only. Mercury

concentrations exceeded the MDCH “restrict consumption” trigger level in 8 fish, and the median mercury concentration was 0.67 ppm (Table 10; Figure 7).

Recommendations: No change to the advisory is recommended and additional monitoring is not necessary at this time.

### **White Lake, Oakland County (ID 2007259)**

#### ***Walleye***

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

Comparison to Trigger Levels: Ten walleye ranging in length from 16 to 26 inches were collected from White Lake in 2007. Total PCB concentrations exceeded women and children trigger levels in 1 fish (Table 9; Figure 8) with a concentration in the women and children “1 meal per month” range. The median total PCB concentration was 0.006 ppm.

Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 4 walleye collected in 2007 (Table 10; Figure 9). The median mercury concentration of walleye greater than 20 inches was 0.52 ppm and walleye less than 20 inches was 0.30 ppm.

Recommendations: No change to the advisory is recommended and additional monitoring is not necessary at this time.

### **Lake Huron Watershed**

#### **Lake Huron, Thunder Bay (ID 2007269)**

#### ***Lake Whitefish***

Existing MDCH Advisory: The general population should not eat more than 1 meal per week of lake whitefish between 18 and 22 inches and no lake whitefish greater than 22 inches from Thunder Bay due to elevated concentrations of PCBs and dioxins. Also, women and children should not eat more than 1 meal per week of lake whitefish less than 18 inches and should not eat any lake whitefish greater than 18 inches due to elevated concentrations of PCBs and dioxins.

Comparison to Trigger Levels: Ten lake whitefish ranging in length from 19 to 25 inches were collected from Thunder Bay in 2007. Total PCB concentrations exceeded the women and children trigger levels in 9 fish (Table 9; Figure 10), and all 9 had concentrations in the women and children “1 meal per week” range. The median total PCB concentration was 0.07 ppm. A total of 45 lake whitefish were collected from Thunder Bay since 1992 and the median total PCB concentration was 0.20 ppm.

The mercury concentrations in all 10 lake whitefish were below the MDCH “restrict consumption” trigger level, and the median concentration was 0.10 ppm (Figure 11). The median mercury concentration in the 45 lake whitefish collected since 1992 was 0.07 ppm.

Recommendations: The samples should be analyzed for dioxins and dioxin-like PCBs. No change to the advisory is recommended pending results of that analysis.

**Lake Huron, Saginaw Bay (ID 2007270)**  
***Freshwater Drum***

Existing MDCH Advisory: Saginaw Bay freshwater drum are not covered by an advisory.

Comparison to Trigger Levels: Ten freshwater drum ranging in length from 14 to 19 inches were collected from Saginaw Bay in 2007. Total PCB concentrations exceeded women and children trigger levels in 3 fish (Table 9; Figure 12), and the concentrations in all 3 fish were in the women and children “1 meal per week” range. The median total PCB concentration in the 10 freshwater drum was 0.04 ppm.

Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 4 of the 10 freshwater drum (Table 10; Figure 13) collected in 2007. The median mercury concentration was 0.44 ppm.

Recommendations: The MDCH should consider advising women and children not to eat more than 1 meal per week of Saginaw Bay freshwater drum due to elevated levels of PCBs and mercury. Additional monitoring is not needed at this time.

**Black River, Croswell Impoundment, Sanilac County (ID 2007263)**  
***Carp***

Existing MDCH Advisory: Women and children should eat no more than 1 meal per week of Black River carp of any size due to elevated concentrations of PCBs.

Comparison to Trigger Levels: Ten carp ranging in length from 17 to 25 inches were collected from the Black River, Croswell Impoundment in 2007. Total PCB concentrations were below women and children trigger levels in all carp collected in 2007 (Figure 14). The median total PCB concentration was 0.001 ppm. A total of 20 carp were collected from the Croswell Impoundment since 1989, and the overall median total PCB concentration was 0.02 ppm.

Mercury concentrations were below the MDCH “restrict consumption” trigger level in all 10 carp collected in 2007, and the median mercury concentration was 0.24 ppm. The median mercury concentration in the 20 carp collected since 1989 was 0.21 ppm.

Recommendations: The MDCH should consider removing the advisory on Black River carp less than 26 inches. Additional carp greater than 26 inches should be collected to evaluate the possibility of removing the advisory based on PCBs.

**Budd Lake, Clare County (ID 2007268)**  
***Largemouth Bass***

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

Comparison to Trigger Levels: Seven largemouth bass ranging in length from 14 to 17 inches were collected from Budd Lake in 2007 and analyzed for mercury only. The mercury concentrations in all 7 fish were below the MDCH “restrict consumption” trigger level, and the median mercury concentration was 0.11 ppm (Figure 15).

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

**Caribou Lake, Chippewa County (ID 2006006)**  
***Rock Bass and Smallmouth Bass***

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

Comparison to Trigger Levels: Ten rock bass ranging in length from 7 to 9 inches were collected from Caribou Lake in 2006 and analyzed for mercury only. Mercury concentrations were below the MDCH “restrict consumption” trigger level in all 10 fish (Table 10; Figure 16), and the median mercury concentration was 0.34 ppm. A total of 15 rock bass were collected from Caribou Lake since 1986 and the median mercury concentration was 0.35 ppm.

Ten smallmouth bass ranging in length from 13 to 18 inches were collected from Caribou Lake in 2006 and analyzed for mercury only. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 3 fish (Table 10; Figure 17). The median mercury concentration in the 7 smallmouth bass greater than the 14-inch legal size limit was 0.5 ppm.

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

**Cranberry Lake, Clare County (ID 2007212)**  
***Largemouth Bass***

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

Comparison to Trigger Levels: Ten largemouth bass ranging in length from 13 to 19 inches were collected from Cranberry Lake in 2007 and analyzed for mercury only. Mercury concentrations in 7 fish exceeded the MDCH “restrict consumption” trigger level (Table 10; Figure 18). The median mercury concentration in the 9 largemouth bass greater than the 14-inch legal size limit was 0.56 ppm.

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

**Hubbard Lake, Alcona County (ID 2006017)**  
***Walleye***

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

Comparison to Trigger Levels: Ten walleye ranging in length from 17 to 20 inches were collected from Hubbard Lake in 2006 and analyzed for mercury only. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 5 fish (Table 10; Figure 19) and the median mercury concentration was 0.5 ppm. A total of 20 walleye were collected from Hubbard Lake since 1989 and the median mercury concentration was 0.5 ppm.

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

**Long Lake, Montmorency County (ID 2006046)**

***Smallmouth Bass***

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

Comparison to Trigger Levels: Ten smallmouth bass ranging in length from 12 to 19 inches were collected from Long Lake in 2006 and analyzed for mercury only. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 5 fish (Table 10; Figure 20). The median mercury concentration in the 8 smallmouth bass greater than the 14-inch legal size limit was 0.6 ppm.

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

**Lost Lake, Presque Isle County (ID 2007237)**

***Largemouth Bass***

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

Comparison to Trigger Levels: Ten largemouth bass ranging in length from 13 to 18 inches were collected from Lost Lake in 2007 and analyzed for mercury only. The total mercury concentration in 9 fish exceeded the MDCH “restrict consumption” trigger level (Table 10; Figure 21). The median concentration in the 9 legal size largemouth bass collected in 2007 was 0.72 ppm.

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

**Murphy Lake, Tuscola County (ID 2007243)**

***Northern Pike***

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

Comparison to Trigger Levels: Ten northern pike ranging in length from 20 to 34 inches were collected from Murphy Lake in 2007 and analyzed for mercury only. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 3 northern pike (Table 10; Figure 22). The median mercury concentration in the 7 fish greater than the 24-inch legal size limit was 0.37 ppm.

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

**Otsego Lake, Otsego County (ID 2007244)**  
**Walleye**

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

Comparison to Trigger Levels: Ten walleye ranging in length from 14 to 25 inches were collected from Otsego Lake in 2007 and analyzed for mercury only. Total mercury concentration in 2 fish exceeded the MDCH “restrict consumption” trigger level (Table 10; Figure 23). The median mercury concentration in the 7 legal size walleye collected in 2007 was 0.39 ppm. The median mercury concentration in legal size walleye less than 22 inches was 0.2 ppm and the median concentration in walleye greater than 22 inches was 0.5 ppm.

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

**Tobico Marsh, Bay County (ID 2007256)**  
**Carp, Largemouth Bass, and Northern Pike**

Existing MDCH Advisory: Women and children should eat no more than 1 meal per week of Tobico Marsh carp of any size due to elevated levels of PCBs. Largemouth bass are covered by the statewide mercury advisory. Women and children should not eat more than 1 meal per week of northern pike greater than 26 inches due to elevated concentrations of PCBs.

Comparison to Trigger Levels: Ten carp ranging in length from 19 to 21 inches were collected from Tobico Marsh in 2007. Total PCB concentrations exceeded women and children trigger levels in 5 fish (Table 9; Figure 24). Concentrations in 4 carp were in the women and children “1 meal per week” range, and 1 fish was in the “1 meal per month” range. The median total PCB concentration was 0.05 ppm. A total of 20 carp were collected from Tobico Marsh since 1996 and the median total PCB concentration was 0.09 ppm.

Ten largemouth bass ranging in length from 12 to 18 inches were collected from Tobico Marsh in 2007. Total PCB concentrations were below the women and children trigger levels in all 10 fish. The median total PCB concentration for the 7 legal sized largemouth bass was 0.005 ppm.

Mercury concentrations were below the “restrict consumption” trigger level in all 10 largemouth bass collected from Tobico Marsh in 2007 (Table 10; Figure 25). Linear regression analysis indicates that Tobico Marsh largemouth bass greater than 20 inches are likely to have mercury concentrations of at least 0.5 ppm.

Seven northern pike ranging in length from 19 to 25 inches were collected from Tobico Marsh in 2007. Total PCB concentrations were below the women and children trigger levels in all 7 fish (Table 9; Figure 26), and the median total PCB concentration was 0.001 ppm. A total of 17 northern pike were collected from Tobico Marsh since 1996. The median total PCB concentration in the 10 fish greater than the 24-inch legal size limit was 0.02 ppm.

Mercury concentrations were below the “restrict consumption” trigger level in all 10 northern pike collected from Tobico Marsh in 2007 (Table 10; Figure 27). The median mercury concentration in the 10 fish collected since 1996 that were greater than the 24-inch legal size limit was 0.17 ppm.

Recommendations: No changes to the advisory are recommended at this time.

Additional northern pike larger than 26 inches and carp should be collected to evaluate the possibility of relaxing the advisory based on PCBs.

### **3.1.2.3 Lake Michigan Watershed**

#### **Bass Lake (East), Marquette County (ID 2007202)**

##### ***Northern Pike***

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

Comparison to Trigger Levels: Ten northern pike ranging in length from 20 to 27 inches were collected from Bass Lake in 2007 and analyzed for mercury only. Mercury concentrations were below the MDCH “restrict consumption” trigger level in all 10 fish (Table 10; Figure 28), and the median mercury concentration in the 6 legal size northern pike collected was 0.35 ppm.

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

#### **Crockery Lake, Ottawa County (ID 2006009)**

##### ***Largemouth Bass***

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

Comparison to Trigger Levels: Ten largemouth bass ranging in length from 13 to 19 inches were collected from Crockery Lake in 2006 and analyzed for mercury only. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 8 fish (Table 10; Figure 29). The median mercury concentration in the 9 largemouth bass greater than the 14-inch legal size limit was 0.61 ppm.

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

#### **Dodge Lake, Schoolcraft County (ID 2006121)**

##### ***Northern Pike***

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

Comparison to Trigger Levels: Ten northern pike ranging in length from 24 to 30 inches were collected from Dodge Lake in 2006 and analyzed for mercury only. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 5 fish (Table 10; Figure 30). All of the northern pike were of legal size and the median mercury concentration was 0.52 ppm.

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

## **Galien River, Berrien County (ID 2007215)**

### ***Carp***

Existing MDCH Advisory: No one should eat Galien River carp greater than 22 inches due to elevated concentrations of PCBs and chlordane. Also, women and children should eat no more than 1 meal per week of carp between 12 and 14 inches and no more than 1 meal per month of carp between 14 and 22 inches due to elevated concentrations of PCBs and chlordane.

Comparison to Trigger Levels: Ten carp ranging in length from 22 to 26 inches were collected from the Galien River in 2007. Total PCB concentrations exceeded women and children trigger levels in 4 fish. Concentrations in 2 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 31). The overall median total PCB concentration was 0.04 ppm. A total of 16 carp were collected from the Galien River since 1992 and the median total PCB concentration was 0.26 ppm.

Total chlordane concentrations were below the MDCH trigger level in all 10 carp collected in 2007 (Figure 32), and the median chlordane concentration was 0.002 ppm. Three of 16 (19%) carp collected since 1992 had total chlordane concentrations exceeding the MDCH trigger level.

Recommendations: The MDCH should consider removing chlordane from the list of contaminants causing the advisory on Galien River carp. The MDCH should also consider removing the general population advisory on Galien River carp. Additional Galien River carp should be collected to evaluate the possibility of relaxing the advisory for women and children.

## **Glen Lake, Leelanau County (ID 2007216)**

### ***Rainbow Trout***

Existing MDCH Advisory: Glen Lake rainbow trout are not covered by an advisory.

Comparison to Trigger Levels: Eleven rainbow trout ranging in length from 13 to 26 inches were collected from Glen Lake in 2007. The total PCB concentration in 1 fish exceeded women and children trigger levels with a concentration in the women and children “1 meal per week” range (Table 9; Figure 33). The median total PCB concentration in the 7 rainbow trout greater than the 15-inch legal size limit was 0.008 ppm, and the concentration in the 1 fish greater than 22 inches was 0.054 ppm.

Mercury concentrations were below the MDCH “restrict consumption” trigger level in all 11 rainbow trout (Table 10; Figure 34), and the median mercury concentration was 0.13 ppm.

Recommendations: The MDCH should consider advising women and children not to eat more than 1 meal per week of Glen Lake rainbow trout greater than 22 inches due to elevated levels of PCBs. Additional monitoring is not necessary at this time.

## **Grand River, Grand Rapids, Below 6<sup>th</sup> Street Dam (ID 2007300) and at Ionia (ID 2006103)**

### ***Channel Catfish, Northern Pike, and Redhorse Sucker***

Existing MDCH Advisory: Women and children should eat no more than 1 meal per week of channel catfish between 12 and 18 inches and no more than 1 meal per month of channel catfish greater than 18 inches due to elevated concentrations of PCBs. In addition, women and children should eat no more than 1 meal per week of Grand River northern pike greater than

22 inches due to elevated concentrations of PCBs. Lastly, women and children should eat no more than 1 meal per month of sucker from the Grand River due to elevated levels of PCBs.

Comparison to Trigger Levels: Ten channel catfish ranging in length from 12 to 21 inches were collected from the Grand River at Ionia in 2006. Total PCB concentrations exceeded women and children trigger levels in 5 fish. Concentrations in 5 fish were in the women and children “1 meal per week” range (Table 9; Figure 35). The median total PCB concentration in channel catfish less than 18 inches was 0.03 ppm, and the median concentration in fish greater than 17 inches was 0.07 ppm. A total of 20 channel catfish were collected from the Grand River since 1989 (10 were collected from the Moores Park Impoundment in 1989). The median total PCB concentration in channel catfish less than 18 inches was 0.08 ppm and the median concentration in fish greater than 18 inches was 0.12 ppm.

Ten northern pike ranging in length from 23 to 28 inches were collected from the Grand River at Grand Rapids, below the 6<sup>th</sup> Street Dam in 2007. Total PCB concentrations exceeded women and children trigger levels in 4 fish. Concentrations in the 4 northern pike were in the women and children “1 meal per week” range (Table 9; Figure 36). The overall median total PCB concentration in the 9 legal size northern pike collected in 2007 was 0.04 ppm. A total of 12 northern pike were collected from the Grand River since 1998 and the median total PCB concentration of the 9 legal size fish was 0.04 ppm.

Mercury concentrations were below the MDCH “restrict consumption” trigger level in all 10 northern pike and the median mercury concentration for the 9 legal size fish was 0.18 ppm (Table 10; Figure 37). The median mercury concentration for the 9 legal size northern pike collected since 1998 was 0.18 ppm.

Ten redhorse sucker ranging in length from 12 to 17 inches were collected from the Grand River at Ionia in 2006. Total PCB concentrations exceeded women and children trigger levels in 6 fish, and all concentrations were in the women and children “1 meal per week” range (Table 9; Figure 38). The overall median PCB concentration was 0.05 ppm. A total of 30 white sucker and redhorse sucker were collected from the Grand River since 1998, and the overall median total PCB concentration was 0.1 ppm.

Recommendations: No change to the advisory is recommended. Additional channel catfish, redhorse sucker, white sucker, and legal size northern pike should be collected from the Grand River to evaluate the possibility of relaxing the advisory.

### **Klinger Lake, St. Joseph County (ID 2006126) *Northern Pike***

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

Comparison to Trigger Levels: Ten northern pike ranging in size from 22 to 28 inches were collected from Klinger Lake in 2006 and analyzed for mercury only. Mercury concentration in 3 fish exceeded the MDCH “restrict consumption” trigger level (Table 10; Figure 39). The median mercury concentration in the 5 fish larger than the 24-inch legal size limit was 0.72 ppm.

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

### **Lake Margrethe, Crawford County (ID 2007227)**

#### ***Walleye***

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

Comparison to Trigger Levels: Ten walleye ranging in length from 14 to 20 inches were collected from Lake Margrethe and analyzed for mercury only. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 4 walleye (Table 10; Figure 40). The median mercury concentration in the 8 walleye greater than the 15-inch legal size limit was 0.47 ppm. A total of 20 walleye were collected from Lake Margrethe since 1995. The median mercury concentration in the 18 legal size walleye was 0.44 ppm.

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

### **Lake Michigamme, Marquette County (ID 2006035)**

#### ***Rock Bass and Walleye***

Existing MDCH Advisory: Lake Michigamme rock bass are covered by the statewide mercury advisory. The general population should eat no more than 1 meal per week and women and children should eat no more than 1 meal per month of Lake Michigamme walleye due to elevated levels of mercury.

Comparison to Trigger Levels: Ten rock bass ranging in length from 7 to 11 inches were collected from Lake Michigamme and analyzed for mercury only. Median mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 9 fish (Table 10; Figure 41). The median mercury concentration was 0.69 ppm. A total of 14 rock bass were collected from Lake Michigamme since 1984; the median mercury concentration was 0.69 ppm.

Ten walleye ranging in length from 14 to 26 inches were collected from Lake Michigamme and analyzed for mercury only. Median mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 9 fish and exceeded the MDCH “no consumption” trigger level in 1 fish (Table 10; Figure 42). The median mercury concentration in the 7 walleye larger than the 15-inch legal size limit was 1.16 ppm. A total of 16 walleye were collected from Lake Michigamme since 1984, and the median mercury concentration in the 11 legal size walleye was 1.10 ppm. The median mercury concentration in walleye less than 18 inches was 0.87 ppm; the median concentration in walleye greater than 18 inches was 1.92 ppm.

Recommendations: The MDCH should consider advising that no one should eat Lake Michigamme walleye greater than 18 inches due to elevated levels of mercury. Additional monitoring is not necessary at this time.

### **Long Lake, Iron County (ID 2007235)**

#### ***Walleye***

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

Comparison to Trigger Levels: Ten walleye ranging in length from 20 to 30 inches were collected from Long Lake in 2007 and analyzed for mercury only. Mercury concentrations in 9

fish exceeded the MDCH “restrict consumption” trigger level (Table 10; Figure 43). The median mercury concentration was 0.64 ppm.

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

**Long Lake, Kent County (ID 2006044)**  
***Largemouth Bass***

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

Comparison to Trigger Levels: Ten largemouth bass ranging in length from 12 to 15 inches were collected from Long Lake in 2006 and analyzed for mercury only. The mercury concentration in 3 fish exceeded the MDCH “restrict consumption” trigger level (Table 10; Figure 44). The median mercury concentration of the 6 legal size largemouth bass was 0.48 ppm.

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

**Manistique River, downstream Manistique Papers Dam, Schoolcraft County (ID 2007238)**  
***Walleye***

Existing MDCH Advisory: The general population should eat no more than 1 meal per week of Manistique River walleye greater than 22 inches due to elevated concentrations of mercury and PCBs. Also, women and children should 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 due to elevated concentrations of mercury and PCBs.

Comparison to Trigger Levels: Ten walleye ranging in length from 17 to 29 inches were collected from the Manistique River downstream of the Manistique Papers Dam. Total PCB concentrations exceeded women and children trigger levels in 9 fish (Table 9; Figure 45). Concentrations in 8 fish were in the women and children “1 meal per week” and 1 fish was in the women and children “1 meal per month” range. The median total PCB concentration in legal size walleye less than 22 inches was 0.06 ppm and the concentration in fish greater than 22 inches was 0.19 ppm. A total of 30 walleye were collected from the Manistique River since 2003. The median total PCB concentration in the legal size walleye less than 22 inches was 0.06 ppm and the concentration in the walleye greater than 22 inches was 0.21 ppm.

Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 2 walleye collected in 2007 and the median mercury concentration was 0.20 ppm (Table 10; Figure 46). A total of 30 walleye were collected from the Manistique River since 2003 and analyzed for mercury. The median mercury concentration in the 22 legal size walleye collected was 0.33 ppm.

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

**Maple River, Clinton/Gratiot/Ionia Counties (ID 2006150)**

***Carp***

Existing MDCH Advisory: Maple River carp are not covered by an advisory.

Comparison to Trigger Levels: Ten carp ranging in length from 18 to 23 inches were collected from the Maple River in 2006. Total PCB concentrations exceeded women and children trigger levels in 1 fish, and the concentration was in the women and children “1 meal per week” range (Table 9; Figure 47). The median total PCB concentration was 0.001 ppm.

Mercury concentration exceeded the MDCH “restrict consumption” trigger level in 1 carp collected from the Maple River and the median mercury concentration was 0.28 ppm (Table 10; Figure 48).

Recommendations: The MDCH should consider advising women and children to eat no more than 1 meal per week of Maple River carp larger than 22 inches due to elevated levels of PCBs. Additional monitoring is not necessary at this time.

**Milakokia Lake, Mackinac County (ID 2007241)**

***Walleye***

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

Comparison to Trigger Levels: Ten walleye ranging in length from 14 to 23 inches were collected from Milakokia Lake in 2007 and analyzed for mercury only. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 4 fish, and the median mercury concentration in the 9 legal size walleye was 0.47 ppm (Table 9; Figure 49). A total of 22 walleye were collected from Milakokia Lake since 1985, and the median mercury concentration was 0.81 ppm.

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

**Millecoquins Lake, Mackinac County (ID 2006049)**

***Rock Bass***

Existing MDCH Advisory: Millecoquins Lake rock bass are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten rock bass ranging in length from 8 to 10 inches were collected from Millecoquins Lake in 2006 and analyzed for mercury only. Mercury concentration exceeded the MDCH “restrict consumption” trigger level in 1 fish, and the median mercury concentration was 0.32 ppm (Table 9; Figure 50).

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

**Muskegon Lake, Muskegon County (ID 2006050)**  
***Northern Pike***

Existing MDCH Advisory: Women and children should eat no more than 1 meal per week of northern pike less than 26 inches and no more than 1 meal per month of northern pike greater than 26 inches due to elevated concentrations of PCBs.

Comparison to Trigger Levels: Ten northern pike ranging in length from 22 to 26 inches were collected from Muskegon Lake in 2006. Total PCB concentrations exceeded women and children trigger levels in 2 fish, and the concentrations in both fish were in the women and children “1 meal per week” range (Table 9; Figure 51). The median total PCB concentration of the 5 legal size northern pike was 0.01 ppm. A total of 17 northern pike were collected from Muskegon Lake since 1986. The median total PCB concentration of the 9 legal size northern pike was 0.06 ppm.

Mercury concentration exceeded the MDCH “restrict consumption” trigger level in 2 northern pike (Table 10; Figure 52). The median mercury concentration of the 5 legal size fish was 0.33 ppm. The median mercury concentration of the 9 legal size northern pike collected since 1986 was 0.23 ppm.

Recommendations: No changes to the advisory are recommended. Additional northern pike larger than 26 inches should be collected to evaluate the possibility of relaxing the advisory.

**Osterhout Lake, Allegan County (ID 2007265)**  
***Largemouth Bass***

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

Comparison to Trigger Levels: Ten largemouth bass ranging in length from 12 to 17 inches were collected from Osterhout Lake and analyzed for mercury only. Mercury concentrations were below the MDCH “restrict consumption” trigger level in all 10 fish (Table 10; Figure 53). The median mercury concentration for the 6 largemouth bass greater than the 14-inch legal size limit was 0.34 ppm. Regression analysis indicates that Osterhout Lake largemouth bass larger than 17 inches are likely to have mercury concentrations exceeding 0.5 ppm.

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

**Randall Lake Chain, Morrison Lake, Branch County (ID 2007242)**  
***Northern Pike***

Existing MDCH Advisory: Women and children should eat no more than 1 meal per month and the general population should eat no more than 1 meal per week of Randall Lake Chain northern pike due to elevated concentrations of mercury and PCBs.

Comparison to Trigger Levels: Ten northern pike ranging in length from 20 to 34 inches were collected from the Randall Lake Chain, Morrison Lake in 2007. Total PCB concentrations were below women and children trigger levels in all 10 fish (Table 9; Figure 54). The median total PCB concentration of the 7 northern pike greater than the 24-inch legal size limit was 0.004 ppm. A total of 18 northern pike were collected from the Randall Lake Chain since 1990.

The median total PCB concentration in the 12 legal size northern pike collected since 1990 was 0.02 ppm.

Mercury concentration exceeded the MDCH “restrict consumption” trigger level in 7 northern pike collected in 2007 (Table 10; Figure 55). The median mercury concentration of the 7 fish greater than the 24-inch legal size limit was 0.72 ppm. The median mercury concentration in the 12 legal size northern pike collected since 1990 was 0.55 ppm.

Recommendations: The MDCH should consider removing PCBs from the list of contaminants causing the advisory for Randall Lake Chain northern pike. No additional monitoring is necessary at this time.

**Silver Lake, Grand Traverse County (ID 2007251)**  
***Walleye***

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

Comparison to Trigger Levels: Ten walleye ranging in length from 13 to 19 inches were collected from Silver Lake in 2007 and analyzed for mercury only. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 3 fish (Table 10; Figure 56). The median mercury concentration of the 7 legal size walleye was 0.5 ppm. Regression analysis indicates that Silver Lake walleye greater than 18 inches are likely to have mercury concentrations exceeding 0.5 ppm.

Recommendations: No changes to the advisory are recommended and additional monitoring is not necessary at this time.

**White Lake, Muskegon County (ID 2007258)**  
***Carp and Northern Pike***

Existing MDCH Advisory: No one should eat carp of any size from White Lake due to elevated levels of PCBs. White Lake northern pike are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten carp ranging in length from 22 to 30 inches were collected from White Lake in 2007. Total PCB concentrations exceeded the general population trigger level in 1 (10%) fish (Table 9; Figure 57). Concentrations exceeded women and children trigger levels in 9 carp. Total PCB concentrations in 6 fish were in the women and children “1 meal per week” range, 1 fish was in the women and children “1 meal per month” range, 1 fish was in the women and children “6 meals per year” range, and 1 fish exceeded the women and children “no consumption trigger level. The median total PCB concentration was 0.14 ppm. A total of 25 carp were collected from White Lake since 1991 and analyzed for PCBs. The median total PCB concentration was 0.71 ppm.

Ten northern pike ranging in length from 24 to 35 inches were collected from White Lake in 2007. Total PCB concentrations in 5 fish exceeded the women and children trigger levels (Table 9; Figure 58); all 5 northern pike had concentrations in the “1 meal per week” range. The median total PCB concentration was 0.06 ppm.

Mercury concentrations in 4 northern pike exceeded the MDCH “restrict consumption” trigger level and the median concentration was 0.46 ppm (Table 10; Figure 59). A total of 20 northern

pike were collected from White Lake since 1984. The median mercury concentration was 0.41 ppm.

Recommendations: The MDCH should consider relaxing the general population advisory to no more than 1 meal per week of White Lake carp of any size. Also, the MDCH should consider adding PCBs to the list of contaminants causing the advisory on White Lake northern pike.

No additional monitoring is necessary at this time.

### **3.1.2.5 Lake Superior Watershed**

#### **Lake Superior, Marquette and Keweenaw Bay (IDs 2007267, 2007230 and 2007231) *Lake Herring, Siscowet, Lake Whitefish***

Existing MDCH Advisory: Women and children should eat no more than 1 meal per week of Lake Superior lake herring less than 26 inches and no more than 1 meal per month of lake herring greater than 26 inches due to elevated concentrations of PCBs while the general population should eat no more than 1 meal per week of lake herring greater than 30 inches. Women and children should eat no more than 1 meal per month of siscowet less than 18 inches and no one should eat any siscowet greater than 18 inches due to elevated concentrations of chlordane, dioxins, and PCBs. In addition, women and children should eat no more than 1 meal per week of lake whitefish greater than 22 inches due to elevated concentrations of PCBs.

Comparison to Trigger Levels: Ten lake herring ranging in size from 13 to 18 inches were collected from Lake Superior in 2007. Total PCB concentrations were below women and children trigger levels in all 10 fish (Table 9; Figure 60) and the median total PCB concentration was 0.008 ppm. A total of 31 lake herring were collected from Lake Superior since 1994 and the median total PCB concentration was 0.035 ppm.

Ten siscowet ranging in size from 17 to 26 inches were collected from Lake Superior in 2007. Total PCB concentrations were below the general population trigger level in all 10 fish. Concentrations exceeded women and children trigger levels in all 10 fish (Table 9; Figure 61). Concentrations in 4 fish were in the women and children “1 meal per week” range, 5 fish were in the “1 meal per month” range, and 1 fish was in the women and children “no consumption” range. A total of 148 siscowet have been collected from Lake Superior since 1987. Total PCB concentrations have declined and have not exceeded the general population trigger level since 1987. A total of 49 siscowet were collected since 1996. The median total PCB concentration in fish less than 18 inches was 0.17 ppm, 0.24 ppm in fish between 18 and 22 inches, 0.53 ppm in fish between 22 and 26 inches, and 1.14 ppm in siscowet greater than 26 inches collected from Lake Superior since 1996.

Mercury concentrations exceeded the MDCH “restrict consumption” in 2 of 10 siscowet collected in 2007 and the median mercury concentration was 0.22 ppm (Table 10; Figure 62). A total of 130 siscowet collected from Lake Superior since 1986 were analyzed for mercury and concentrations have declined since that time. A total of 49 siscowet were collected since 1996. The median mercury concentration in fish less than 18 inches was 0.17 ppm, 0.18 ppm in fish between 18 and 22 inches, 0.30 ppm in fish between 22 and 26 inches, and 0.52 ppm in siscowet greater than 26 inches collected from Lake Superior since 1996.

Total chlordane concentrations exceeded the MDCH “restrict consumption” trigger level in 1 (10%) siscowet collected in 2007 (Figure 63). A total of 148 siscowet were collected from

Lake Superior since 1987 and total chlordane concentrations have declined since that time. A total of 49 siscowet were collected since 1996. Total chlordane concentrations were below the trigger level in all 25 fish less than 22 inches. Concentrations exceeded the trigger level in 5 of 20 (25%) siscowet 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 10 siscowet collected in 2007. Dioxin TEQ concentrations exceeded the MDCH trigger level in 1 (10%) fish (Table 11; Figure 64). Dioxin TEQ concentrations exceeded the trigger level in 15 of 40 (38%) siscowet collected since 1995. Concentrations exceeded the trigger level in 10 of 31 (32%) fish less than 22 inches and 5 of 9 (56%) fish greater than 22 inches.

Seventeen lake whitefish ranging in size from 18 to 22 inches were collected from Lake Superior in 2007. Total PCB concentrations exceeded women and children levels in 12 fish, and all 12 had concentrations in the women and children “1 meal per week” range. The median total PCB concentration was 0.06 ppm (Table 9; Figure 65). A total of 63 lake whitefish were collected from Lake Superior since 1996. The median total PCB concentration in fish less than 22 inches was 0.06 ppm and the median concentration in fish greater than 22 inches was 0.05 ppm.

Recommendations: The MDCH should consider relaxing the women and children advisory to no more than 1 meal per week of Lake Superior lake herring of any size.

The MDCH should also consider advising women and children to eat no more than 1 meal per week of Lake Superior lake whitefish of any size due to elevated concentrations of PCBs.

Additional siscowet should be collected from Lake Superior and analyzed for dioxins, furans, and dioxin-like PCBs to evaluate the possibility of relaxing the advisory based on dioxin TEQ.

### **Lake Superior, Portage Lake/Sturgeon River, Houghton County (ID 2007254)** ***Burbot***

Existing MDCH Advisory: Lake Superior burbot are not covered by an advisory.

Comparison to Trigger Levels: Ten burbot ranging in length from 14 to 25 inches were collected from Portage Lake/Sturgeon River in 2007. Total PCB concentrations were below the women and children trigger levels in all 10 fish (Table 9; Figure 66). The median total PCB concentration was 0.02 ppm.

Burbot liver is consumed by many of the anglers that target the species. Burbot liver samples from 7 fish were analyzed as 2 composites and liver samples from the 2 largest fish were analyzed individually. The total PCB concentrations in all 4 samples exceeded women and children trigger levels (Table 9; Figure 67). Concentrations in 3 samples were in the “1 meal per month” range and 1 sample was in the “6 meals per year” range. The median total PCB concentration was 0.64 ppm.

Mercury concentration exceeded the MDCH “restrict consumption” trigger level in 1 fish (Table 10; Figure 68). The median mercury concentration in burbot less than 22 inches was 0.22 ppm.

Mercury concentrations in all 4 burbot liver samples were below the MDCH trigger level.

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 1 meal per month of Lake Superior burbot greater than 22 inches due to elevated levels of mercury.

Based on analysis of PCB concentrations found in Lake Superior burbot livers, the MDCH has advised women and children not to eat internal organs of any fish from Michigan water bodies due to elevated levels of PCBs.

Additional monitoring is not necessary at this time.

**Blind Sucker Flooding, Luce County (ID 2007207)**  
***Yellow Perch***

Existing MDCH Advisory: Blind Sucker Flooding yellow perch are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten yellow perch ranging in length from 6 to 8 inches were collected from Blind Sucker Flooding and analyzed for mercury only. Mercury concentrations were below the MDCH “restrict consumption” trigger level in all 10 fish (Table 10; Figure 69). The median mercury concentration was 0.17 ppm.

Recommendations: No change to the advisory is recommended and additional monitoring is not necessary at this time.

**Marion Lake, Gogebic County (ID 2003500)**  
***Northern Pike, Smallmouth Bass, Walleye, and Yellow Perch***

Existing MDCH Advisory: Marion Lake northern pike, smallmouth bass, walleye, and yellow perch are covered by the statewide mercury advisory.

Comparison to Trigger Levels: At the request of the United States Forest Service, 1 northern pike, 1 smallmouth bass, 1 walleye, and 1 yellow perch collected from Marion Lake in 2003 were analyzed for mercury only. Mercury concentration exceeded MDCH trigger level in the 1 northern pike and the mercury concentration was 0.90 ppm (Table 10; Figure 70).

A total of 8 walleye were collected from Marion Lake since 1987. The median mercury concentration of the 6 walleye greater than the 15-inch legal size limit was 0.8 ppm (Figure 71).

Recommendations: No change to the advisory is recommended and additional monitoring is not necessary at this time.

**Portage Lake, Houghton County (ID 2007247)**  
***Walleye***

Existing MDCH Advisory: The general population should eat no more than 1 meal per week of Portage Lake walleye greater than 22 inches and women and children should eat no more than 1 meal per month of walleye greater than 22 inches due to elevated concentrations of mercury and PCBs.

Comparison to Trigger Levels: Ten walleye ranging in length from 16 to 28 inches were collected from Portage Lake in 2007. Total PCB concentrations exceeded women and children trigger levels in 2 fish, and concentrations in both fish were in the women and children “1 meal per week” range. The median total PCB concentration was 0.03 ppm (Table 9; Figure 72). A total of 25 walleye were collected from Portage Lake since 1988. The median total PCB concentration in legal size walleye less than 22 inches was 0.025 ppm, and in fish greater than 22 inches the median concentration was 0.08 ppm.

Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 2 walleye collected in 2007 (Table 10; Figure 73). The median mercury concentration in walleye less than 22 inches was 0.24 ppm and the median concentration in fish greater than 22 inches was 0.87 ppm. A total of 25 walleye were collected since 1988. The median mercury concentration in legal size walleye less than 22 inches was 0.23 ppm, and in fish greater than 22 inches the median concentration was 0.87 ppm.

Recommendations: No change to the advisory is recommended and additional monitoring is not necessary at this time.

### **Torch Lake, Houghton County (ID 2007257) *Northern Pike, Walleye, and White Sucker***

Existing MDCH Advisory: Women and children should eat no more than 1 meal per week of northern pike from Torch Lake less than 30 inches and no more than 1 meal per month of northern pike greater than 30 inches, and the general population should eat no more than 1 meal per week of northern pike greater than 30 inches due to elevated concentrations of mercury and PCBs. The general population should eat no more than 1 meal per week of walleye greater than 22 inches due to elevated concentrations of mercury and PCBs. Also, women and children should 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 due to elevated concentrations of mercury and PCBs. White sucker are not covered by an advisory.

Comparison to Trigger Levels: Ten northern pike ranging in size from 19 to 37 inches were collected from Torch Lake in 2007. Total PCB concentrations exceeded women and children trigger levels in 1 fish with a concentration in the women and children “1 meal per week” range. The median total PCB concentration was 0.03 ppm (Table 9; Figure 74). A total of 30 northern pike were collected from Torch Lake since 1988; the median total PCB concentration in the 16 legal size northern pike less than 30 inches was 0.044 ppm, and the median concentration in the 6 northern pike greater than 30 inches was also 0.044 ppm.

The mercury concentration in 2 northern pike exceeded the MDCH “restrict consumption” trigger level and the median mercury concentration was 0.42 ppm for the 7 legal size fish collected in 2007 (Table 10; Figure 75). The median mercury concentration in the 16 legal size northern pike less than 30 inches collected since 1988 was 0.31 ppm, and the median mercury concentration in the 6 northern pike greater than 30 inches was 0.59 ppm.

Twenty walleye ranging in length from 15 to 25 inches were collected from Torch Lake in 2007. Total PCB concentrations exceeded women and children trigger levels in 14 fish. Concentrations in 7 walleye were in the women and children “1 meal per week” range and 7 were in the women and children “1 meal per month” range. The median total PCB concentration in walleye less than 22 inches was 0.04 ppm, and the median concentration in fish greater than 22 inches was 0.21 ppm (Table 9; Figure 76). A total of 36 walleye were

collected from Torch Lake since 1988. The median total PCB concentration in the 25 legal size walleye less than 22 inches was 0.04 ppm and the median concentration in the 9 walleye greater than 22 inches was 0.21 ppm.

Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 10 walleye and exceeded the MDCH “no consumption” trigger level in 3 walleye collected in 2007 (Table 10; Figure 77). The median mercury concentration in walleye less than 22 inches was 0.40 ppm and the median concentration in walleye greater than 22 inches was 1.4 ppm. The median mercury concentration in the 25 legal size walleye less than 22 inches collected since 1988 was 0.33 ppm. The median mercury concentration in the 9 walleye greater than 22 inches was 1.4 ppm. Regression analysis indicates that Torch Lake walleye greater than 25 inches are likely to have mercury concentrations exceeding the MDCH “no consumption” trigger level.

Ten white sucker ranging in length from 13 to 19 inches were collected from Torch Lake in 2007. Total PCB concentrations exceeded women and children trigger levels in 1 fish with a concentration in the women and children “1 meal per week” range (Table 9; Figure 78). The median total PCB concentration was 0.007 ppm.

Mercury concentrations were below the MDCH “restrict consumption” trigger level in all 10 white sucker and the median mercury concentration was 0.08 ppm (Table 10; Figure 79).

Recommendations: The MDCH should consider advising that no one eat Torch Lake walleye over 22 inches due to elevated levels of mercury and PCBs.

No additional monitoring is necessary at this time.

### **3.1.3 Summary of Recommendations**

The MDCH should consider relaxing fish consumption advisories at 5 sites and adding or expanding advisories at 7 sites. Additional monitoring is recommended for 5 water bodies.

#### **3.1.3.1 Summary of Recommendations for Relaxed Advisories**

- The MDCH should consider removing the advisory on Black River (Sanilac County) carp less than 26 inches.
- The MDCH should consider removing chlordane from the list of contaminants causing the advisory on Galien River (Berrien County) carp. The MDCH should also consider removing the general population advisory on Galien River carp.
- The MDCH should consider removing PCBs from the list of contaminants causing the advisory for Randall Lake Chain (Branch County) northern pike.
- The MDCH should consider relaxing the general population advisory to no more than 1 meal per week of White Lake (Muskegon County) carp of any size.
- The MDCH should consider relaxing the women and children advisory to no more than 1 meal per week of Lake Superior lake herring of any size.
- In addition, if the MDCH retains the current advisory protocol for mercury, relaxation of fish consumption advisories should be considered for the following sites and species:

White Lake (Oakland County) walleye, Budd Lake (Clare County) largemouth bass, Otsego Lake (Otsego County) walleye, Tobico Marsh (Bay County) largemouth bass, East Bass Lake (Marquette County) northern pike, and Silver Lake (Grand Traverse County) walleye.

### **3.1.3.2 Summary of Recommendations for Expanded Advisories**

- The MDCH should consider advising women and children not to eat more than 1 meal per week of Saginaw Bay freshwater drum due to elevated levels of PCBs and mercury.
- The MDCH should consider advising women and children not to eat more than 1 meal per week of Glen Lake (Leelanau County) rainbow trout greater than 22 inches due to elevated levels of PCBs.
- The MDCH should consider advising that no one should eat Lake Michigamme (Marquette County) walleye greater than 18 inches due to elevated levels of mercury.
- The MDCH should consider advising women and children to eat no more than 1 meal per week of Maple River (Clinton/Gratiot/Ionia Counties) carp larger than 22 inches due to elevated levels of PCBs.
- The MDCH should consider adding PCBs to the list of contaminants causing the advisory on White Lake (Muskegon County) northern pike.
- The MDCH should consider advising women and children to eat no more than 1 meal per week of Lake Superior lake whitefish of any size 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 1 meal per month of Lake Superior burbot greater than 22 inches due to elevated levels of mercury.
- Based on analysis of PCB concentrations found in Lake Superior burbot livers, the MDCH has advised women and children not to eat the internal organs of any fish from Michigan water bodies due to elevated levels of PCBs.
- The MDCH should consider advising that no one eat Torch Lake (Houghton County) walleye over 22 inches due to elevated levels of mercury and PCBs.

### **3.1.3.3 Summary of Recommendations for Additional Monitoring**

- Additional carp greater than 26 inches should be collected from the Black River, Sanilac County, to evaluate the possibility of removing the advisory based on PCBs.
- Additional northern pike larger than 26 inches and carp should be collected from Tobico Marsh (Bay County) to evaluate the possibility of relaxing the advisory based on PCBs.
- Additional Galien River (Berrien County) carp should be collected to evaluate the possibility of relaxing the advisory based on PCBs.

- Additional channel catfish, redhorse sucker, white sucker, and legal size northern pike should be collected from the Grand River to evaluate the possibility of relaxing the advisory based on PCBs.
- Additional northern pike larger than 26 inches should be collected from Muskegon Lake (Muskegon County) to evaluate the possibility of relaxing the advisory based on PCBs.
- Additional siscowet should be collected from Lake Superior and analyzed for dioxins, furans, and dioxin-like PCBs to evaluate the possibility of relaxing the advisory based on dioxin TEQ.

#### **3.1.3.4 Summary of WQS Attainment Status**

The MDEQ-WB is required by the federal Clean Water Act (CWA) to describe the water quality of all navigable waters of the state and to provide an analysis of the extent to which these waters support designated uses. Designated uses are set forth in Rule 100 (R 323.1100) of the Part 4 Rules, WQS, promulgated under Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Michigan Compiled Laws). States are required by the CWA to develop a list of water bodies that do not support designated uses or do not attain WQS, and therefore require the development of a Total Maximum Daily Load (TMDL). The MDEQ-WB compiles a biennial integrated report, which includes that list, in order to satisfy CWA requirements.

Water bodies are evaluated and placed into at least 1 reporting category for each of 10 designated uses. A water body is placed in Category 1 if all designated uses are supported and no use is threatened and in Category 2 if some designated uses are supported. Category 3 indicates that there is not sufficient data to determine if the designated use is being supported. Category 4 includes water bodies that have a threatened or impaired designated use, but do not need a TMDL developed because either: (a) a TMDL has been approved or established by the USEPA; (b) an impairment caused by a pollutant is being addressed through other pollution control requirements; or (c) an impairment is not caused by a pollutant. Lastly, if a water body does not attain WQS and is in need of TMDL development, it is listed in Category 5.

The fish consumption designated use protects a water body's ability to provide a fishery for human consumption. Attainment status of the fish consumption designated use is determined for water bodies with site-specific data, water column concentrations of Bioaccumulative Chemicals of Concern (BCCs), fish tissue concentrations of BCCs, and/or Fish Consumption Advisories issued by the MDCH. Details of the methods used to make attainment status determinations as well as changes in attainment status are subject to biennial review, and are presented in the 2008 Sections 303(d), 305(b), and 314 Integrated Report (LeSage and Smith, 2008).

The sites assessed for the FCMP 2008 Annual Report represented 40 water bodies. Seventeen of the water bodies had not been assessed previously for the fish consumption designated use (Table 12). We will propose that 13 of the previously unassessed water bodies be designated Category 5, 3 designated Category 2, and 1 water body designated Category 3 for fish consumption designated use. In addition, we propose that 1 water body be changed from Category 3 to Category 5 for the fish consumption designated use. Water body record modifications will be reviewed by MDEQ staff and the public before being presented in the 2010 Integrated Report (IR). The USEPA will then review the IR to determine if they can approve the changes in attainment status.

## 3.2 CAGED FISH BIOCONCENTRATION STUDIES

Caged fish bioconcentration monitoring was conducted at 9 locations in 5 watersheds in 2007. The raw data are presented in Appendix E. General highlights of the caged fish studies conducted in the Black River, Chippewa River, Looking Glass River, Maple River, and Pine River watersheds include:

- Net uptake of mercury was not measured at any caged fish locations in 2007.
- Net uptake of total lipid-normalized PCBs was measured at 3 of 9 locations. 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 3 of 9 locations. 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 chlordane was measured at 4 of 9 locations. Net uptake was 1 ppb at all 4 sites.
- Net uptake of total PBDE was measured in samples from all 5 caged fish locations where the contaminant was assayed.

### 3.2.1 Black River Caged Fish Study

Cages were placed at 3 locations in the Black River (Sanilac and St. Clair Counties) in 2007 (Figure 3). The Black River is covered by a sport fish consumption advisory due to elevated concentrations of PCBs in carp. The 2007 caged fish study was conducted to identify sources of PCBs and other BCCs. A previous caged fish study was conducted in the Black River near the river mouth in 1993.

Total PCBs and lipid-normalized total PCBs were quantified in samples from the Black River mouth 1993 (Figures 80 and 81), but no quantifiable uptake was measured in samples from any of the 3 sites monitored in 2007 (Table 13).

Net uptake of lipid-normalized total chlordane was quantified at all 3 Black River sites in 2007 (Table 13). The concentrations at the 3 sites were equivalent, indicating that sources are probably diffuse and the contaminant is ubiquitous in the environment. The average net uptake was 1 ppb, which ranks approximately in the 60th percentile of concentrations measured in caged fish samples from Great Lakes tributaries in Michigan (Table 14).

The samples from the Black River mouth site were analyzed for PBDE congeners. Net uptake of lipid-normalized total PBDE was 0.2 ppb, which is the lowest concentration measured in caged fish samples to date.

No quantifiable uptake of any other contaminant, including mercury and total DDT, was measured at any of the 3 Black River locations (Table 13).

### **3.2.2 Chippewa River Caged Fish Study**

One cage was placed in the Chippewa River near, but upstream, of the confluence with the Pine River in 2007 (Figure 4). A previous caged fish study was conducted in the Chippewa River in 2000 with 1 site downstream of the Pine River confluence and 1 site roughly 8 river miles upstream of that confluence. Another caged fish study was conducted in 2002 with a cage set at the site downstream of the Pine River confluence. The 2007 study was conducted in conjunction with a study of the Pine River, and the Chippewa River cage was placed in order to provide independent results for each river.

The Chippewa River is covered by a sport fish consumption advisory due to elevated levels of PCBs in suckers. The 2007 caged fish study was conducted to identify sources of PCBs and other BCCs.

No net uptake of lipid-normalized total PCBs was measured at the Chippewa River caged fish site in 2007 (Table 13). This is consistent with the results of previous caged fish studies on the river and indicates that there is no significant source of PCBs in the Chippewa River watershed.

Net uptake of lipid-normalized total chlordane was quantified at the Chippewa River site in 2007 (Table 13) at a low level consistent with results found in previous studies.

The samples from the Chippewa River site were analyzed for PBDE congeners. Net uptake of lipid-normalized total PBDE was 0.4 ppb, which ranks approximately in the 30<sup>th</sup> percentile of concentrations measured in caged fish samples to date.

No quantifiable uptake of any other contaminant, including mercury and total DDT, was measured at the Chippewa River site (Table 13).

### **3.2.3 Looking Glass River Caged Fish Study**

One cage was placed in the Looking Glass River near the mouth in 2007 (Figure 5). The Looking Glass River has not been monitored previously using caged fish; this study was conducted to determine if there are sources of PCBs and other BCCs in the watershed.

The samples from the Looking Glass River site were analyzed for PBDE congeners. Net uptake of lipid-normalized total PBDE was 0.8 ppb, which ranks approximately in the 70<sup>th</sup> percentile of concentrations measured in caged fish samples to date.

No quantifiable uptake of any other contaminant, including mercury, total PCBs, total chlordane, and total DDT, was measured at the Looking Glass River site (Table 13).

### **3.2.4 Maple River Caged Fish Study**

One cage was placed in the Maple River near its confluence with the Grand River in 2007 (Figure 6). The Maple River has not been monitored previously using caged fish; this study was conducted to determine if there are sources of PCBs and other BCCs in the watershed.

The samples from the Maple River site were analyzed for PBDE congeners. Net uptake of lipid-normalized total PBDE was 0.3 ppb, which ranks approximately in the 20<sup>th</sup> percentile of concentrations measured in caged fish samples to date.

No quantifiable uptake of any other contaminant, including mercury, total PCBs, total chlordane, and total DDT, was measured at the Maple River site (Table 13).

### **3.2.5 Pine River Caged Fish Study**

Three cages were placed in the Pine River between the city of Alma (Gratiot County) and the confluence with the Chippewa River in Midland County (Figure 4). 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. Remediation projects addressing the problem of contaminated river sediments near that site were completed in 2006.

The highest net uptake of lipid-normalized total DDT measured in the 2007 Pine River caged fish study was observed at the Wastewater Treatment Plant (WWTP) site immediately downstream of the St. Louis Impoundment (Table 13; Figure 82). Based on the uptake measured at the WWTP site, DDT concentrations in the Pine River downstream of the St. Louis Impoundment have not changed significantly since 1999. However, water column contaminant concentrations can be affected by river discharge; elevated concentrations are observed during both low and high flow periods, and the lowest concentrations are generally measured during periods of moderate flow (Turk and Troutman, 1981). The results of the 2002 study appear to be inconsistent with the other years, but this may be due to differences in river discharge between the years. The mean Pine River flow during the sampling periods in 1999, 2000, and 2002 was equivalent, while the flow during the 2007 sampling period was significantly lower. The low flow in 2007 may have led to uptake that overestimates concentrations in comparison with samples collected during years with higher flows. Caged fish studies should be continued at selected sites on the Pine River to evaluate changes in DDT concentrations.

Net uptake of lipid-normalized total PCBs was measured at all 3 sites in the Pine River in 2007 (Table 13; Figure 83). The highest concentration was observed at the St. Louis WWTP site. This is consistent with the results of previous caged fish studies (Figure 83) and suggests that there is a source of PCBs between US-127 and the WWTP site. As noted in the discussion of DDT results, low river flows in 2007 may have led to an overestimate of uptake relative to the other sampling years.

The samples from the Gordonville Road site were analyzed for PBDE congeners. Net uptake of lipid-normalized total PBDE was 0.7 ppb, which ranks approximately in the 60<sup>th</sup> percentile of concentrations measured in caged fish samples to date.

No quantifiable uptake of any other contaminant, including mercury and total chlordane, was measured in the Pine River samples in 2007 (Table 13).

### **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 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 84 and 85). Also, Lake Michigan lake trout had higher levels of total PCBs 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 86). 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 87). 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 88).

### **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 2000 are presented in Figure 89. 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. Concentrations of all three contaminants increased in both chinook and coho salmon from Lake Michigan between 1998 and 2000. The fact that total DDT, total PCBs, and total chlordane all increased suggests that the changes in concentrations are probably due to food-web changes after introductions of exotic species (e.g., zebra mussel, goby) rather than increases in contaminant loading to the lake.

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 2000 are presented in Figure 90. 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. The Lake Huron coho salmon population has declined significantly in recent years, and only chinook salmon samples were analyzed in 1999 and 2000. Total DDT, total PCB, and total chlordane concentrations all increased in chinook salmon between 1998 and 2000. As in Lake Michigan, the increased concentrations are probably due to changes in the food-web following the introduction of exotic species.

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 all 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, weight, and

collection date as explanatory variables for mercury concentrations. The model for organic contaminant concentrations used length, weight, 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  $\pm 1.4\%$  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  $1.4\%$  per year. Therefore, the absolute value of the real trend (if any) was  $1.4\%$  per year or less.

Statistically significant changes in mercury concentrations were detected in 12 of 32 data sets (Table 15; Figure 91). Concentrations are increasing in at least 1 species of fish at 7 of the 8 Great Lakes or connecting channel trend sites where a trend can be detected. The average and median rates of change in these 8 data sets were  $+3.0\%$  per year and  $+4.1\%$  per year, respectively. Mercury concentrations declined in fish from 2 of 3 inland lakes or rivers where trends could be detected, and increased in fish from the third site. The average and median rates of change in fish from the 3 inland lakes or rivers was  $-0.8\%$  per year and  $-2.5\%$  per year, respectively. Minimum detectable mercury concentration trends from all inland lake, river, Great Lakes, and connecting channel data sets ranged from  $\pm 1.1\%$  per year to  $\pm 2.9\%$  per year with a median minimum detectable trend of  $\pm 1.9\%$  per year.

Statistically significant changes in total PCB concentrations were detected in 30 of 32 data sets (Table 15; Figure 92). Total PCB concentrations decreased in 29 of the 30 data sets where changes were statistically significant. The one exception was lake trout from Grand Sable Lake where a  $9.1\%$  increase in total PCB concentrations was observed between 1991 and 1995. No samples have been collected from that lake since 1995. Where trends in total PCB concentrations could be detected, concentrations tended to decrease faster in fish from rivers and inland lakes compared to fish from the Great Lakes and connecting channels. A significant trend in total PCB concentrations was detected in fish from all river and inland lake trend sites, and concentrations declined at 12 of the 13 sites. The average and median rates of change in fish from all 13 inland sites were  $-7.1\%$  per year and  $-6.4\%$  per year, respectively. Total PCB concentrations declined in at least 1 species from all 10 sites in the Great Lakes or connecting channels. The average and median rates of change in these data sets were  $-6.4\%$  per year and  $-5.7\%$  per year, respectively. Only 1 data set (Little Bay de Noc carp) has not yet shown a significant trend in total chlordanes concentrations, with a minimum detectable trend of  $\pm 3.8\%$ .

Changes in total DDT concentrations were detected in 29 of 32 data sets (Table 15; Figure 93). Total DDT concentrations decreased in all 29 data sets where changes were statistically significant. Concentrations declined in fish from all 11 rivers and inland lakes where a trend was detected, and the average and median rates of change in fish from those 11 sites were  $-8.2\%$  per year and  $-8.6\%$  per year, respectively. Concentrations decreased in all of the Great Lakes and connecting channel data sets where a trend could be detected. The average and median rates of change in fish from these sites were  $-8.8\%$  per year and  $-8.7\%$  per year, respectively.

Minimum detectable trends from all inland lake, river, Great Lakes, and connecting channel data sets ranged from +/-3.7% per year to +/-4.3% per year with a median minimum detectable trend of +/-3.8% per year.

Changes in total chlordane concentrations were observed in 29 of 30 data sets (Table 15; Figure 94). Concentrations were consistently near or below the QL in walleye from Lake Gogebic and South Manistique Lake, and trend analysis was not appropriate or necessary for those data sets. Total chlordane concentrations decreased in all 29 data sets where changes were statistically significant, and the rates of decline at the Great Lakes, connecting channels, and inland sites were equivalent. Total chlordane concentrations declined in fish from all 11 rivers and inland lakes where analysis was appropriate. The average and median rates of change in fish from these 11 sites were equal at -9.2% per year. Concentrations of total chlordane declined in 18 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 -9.9% per year and -9.0% per year, respectively. Only 1 data set (Detroit River carp) has not yet shown a significant trend in total chlordane concentrations, and has a minimum detectable trend of +/-2.7%.

Changes in dioxin TEQ concentrations were measured in fish from all 4 sites where samples were analyzed for the contaminant (Table 15; Figure 95). Concentrations declined in lake trout from Grand Traverse Bay, Thunder Bay, and Keweenaw Bay, and in carp from Saginaw Bay. The average and median rates of decline in dioxin TEQ were -7.9% per year and -7.8% per year, respectively.

The minimum detectable trends in all data sets ranged from +/-1.1% per year to +/-4.3% per year. 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 all of the trends analyses conducted.

In addition, the following general conclusions can be made:

- Lindane, terphenyl, polybrominated biphenyls, 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, hexachlorobenzene, total PCBs, 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 QL. 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 extensive areas of PCB-contaminated sediments, a 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 the Detroit River. 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.

### **3.4 SPECIAL STUDIES**

#### **3.4.1 Contaminant Concentrations in MDNR Fish Hatchery Stock**

At the request of the MDNR-Fisheries Division, contaminant concentrations in samples of fingerling and yearling fish of several species from 2 state hatcheries were measured. Composite samples of whole fish were analyzed for the standard suite of contaminants (Table 3).

One composite sample each of brown trout and chinook salmon from the Thompson State Fish Hatchery were analyzed (ID 2007500). Concentrations of quantifiable contaminants were higher in the chinook salmon sample as compared to the brown trout sample. The mercury concentration was 0.02 ppm in the brown trout sample and 0.04 ppm in the chinook salmon sample. The total PCB concentration was below the QL (0.001 ppm) in the brown trout sample and 0.04 ppm in the chinook salmon sample. Total chlordane was not quantifiable in the brown trout sample and was 0.003 ppm in the chinook salmon sample. Total DDT concentrations were 0.001 ppm in the brown trout sample and 0.021 in the chinook salmon sample. All other contaminant concentrations in the Thompson Hatchery samples were below QLs.

Two composite samples of chinook salmon and 1 composite sample of coho salmon from the Platte River State Fish Hatchery were analyzed (ID 2007501). Mercury concentrations ranged from an average of 0.03 ppm in chinook salmon to 0.06 ppm in coho salmon. The total PCB concentration in the coho salmon sample was 0.01 ppm and averaged 0.09 ppm in the chinook salmon samples. Total chlordane was not quantifiable in the coho salmon sample and averaged 0.004 ppm in the chinook salmon samples. The total DDT concentration in the coho salmon sample was 0.01 ppm and averaged 0.02 ppm in the chinook salmon samples. All other contaminant concentrations in the Platte River Hatchery samples were at or below QLs.

Total PCB concentrations in the chinook salmon samples from both hatcheries sampled in 2007 were near or above the level at which the MDCH would recommend restricted consumption by children and women of childbearing age. However, the samples were whole fish, which generally have higher concentrations of chlorinated organic contaminants than fillet samples from the same fish.

Complete results are presented in Appendix E.

### **3.4.2 Se Concentrations in Marquette County Aquatic Biota**

Cleveland Cliffs Michigan Operations operates the Empire and Tilden mining facilities in the Marquette Iron Range near the town of Palmer (Marquette County). Because of concerns about Se in facility effluents, waste rock seeps, and nearby surface waters, the MDEQ formed an internal work group in 2008. The work group developed a monitoring plan, which included the analysis of fish and macroinvertebrate samples from streams that may be impacted by Se contamination from the mining operations (Goose Lake Outlet and Warner Creek) as well as from a control site (Bear Creek).

Biotic samples were collected from 3 sample sites in May 2008. Fish tissue samples from all 3 locations were analyzed (wet weight) for Se. At Goose Lake Outlet (ID 2008500), mean Se levels ranged from 8 to 17.5 ppm in the tissues of brook trout, white suckers, fathead minnows, and creek chubs. In Warner Creek (ID 2008502), mean tissue Se levels for the same species ranged from 5.6 to 10.1 ppm. Se concentrations in fish from the Bear Creek control site (ID 2008501) were low, never exceeding a mean of 1 ppm.

Benthic macroinvertebrates from Goose Lake Outlet also were analyzed; a Se concentration of 22.3 ppm was found in a composite of caddisfly tissue (a level greater than in fish tissue). Se was also present at lower levels in leeches, snails, mayflies, and odonates. Benthic invertebrates were not collected from Warner Creek or Bear Creek for tissue analysis.

The Se monitoring methods and results are discussed fully in a separate staff report (Selenium Monitoring Workgroup, 2009). Complete results are presented in Appendix E.

Report by: Joseph Bohr, Aquatic Biologist  
Surface Water Assessment Section  
Water Bureau

Jamie VanDusen, Aquatic Biologist  
Great Lakes Environmental Center

## SECTION 4.0

### REFERENCES

- Bohr, J., and J. Zbytowski. 2008. Michigan Fish Contaminant Monitoring Program: 2007 Annual Report. MDEQ-WB Report #MI/DEQ/WB-08/029.
- Bohr, J., and J. Zbytowski. 2007. Michigan Fish Contaminant Monitoring Program: 2006 Annual Report. MDEQ-WB Report #MI/DEQ/WB-07/053.
- Bohr, J., and J. Zbytowski. 2006. Michigan Fish Contaminant Monitoring Program: 2005 Annual Report. MDEQ-WB Report #MI/DEQ/WB-06/091.
- Day, R. 1997. Michigan Fish Contaminant Monitoring Program: 1997 Annual Report. MDEQ-SWQD Report #MI/DEQ/SWQ-97/125.
- Day, R. 1998. Michigan Fish Contaminant Monitoring Program: 1998 Annual Report. MDEQ-SWQD Report #MI/DEQ/SWQ-98/091.
- Day, R. 1999. Michigan Fish Contaminant Monitoring Program: 1999 Annual Report. MDEQ-SWQD Report #MI/DEQ/SWQD-99/164.
- Day, R. 2002. Michigan Fish Contaminant Monitoring Program: 2002 Annual Report. MDEQ-SWQD Report #MI/DEQ/SWQD-03/084.
- Day, R., and J. Bohr. 2005. Michigan Fish Contaminant Monitoring Program: 2004 Annual Report. MDEQ-WB Report #MI/DEQ/WB-05/024.
- Day, R., J. Bohr, and R. Ramirez. 2004. Michigan Fish Contaminant Monitoring Program: 2003 Annual Report. MDEQ-WB Report #MI/DEQ/WB-04/080.
- Day, R. and S. Holden. 1996. Michigan Fish Contaminant Monitoring Program: 1996 Annual Report. MDEQ-SWQD Report #MI/DEQ/SWQ-96/112.
- Day, R. and S. Walsh. 2000. Michigan Fish Contaminant Monitoring Program: 2000 Annual Report. MDEQ-SWQD Report #MI/DEQ/SWQ-00/122.
- Day, R. and S. Walsh. 2001. Michigan Fish Contaminant Monitoring: 2001 Annual Report. MDEQ-SWQD Report #MI/DEQ/SWQ-02/035.
- DeVault, D.S., R. Hesselberg, P.W. Rodgers, T.J. Feist. 1996. Contaminant Trends in Lake Trout and Walleye from the Laurentian Great Lakes. J. Grt. Lks. Res. 22(4):884-895.
- Duling, L. 1988. Fish Contaminant Monitoring Program - 1988 Annual Report. MDNR-SWQD Report #MI/DNR/SWQ-88/090.
- Duling, L. and S. Benzie. 1989. Fish Contaminant Monitoring Program - 1989 Annual Report. MDNR-SWQD Report #MI/DNR/SWQ-89/168.

- Duling, L. and S. Benzie. 1990. Fish Contaminant Monitoring Program - 1990 Annual Report. MDNR-SWQD Report #MI/DNR/SWQ-90/077.
- Eisenreich, S.J. 1996. Toxaphene in the Great Lakes: Concentrations, Trends and Pathways. Proceedings of a March 27-29, 1996 Workshop. 23 pp.
- Exponent. 2003. Fish Contaminant Monitoring Program: Review and Recommendations. Prepared for MDEQ-WD.
- LeSage, S. W., and J. Smith. 2008. Water quality and pollution control in Michigan 2008 sections 303(d), 305(b), and 314 Integrated Report. MDEQ-WB Report #MI/DEQ/WB-08/007.
- Michigan Department of Natural Resources (MDNR). 1986a. Fish Contaminant Monitoring Program - 1986 Annual Report. MDNR-SWQD Report #MI/DNR/SWQ-91/294.
- Michigan Department of Natural Resources (MDNR). 1986b. Fish Contaminant Monitoring in Michigan - 1985. MDNR-SWQD Report #MI/DNR/SWQ-87/055.
- Michigan Department of Natural Resources (MDNR). 1989. Fish Contaminant Monitoring in Michigan - 1984. MDNR-SWQD Report #MI/DNR/SWQ-89/071.
- Saalfeld, G., C. Waggoner, S. Benzie, B. Walker, and J. Gahsman. 1991. Michigan Fish Contaminant Monitoring Program 1991 Annual Report. MDNR-SWQD Report #MI/DNR/SWQ-91/273.
- Selenium Monitoring Workgroup. 2009. An Assessment Of Environmental Selenium Levels Around Empire And Tilden Mines Marquette County, Michigan. MDEQ-WB Report #MI/DEQ/WB-0/038.
- Turk, J.T. and D.W. Troutman. 1981. Polychlorinated Biphenyl Transport in the Hudson River, New York. USGS Water-Resources Investigations 81-9. Reston, Virginia: U.S. Geological Survey. 11 p.
- Van den Berg, M., L.S. Birnbaum, M. Denison, M. DeVito, W. Farland, M. Feeley, H. Fiedler, H. Hakansson, A. Hanberg, L. Haws, M. Rose, S. Safe, D. Schrenk, C. Tohyama, A. Tritscher, J. Tuomisto, M. Tysklind, N. Walker, and R.E. Peterson. 2006. The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds. Toxicological Sciences 93(2):223-241.
- Waggoner, C.A. 1992. Michigan Fish Contaminant Monitoring Program: 1992 Annual Report. MDNR-SWQD Report #MI/DNR/SWQ-92/292.
- Wood, C.A. 1993. Michigan Fish Contaminant Monitoring Program: 1993 Annual Report. MDNR-SWQD Report #MI/DNR/SWQ-93/059.
- Wood, C.A. 1994. Michigan Fish Contaminant Monitoring Program: 1994 Annual Report. MDNR-SWQD Report #MI/DNR/SWQ-94/074.
- Wood, C.A., R. Day, and S. Holden. 1995. Michigan Fish Contaminant Monitoring Program: 1995 Annual Report. MDEQ-SWQD Report #MI/DEQ/SWQ-95/087.

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

| Standard Edible Portion      | Common Name                                                   | Scientific Name                 |
|------------------------------|---------------------------------------------------------------|---------------------------------|
| Skin-on<br>Fillet            | Yellow Perch                                                  | <i>Perca flavescens</i>         |
|                              | Walleye                                                       | <i>Sander vitreus</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<br><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<br>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>Carpoides cyprinus</i>                                     |                                 |
| Skin-off Steak               | Sturgeon                                                      | <i>Acipenser fulvescens</i>     |
| Headless, Gutted             | Rainbow Smelt                                                 | <i>Osmerus mordax</i>           |

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

| WATER BODY                                 | SPECIES COLLECTED* | YEARS MONITORED                      |
|--------------------------------------------|--------------------|--------------------------------------|
| <b>GREAT LAKES AND CONNECTING CHANNELS</b> |                    |                                      |
| Lake Michigan                              |                    |                                      |
| Little Bay de Noc                          | Carp               | 1992, 94, 00, 03, 05, 07             |
|                                            | Walleye            | 1992, 94, 97, 00, 02, 05, 07         |
| Grand Traverse Bay                         | Carp               | 1993, 95, 00, 03                     |
|                                            | Lake Trout (D)     | 1990, 92, 95, 98, 01, 04, 06         |
| Lake Huron                                 |                    |                                      |
| Saginaw Bay                                | Carp (D)           | 1990, 92, 94, 98, 01, 03, 05         |
|                                            | Walleye            | 1990, 91, 92, 94, 98, 03, 05, 07     |
| Thunder Bay                                | Carp               | 1992, 94, 95, 99, 01, 04, 06         |
|                                            | Lake Trout (D)     | 1992, 94, 95, 98, 01, 04, 05, 07     |
|                                            | Walleye            | 1991, 95, 98, 01, 05, 07             |
| Lake Superior                              |                    |                                      |
| Keweenaw Bay                               | Lake Trout (D)     | 1991, 93, 96, 99, 01, 04, 07         |
| Lake St. Clair                             |                    |                                      |
| L'Anse Creuse Bay                          | Carp               | 1990, 92, 94, 98, 02, 05, 07         |
|                                            | Walleye            | 1990, 92, 94, 98, 02, 05, 07         |
| Lake Erie                                  |                    |                                      |
| Brest Bay                                  | Carp               | 1990, 92, 94, 97, 98, 02, 06         |
|                                            | Walleye            | 1990, 92, 94, 98, 04, 06             |
| St. Marys River                            |                    |                                      |
| Munuscong Bay                              | Carp               | 1993, 95, 98, 04                     |
|                                            | Walleye            | 1991, 93, 95, 98, 01, 05, 07         |
| St. Clair River                            |                    |                                      |
| Algonac                                    | Carp               | 1992, 94, 02, 05, 07                 |
|                                            | Walleye            | 1992                                 |
| Detroit River                              |                    |                                      |
| Grassy Island                              | Carp               | 1990, 92, 94, 96, 98, 01, 04, 07     |
|                                            | Walleye            | 1990, 94, 96, 98, 01, 04, 05         |
| <b>RIVERS</b>                              |                    |                                      |
| Grand River                                | Carp               | 1990, 92, 95, 00, 03, 05, 07         |
| Kalamazoo River                            | Carp               | 1990, 92, 94, 97, 99, 01, 03, 05, 07 |
| 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, 05, 07     |
| River Raisin                               | Carp               | 1991, 94, 97, 00, 04, 06             |
| St. Joseph River                           | Carp               | 1991, 93, 97, 00, 02, 05, 07         |
| <b>INLAND LAKES</b>                        |                    |                                      |
| Grand Sable Lake                           | Lake Trout         | 1991, 93, 95                         |
| Lake Gogebic                               | Walleye            | 1992, 94, 97, 00, 02, 05             |
| South Manistique Lake                      | Walleye            | 1991, 93, 95, 98, 01, 03, 05, 07     |
| Higgins Lake                               | Lake Trout         | 1991, 95, 97, 00, 02                 |
| Houghton Lake                              | Largemouth Bass    | 1992, 94, 98, 01, 04, 06             |
| Gull Lake                                  | Largemouth Bass    | 1991, 93, 95, 97, 00, 02, 05, 07     |
| Gun Lake                                   | Largemouth Bass    | 1990, 92, 94, 97, 00, 02, 05, 07     |
| Pontiac Lake                               | Largemouth Bass    | 1992, 94, 97, 99, 03, 06             |

\*D = dioxin and furan congeners.

Table 3. Halogenated organic chemicals and mercury quantified 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                      |
| Oxychlorane                 | 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. PCB structure and corresponding identification number of congeners quantified 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                        |
| <br>                                              |                                |
| <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 6a. Halogenated organic chemicals and mercury analyzed in caged fish tissue samples.

| <u>Analyses for all caged fish sites:</u> | <u>Level of Quantification</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                      |
| Oxychlorane                               | 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                      |
| Total PBDE (sum of 8 congeners)           | 0.001 ppm                      |

Table 6b. Polybrominated diphenyl ether congeners analyzed in selected caged fish tissue samples.

| <u>BZ#</u> | <u>Structure</u>                               | <u>Level of Quantification (ppt)</u> |
|------------|------------------------------------------------|--------------------------------------|
| 028        | Tribromodiphenyl ethers<br>2,4,4'              | 50                                   |
| 047        | Tetrabromodiphenyl ethers<br>2,2',4,4'         | 50                                   |
| 099        | Pentabromodiphenyl ethers<br>2,2',4,4',5       | 50                                   |
| 100        | 2,2',4,4',6                                    | 50                                   |
| 153        | Hexabromodiphenyl ethers<br>2,2',4,4',5,5'     | 50                                   |
| 154        | 2,2',4,4',5,6                                  | 50                                   |
| 183        | Heptabromodiphenyl ethers<br>2,2',3,4,4',5',6' | 50                                   |
| 209        | Decabromodiphenyl ether                        | 500                                  |

BZ# = identification numbers adopted by the International Union of Pure and Applied Chemists.  
ppt = part per trillion (ng/Kg) billion ( $\mu\text{g}/\text{Kg}$ )

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<br>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    |
|--------------------|----------------------|-----------------------|---------------------------|----------------------------------------------------|
| Total Chlordane    | 20                   | 18                    | 0.001-0.444               | Lake Superior, Keweenaw Bay- Siscowet              |
| Total DDT          | 20                   | 20                    | 0.001-1.061               | White Lake, Muskegon County- Carp                  |
| Dieldrin           | 20                   | 16                    | 0.001-0.047               | Lake Superior, Keweenaw Bay- Lake Whitefish        |
| Heptachlor Epoxide | 20                   | 4                     | 0.001-0.017               | Lake Superior, Marquette- Lake Whitefish           |
| Hexachlorobenzene  | 20                   | 4                     | 0.001-0.006               | Lake Superior, Keweenaw Bay- Siscowet              |
| Mirex              | 20                   | 4                     | 0.001-0.056               | White Lake, Muskegon County- Carp                  |
| Mercury            | 43                   | 43                    | 0.02-2.34                 | Torch Lake, Houghton County- Walleye               |
| Octachlorostyrene  | 20                   | 4                     | 0.001-0.036               | White Lake, Muskegon County- Carp                  |
| PBB                | 20                   | 3                     | 0.001-0.004               | Lake Superior, Portage Lake/Sturgeon River- Burbot |
| Total PCB          | 20                   | 20                    | 0.001-3.139               | White Lake, Muskegon County- Carp                  |
| Total TPBDE        | 7                    | 7                     | 1.00-374.9                | Lake Superior, Keweenaw Bay- Siscowet              |
| Dioxin TEQ         | 1                    | 1                     | 1.1-11.2 ppt              | Lake Superior, Keweenaw Bay- Siscowet              |

K = Unquantified at the level shown.

\* Aldrin, Beta-BCH, Heptachlor, Heptachlorostyrene, Hexachlorostyrene, Lindane, Pentachlorostyrene, Terphenyl, and Toxaphene were not quantified at any of the sites monitored.

Table 9. Edible portion fish tissue samples with total PCB concentrations exceeding the MDCH's sport fish consumption advisory trigger levels.

|                                |                                             |                                                       |                              | 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<br>0.05-0.2 ppm                           | 1 meal/month<br>0.2-1.0 ppm | 6 meals/year<br>1.0-1.9 ppm | No Cons.<br>> 1.9 ppm | 2.0 ppm                          | Current Advisory         |
| <b>Lake Erie Watershed</b>     |                                             |                                                       |                              |                                                       |                             |                             |                       |                                  |                          |
| 2007259                        | White Lake<br>Oakland County                | Walleye                                               | 0.006                        |                                                       | 1/10                        |                             |                       |                                  | No (#)                   |
| <b>Lake Huron Watershed</b>    |                                             |                                                       |                              |                                                       |                             |                             |                       |                                  |                          |
| 2007270                        | Lake Huron<br>Saginaw Bay                   | Freshwater Drum                                       | 0.04                         | 2/10                                                  | 1/10                        |                             |                       |                                  | No                       |
| 2007269                        | Lake Huron<br>Thunder Bay                   | Lake Whitefish                                        | 0.07                         | 9/10                                                  |                             |                             |                       |                                  | Yes (#)                  |
| 2007256                        | Tobico Wetland<br>Bay County                | Carp                                                  | 0.05                         | 4/10                                                  | 1/10                        |                             |                       |                                  | Yes                      |
| <b>Lake Michigan Watershed</b> |                                             |                                                       |                              |                                                       |                             |                             |                       |                                  |                          |
| 2007215                        | Galien River                                | Carp                                                  | 0.04                         | 2/10                                                  | 2/10                        |                             |                       |                                  | Yes (#)                  |
| 2007216                        | Glen Lake<br>Leelanau County                | Rainbow Trout                                         | 0.006                        | 1/10                                                  |                             |                             |                       |                                  | No                       |
| 2007300                        | Grand River<br>Below 6 <sup>th</sup> St Dam | Northern Pike                                         | 0.03                         | 4/10                                                  |                             |                             |                       |                                  | Yes                      |
| 2006103                        | Grand River<br>Ionia                        | Carp<br>Channel Catfish<br>Redhorse Sucker<br>Walleye | 0.21<br>0.04<br>0.05<br>0.04 | 5/10<br>5/10<br>6/10<br>4/10                          | 5/10                        |                             |                       |                                  | Yes<br>Yes<br>Yes<br>Yes |
| 2007238                        | Manistique River<br>d/s Papers Dam          | Walleye                                               | 0.07                         | 8/10                                                  | 1/10                        |                             |                       |                                  | Yes(#)                   |
| 2006150                        | Maple River<br>u/s Matherton                | Carp                                                  | 0.001                        | 1/10                                                  |                             |                             |                       |                                  | No                       |

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<br>0.05-0.2 ppm                           | 1 meal/month<br>0.2-1.0 ppm | 6 meals/year<br>1.0-1.9 ppm | No Cons.<br>> 1.9 ppm | 2.0 ppm |                                  |                  |
| 2006050                        | Muskegon Lake<br>Muskegon County | Northern Pike  | 0.02             | 2/10                                                  |                             |                             |                       |         | Yes                              |                  |
| 2007258                        | White Lake<br>Muskegon County    | Carp           | 0.15             | 5/9                                                   | 1/9                         | 1/9                         |                       | 1/9     | Yes                              |                  |
| <b>Lake Superior Watershed</b> |                                  |                |                  |                                                       |                             |                             |                       |         |                                  |                  |
| 2007230                        | Lake Superior                    | Lake Whitefish | 0.06             | 12/17                                                 |                             |                             |                       |         | Yes                              |                  |
| 2007267                        | Keweenaw Bay                     | Siscowet       | 0.24             | 4/10                                                  | 5/10                        | 1/10                        |                       |         | Yes (#)                          |                  |
| 2007247                        | Portage Lake<br>Houghton County  | Walleye        | 0.03             | 2/10                                                  |                             |                             |                       |         | Yes (#)                          |                  |
| 2007257                        | Torch Lake<br>Houghton County    | Northern Pike  | 0.03             |                                                       | 1/10                        |                             |                       |         | Yes (#)                          |                  |
|                                |                                  | Walleye        | 0.14             | 7/20                                                  | 7/20                        |                             |                       |         | Yes (#)                          |                  |
|                                |                                  | White Sucker   | 0.007            | 1/10                                                  |                             |                             |                       |         | No                               |                  |

Table 10. Edible portion fish tissue samples with mercury concentrations exceeding the MDCH's sport fish consumption advisory trigger level.

| Site ID                        | Location                              | Species         | Species Median Concentration (ppm) | Range (ppm) | Exceedance* Rate | Current Advisory |
|--------------------------------|---------------------------------------|-----------------|------------------------------------|-------------|------------------|------------------|
| <b>Lake Erie Watershed</b>     |                                       |                 |                                    |             |                  |                  |
| 2007240                        | Middle Straits Lake<br>Oakland County | Northern Pike   | 0.67                               | 0.13-1.12   | 8/10             | Yes (a)          |
| 2007259                        | White Lake<br>Oakland County          | Walleye         | 0.4                                | 0.29-0.86   | 4/10             | Yes (a)          |
| <b>Lake Huron Watershed</b>    |                                       |                 |                                    |             |                  |                  |
| 2007270                        | Lake Huron<br>Saginaw Bay             | Freshwater Drum | 0.44                               | 0.11-0.78   | 4/10             | No               |
| 2006006                        | Caribou Lake<br>Chippewa County       | Smallmouth Bass | 0.42                               | 0.23-0.86   | 3/10             | Yes (a)          |
| 2007212                        | Cranberry Lake<br>Clare County        | Largemouth Bass | 0.55                               | 0.25-1.0    | 7/10             | Yes (a)          |
| 2006017                        | Hubbard Lake<br>Alcona County         | Walleye         | 0.5                                | 0.29-0.65   | 5/10             | Yes (a)          |
| 2006046                        | Long Lake<br>Montmorency County       | Smallmouth Bass | 0.5                                | 0.2-0.75    | 5/10             | Yes (a)          |
| 2007237                        | Lost Lake<br>Presque Isle County      | Largemouth Bass | 0.73                               | 0.45-0.89   | 9/10             | Yes (a)          |
| 2007243                        | Murphy Lake<br>Tuscola County         | Northern Pike   | 0.34                               | 0.22-0.73   | 3/10             | Yes (a)          |
| 2007244                        | Otsego Lake<br>Otsego County          | Walleye         | 0.16                               | 0.05-0.65   | 2/10             | Yes (a)          |
| <b>Lake Michigan Watershed</b> |                                       |                 |                                    |             |                  |                  |
| 2006009                        | Crockery Lake<br>Ottawa County        | Largemouth Bass | 0.61                               | 0.29-0.90   | 8/10             | Yes (a)          |

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

a The species and water body 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   |
|---------|--------------------------------------|----------------------|------------------------------------|------------------------|------------------|--------------------|
| 2006121 | Dodge Lake<br>Schoolcraft County     | Northern Pike        | 0.52                               | 0.29-0.77              | 5/10             | Yes (a)            |
| 2007300 | Grand River<br>At Ionia              | Walleye              | 0.23                               | 0.21-0.51              | 1/10             | No (#)             |
| 2006126 | Klinger Lake<br>St. Joseph County    | Northern Pike        | 0.32                               | 0.21-1.11              | 3/10             | Yes (a)            |
| 2007227 | Lake Margrethe<br>Crawford County    | Walleye              | 0.47                               | 0.35-0.80              | 4/10             | Yes (a)            |
| 2006035 | Lake Michigamme<br>Marquette County  | Rock Bass<br>Walleye | 0.69<br>1.01                       | 0.42-0.93<br>0.80-1.92 | 9/10<br>10/10    | Yes (a)<br>Yes (#) |
| 2007235 | Long Lake<br>Iron County             | Walleye              | 0.64                               | 0.39-1.06              | 9/10             | Yes (a)            |
| 2006044 | Long Lake<br>Kent County             | Largemouth Bass      | 0.45                               | 0.37-0.62              | 3/10             | Yes (a)            |
| 2007238 | Manistique River<br>Manistique       | Walleye              | 0.2                                | 0.07-0.95              | 2/10             | Yes (#)            |
| 2006150 | Maple River<br>Clinton County        | Carp                 | 0.28                               | 0.20-0.59              | 1/10             | No                 |
| 2007241 | Milakokia Lake<br>Mackinac County    | Walleye              | 0.47                               | 0.13-1.10              | 4/10             | Yes (a)            |
| 2006049 | Millecoquins Lake<br>Mackinac County | Rock Bass<br>Walleye | 0.32<br>0.81                       | 0.19-0.51<br>0.53-0.97 | 1/10<br>10/10    | Yes (a)<br>Yes (a) |
| 2006050 | Muskegon Lake<br>Muskegon County     | Northern Pike        | 0.31                               | 0.18-0.64              | 2/10             | No (#)             |
| 2007242 | Randall Lake Chain<br>Morrison Lake  | Northern Pike        | 0.63                               | 0.39-0.97              | 7/10             | Yes (#)            |

\* Number of samples exceeding trigger levels/number of samples analyzed.  
a The species and water body 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   |
|--------------------------------|-------------------------------------------------|--------------------------|------------------------------------|------------------------|------------------|--------------------|
| 2007251                        | Silver Lake<br>Grand Traverse County            | Walleye                  | 0.28                               | 0.17-0.56              | 3/10             | Yes (a)            |
| 2007258                        | White Lake<br>Muskegon County                   | Northern Pike            | 0.46                               | 0.30-0.59              | 4/10             | No                 |
| <b>Lake Superior Watershed</b> |                                                 |                          |                                    |                        |                  |                    |
| 2007230                        | Lake Superior<br>Keweenaw Bay                   | Siscowet                 | 0.22                               | 0.12-0.71              | 2/10             | Yes (#)            |
| 2007254                        | Lake Superior<br>Portage Lake/Sturgeon<br>River | Burbot                   | 0.22                               | 0.11-0.67              | 1/10             | No                 |
| 2003500                        | Marion Lake<br>Gogebic County                   | Northern Pike            | 0.90                               | 0.90                   | 1/1              | Yes (a)            |
| 2007247                        | Portage Lake<br>Houghton County                 | Walleye                  | 0.31                               | 0.15-1.3               | 2/10             | Yes (#)            |
| 2007257                        | Torch Lake<br>Houghton County                   | Northern Pike<br>Walleye | 0.34<br>0.79                       | 0.18-1.04<br>0.17-2.34 | 2/10<br>14/20    | Yes (#)<br>Yes (#) |

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

Table 11. Dioxin TEQ concentrations in edible portion samples.

| Site ID | Location      | Species  | Species Median Concentration (ppt) | Range (ppt) | Exceedance* Rate | Current Advisory |
|---------|---------------|----------|------------------------------------|-------------|------------------|------------------|
| 2007230 | Lake Superior | Siscowet | 2.2                                | 1.1-11.2    | 1/10             | Yes              |

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

Table 12. Fish consumption water quality attainment categories for water bodies assessed for the 2008 report.

| Location                                                    | Present Category | Proposed Category | Impairment                       | Species Sampled                            |
|-------------------------------------------------------------|------------------|-------------------|----------------------------------|--------------------------------------------|
| <b>Lake Erie Watershed</b>                                  |                  |                   |                                  |                                            |
| Middle Straits Lake, Oakland County                         | None             | 5                 | Fish Tissue-Hg                   | Northern Pike                              |
| White Lake, Oakland County                                  | None             | 5                 | Fish Tissue-Hg                   | Walleye                                    |
| <b>Lake Huron Watershed</b>                                 |                  |                   |                                  |                                            |
| Lake Huron, Thunder Bay                                     | 5                | 5                 | FCA PCB, Dioxins                 | Lake Whitefish                             |
| Lake Huron, Saginaw Bay                                     | 5                | 5                 | FCA PCB, Dioxins, Fish Tissue-Hg | Freshwater Drum                            |
| Black River, Croswell Impoundment, Sanilac County           | 5                | 5                 | FCA PCB                          | Carp                                       |
| Budd Lake, Clare County                                     | None             | 2                 |                                  | Largemouth Bass                            |
| Caribou Lake, Chippewa County                               | 5                | 5                 | Fish Tissue-Hg                   | Rock Bass<br>Smallmouth Bass               |
| Cranberry Lake, Clare County                                | None             | 5                 | Fish Tissue-Hg                   | Largemouth Bass                            |
| Hubbard Lake, Alcona County                                 | 5                | 5                 | Fish Tissue-Hg                   | Walleye                                    |
| Long Lake, Montmorency County                               | None             | 5                 | Fish Tissue-Hg                   | Smallmouth Bass                            |
| Lost Lake, Presque Isle County                              | None             | 5                 | Fish Tissue-Hg                   | Largemouth Bass                            |
| Murphy Lake, Tuscola County                                 | None             | 5                 | Fish Tissue-Hg                   | Northern Pike                              |
| Otsego Lake, Otsego County                                  | None             | 2                 |                                  | Walleye                                    |
| Tobico Marsh, Bay County                                    | 5                | 5                 | FCA PCB                          | Carp<br>Largemouth Bass<br>Northern Pike   |
| <b>Lake Michigan Watershed</b>                              |                  |                   |                                  |                                            |
| Bass Lake, Marquette County                                 | None             | 5                 | Fish Tissue-Hg                   | Northern Pike                              |
| Crockery Lake, Ottawa County                                | None             | 5                 | Fish Tissue-Hg                   | Largemouth Bass                            |
| Dodge Lake, Schoolcraft County                              | none             | 5                 | Fish Tissue-Hg                   | Northern Pike                              |
| Galien River, Berrien County                                | 5                | 5                 | FCA PCB *                        | Carp                                       |
| Glen Lake, Leelanau County                                  | 5                | 5                 | FCA PCB                          | Rainbow Trout                              |
| Grand River, Grand Rapids, Below 6 <sup>th</sup> Street Dam | 5                | 5                 | FCA PCB                          | Northern Pike                              |
| Grand River, Ionia County                                   | 5                | 5                 | FCA PCB                          | Carp<br>Channel Catfish<br>Redhorse Sucker |
| Klinger Lake, St. Joseph County                             | 3                | 5                 | Fish Tissue-Hg                   | Northern Pike                              |
| Lake Margrethe, Crawford County                             | 5                | 5                 | Fish Tissue-Hg                   | Walleye                                    |

Table 12. Continued.

| Location                                                | Present Category | Proposed Category | Impairment                                  | Species Sampled                                             |
|---------------------------------------------------------|------------------|-------------------|---------------------------------------------|-------------------------------------------------------------|
| Lake Michigamme, Marquette County                       | 5                | 5                 | Fish Tissue-Hg                              | Rock Bass<br>Walleye                                        |
| Long Lake, Iron County                                  | None             | 5                 | Fish Tissue-Hg                              | Walleye                                                     |
| Long Lake, Kent County                                  | None             | 5                 | Fish Tissue-Hg                              | Largemouth Bass                                             |
| Manistique River, d/s Manistique Dam Schoolcraft County | 5                | 5                 | FCA PCB                                     | Walleye                                                     |
| Maple River, Clinton County                             | 5                | 5                 | FCA PCB                                     | Carp                                                        |
| Milakokia Lake, Mackinac County                         | 5                | 5                 | Fish Tissue-Hg                              | Walleye                                                     |
| Millecoquins Lake, Mackinac County                      | 5                | 5                 | Fish Tissue-Hg                              | Rock Bass                                                   |
| Muskegon Lake, Muskegon County                          | None             | 5                 | FCA PCB                                     | Northern Pike                                               |
| Osterhout Lake, Allegan County                          | None             | 2                 |                                             | Largemouth Bass                                             |
| Randall Lake Chain, Morrison Lake                       | 5                | 5                 | Fish Tissue-Hg <sup>†</sup>                 | Northern Pike                                               |
| Silver Lake, Grand Traverse County                      | None             | 5                 | Fish Tissue-Hg                              | Walleye                                                     |
| White Lake, Muskegon County                             | 5                | 5                 | FCA PCB, Fish Tissue-Hg                     | Carp<br>Northern Pike                                       |
| <b>Lake Superior Watershed</b>                          |                  |                   |                                             |                                                             |
| Lake Superior, Marquette and Keweenaw Bay               | 5                | 5                 | FCA PCB, Chlordane, Dioxins, Fish Tissue-Hg | Lake Herring<br>Siscowet<br>Lake Whitefish                  |
| Blind Sucker Flooding, Luce County                      | None             | 3                 |                                             | Yellow Perch                                                |
| Marion Lake, Gogebic County                             | 5                | 5                 | Fish Tissue-Hg                              | Northern Pike<br>Smallmouth Bass<br>Walleye<br>Yellow Perch |
| Portage Lake, Houghton County                           | 5                | 5                 | FCA PCB, Fish Tissue-Hg                     | Walleye                                                     |
| Torch Lake, Houghton County                             | 5                | 5                 | FCA PCB, Fish Tissue-Hg                     | Northern Pike<br>Walleye<br>White Sucker                    |

\* - Chlordane removed from list of contaminants causing an advisory

† - PCBs removed from list of contaminants causing an advisory

Table 13. Average net uptake of contaminants in caged fish tissue samples collected in 2007. 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) | Total PBDE (ppb) |
|-----------------------------------|------------------------------------------------|-------------|---------------|-----------------|-----------------------|-----------------|------------------|
| <b><u>Black River</u></b>         |                                                |             |               |                 |                       |                 |                  |
| 2007004                           | u/s Croswell                                   | 2           | NQU           | NQU             | 1                     | NQU             | NT               |
| 2007001                           | d/s Croswell                                   | 1           | NQU           | NQU             | 1                     | NQU             | NT               |
| 2007003                           | Near mouth                                     | 1           | NQU           | NQU             | 1                     | NQU             | 0.2              |
| <b><u>Chippewa River</u></b>      |                                                |             |               |                 |                       |                 |                  |
| 2007005                           | u/s Pine River confluence                      | 2           | NQU           | NQU             | 1                     | NQU             | 0.4              |
| <b><u>Looking Glass River</u></b> |                                                |             |               |                 |                       |                 |                  |
| 2007006                           | Near mouth                                     | 2           | NQU           | NQU             | NQU                   | NQU             | 0.8              |
| <b><u>Maple River</u></b>         |                                                |             |               |                 |                       |                 |                  |
| 2007007                           | Near mouth                                     | 2           | NQU           | NQU             | NQU                   | NQU             | 0.3              |
| <b><u>Pine River</u></b>          |                                                |             |               |                 |                       |                 |                  |
| 2007012                           | u/s St. Louis Impoundment (US-127)             | 1           | NQU           | 12              | NQU                   | 13              | NT               |
| 2007013                           | d/s St. Louis Impoundment (WWTP)               | 3           | NQU           | 53              | NQU                   | 679             | NT               |
| 2007008                           | u/s Chippewa River confluence (Gordonville Rd) | 2           | NQU           | 29              | NQU                   | 52              | 0.7              |

NQU = no quantifiable uptake

BQ = below quantification

NT = not tested

Table 14. A comparison of the concentrations of major contaminants measured in caged fish samples from Great Lakes tributaries. Concentrations of chlorinated contaminants are lipid-normalized; mercury concentrations are wet weight.

| Tributary / Sample Year            | PCB (ppb) | DDT (ppb) | Chlordane (ppb) | Mercury (ppb) | PBDE (ppb) |
|------------------------------------|-----------|-----------|-----------------|---------------|------------|
| <b>Lake Erie Watershed</b>         |           |           |                 |               |            |
| Belle River / 1997                 | NQU       | NQU       | NQU             | NQU           |            |
| Black River ( St. Clair Co) / 2007 | NQU       | NQU       | 1               | NQU           | 0.2        |
| Clinton River / 2001               | 37        | 22        | 7               | 10            |            |
| Huron River / 2002                 | 2.4       | 24        | NQU             | NQU           |            |
| Ottawa River / 2005                | 146       | 24        | 7               | NQU           |            |
| Raisin River / 2004                | 65        | 20        | 1               | NQU           |            |
| Rouge River / 2000                 | 28        | 21        | 4               | 8             |            |
| <b>Lake Huron Watershed</b>        |           |           |                 |               |            |
| Au Gres River / 1991               | NQU       | 5         | BQ              | NQU           |            |
| Au Sable River / 1996              | NQU       | 6         | 1               | NQU           |            |
| Kawkawlin River / 2001             | 12        | 12        | NQU             | NQU           |            |
| Saginaw River / 2005               | 83        | 23        | 3               | 3             |            |
| Tawas River / 2006                 | NQU       | NQU       | BQ              | 8             | 1.2        |
| Thunder Bay River / 1996           | NQU       | 4         | 2               | NQU           |            |
| <b>Lake Michigan Watershed</b>     |           |           |                 |               |            |
| Black Creek (Muskegon Co) / 2005   | 5         | 20        | BQ              | NQU           |            |
| Black River (VanBuren Co) / 2002   | 1         | 6         | BQ              | 5             |            |
| Boardman River / 2003              | 9         | 3         | BQ              | 6             |            |
| Escanaba River / 2005              | 13        | 11        | 2               | 5             |            |
| Galien River / 2002                | NQU       | 3.3       | 0.4             | 2             |            |
| Grand River / 2001                 | 16        | 17        | 5               | NQU           |            |
| Kalamazoo River / 1999             | 183       | NT        | NT              | NT            |            |
| Macatawa River / 2005              | 46        | 16        | 7               | NQU           |            |
| Manistique River / 2002            | NQU       | 2         | BQ              | NQU           |            |
| Menominee River / 1993             | NQU       | 6         | 1               | NQU           |            |
| Muskegon River / 2002              | NQU       | 10        | NQU             | 5             |            |
| Pere Marquette / 2003              | 5         | 1         | BQ              | 6             |            |
| Rabbit River / 2003                | 4         | 3         | 0.5             | NQU           |            |
| St. Joseph River / 2006            | NQU       | NQU       | NQU             | NQU           | 1.4        |
| White River / 1992                 | NQU       | 8         | 0.5             | NQU           |            |
| <b>Lake Superior Watershed</b>     |           |           |                 |               |            |
| Ontonagon River / 1992             | NQU       | 3         | BQ              | NQU           |            |
| Two Hearted River / 1992           | NQU       | 2         | 0.6             | NQU           |            |

NQU = no quantifiable uptake  
 BQ = 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.

| WATER BODY                                 | SPECIES    | RATE OF CHANGE (%) AND PROBABILITY (p) |        |           |        |           |        |                 |        |            |        |
|--------------------------------------------|------------|----------------------------------------|--------|-----------|--------|-----------|--------|-----------------|--------|------------|--------|
|                                            |            | Mercury                                |        | Total PCB |        | Total DDT |        | Total Chlordane |        | Dioxin TEQ |        |
|                                            |            | %                                      | p      | %         | p      | %         | p      | %               | p      | %          | p      |
| <b>GREAT LAKES AND CONNECTING CHANNELS</b> |            |                                        |        |           |        |           |        |                 |        |            |        |
| <b>Lake Michigan</b>                       |            |                                        |        |           |        |           |        |                 |        |            |        |
| Little Bay de Noc                          | Carp       | ±2.3                                   |        | ±3.7      |        | ±3.8      |        | -4.0            | <0.05  |            |        |
|                                            | Walleye    | 3.7                                    | <0.001 | -8.6      | <0.001 | -12.3     | <0.001 | -13.7           | <0.001 |            |        |
| Grand Traverse Bay                         | Carp       | ±2.6                                   |        | -10.3     | <0.01  | -10.5     | <0.01  | -8.6            | <0.01  |            |        |
|                                            | Lake Trout | 5.3                                    | <0.001 | -4.6      | <0.001 | -7.9      | <0.001 | -9.0            | <0.001 | -10.8      | <0.001 |
| <b>Lake Huron</b>                          |            |                                        |        |           |        |           |        |                 |        |            |        |
| Saginaw Bay                                | Carp       | ±2.6                                   |        | -6.3      | <0.001 | -2.7      | <0.10  | -7.6            | <0.001 | -5.1       | <0.05  |
|                                            | Walleye    | 3.9                                    | <0.001 | -4.3      | <0.001 | -7.0      | <0.001 | -8.7            | <0.001 |            |        |
| Thunder Bay                                | Carp       | 4.1                                    | <0.05  | ±3.6      |        | ±3.5      |        | -8.7            | <0.001 |            |        |
|                                            | Lake Trout | 2.2                                    | <0.001 | -5.6      | <0.001 | -8.6      | <0.001 | -12.4           | <0.001 | -6.2       | <0.001 |
|                                            | Walleye    | ±2.1                                   |        | -6.0      | <0.001 | -11.5     | <0.001 | -15.1           | <0.001 |            |        |
| <b>Lake Superior</b>                       |            |                                        |        |           |        |           |        |                 |        |            |        |
| Keweenaw Bay                               | Lake Trout | ±1.6                                   |        | -10.4     | <0.001 | -10.0     | <0.001 | -9.6            | <0.001 | -9.4       | <0.001 |
| <b>Lake Erie</b>                           |            |                                        |        |           |        |           |        |                 |        |            |        |
| Brest Bay                                  | Carp       | 5.4                                    | <0.001 | -4.2      | <0.05  | -7.3      | <0.001 | -7.2            | <0.001 |            |        |
|                                            | Walleye    | ±1.9                                   |        | -5.5      | <0.001 | -10.5     | <0.001 | -13.4           | <0.001 |            |        |
| <b>Lake St. Clair</b>                      |            |                                        |        |           |        |           |        |                 |        |            |        |
| L'Anse Creuse Bay                          | Carp       | ±2.8                                   |        | -6.2      | <0.01  | -7.5      | <0.001 | -8.7            | <0.001 |            |        |
|                                            | Walleye    | 4.9                                    | <0.001 | -5.7      | <0.001 | -13.7     | <0.001 | -13.9           | <0.001 |            |        |
| <b>St. Clair River</b>                     |            |                                        |        |           |        |           |        |                 |        |            |        |
| Algonac                                    | Carp       | 4.3                                    | <0.005 | -8.3      | <0.01  | -6.7      | <0.01  | -6.3            | <0.005 |            |        |
| <b>Detroit River</b>                       |            |                                        |        |           |        |           |        |                 |        |            |        |
| Grassy Island                              | Carp       | -6.9                                   | <0.001 | -3.4      | <0.05  | -2.0      | <0.05  | ±2.7            |        |            |        |
|                                            | Walleye    | ±1.9                                   |        | -4.6      | <0.001 | -7.2      | <0.001 | -10.7           | <0.001 |            |        |
| <b>St. Marys River</b>                     |            |                                        |        |           |        |           |        |                 |        |            |        |
| Munuscong Bay                              | Carp       | ±1.8                                   |        | -8.9      | <0.01  | -14.0     | <0.001 | -11.8           | <0.001 |            |        |
|                                            | Walleye    | ±1.8                                   |        | -5.4      | <0.001 | -10.2     | <0.001 | -8.9            | <0.001 |            |        |
|                                            | Average**  | 3.0                                    |        | -6.4      |        | -8.8      |        | -9.9            |        | -7.9       |        |
|                                            | Median**   | 4.1                                    |        | -5.7      |        | -8.7      |        | -9.0            |        | -7.8       |        |

\*± 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.

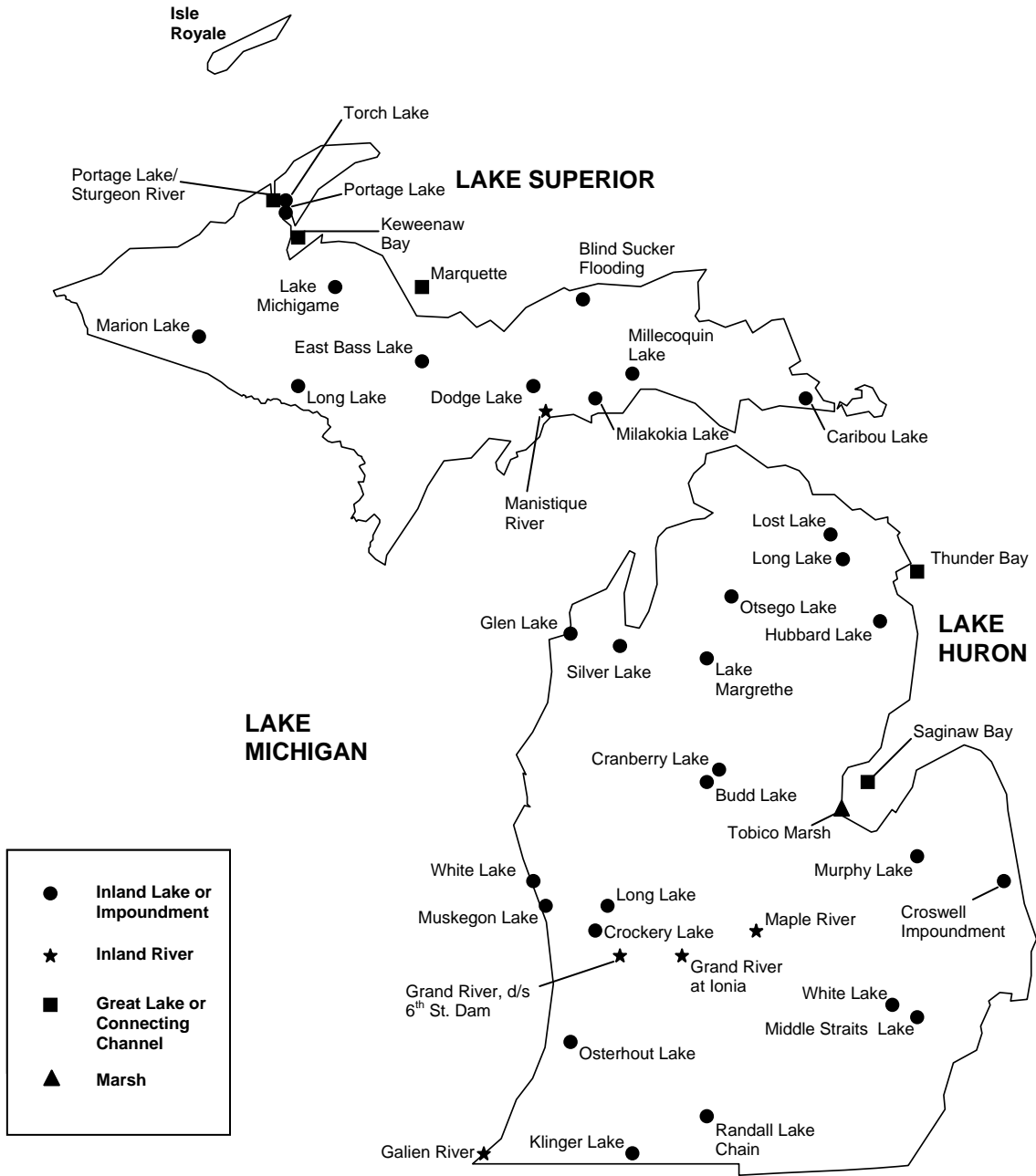
Table 15. Continued

| WATER BODY            | SPECIES         | RATE OF CHANGE (%) AND PROBABILITY (p) |        |           |        |           |        |                 |        |            |   |
|-----------------------|-----------------|----------------------------------------|--------|-----------|--------|-----------|--------|-----------------|--------|------------|---|
|                       |                 | Mercury                                |        | Total PCB |        | Total DDT |        | Total Chlordane |        | Dioxin TEQ |   |
|                       |                 | %                                      | p      | %         | p      | %         | p      | %               | p      | %          | p |
| <b>INLAND RIVERS</b>  |                 |                                        |        |           |        |           |        |                 |        |            |   |
| Grand River           | Carp            | ±2.9                                   |        | -3.1      | <0.005 | ±3.7      |        | -4.5            | <0.001 |            |   |
| Kalamazoo River       | Carp            | ±1.5                                   |        | -7.2      | <0.001 | -7.0      | <0.001 | -3.9            | <0.005 |            |   |
| Muskegon River        | Carp            | ±2.9                                   |        | -13.4     | <0.001 | -11.2     | <0.001 | -13.9           | <0.001 |            |   |
| River Raisin          | Carp            | -2.5                                   | <0.01  | -14.1     | <0.001 | -12.8     | <0.001 | -12.5           | <0.001 |            |   |
| St. Joseph River      | Carp            | ±1.4                                   |        | -2.9      | <0.05  | -7.5      | <0.001 | -5.5            | <0.001 |            |   |
| <b>INLAND LAKES</b>   |                 |                                        |        |           |        |           |        |                 |        |            |   |
| Grand Sable Lake      | Lake Trout      | 7.6                                    | <0.01  | 9.1       | <0.001 | ±4.3      |        | -8.6            | <0.05  |            |   |
| Lake Gogebic          | Walleye         | -7.4                                   | <0.001 | -15.9     | <0.001 | -9.7      | <0.001 | #NA             |        |            |   |
| South Manistique Lake | Walleye         | ±1.5                                   |        | -4.3      | <0.001 | -2.9      | <0.005 | NA              |        |            |   |
| Higgins Lake          | Lake Trout      | ±2.4                                   |        | -10.3     | <0.001 | -8.6      | <0.001 | -12.0           | <0.001 |            |   |
| Houghton Lake         | Largemouth Bass | ±1.4                                   |        | -12.1     | <0.001 | -9.0      | <0.001 | -9.3            | <0.001 |            |   |
| Gull Lake             | Largemouth Bass | ±1.1                                   |        | -6.4      | <0.001 | -9.4      | <0.001 | -12.6           | <0.001 |            |   |
| Gun Lake              | Largemouth Bass | ±1.2                                   |        | -6.3      | <0.001 | -5.2      | <0.005 | -4.8            | <0.001 |            |   |
| Pontiac Lake          | Largemouth Bass | ±2.8                                   |        | -6.0      | <0.005 | -6.8      | <0.001 | -15.0           | <0.001 |            |   |
|                       | Average**       | -0.8                                   |        | -7.1      |        | -8.2      |        | -9.3            |        |            |   |
|                       | Median**        | -2.5                                   |        | -6.4      |        | -8.6      |        | -9.3            |        |            |   |

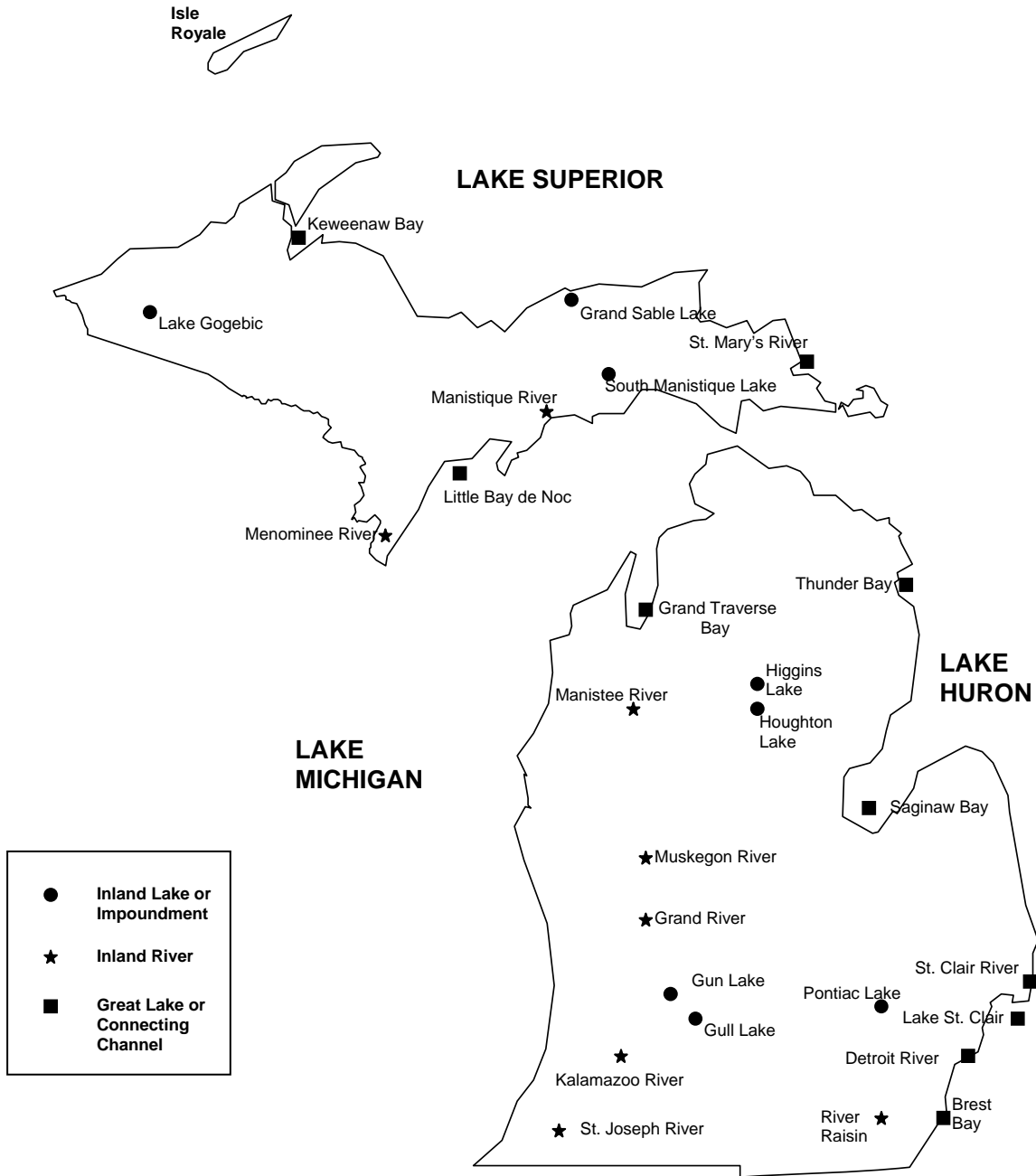
\*± indicates that no significant trend was measured ( $p>0.05$ ) and the value presented is an estimate of the minimum detectable trend.

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

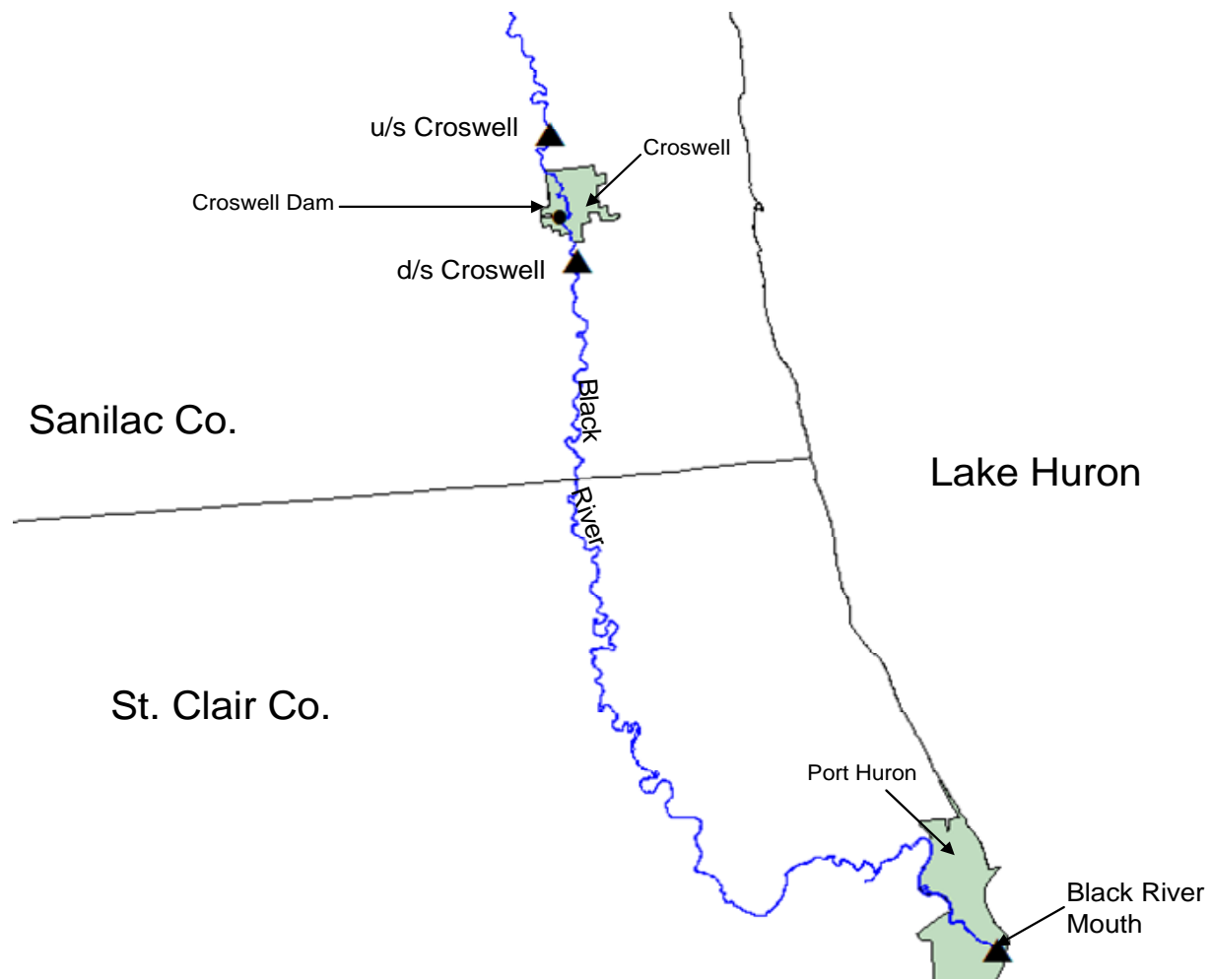
#Trend estimates were not available because contaminant concentrations were below the analytical detection level.



**Figure 1. Edible portion fish sample locations**



**Figure 2. Whole fish trend monitoring sites.**



**Figure 3. Black River 2007 caged fish monitoring locations.**

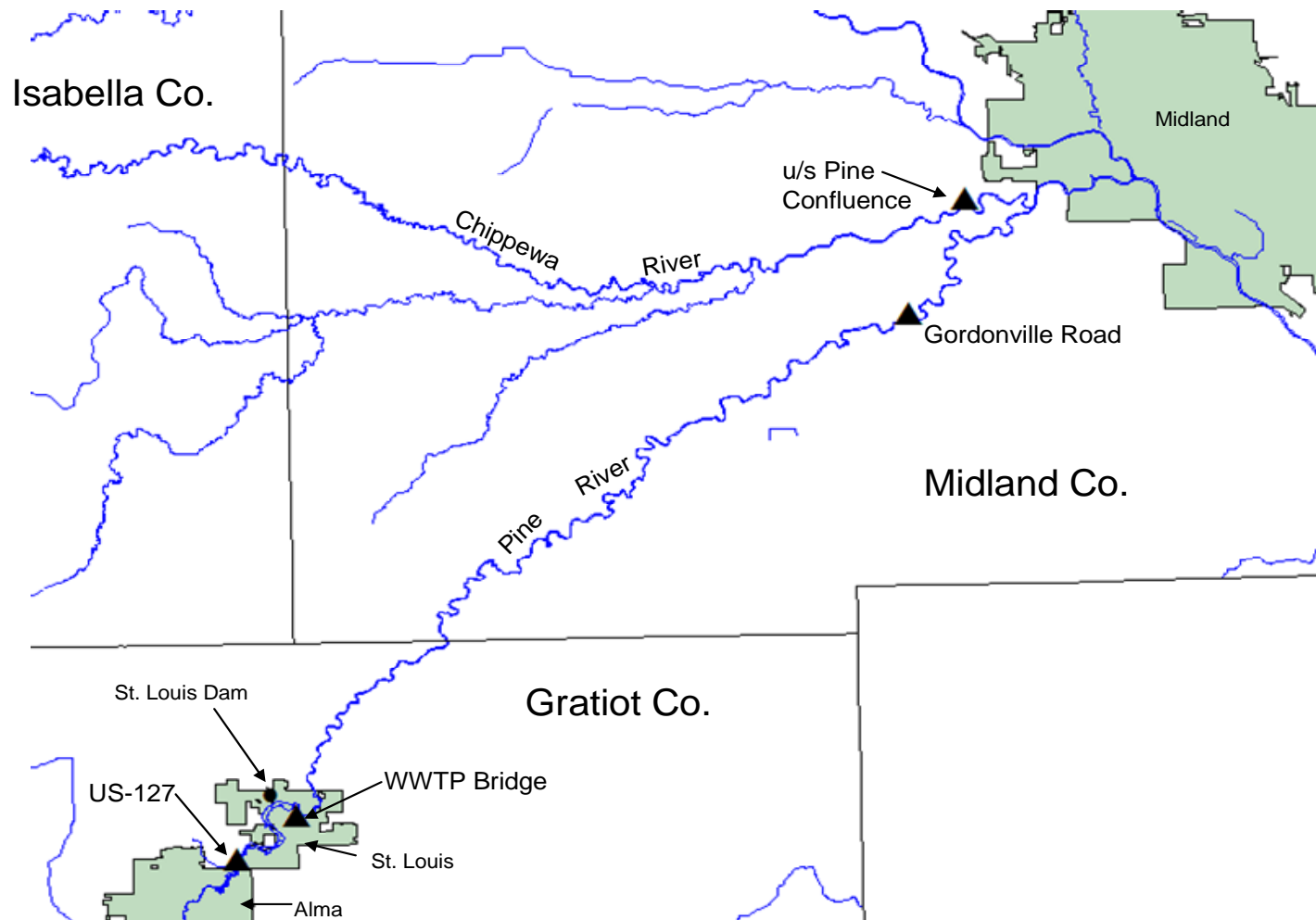
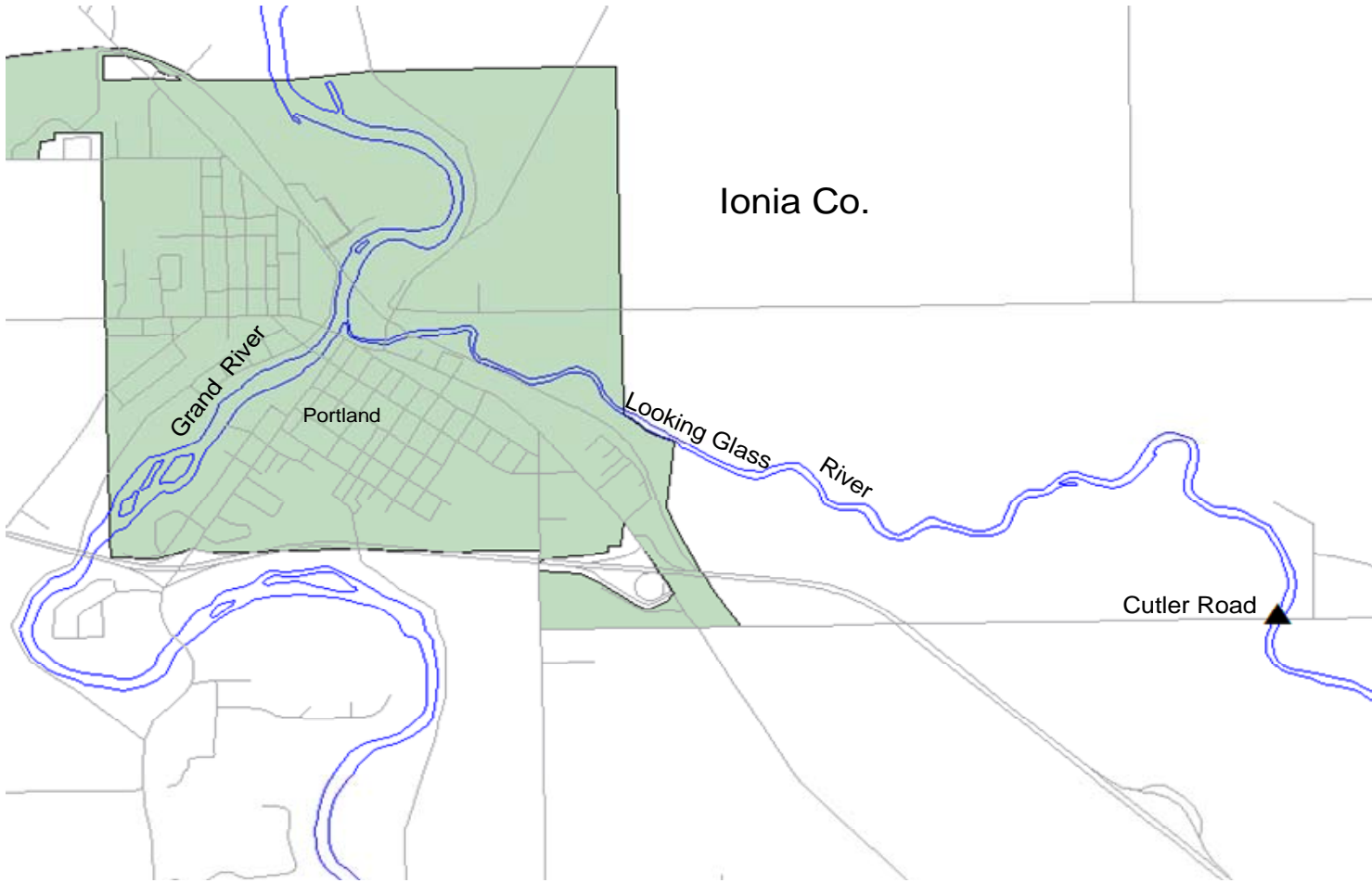


Figure 4. Chippewa and Pine River 2007 caged fish monitoring locations.



**Figure 5. Looking Glass River 2007 caged fish monitoring location.**

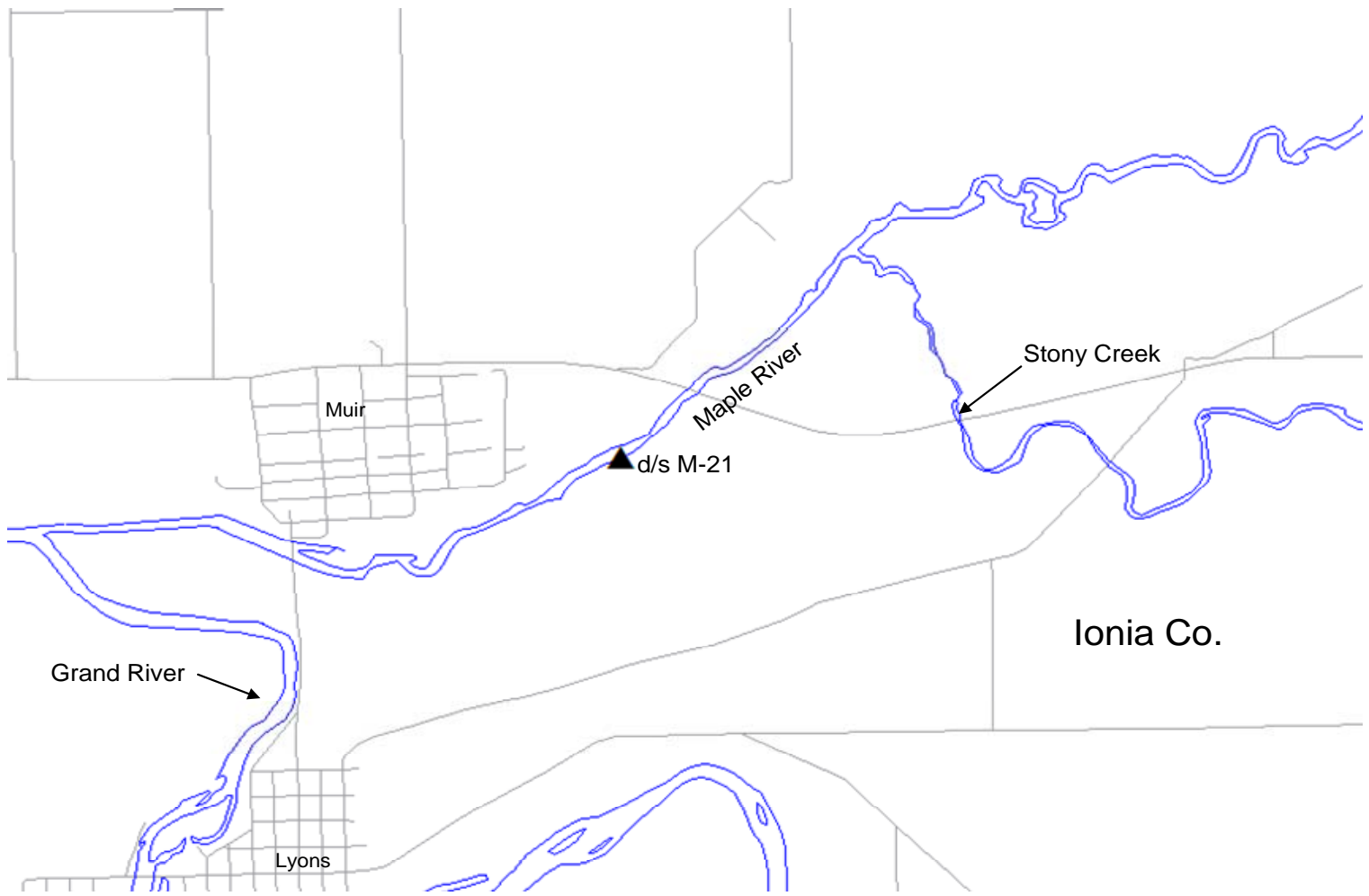
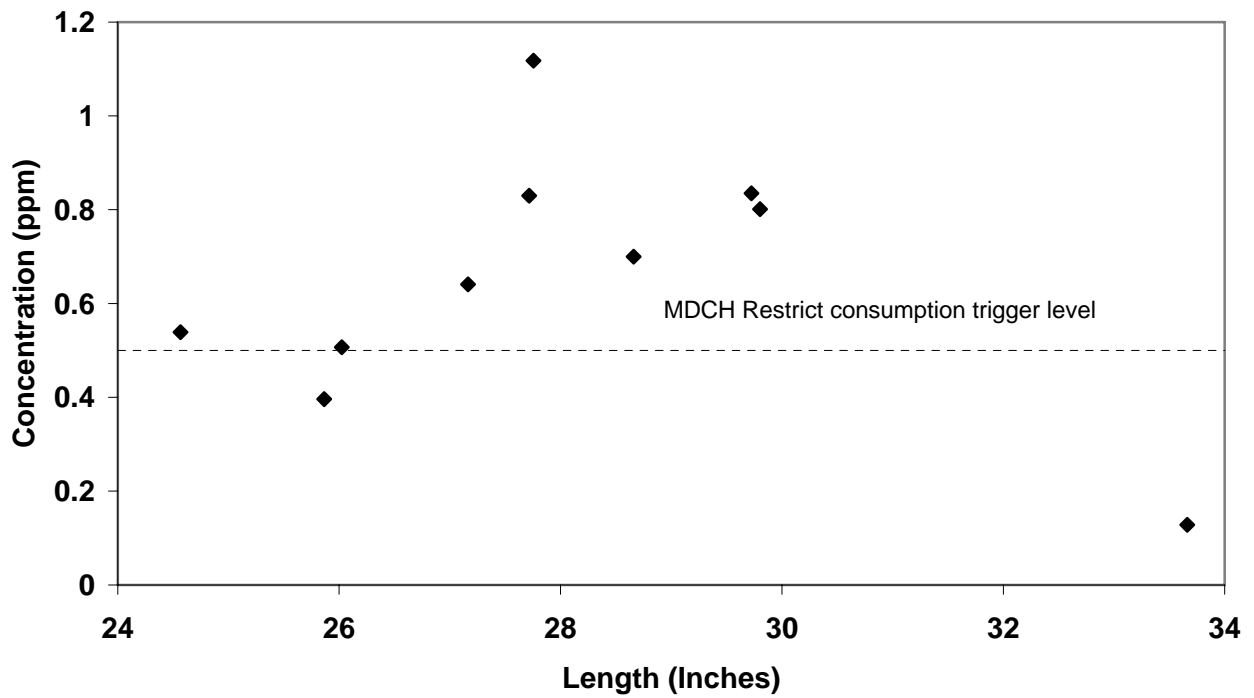


Figure 6. Maple River 2007 caged fish monitoring location.



**Figure 7. Total length versus total mercury concentration in northern pike collected from Middle Straits Lake, Oakland County, in 2007 (ID 2007240).**

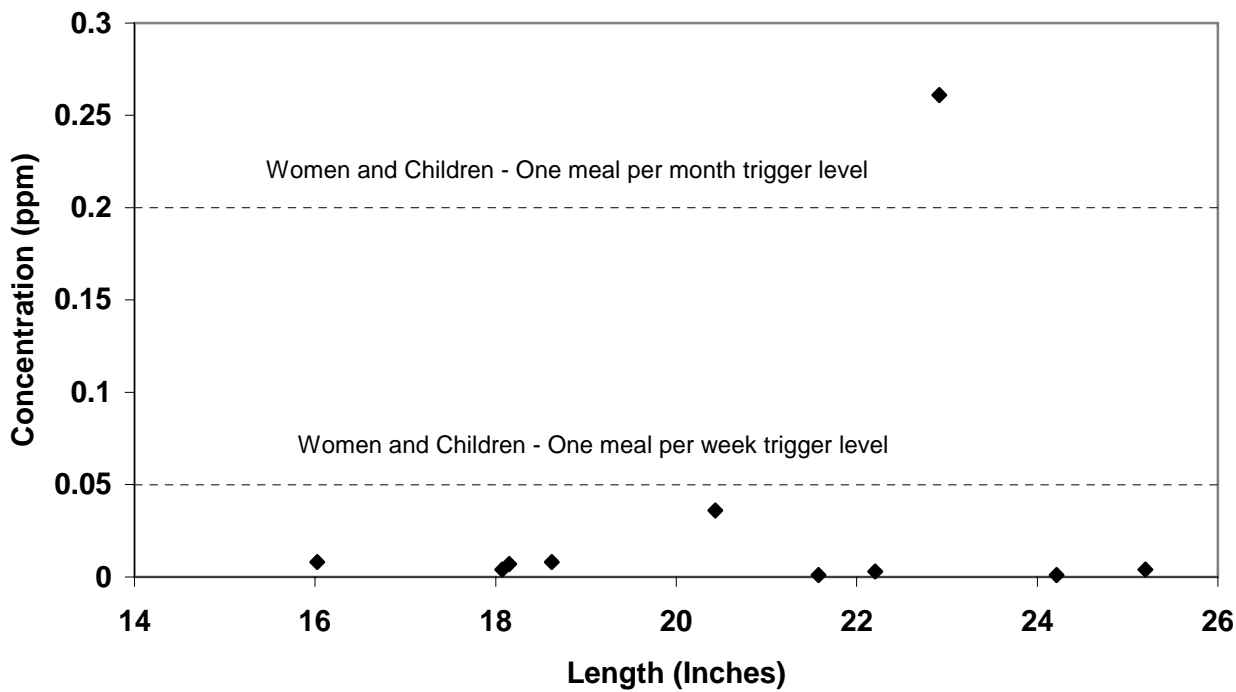


Figure 8. Total length versus total PCB concentration in walleye collected from White Lake, Oakland County, in 2007 (ID 2007259).

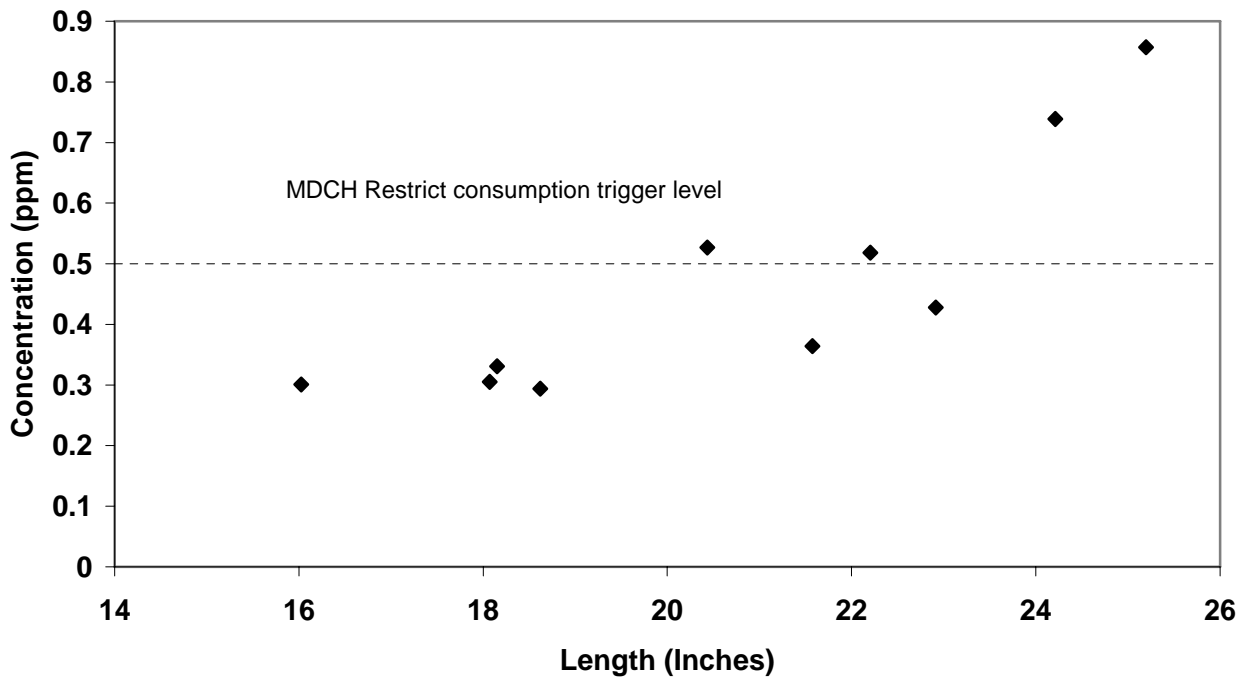


Figure 9. Total length versus total mercury concentration in walleye collected from White Lake, Oakland County, in 2007 (ID 2007259).

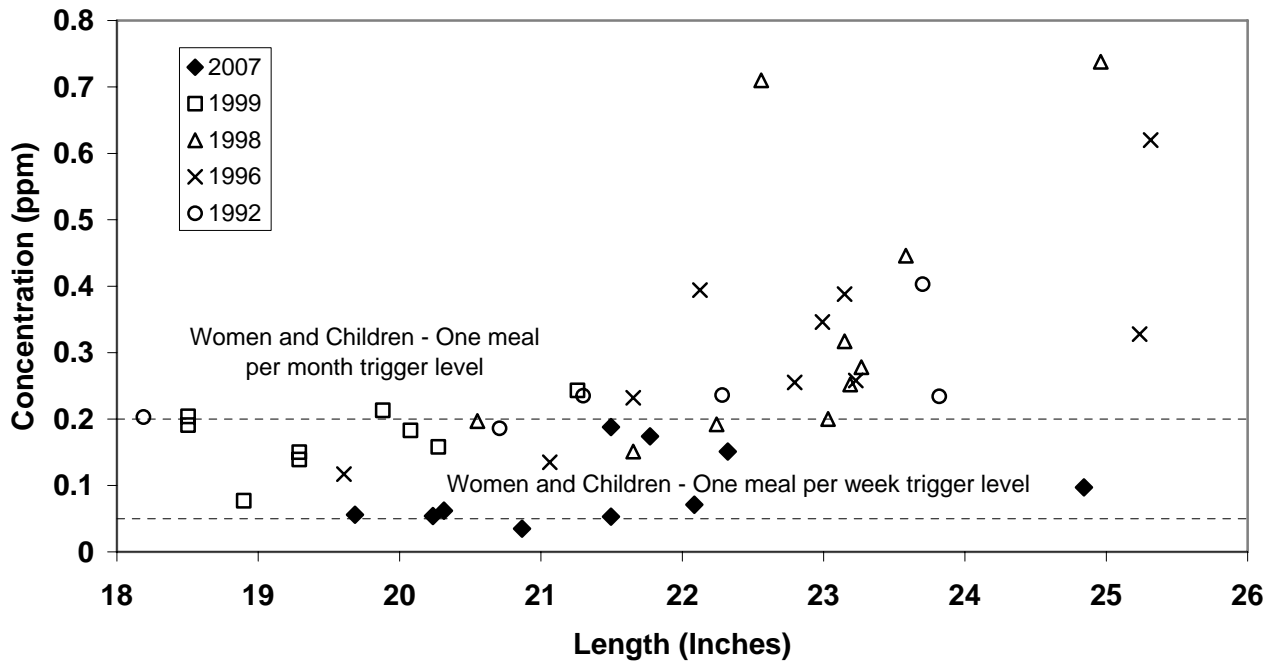


Figure 10. Total length versus total PCB concentration in lake whitefish collected from Lake Huron, Thunder Bay, in 1992 (ID 92057), 1996 (ID 96022), 1998 (ID 1998055), 1999 (ID 1999029), and 2007 (ID 2007269).

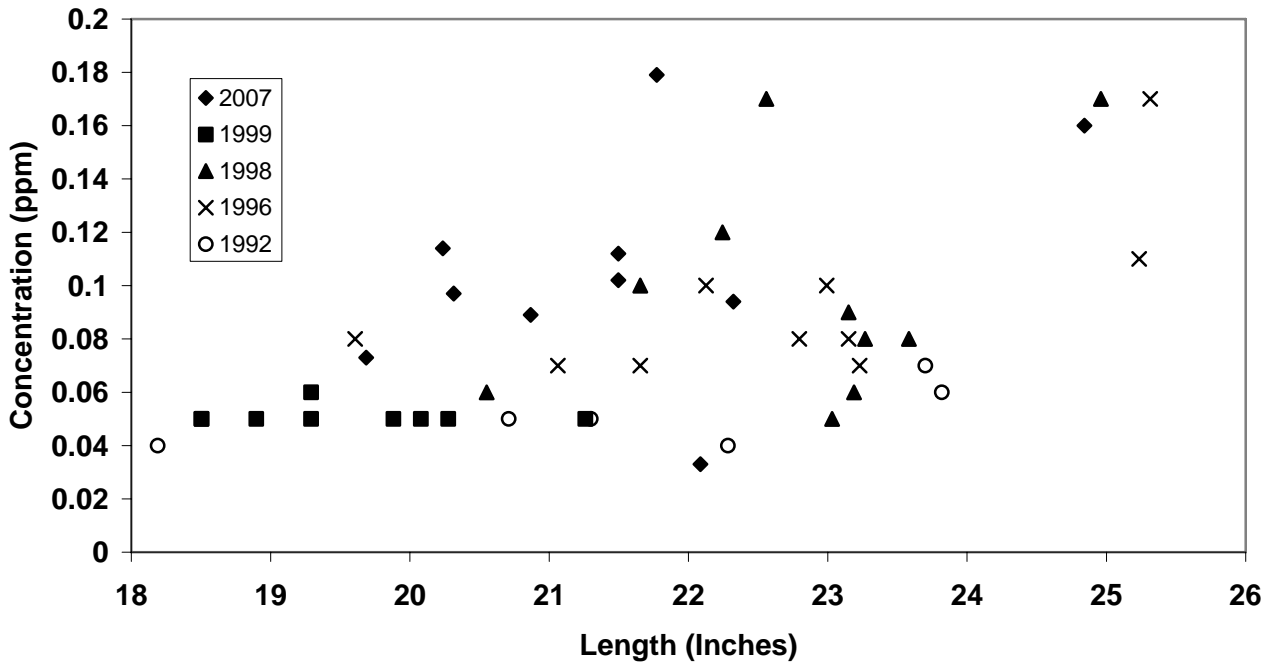


Figure 11. Total length versus total mercury concentration in lake whitefish collected from Lake Huron, Thunder Bay, in 1992 (ID 92057), 1996 (ID 96022), 1998 (ID 1998055), 1999 (ID 1999029), and 2007 (ID 2007269).

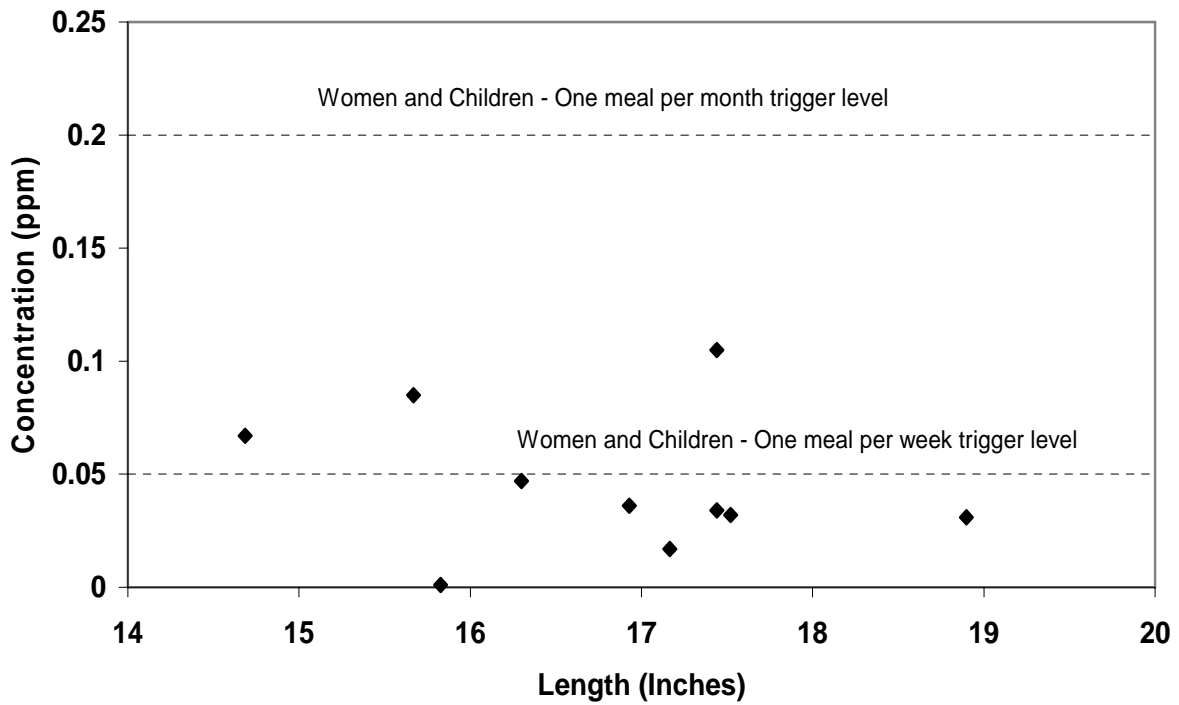


Figure 12. Total length versus total PCB concentration in freshwater drum collected from Saginaw Bay, Charity Island, in 2007 (ID 2007270).

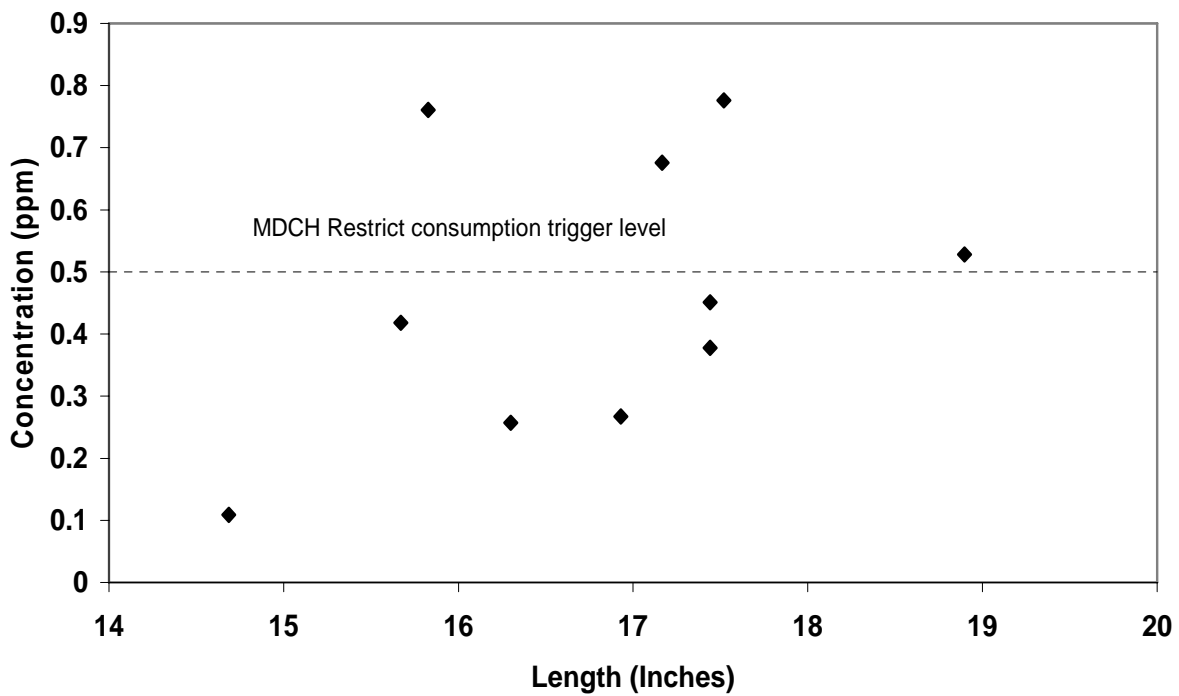


Figure 13. Total length versus total mercury concentration in freshwater drum collected from Saginaw Bay, Charity Island, in 2007 (ID 2007270).

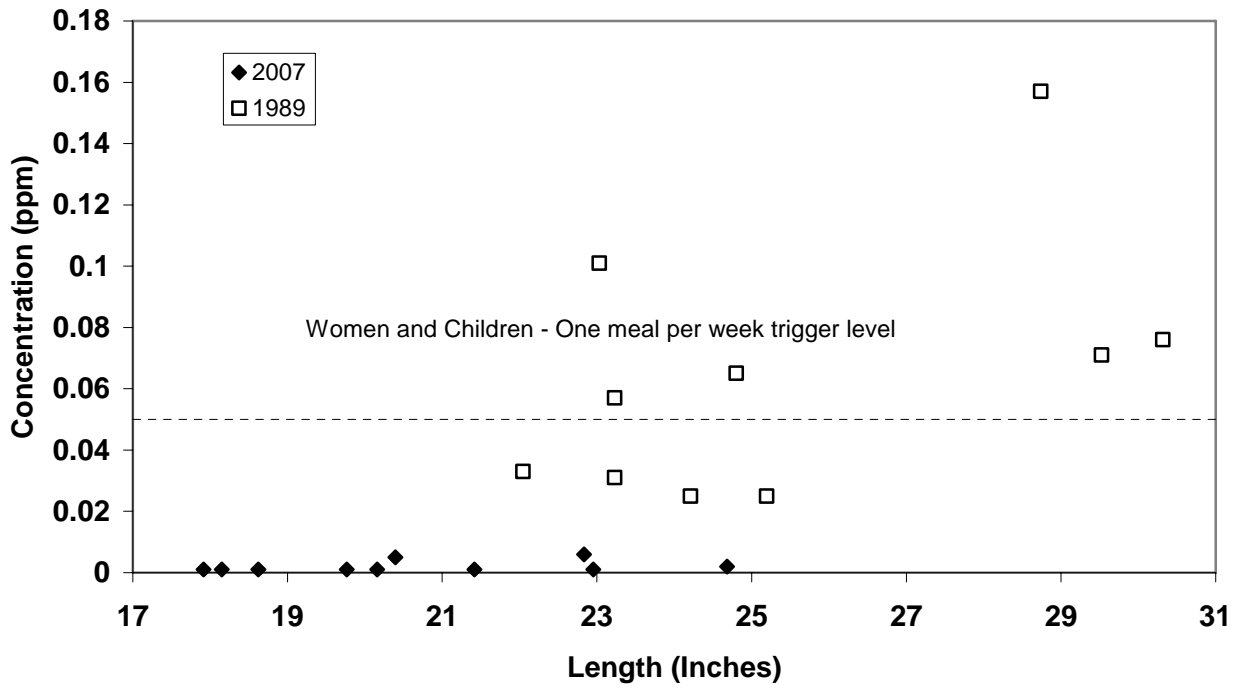


Figure 14. Total length versus total PCB concentration in carp collected from the Black River, Sanilac County, in 1989 (ID 89017) and 2007 (ID 2007263).

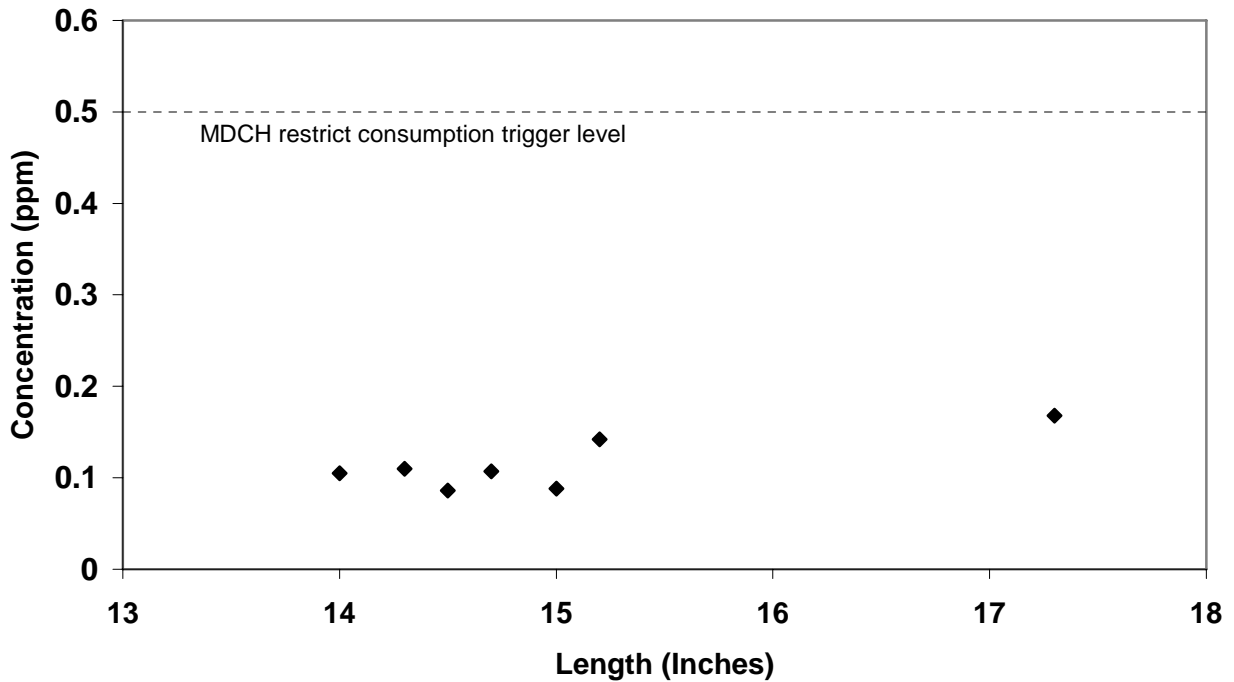


Figure 15. Total length versus total mercury concentration in largemouth bass collected from Budd Lake, Clare Co., in 2007 (ID 2007268).

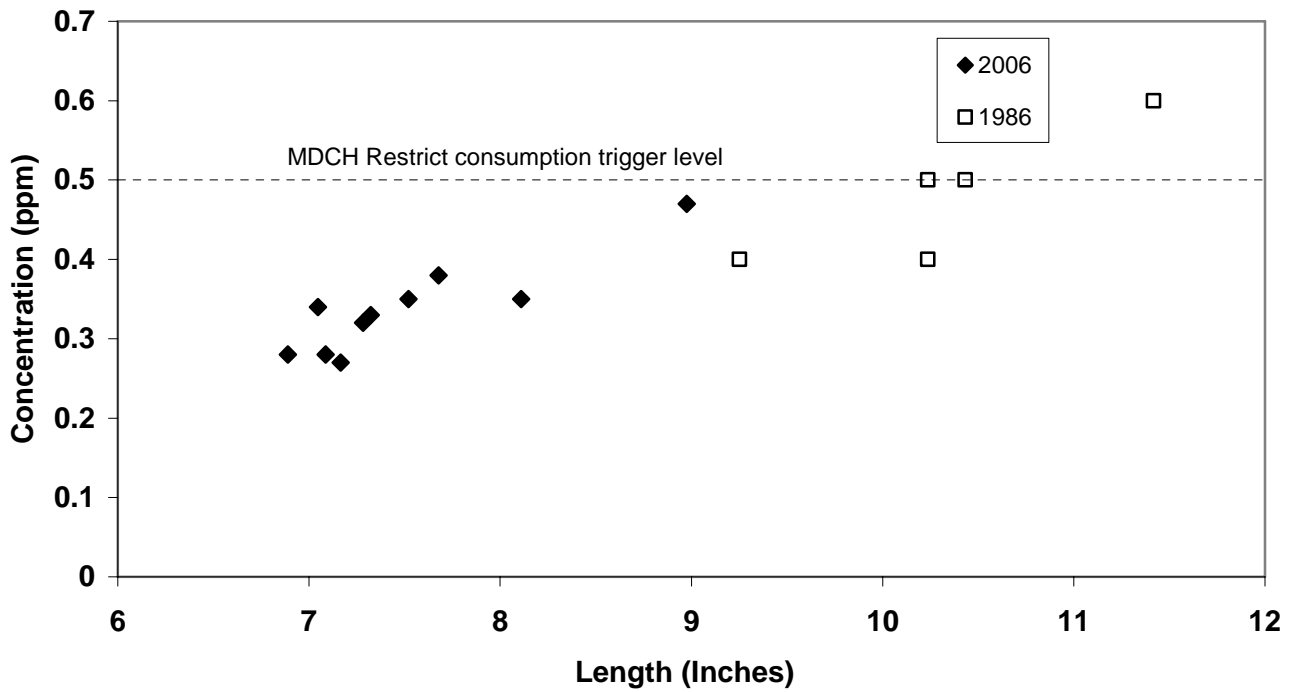


Figure 16. Total length versus total mercury concentration in rock bass collected from Caribou Lake, Chippewa County in 1986 (ID 86004) and 2006 (ID 2006006).

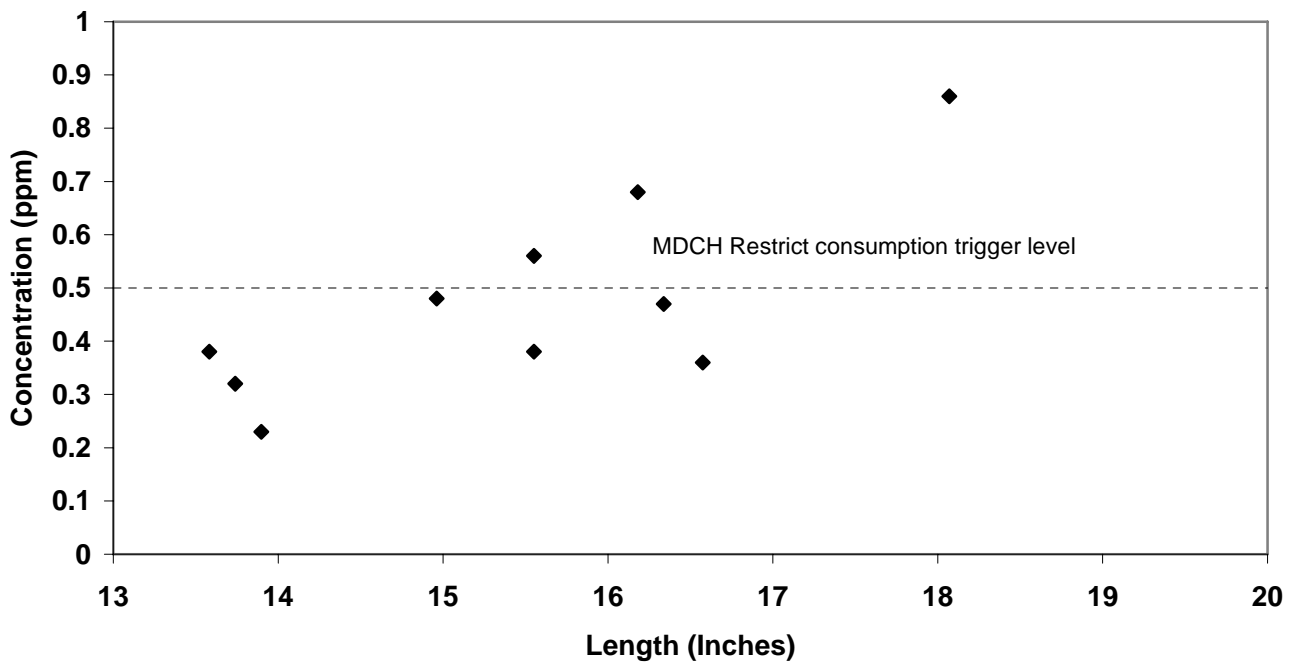


Figure 17. Total length versus total mercury concentration in smallmouth bass collected from Caribou Lake, Chippewa County, in 2006 (ID 2006006).

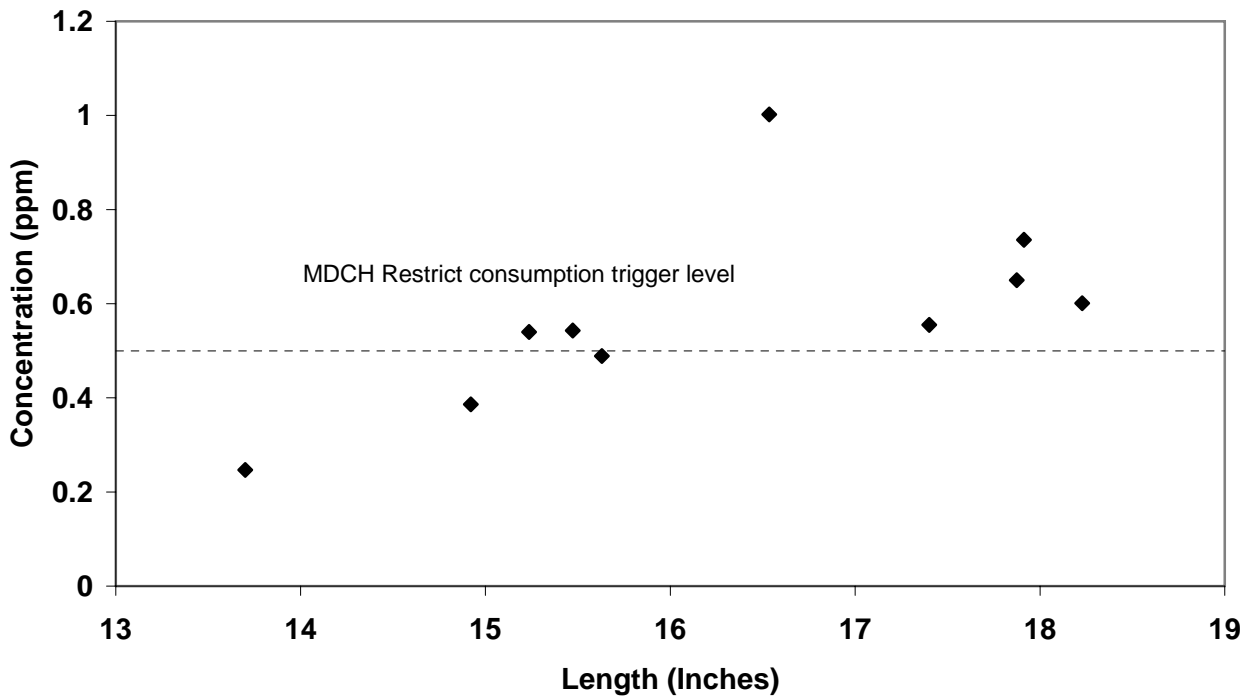


Figure 18. Total length versus total mercury concentration in largemouth bass collected from Cranberry Lake, Clare County, in 2007 (ID 2007212).

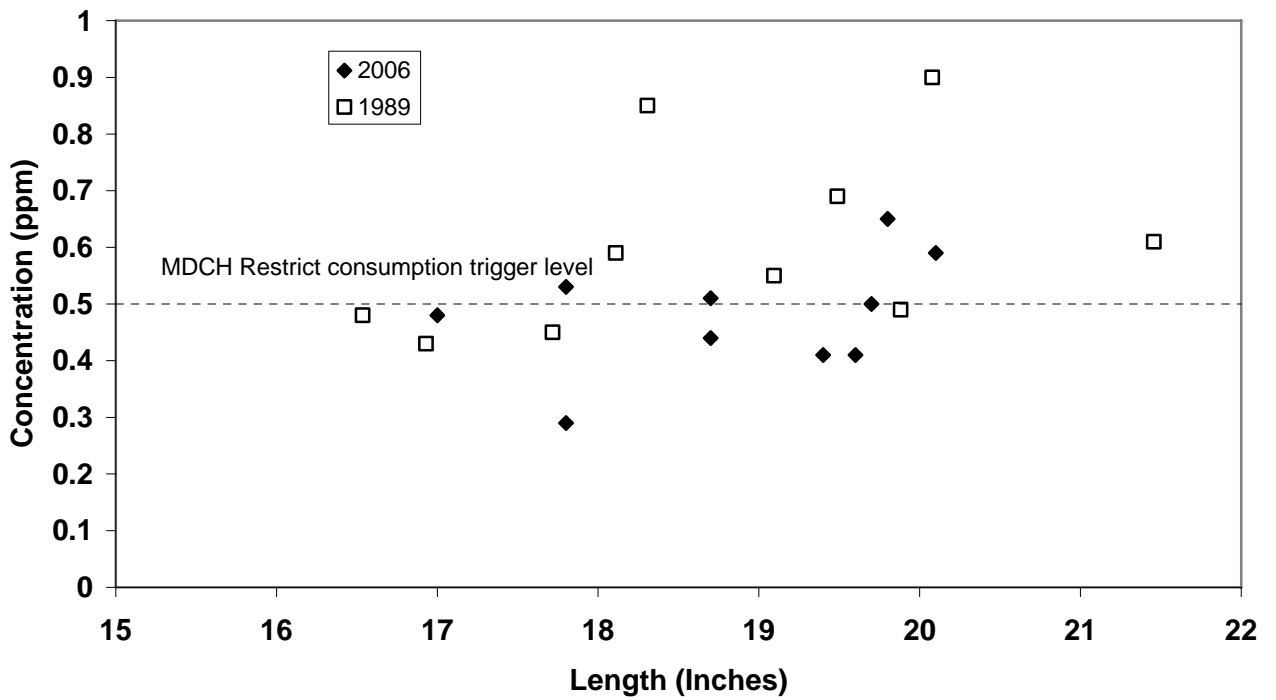


Figure 19. Total length versus total mercury concentration in walleye collected from Hubbard Lake, Alcona County, in 1989 (ID 89076) and 2006 (ID 2006017).

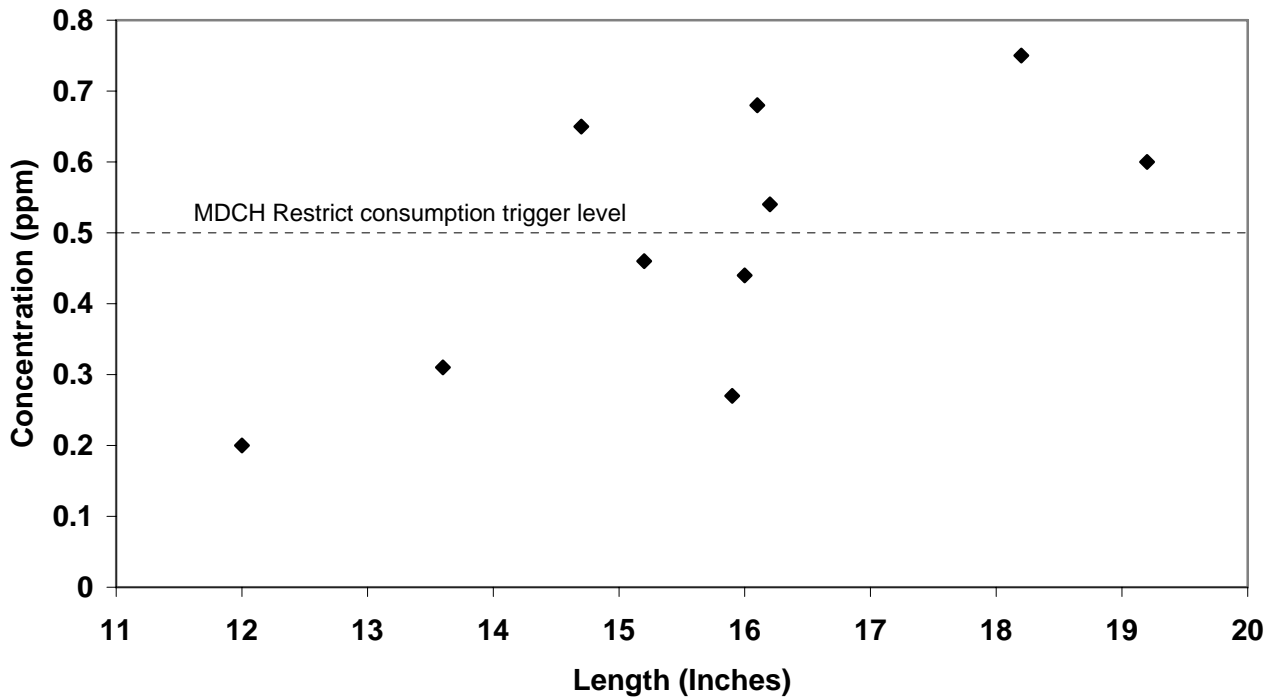


Figure 20. Total length versus total mercury concentration in smallmouth bass collected from Long Lake, Montmorency County, in 2006 (ID 2006046).

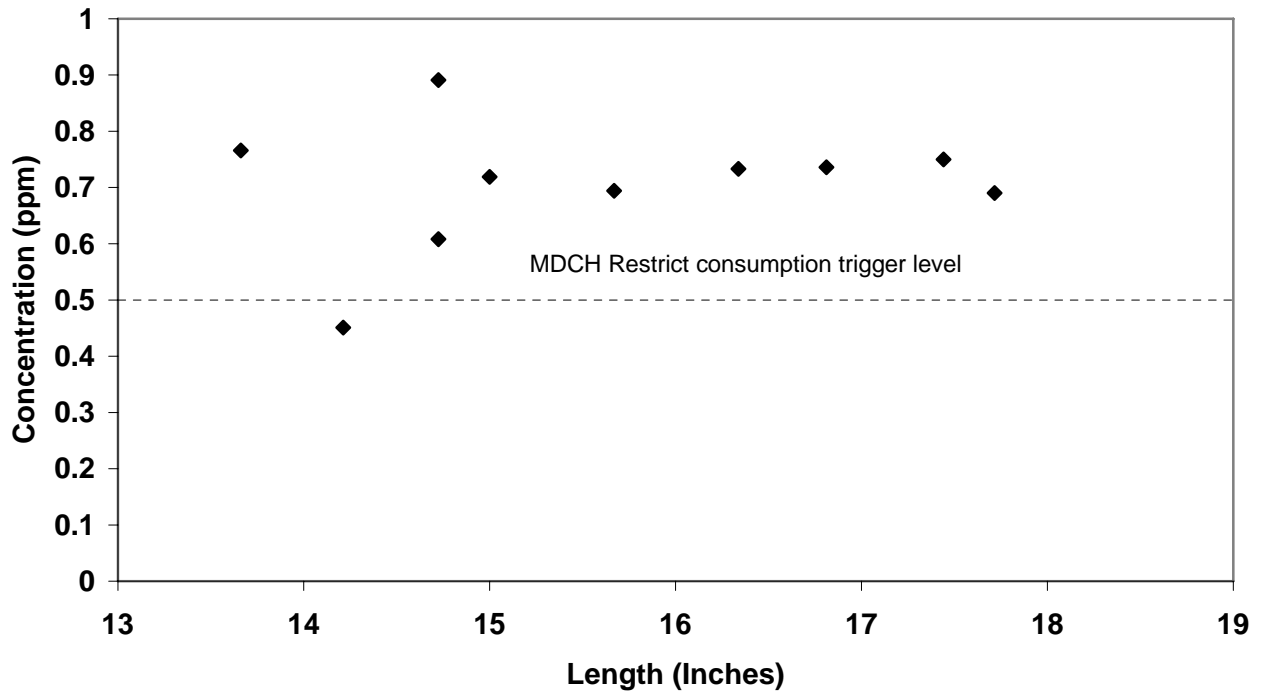


Figure 21. Total length versus total mercury concentration in largemouth bass collected from Lost Lake, Presque Isle County, in 2007 (ID 2007237).

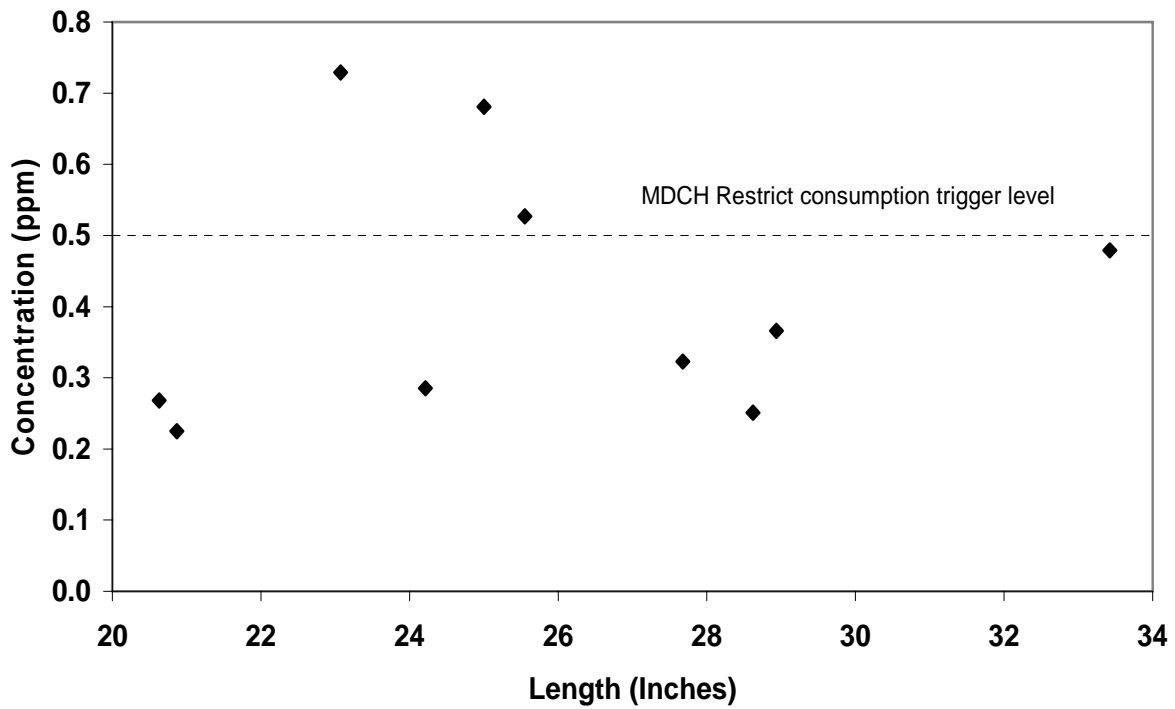


Figure 22. Total length versus total mercury concentration in northern pike collected from Murphy Lake, Tuscola County, in 2007 (ID 2007243).

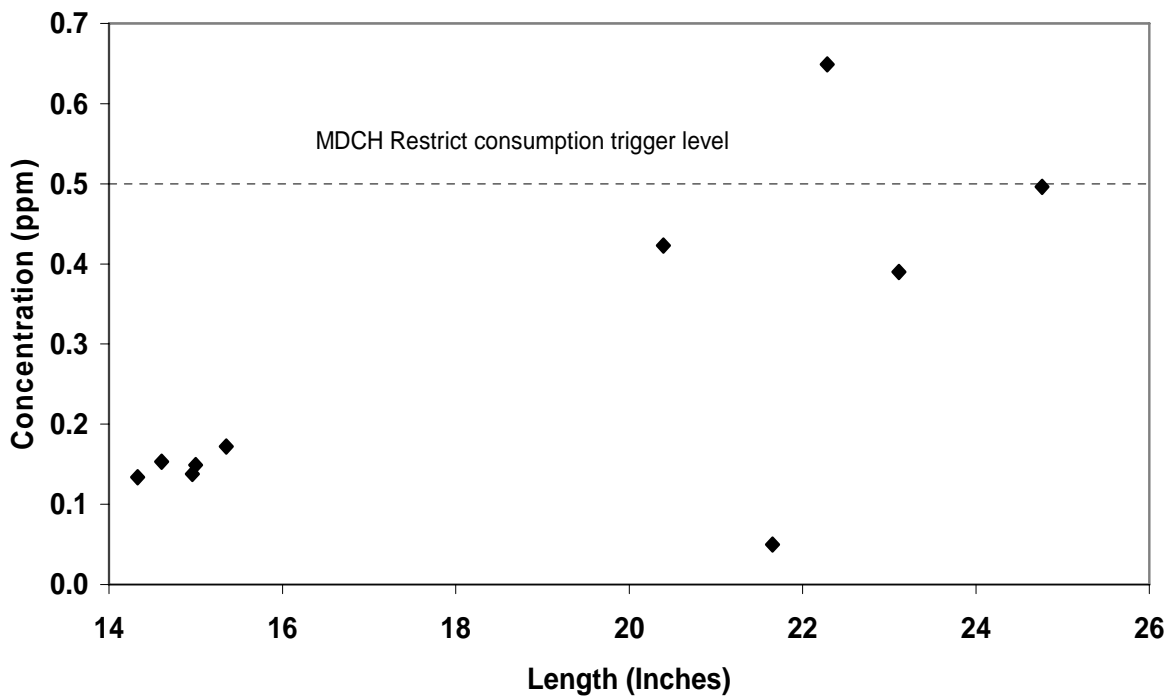


Figure 23. Total length versus total mercury concentration in walleye collected from Otsego Lake, Otsego County, in 2007 (ID 2007244).

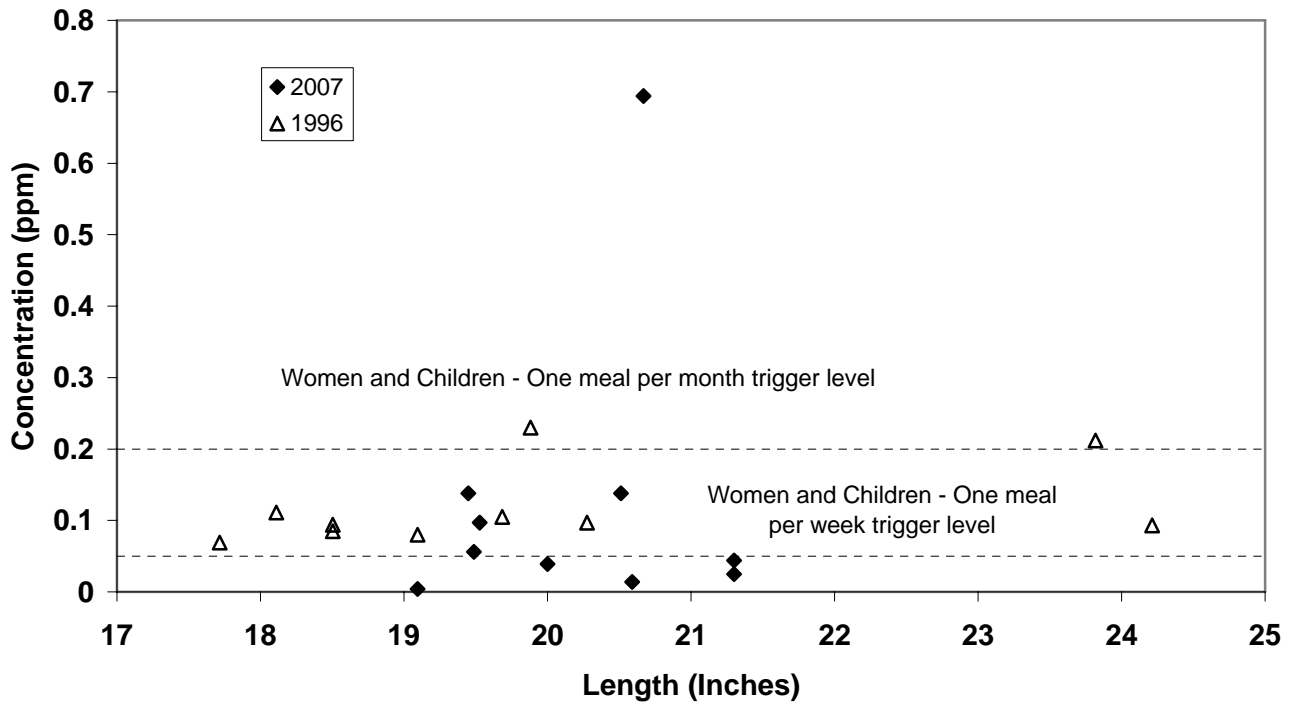


Figure 24. Total length versus total PCB concentration in carp collected from the Tobico Marsh, Bay County, in 1996 (ID 96054) and 2007 (ID 2007256).

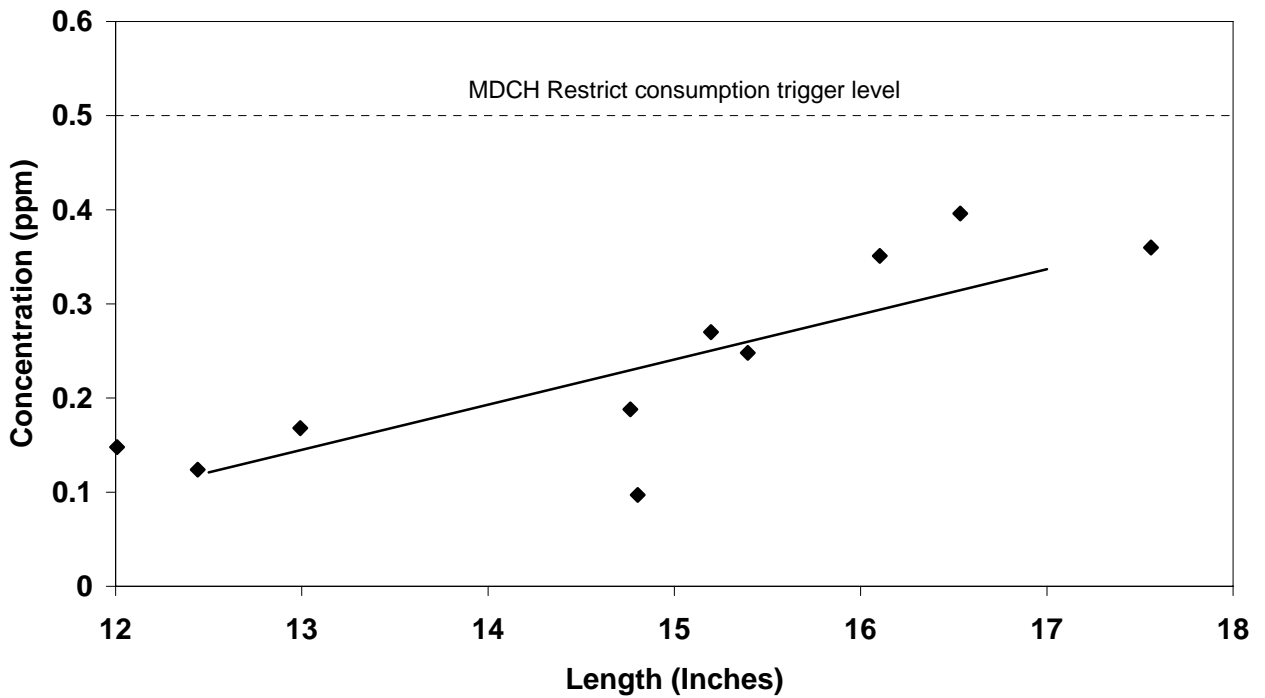


Figure 25. Total length versus total mercury concentration in largemouth bass collected from the Tobico Marsh, Bay County, in 2007 (ID 2007256).

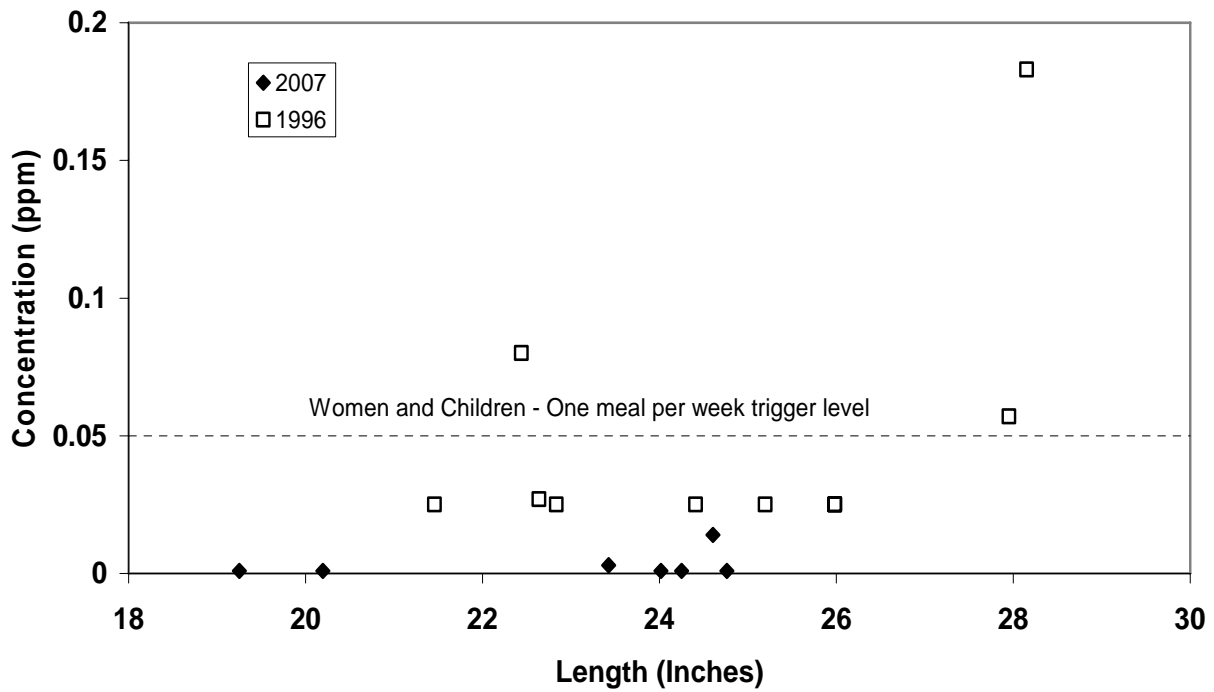


Figure 26. Total length versus total PCB concentration in northern pike collected from the Tobico Marsh, Bay County, in 1996 (ID 96054) and 2007 (ID 2007256).

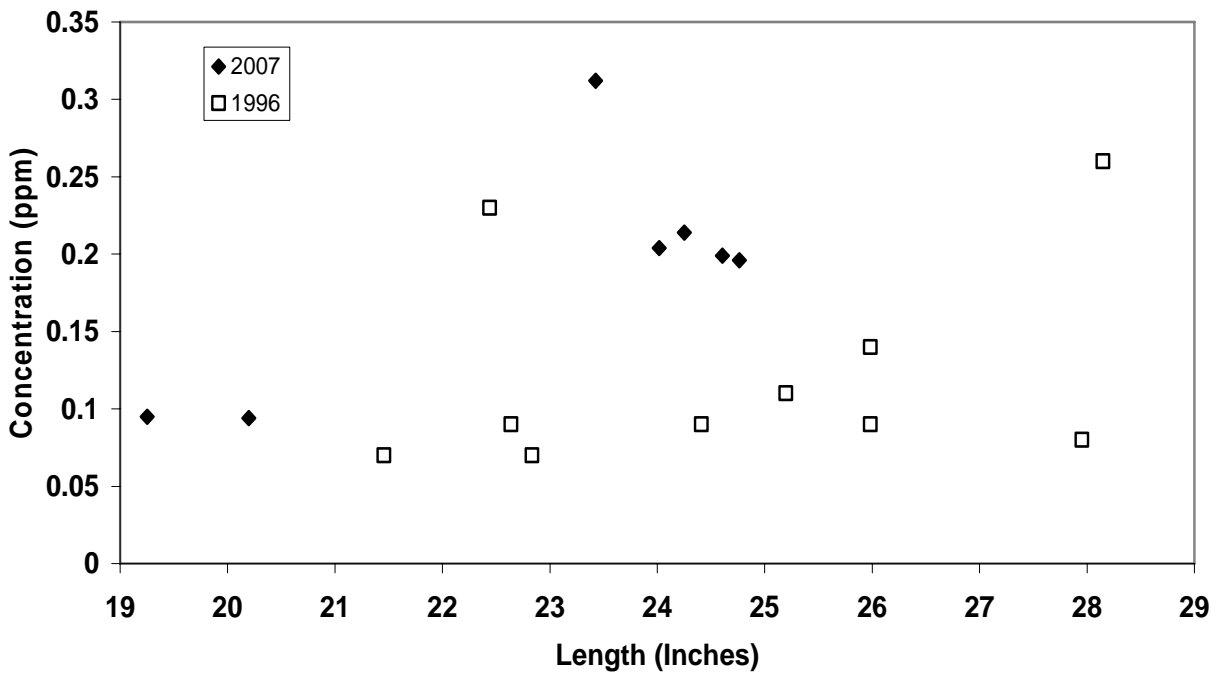


Figure 27. Total length versus total mercury concentration in northern pike collected from the Tobico Marsh, Bay County, in 1996 (ID 96054) and 2007 (ID 2007256).

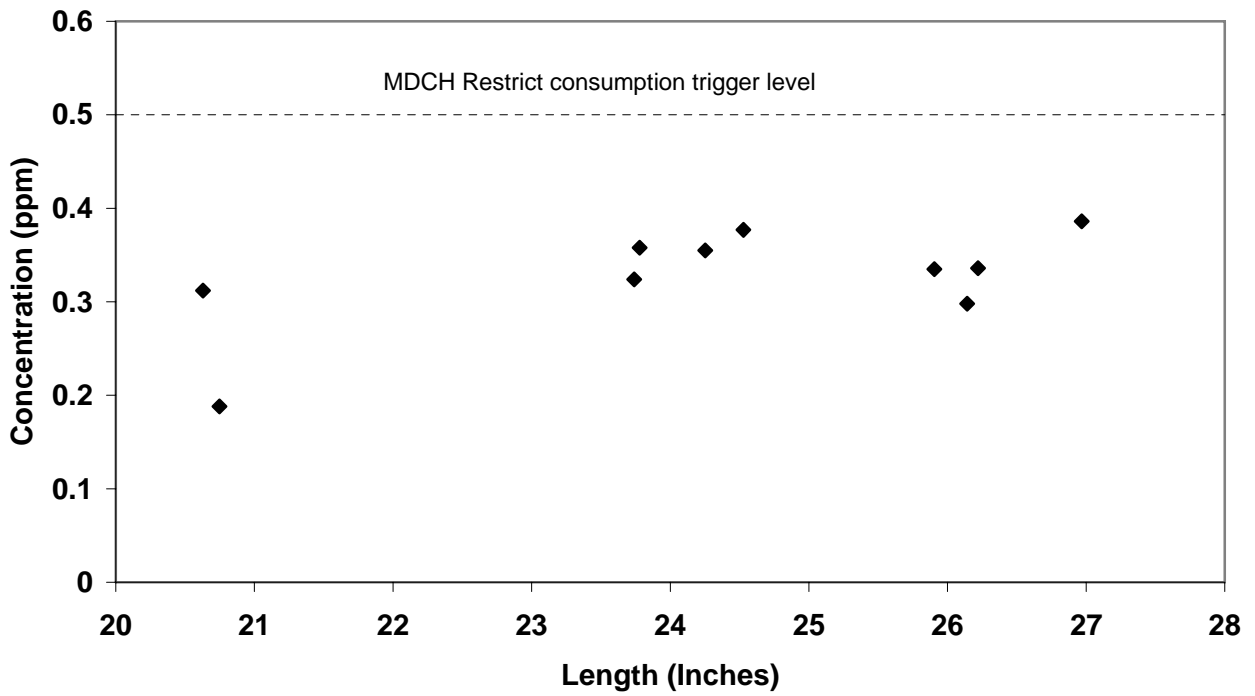


Figure 28. Total length versus total mercury concentration in northern pike collected from Bass Lake (East), Marquette County, in 2007 (ID 2007202).

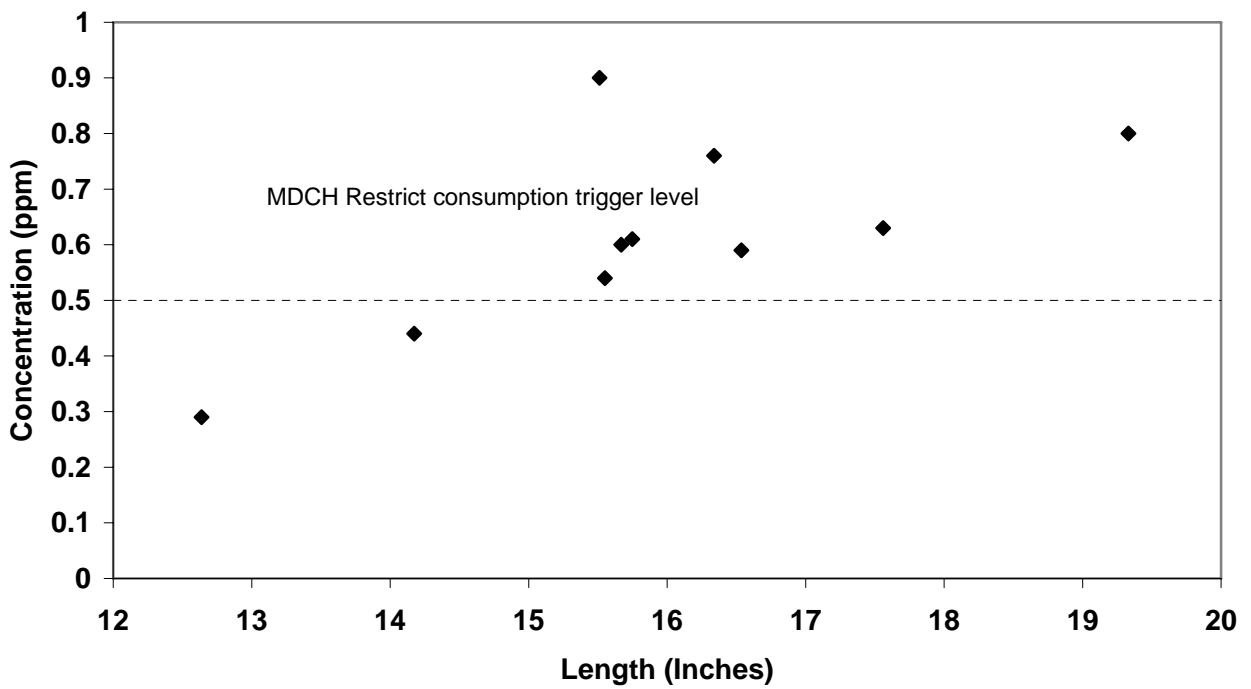


Figure 29. Total length versus total mercury concentration in largemouth bass collected from Crockery Lake, Ottawa County, in 2006 (ID 2006009).

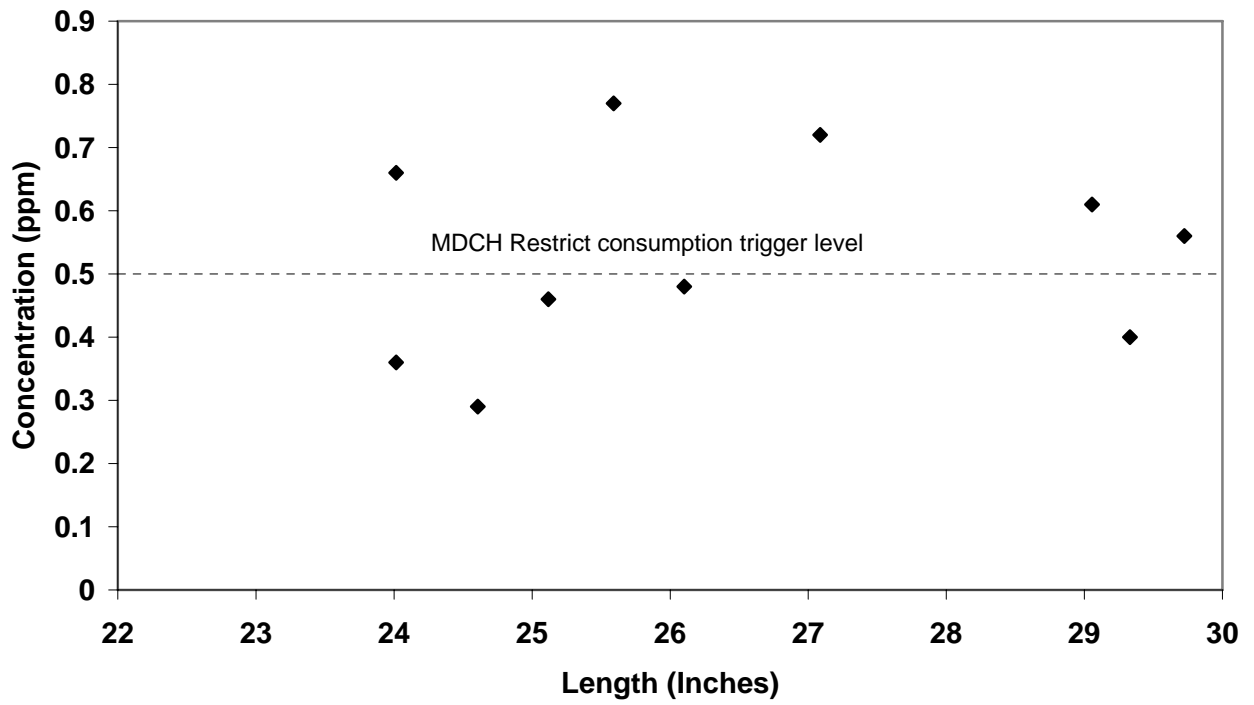


Figure 30. Total length versus total mercury concentration in northern pike collected from Dodge Lake, Schoolcraft County, in 2006 (ID 2006121).

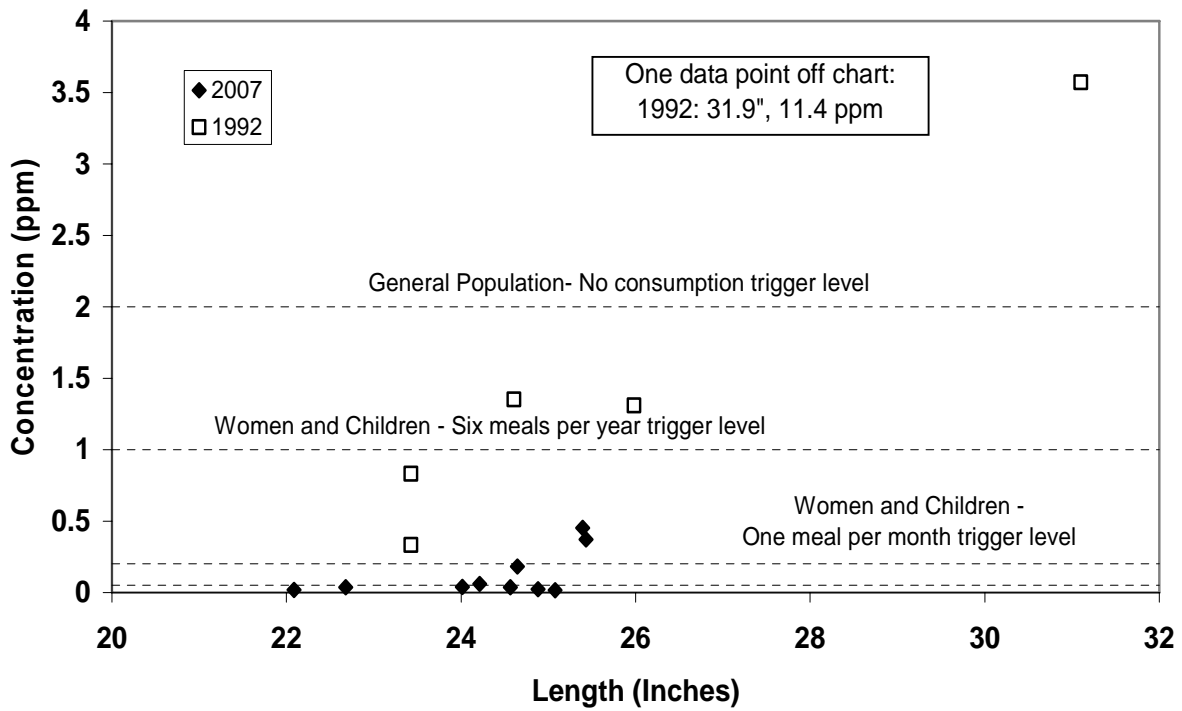


Figure 31. Total length versus total PCB concentration in carp collected from Galien River, Berrien County, in 1992 (ID 92017) and 2007 (ID 2007215).

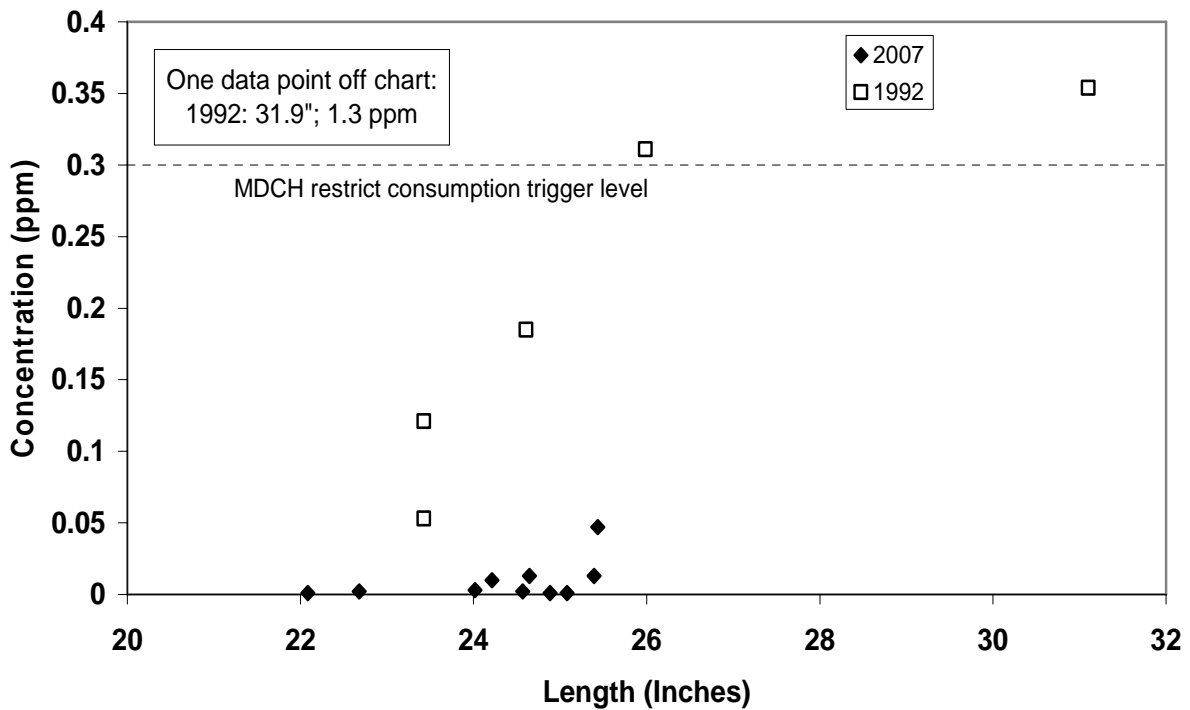


Figure 32. Total length versus total chlordane concentration in carp collected from Galien River, Berrien County, in 1992 (ID 92017) and 2007 (ID 2007215).

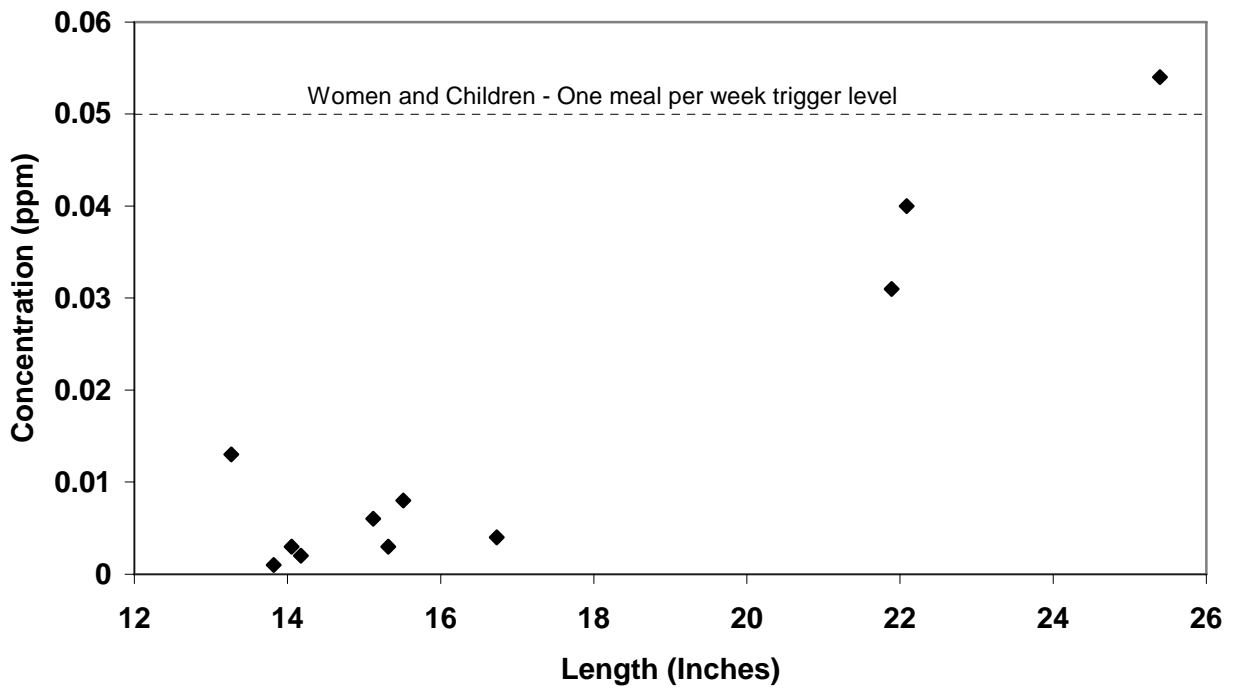


Figure 33. Total length versus total PCB concentration in rainbow trout collected from Glen Lake, Leelanau County, in 2007 (ID 2007216).

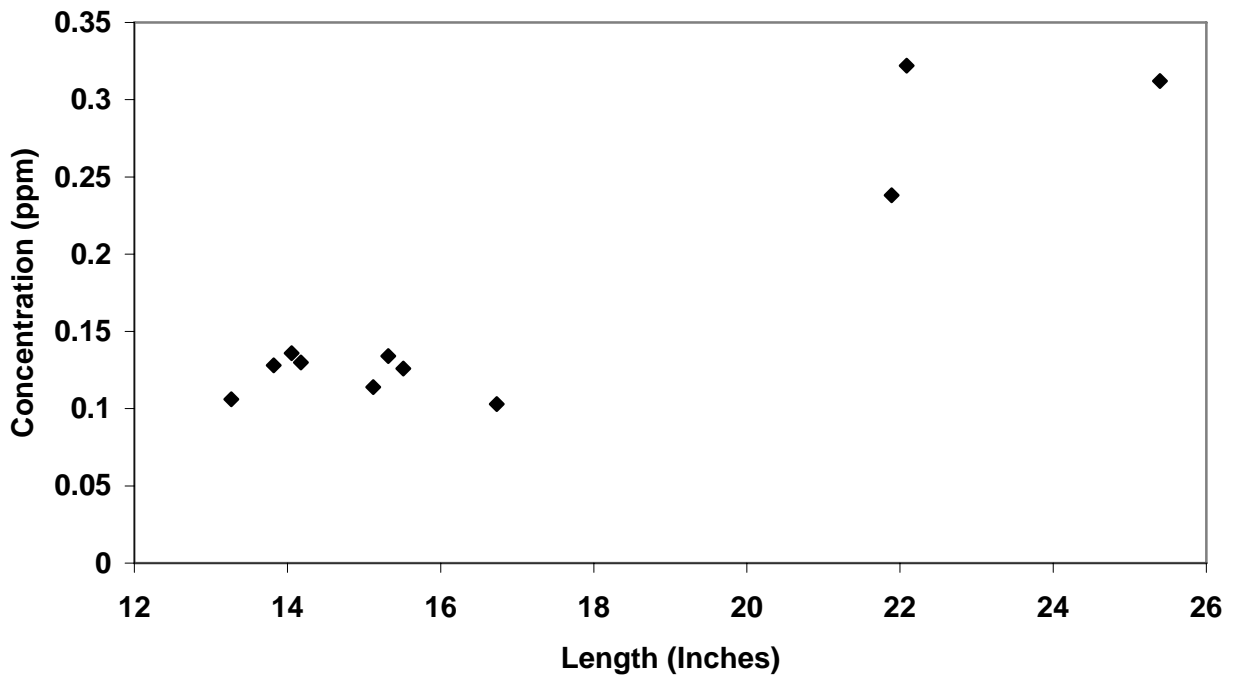


Figure 34. Total length versus total mercury concentration in rainbow trout collected from Glen Lake, Leelanau County, in 2007 (ID 2007216).

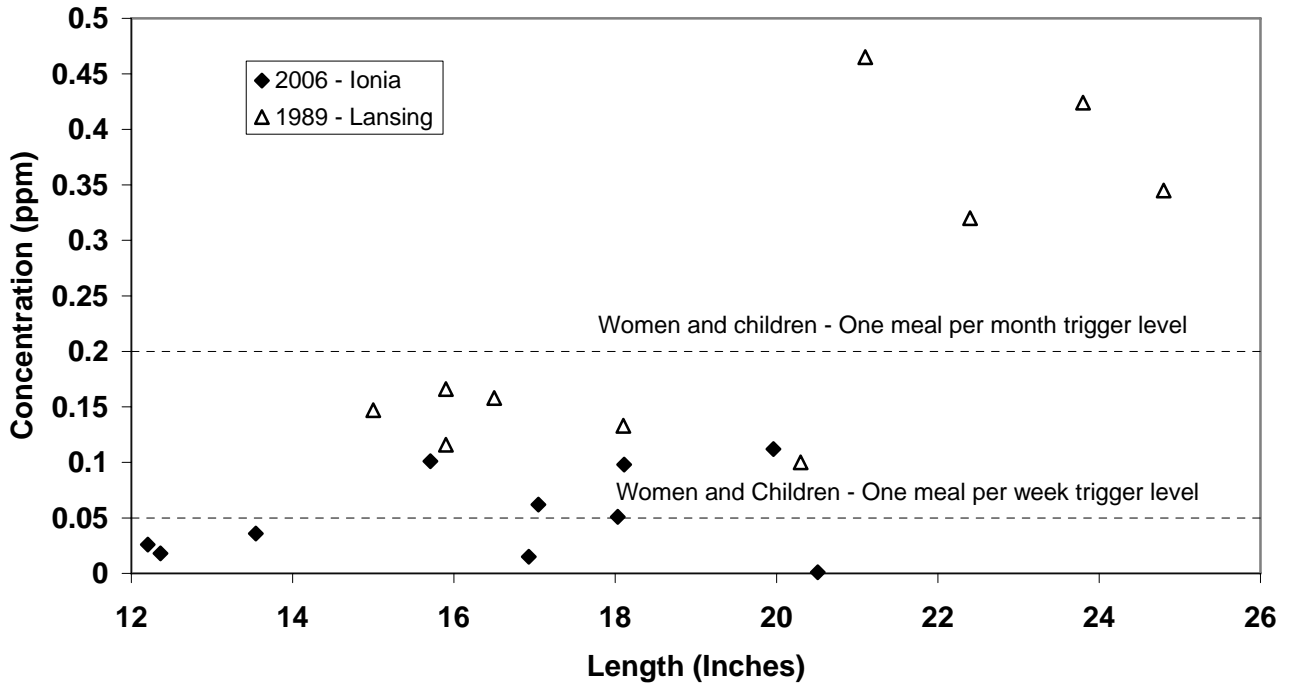


Figure 35. Total length versus total PCB concentration in channel catfish collected from the Grand River at Lansing in 1989 (ID 89054) and Ionia in 2006 (ID 2006103).

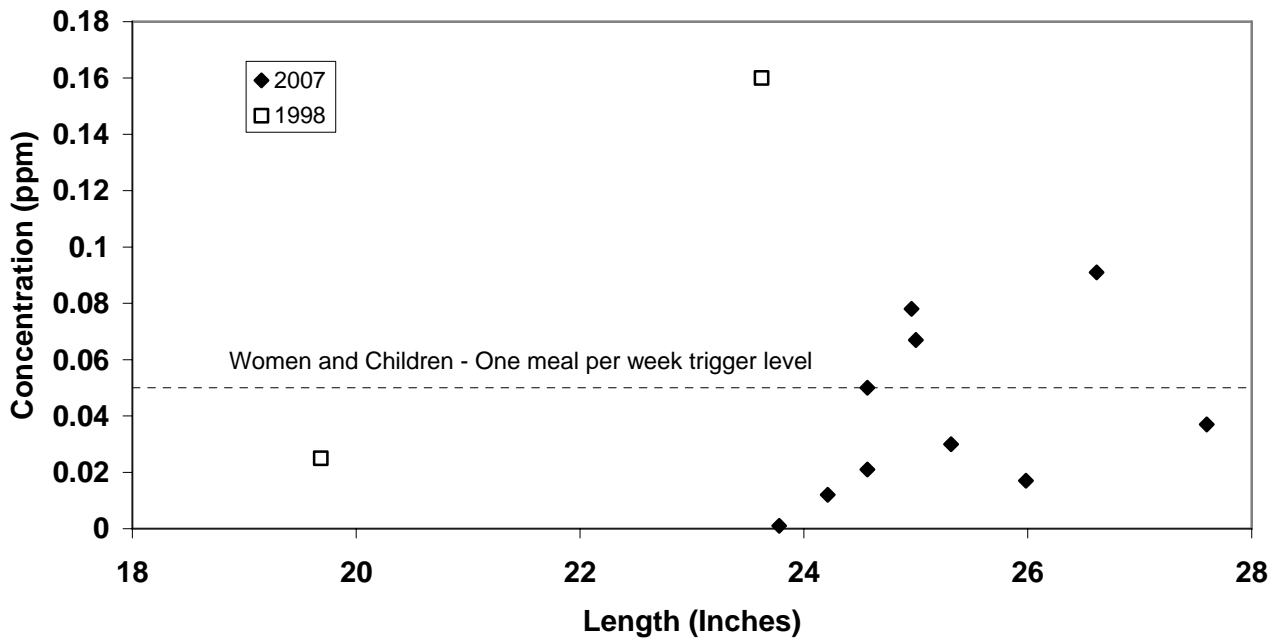


Figure 36. Total length versus total PCB concentration in northern pike collected from the Grand River, below the 6th street dam, in 1998 (ID 1998148) and 2007 (ID 2007300).

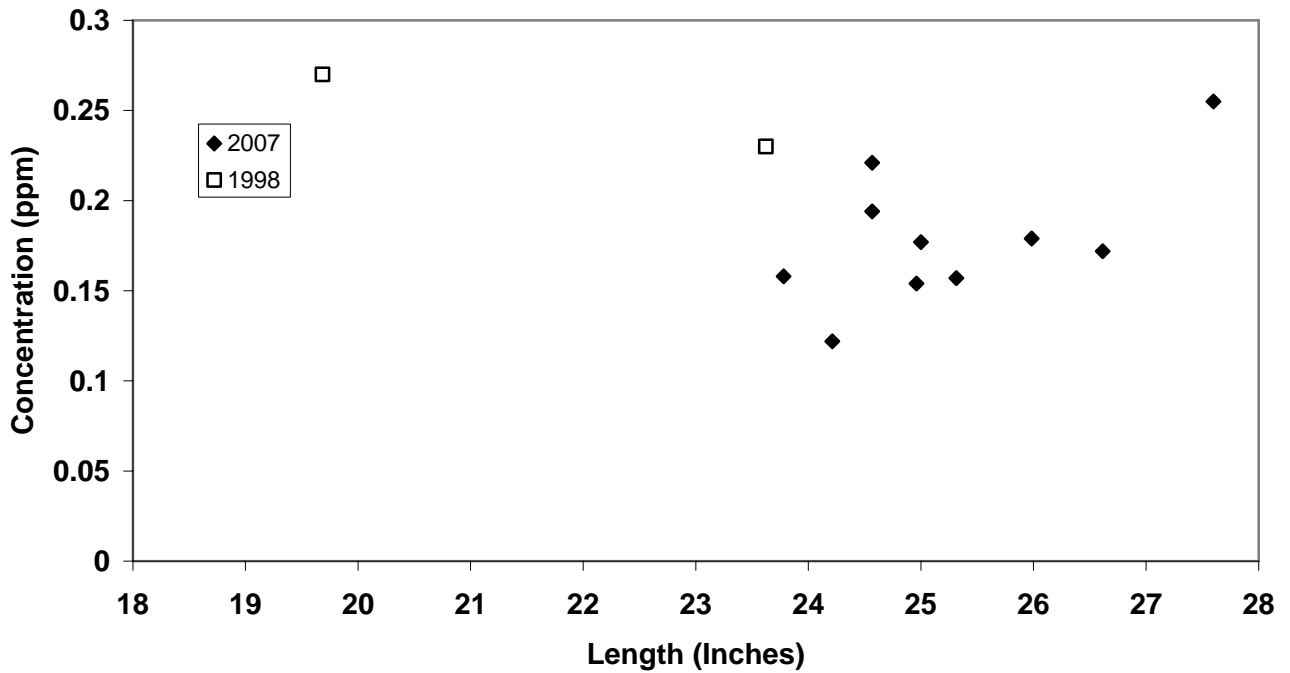


Figure 37. Total length versus total mercury concentration in northern pike collected from the Grand River, below the 6th street dam, in 1998 (ID 1998148) and 2007 (ID 2007300).



Figure 38. Total length versus total PCB concentration in white sucker and redhorse sucker collected from the Grand River at Ionia in 2006 (ID 2006103).

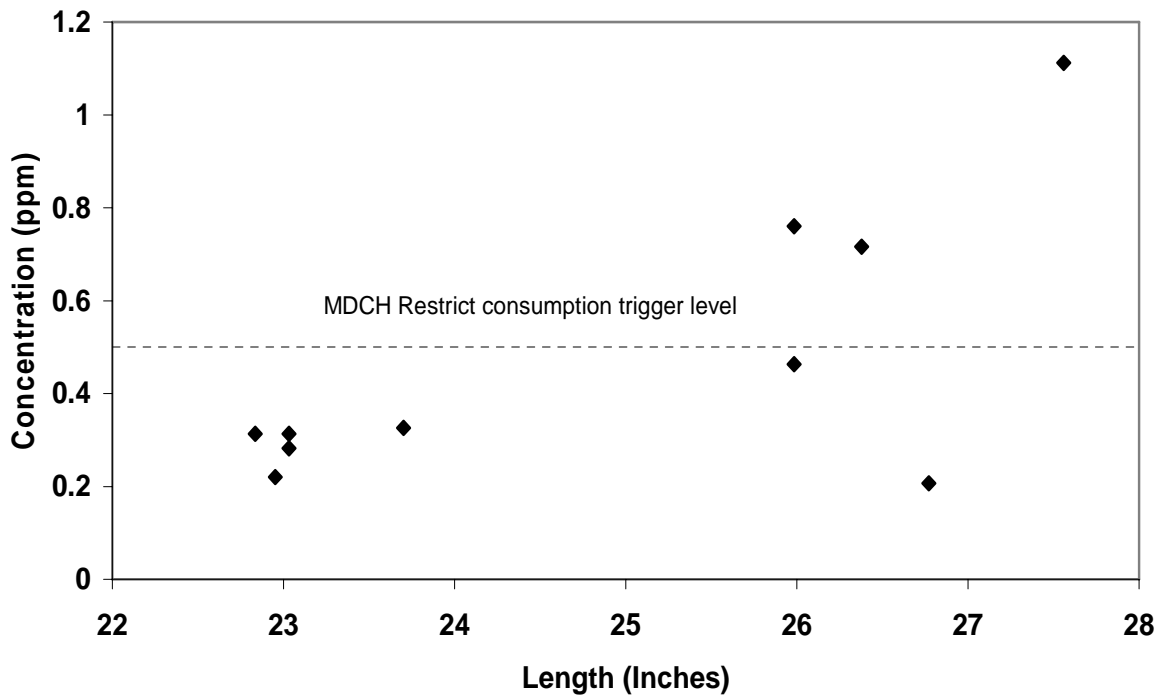


Figure 39. Total length versus total mercury concentration in northern pike collected from Klinger Lake, St. Joseph County, in 2006 (ID 2006126).

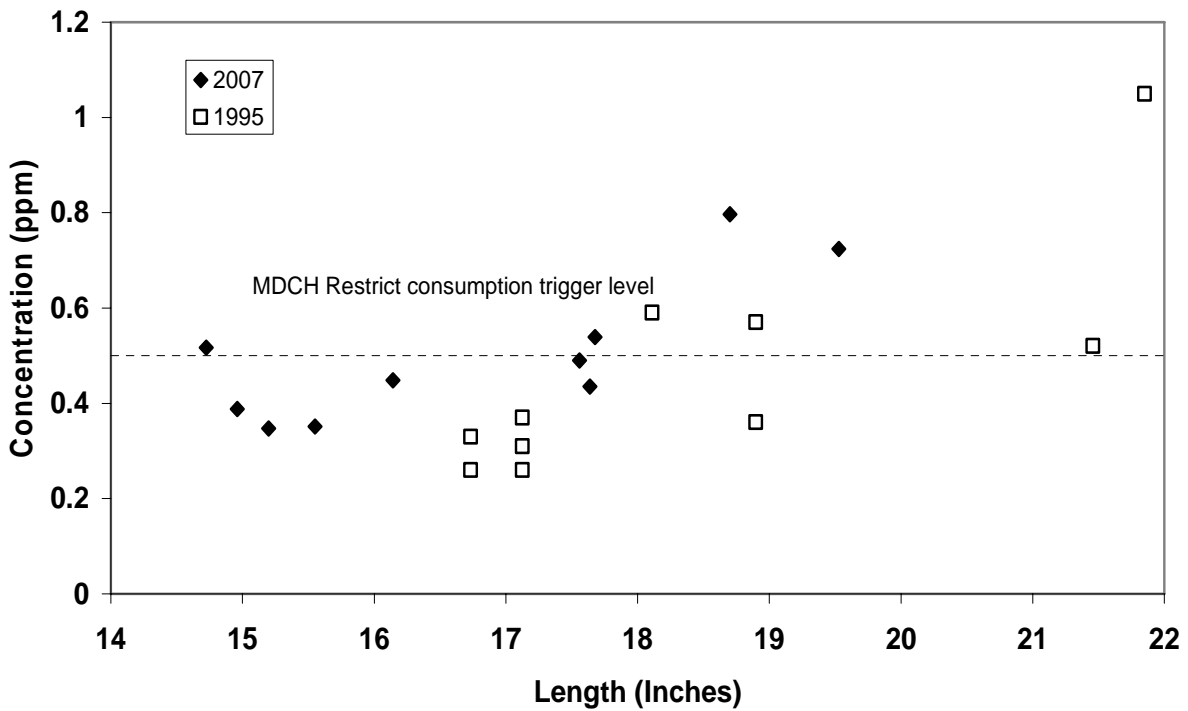


Figure 40. Total length versus total mercury concentration in walleye collected from Lake Margrethe, Crawford County, in 1995 (ID 95002) and 2007 (ID 2007227).

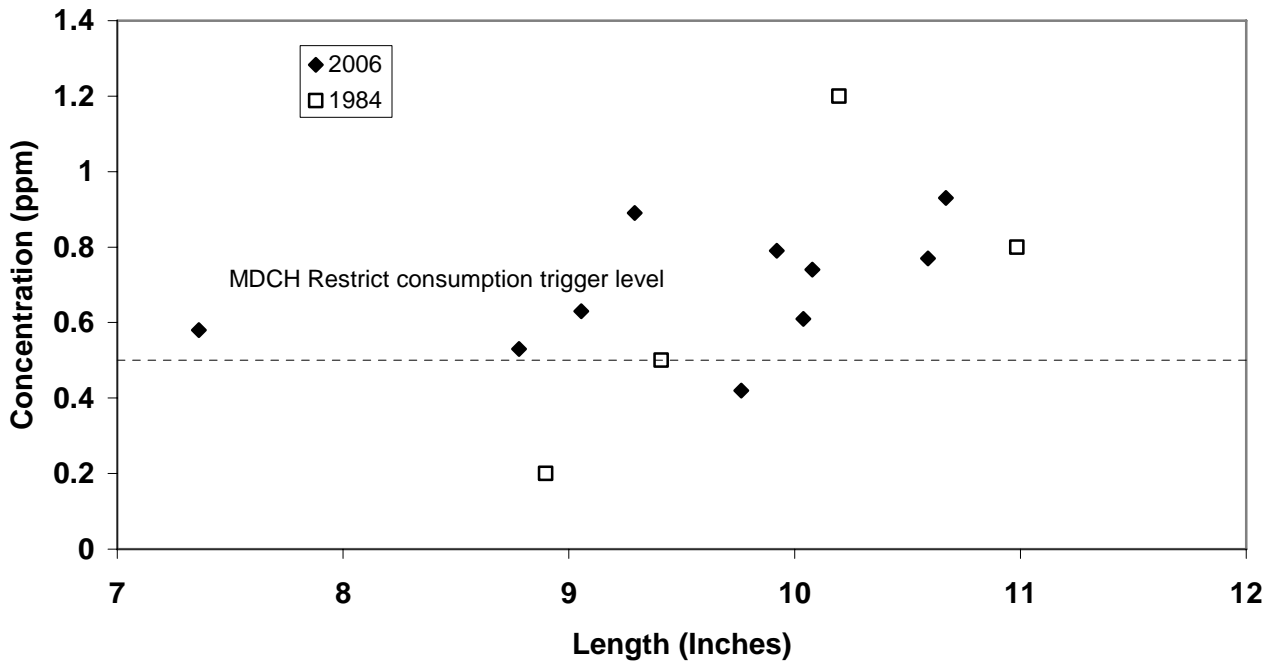


Figure 41. Total length versus total mercury concentration in rock bass collected from Lake Michigamme, Marquette County, in 1984 (ID 84019) and 2006 (ID 2006035).

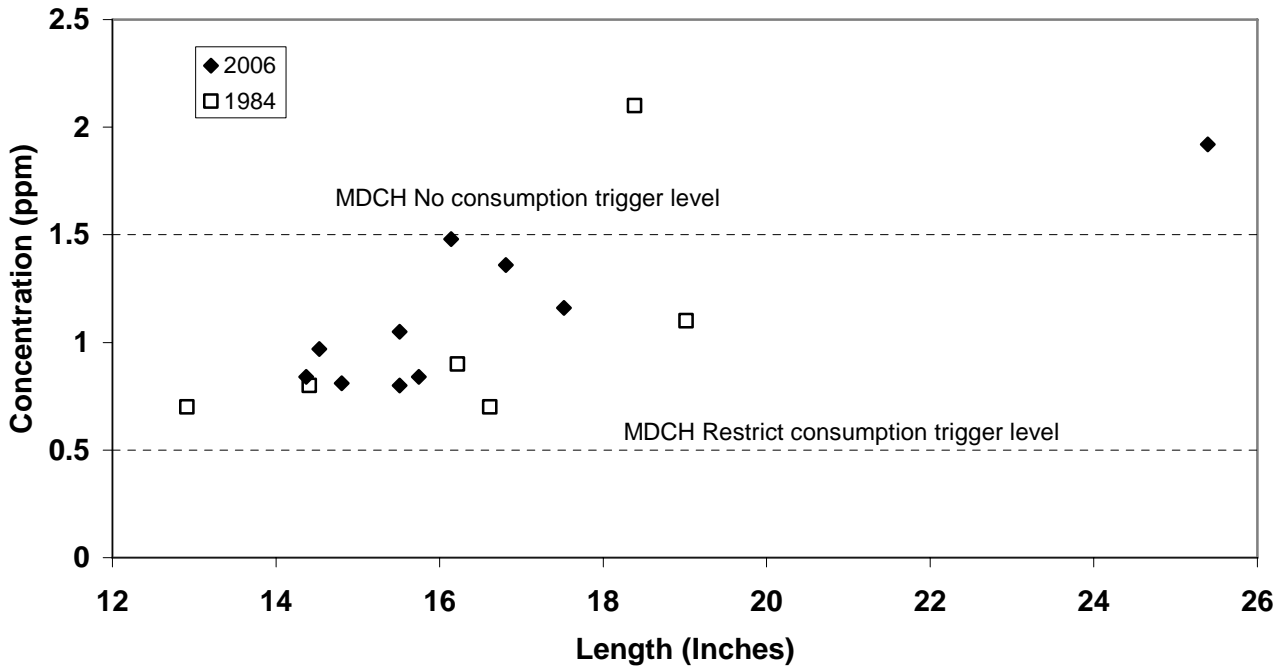


Figure 42. Total length versus total mercury concentration in walleye collected from Lake Michigamme, Marquette County, in 1984 (ID 84019) and 2006 (ID 2006035).

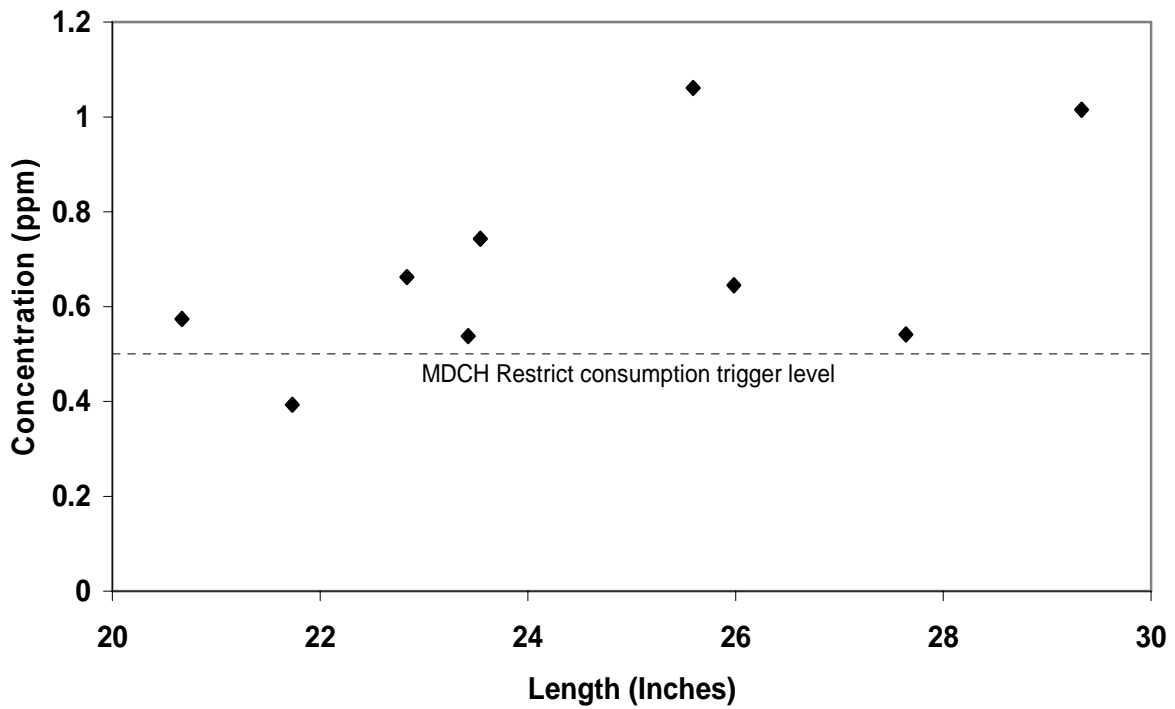


Figure 43. Total length versus total mercury concentration in walleye collected from Long Lake, Iron County, in 2007 (ID 2007235).

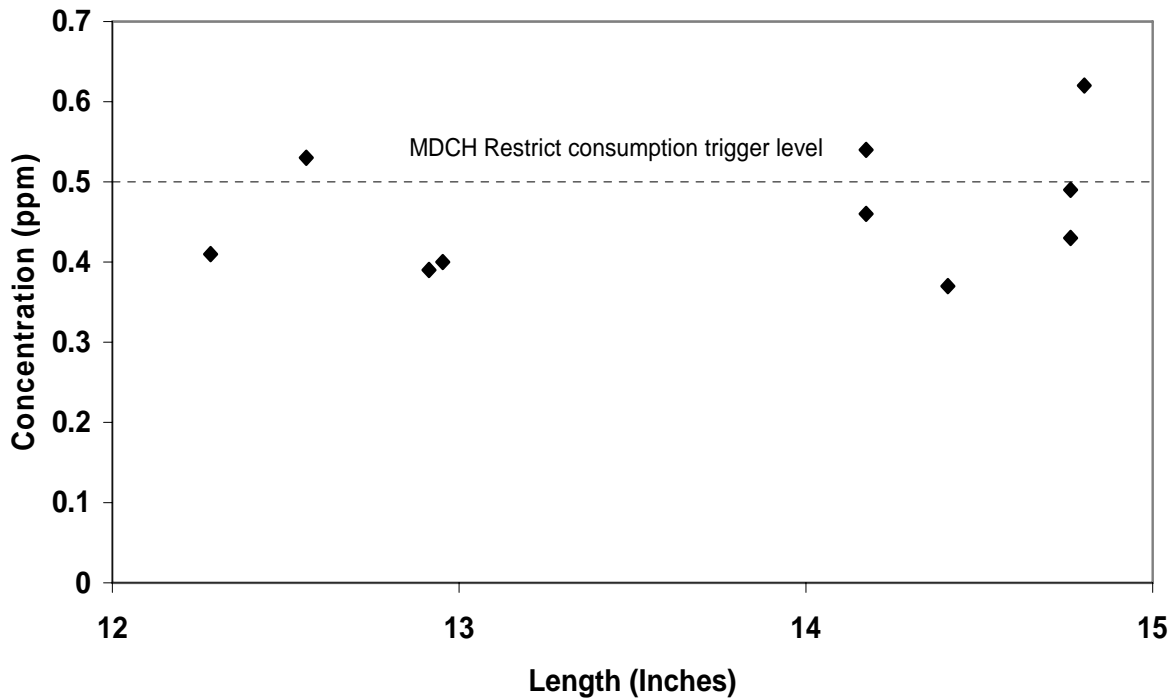


Figure 44. Total length versus total mercury concentration in largemouth bass collected from Long Lake, Kent County, in 2006 (ID 2006044).

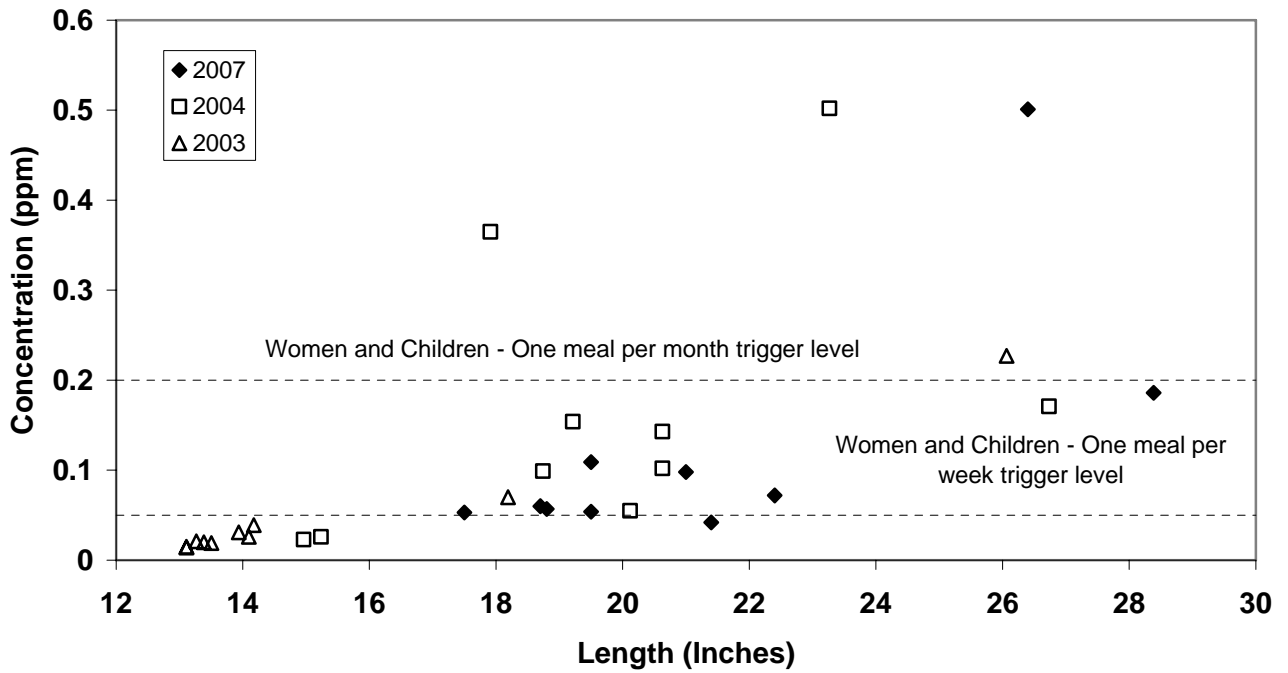


Figure 45. Total length versus total PCB concentration in walleye collected from the Manistique River, downstream of Manistique Papers Dam, in 2003 (ID 2003077), 2004 (ID 2004072), and 2007 (ID 2007238).

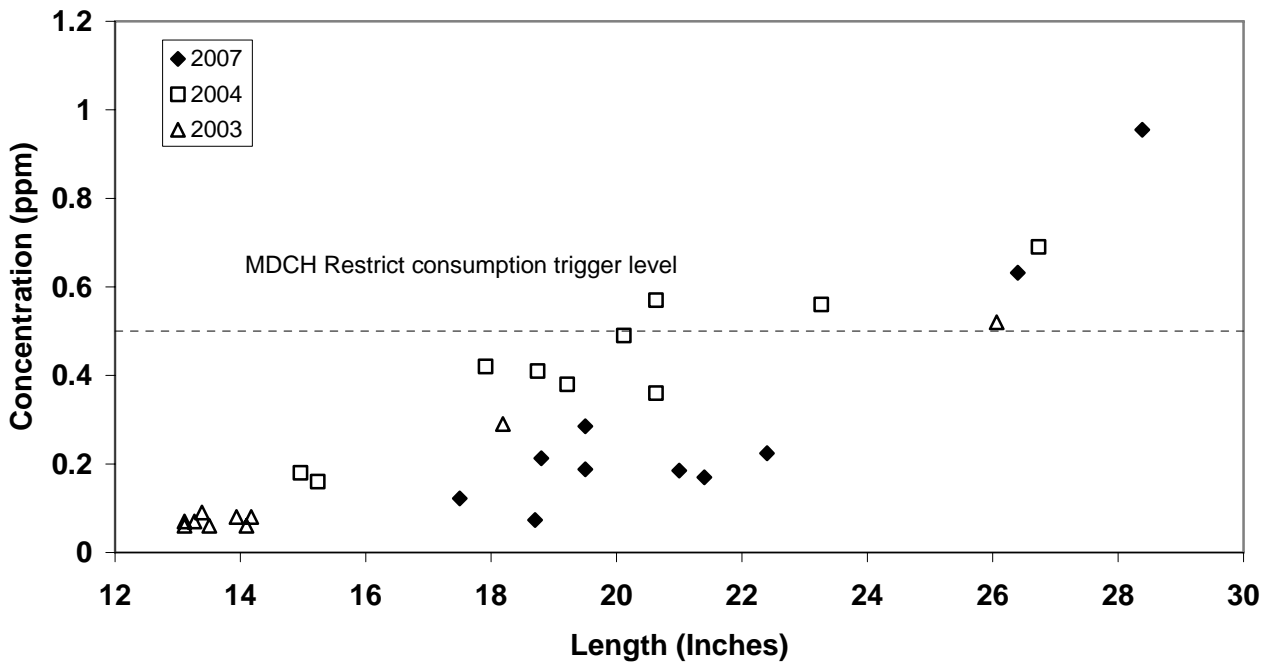


Figure 46. Total length versus total mercury concentration in walleye collected from the Manistique River, downstream of Manistique Papers Dam, in 2003 (ID 2003077), 2004 (ID 2004072), and 2007 (ID 2007238).

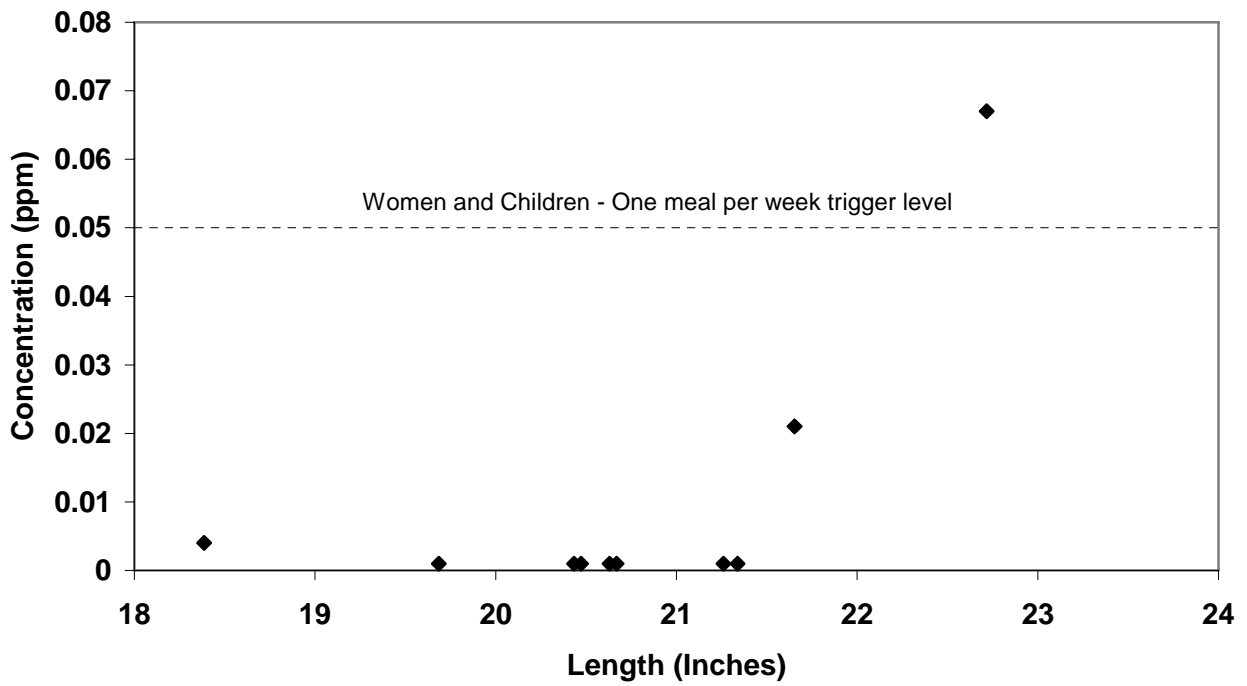


Figure 47. Total length versus total PCB concentration in carp collected from the Maple River, upstream of Matherton in 2006 (ID 2006150).

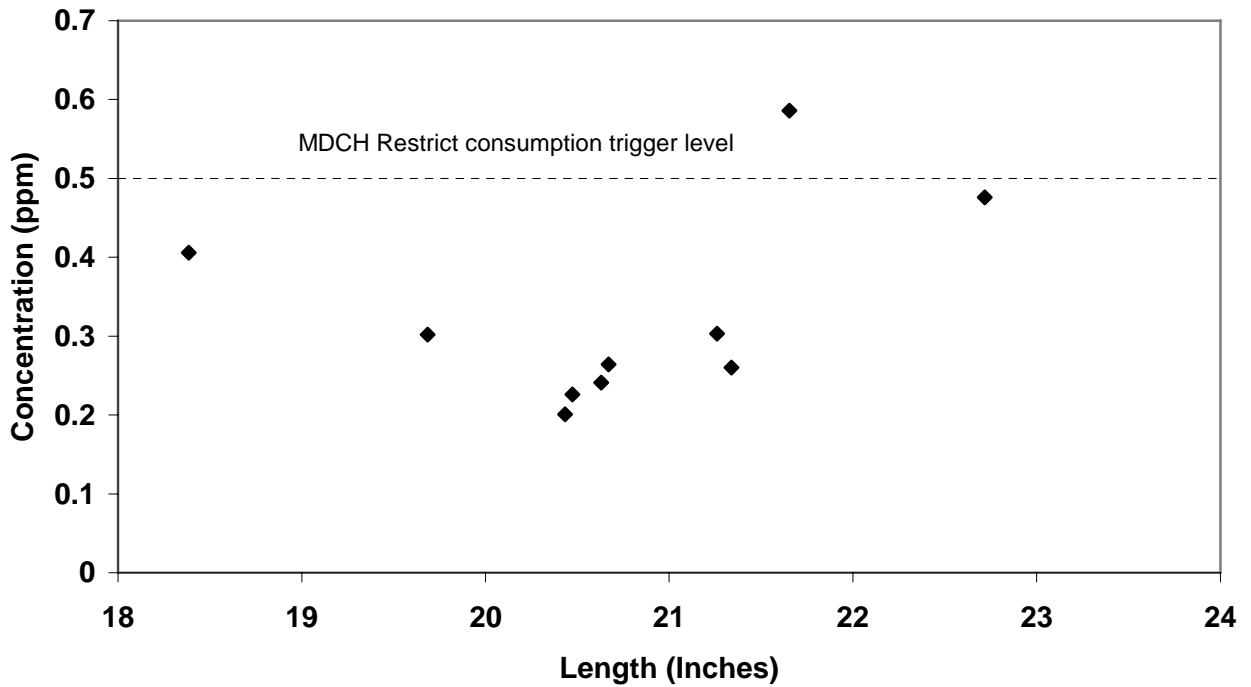


Figure 48. Total length versus total mercury concentration in carp collected from the Maple River, upstream of Matherton in 2006 (ID 2006150).

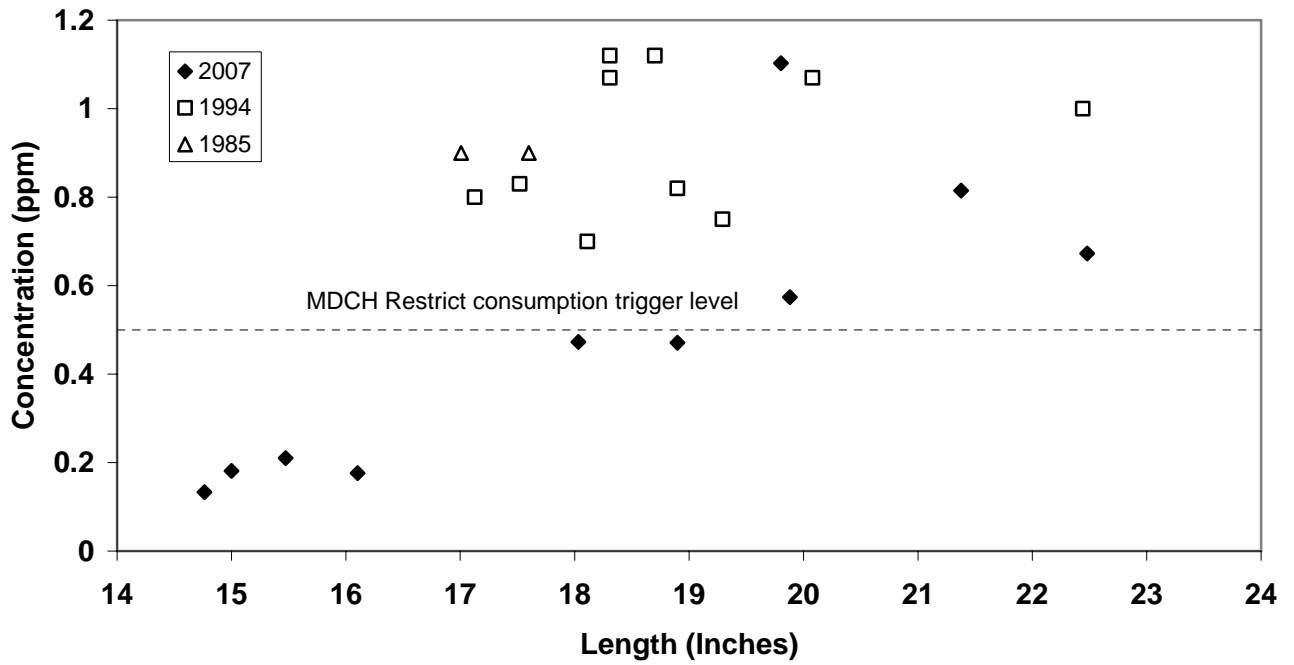


Figure 49. Total length versus total mercury concentration in walleye collected from Milakokia Lake, Mackinac County, in 1985 (ID 85061), 1994 (ID 94031), and 2007 (ID 2007241).

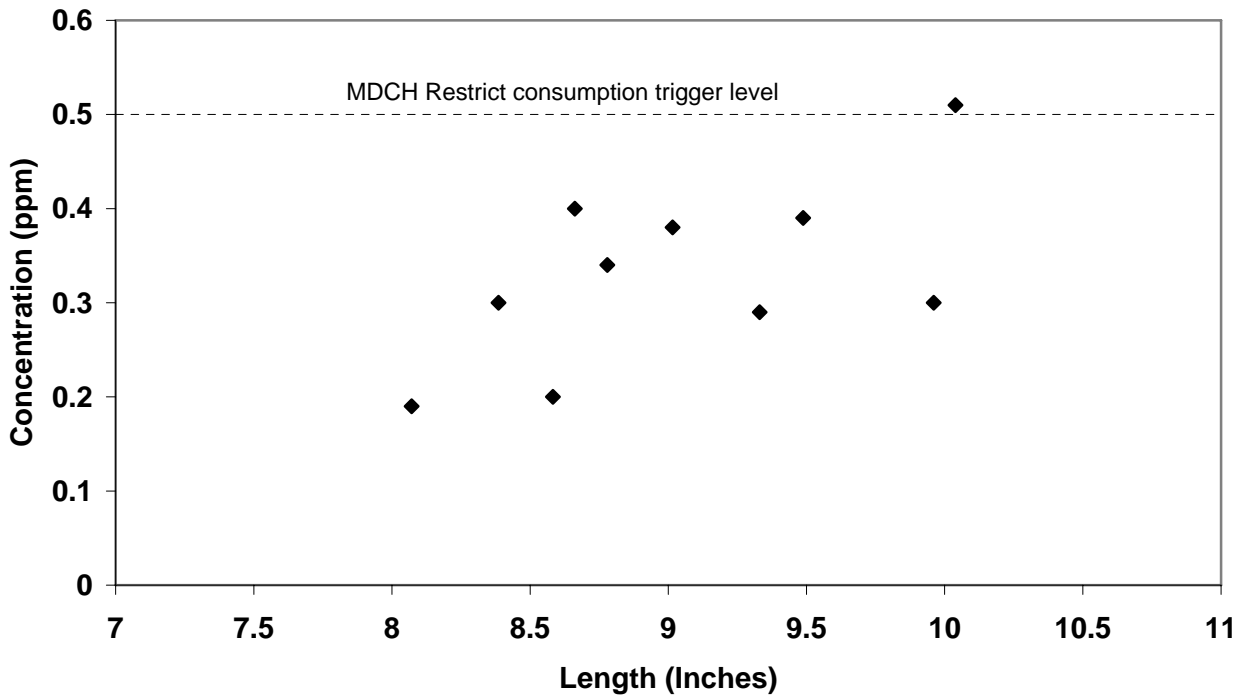


Figure 50. Total length versus total mercury concentration in rock bass collected from Millecoquins Lake, Mackinac County, in 2006 (ID 2006049).

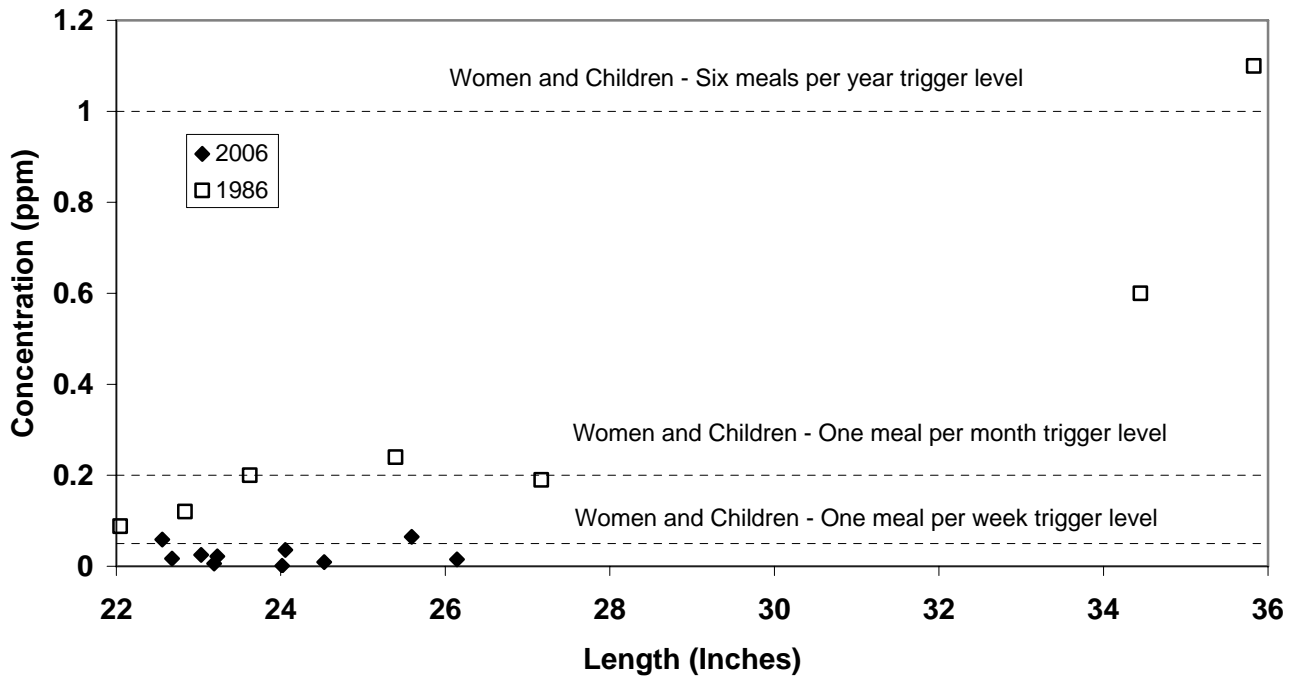


Figure 51. Total length versus total PCB concentration in northern pike collected from Muskegon Lake, Muskegon County, in 1986 (ID 86061) and 2006 (ID 2006050).

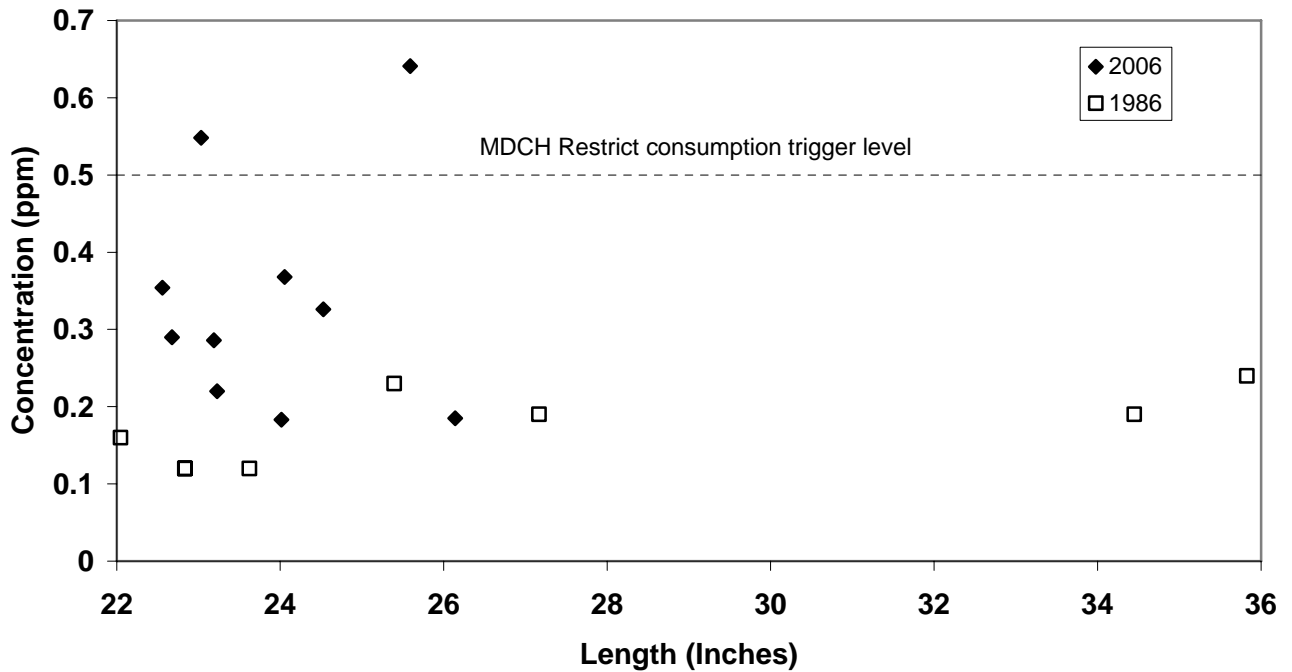


Figure 52. Total length versus total mercury concentration in northern pike collected from Muskegon Lake, Muskegon County, in 1986 (ID 86061) and 2006 (ID 2006050).

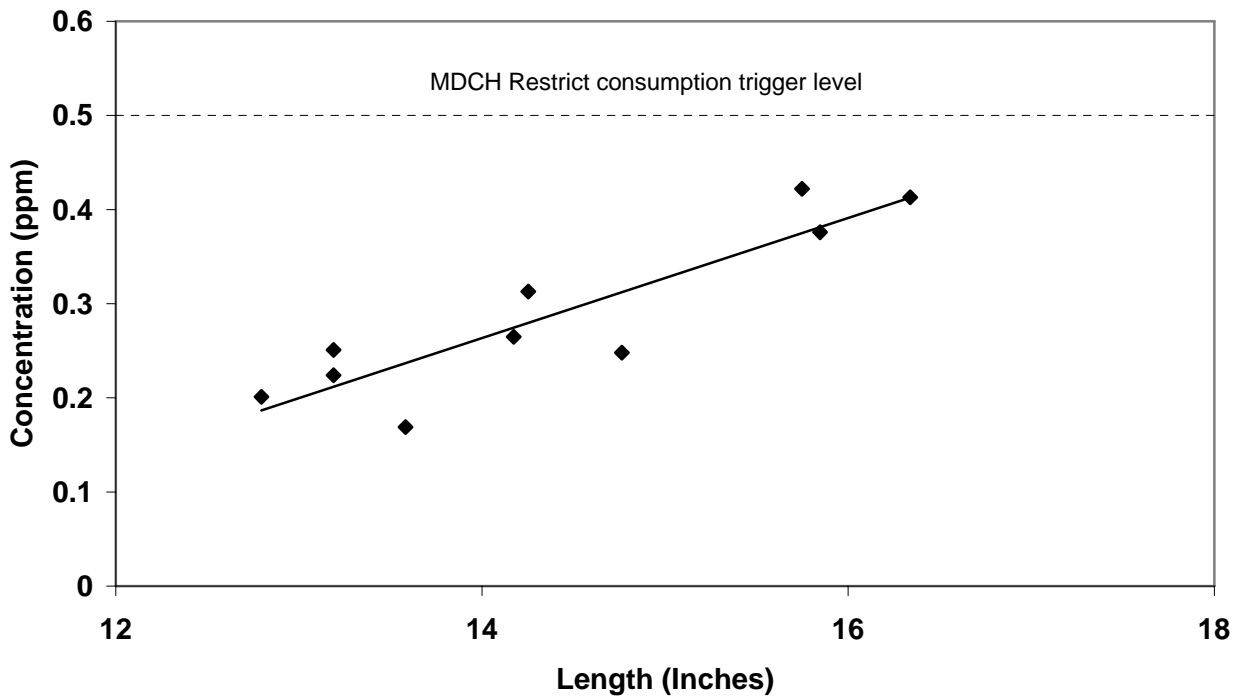


Figure 53. Total length versus total mercury concentration in largemouth bass collected from Osterhout Lake, Allegan County, in 2007 (ID 2007265).

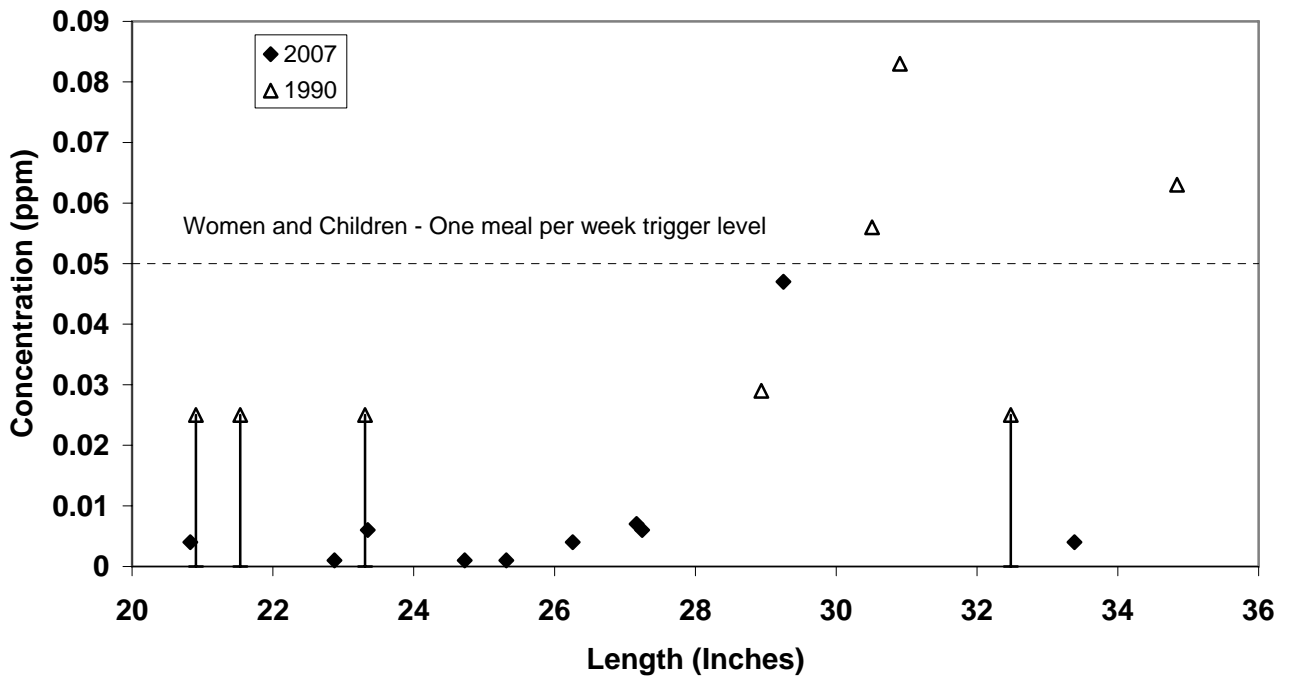


Figure 54. Total length versus total PCB concentration in northern pike collected from the Randall Lake Chain; Craig and Randall Lakes in 1990 (IDs 90014.1 & 90014.2) and Morrison Lake in 2007 (ID 2007242).

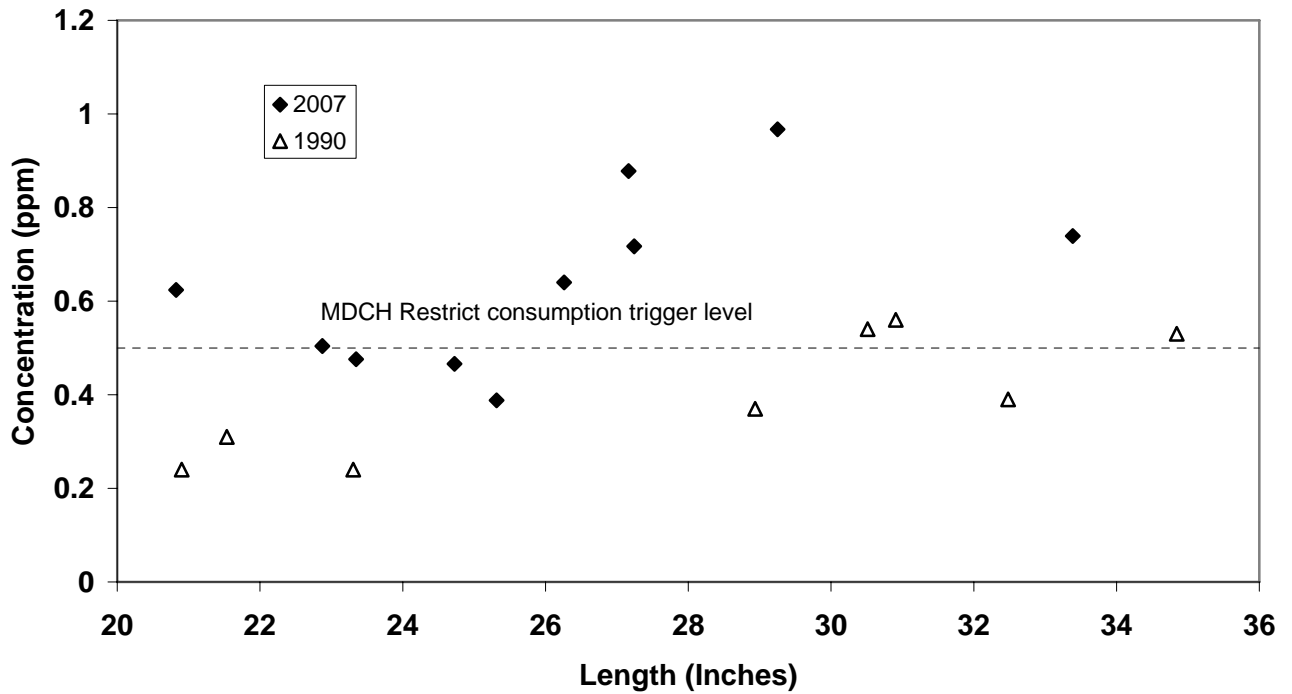


Figure 55. Total length versus total mercury concentration in northern pike collected from the Randall Lake Chain; Craig and Randall Lakes in 1990 (IDs 90014.1 & 90014.2) and Morrison Lake in 2007 (ID 2007242).

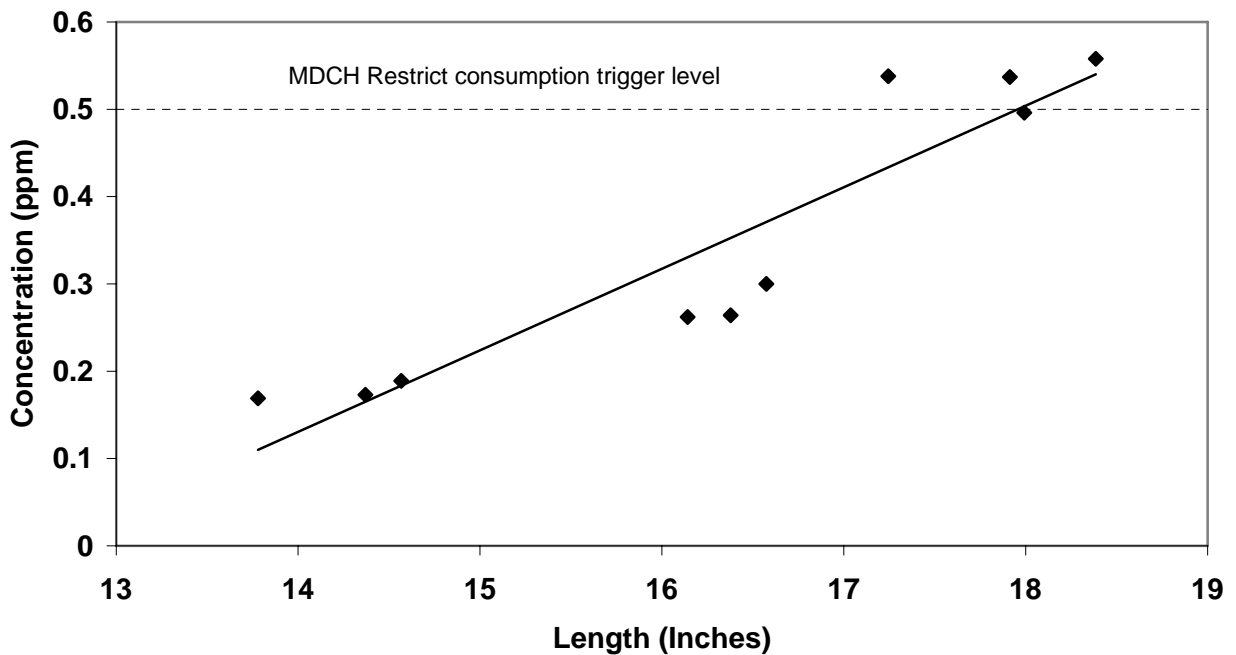


Figure 56. Total length versus total mercury concentration in walleye collected from Silver Lake, Grand Traverse County, in 2007 (ID 2007251).

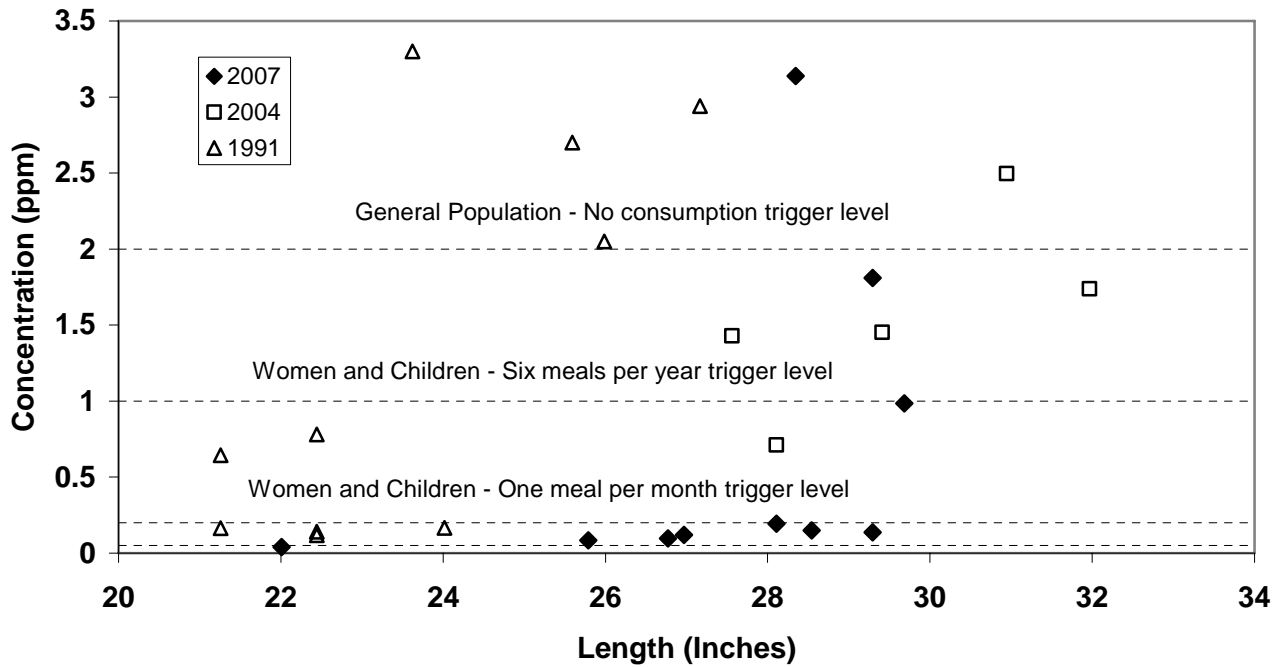


Figure 57. Total length versus total PCB concentration in carp collected from White Lake, Muskegon County, in 1991 (ID 91046), 2004 (ID 2004126), and 2007 (ID 2007258).

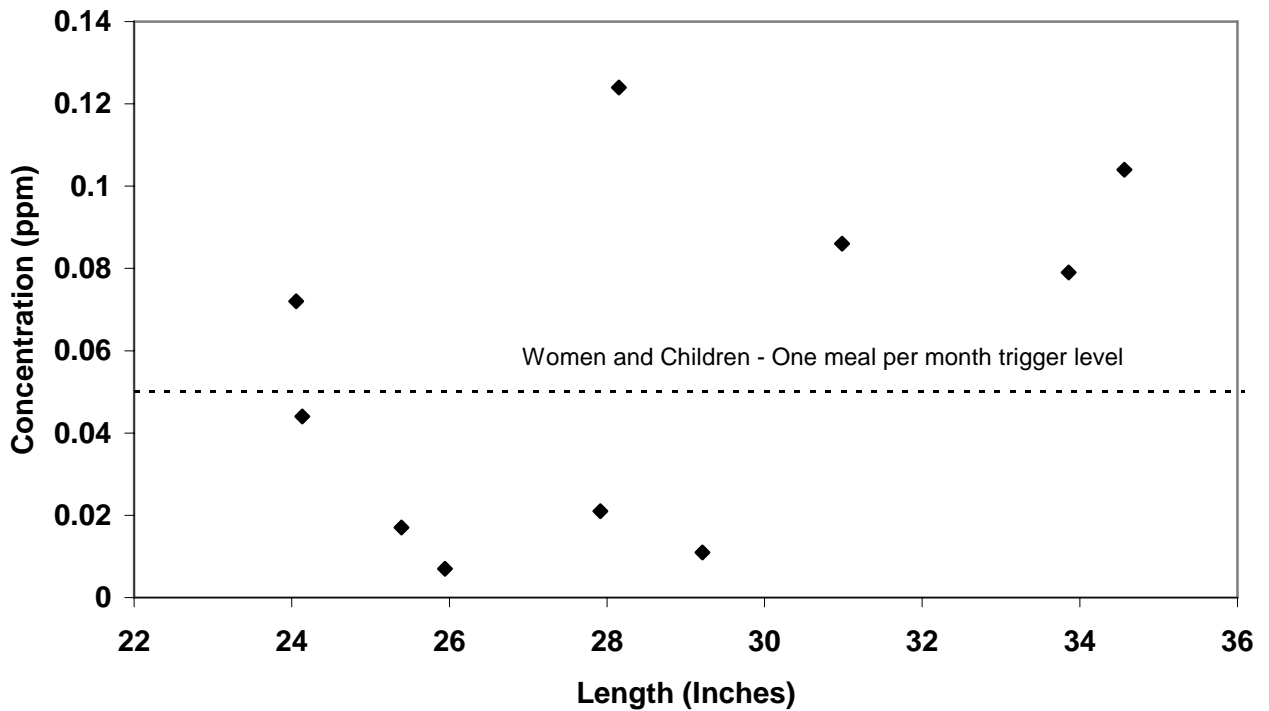


Figure 58. Total length versus total PCB concentration in northern pike collected from White Lake, Muskegon County in 2007 (ID 2007258).

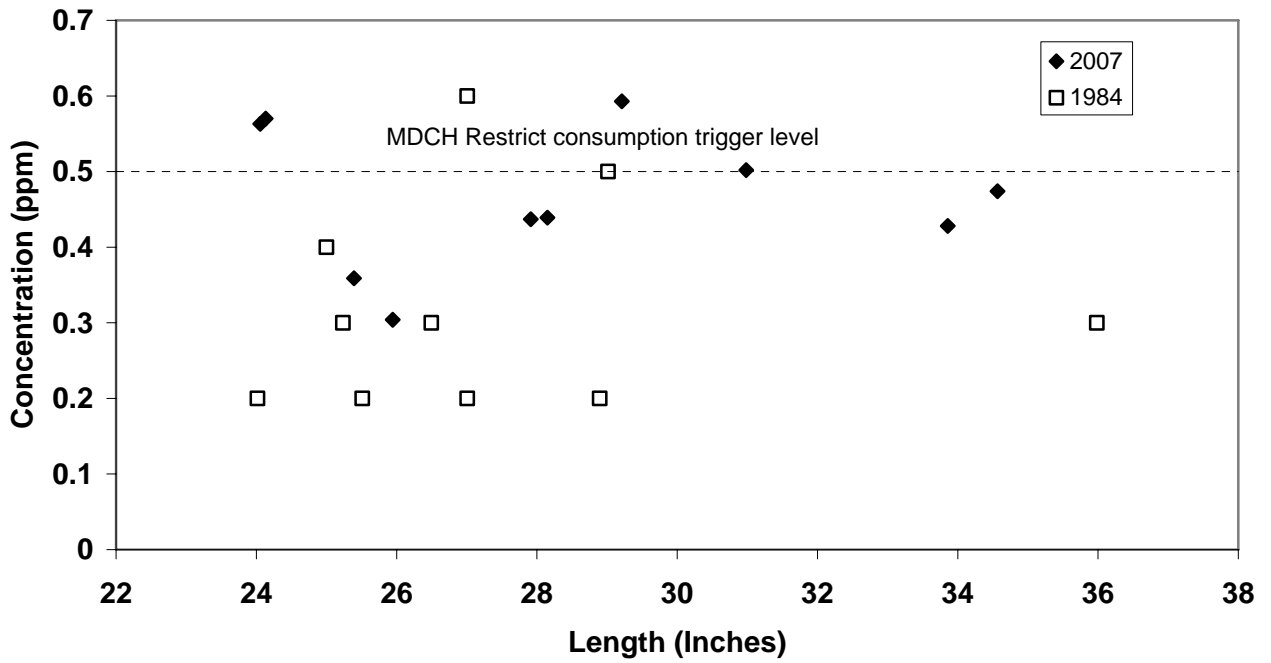


Figure 59. Total length versus total mercury concentration in northern pike collected from White Lake, Muskegon County, in 1984 (ID 84001) and 2007 (ID 2007258).



Figure 60. Total length versus total PCB concentration in lake herring collected from Lake Superior in 1994 (ID 94056), 1995 (ID 954066), 2000 (ID 2000046), and 2007 (ID 2007230).

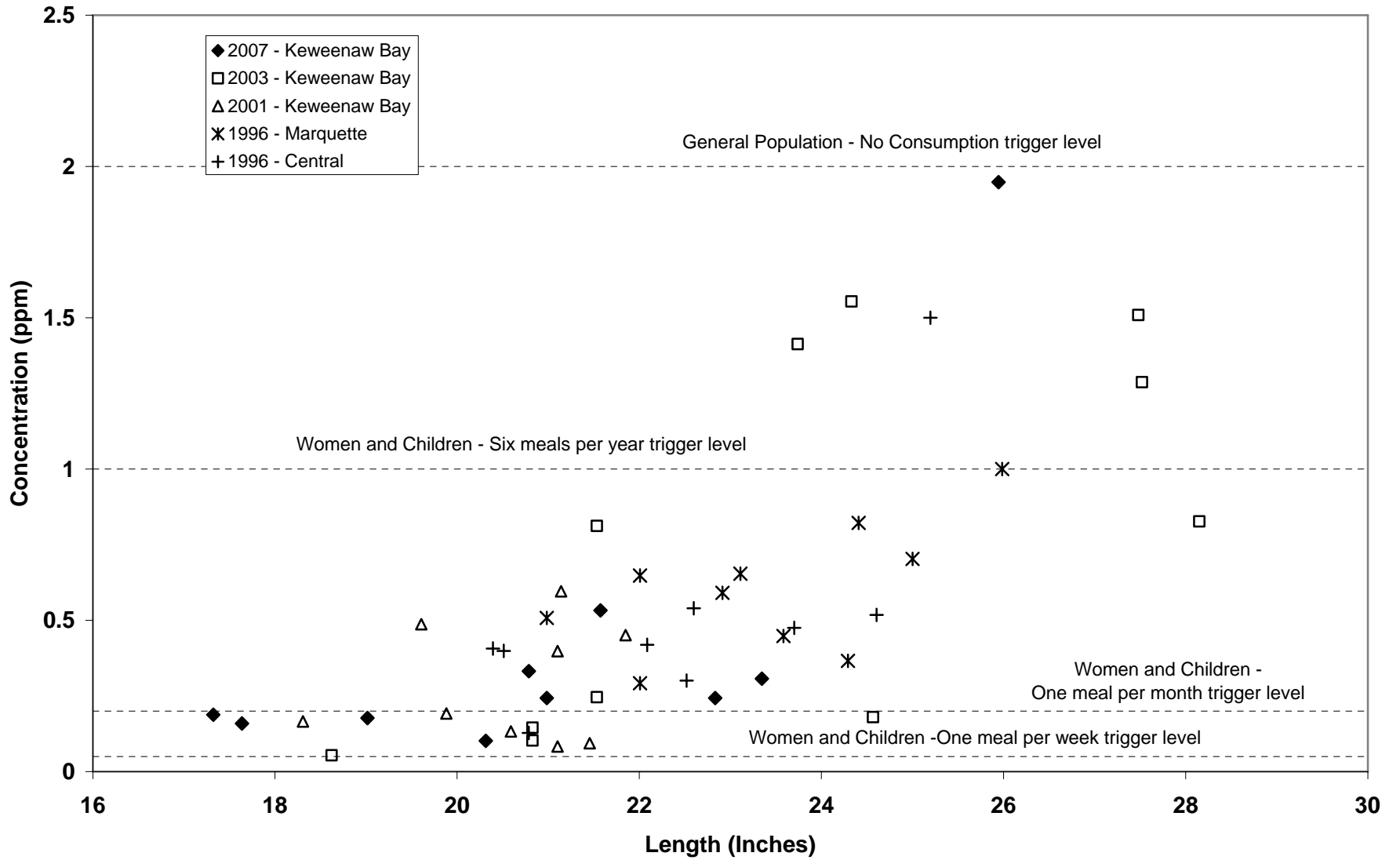


Figure 61. Total length versus total PCB concentration in siscowet collected from Lake Superior in 1996 (IDs 96034 & 96038), 2001 (ID 2001079), 2003 (ID 2003070), and 2007 (ID 2007230).

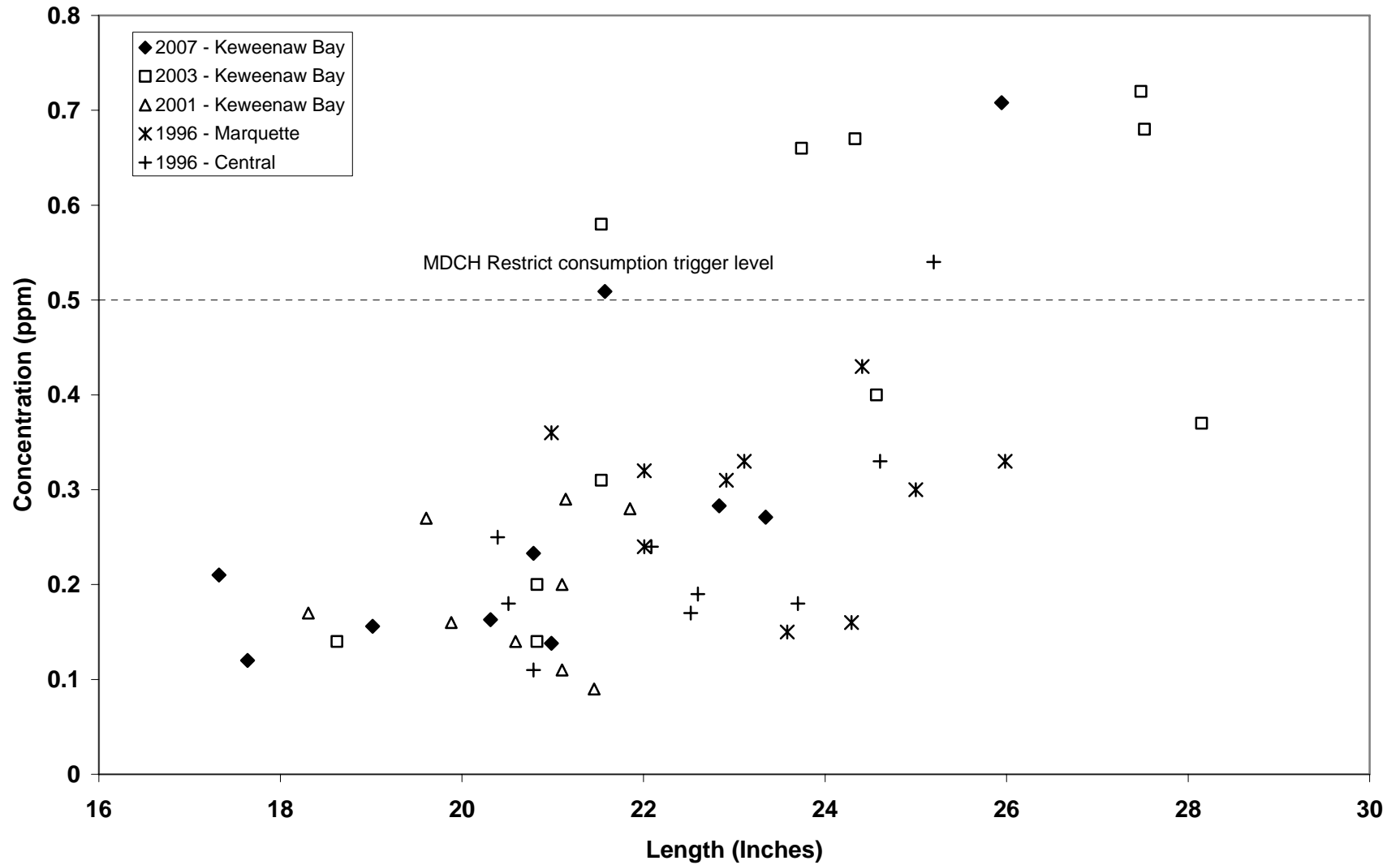


Figure 62. Total length versus mercury concentration in siscowet collected from Lake Superior in 1996 (IDs 96034 & 96038), 2001 (ID 2001079), 2003 (ID 2003070), and 2007 (ID 2007230).

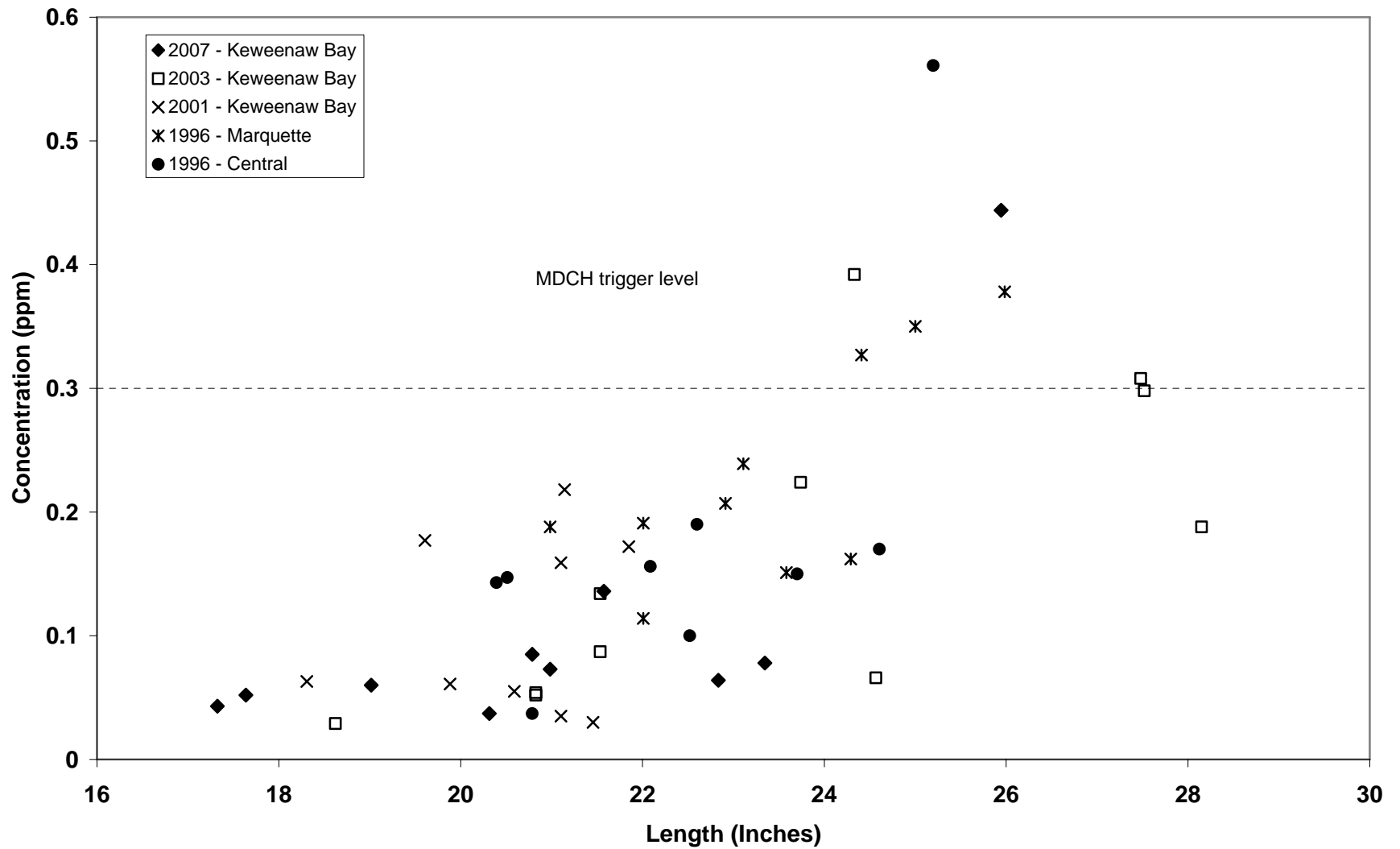


Figure 63. Total length versus total chlordane concentration in siscowet collected from Lake Superior in 1996 (IDs 96034 & 96038), 2001 (ID 2001079), 2003 (ID 2003070), and 2007 (ID 2007230).

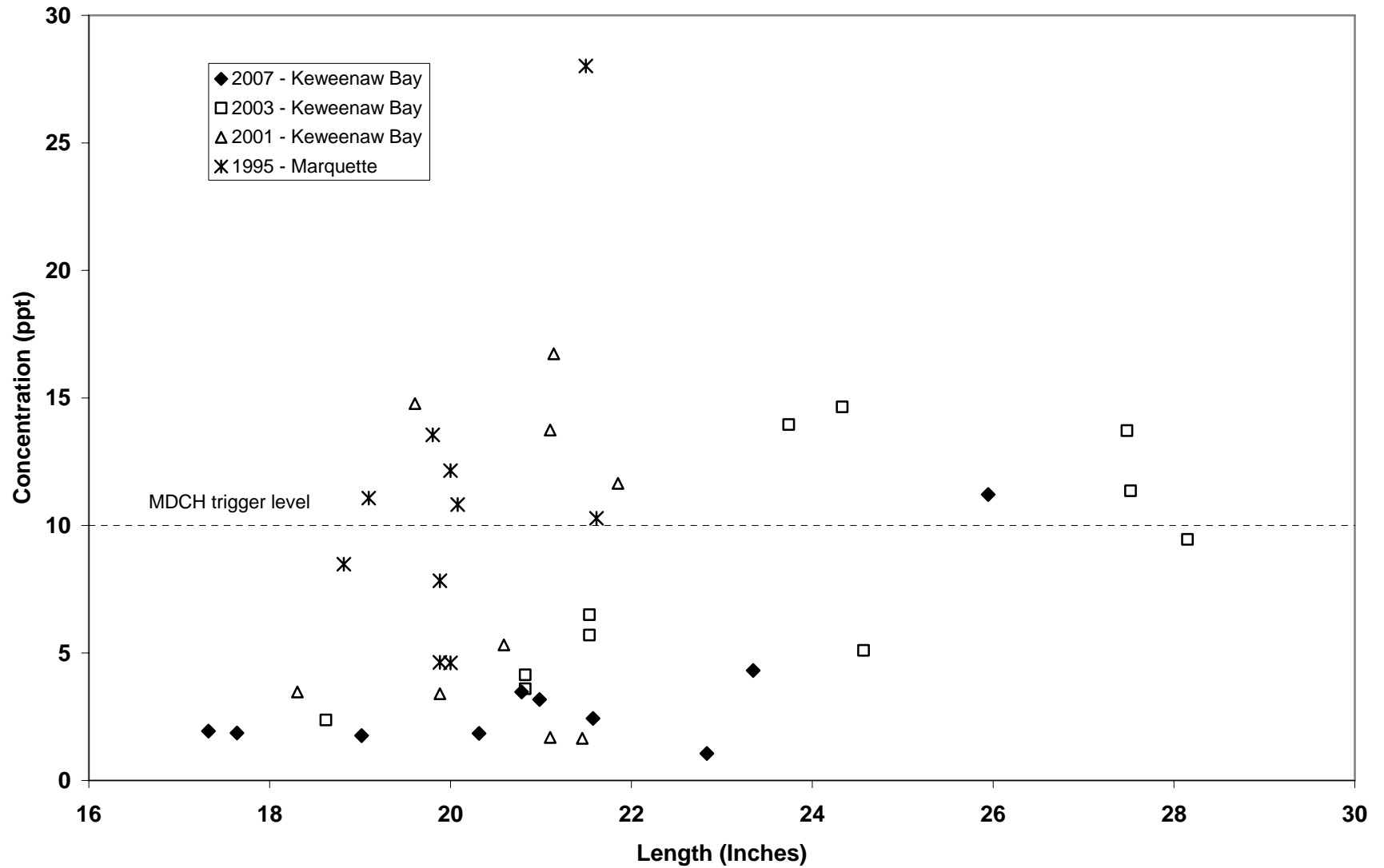


Figure 64. Total length versus dioxin TEQ concentration in siscowet collected from Lake Superior in 1995 (ID 95065), 2001 (ID 2001079), 2003 (ID 2003070), and 2007 (ID 2007230).

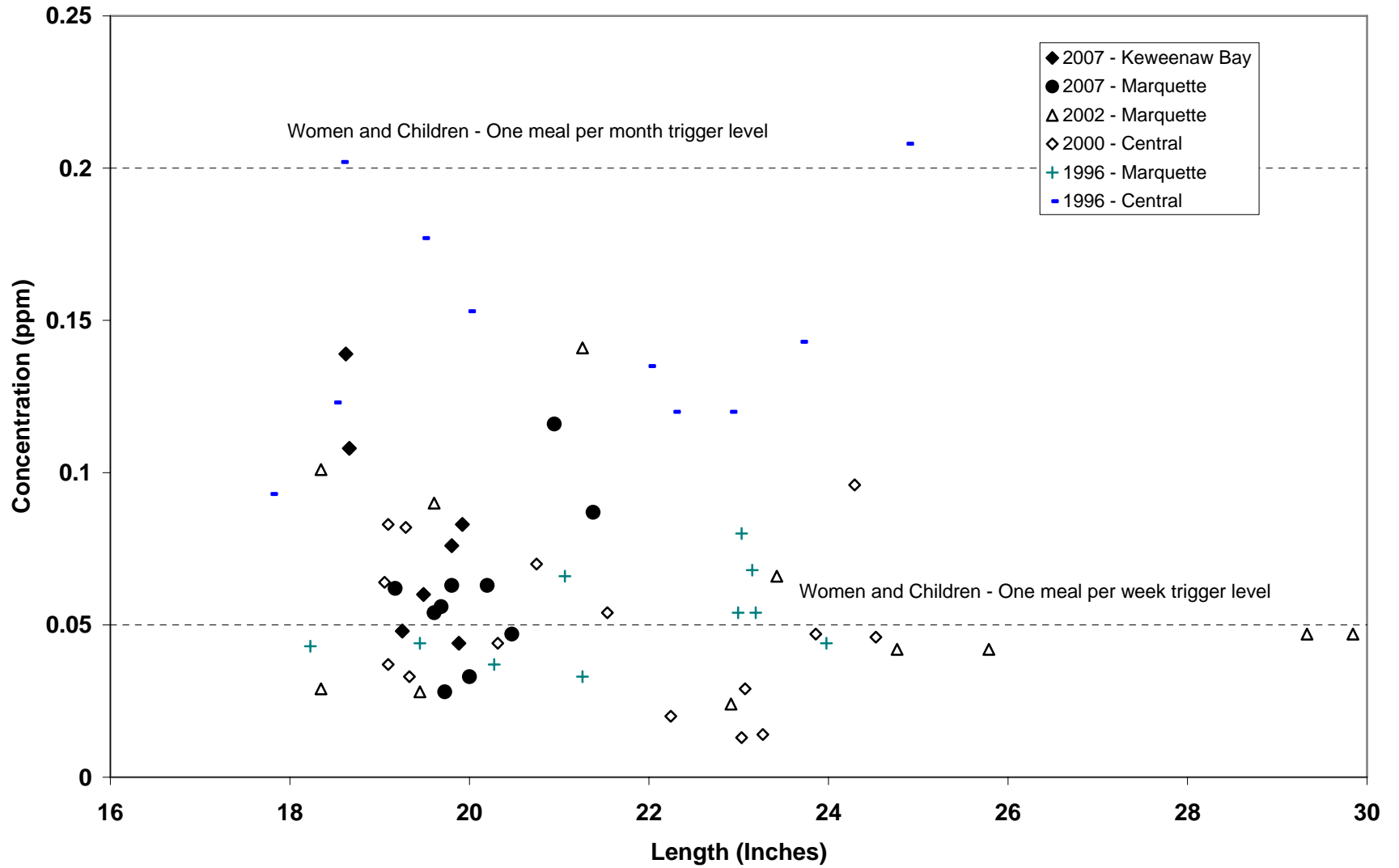


Figure 65. Total length versus total PCB concentration in whitefish collected from Lake Superior in 1996 (IDs 96034 & 96038), 2000 (ID 2000046), 2002 (ID 2002060), and 2007 (IDs 2007231 & 2007267).

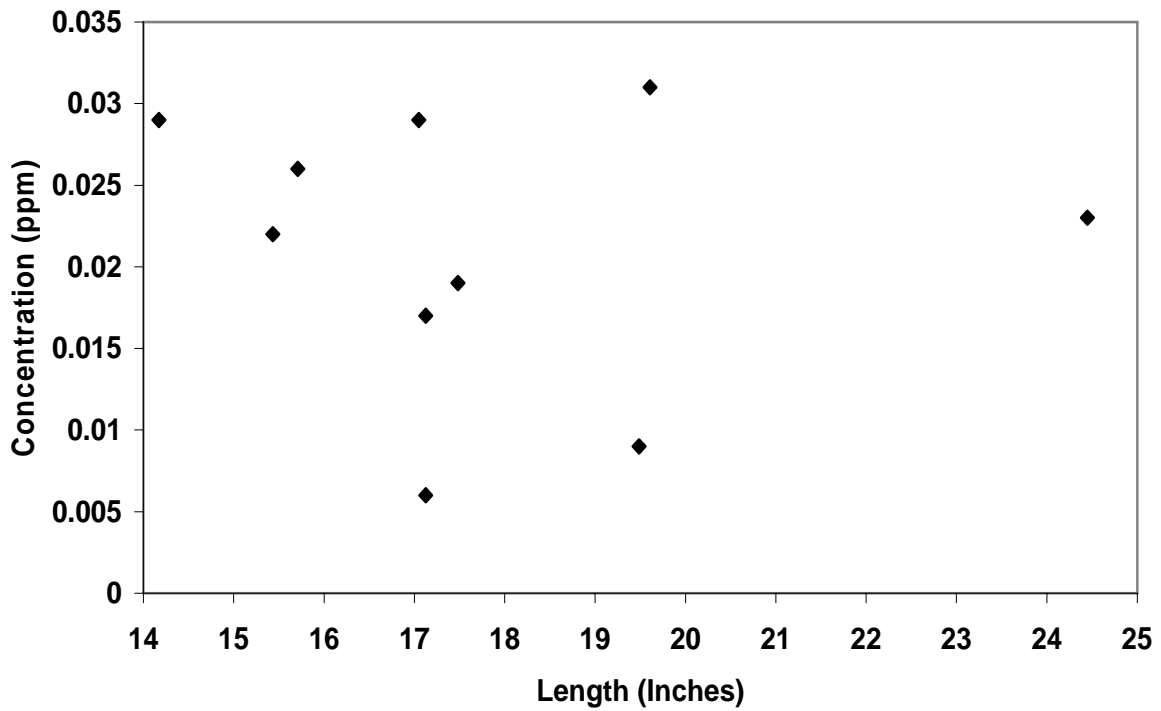


Figure 66. Total length versus total PCB concentration in burbot collected from Lake Superior, in 2007 (ID 2007254).

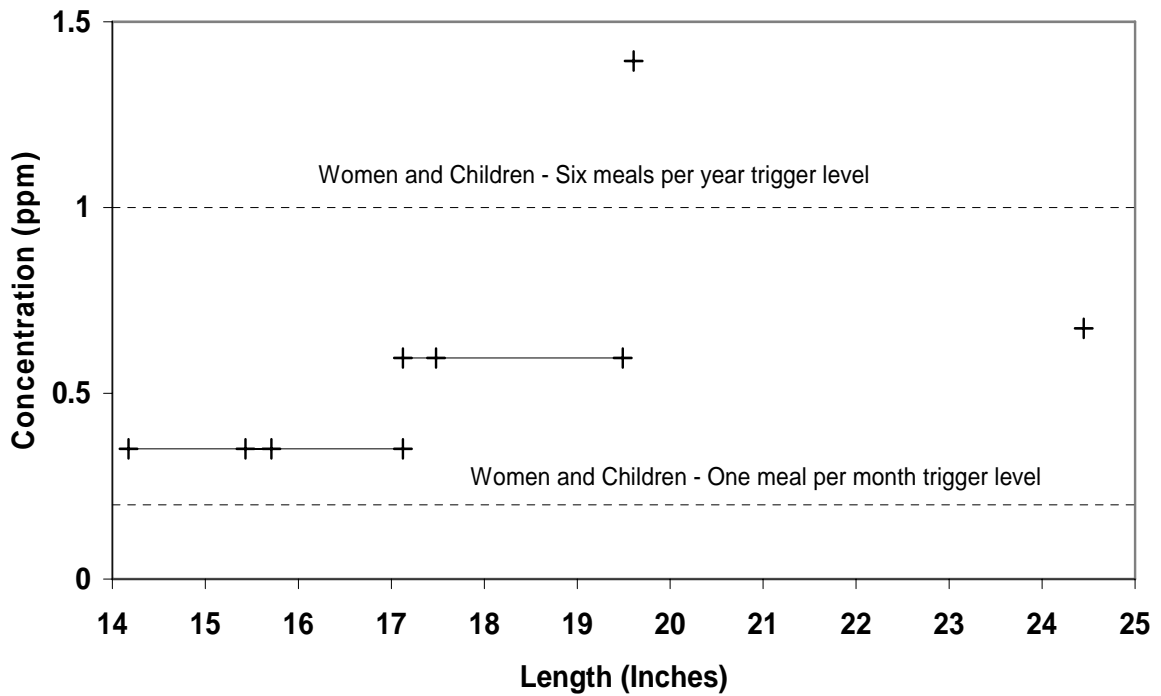


Figure 67. Total length versus total PCB concentration in livers of burbot collected from Lake Superior, in 2007 (ID 2007254).

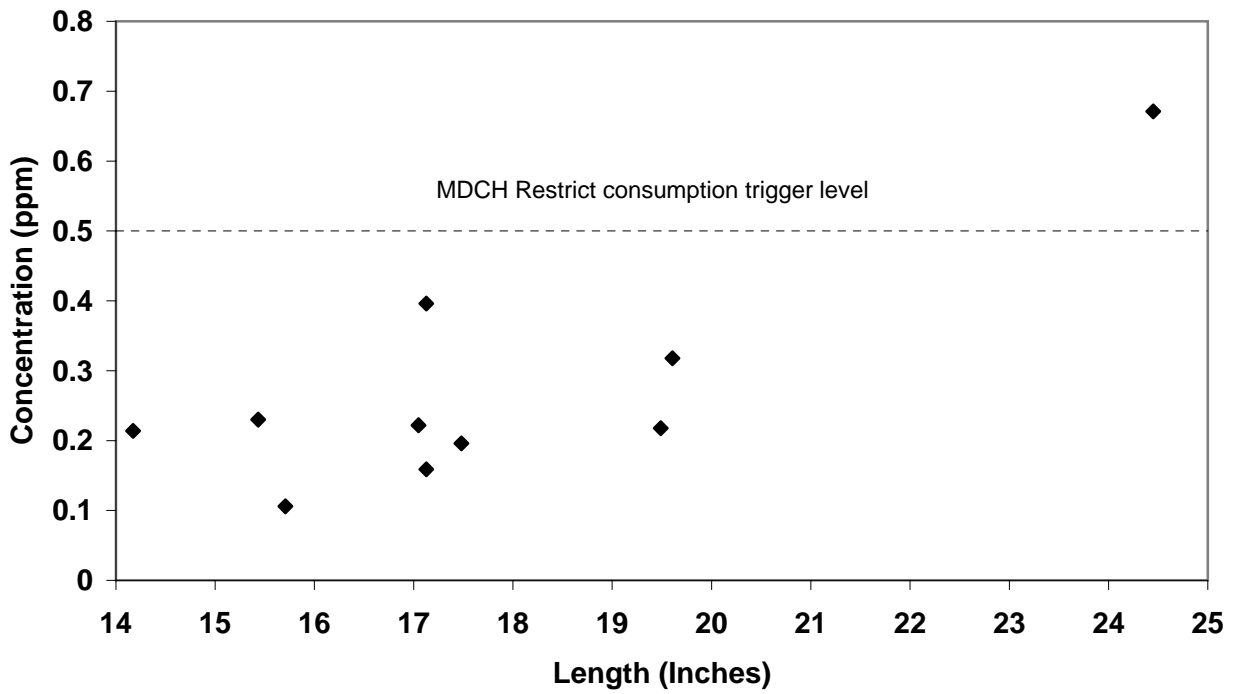


Figure 68. Total length versus mercury concentration in burbot collected from Lake Superior, in 2007 (ID 2007254).

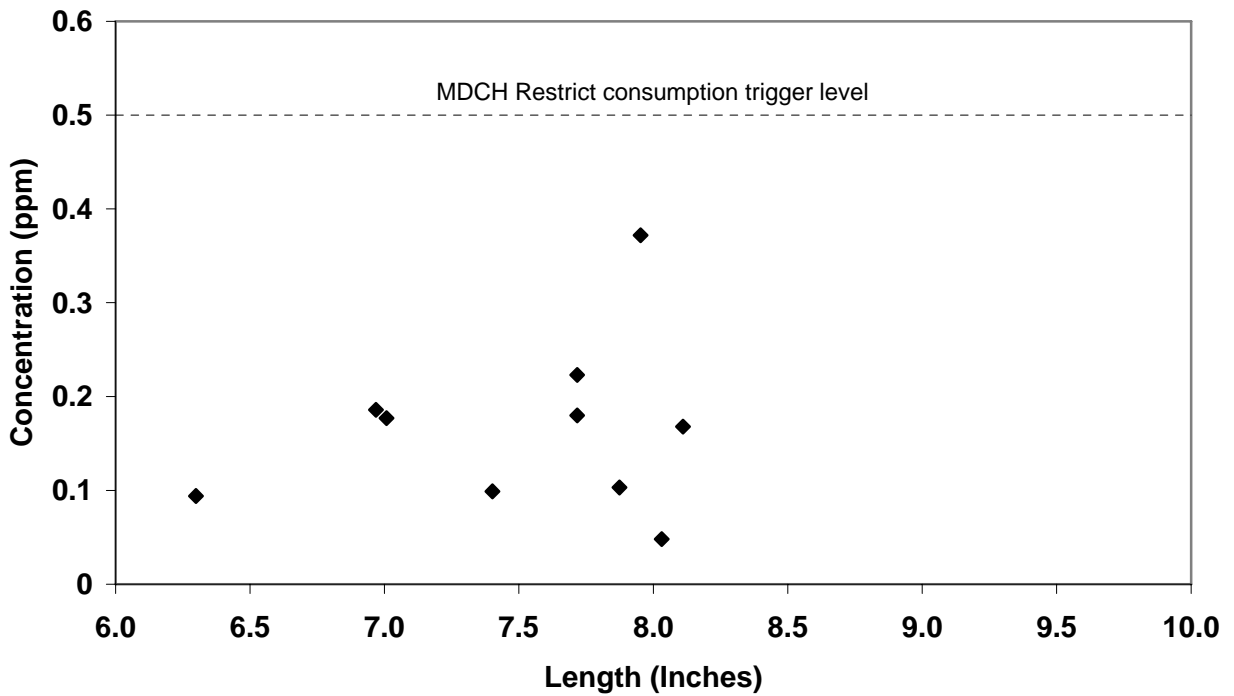


Figure 69. Total length versus total mercury concentration in yellow perch collected from Blind Sucker Flooding, Luce County, in 2007 (ID 2007207).

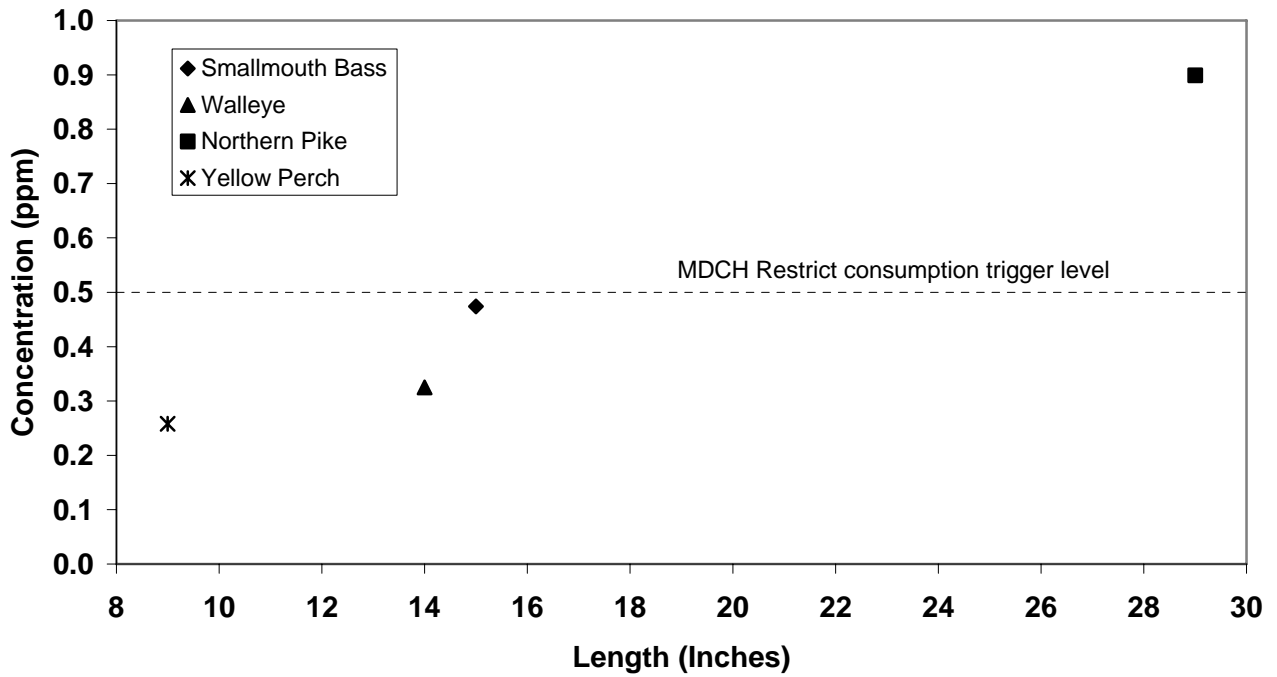


Figure 70. Total length versus total mercury concentration in northern pike, smallmouth bass, walleye, and yellow perch collected from Marion Lake, Gogebic County, in 2003 (ID 2003500).

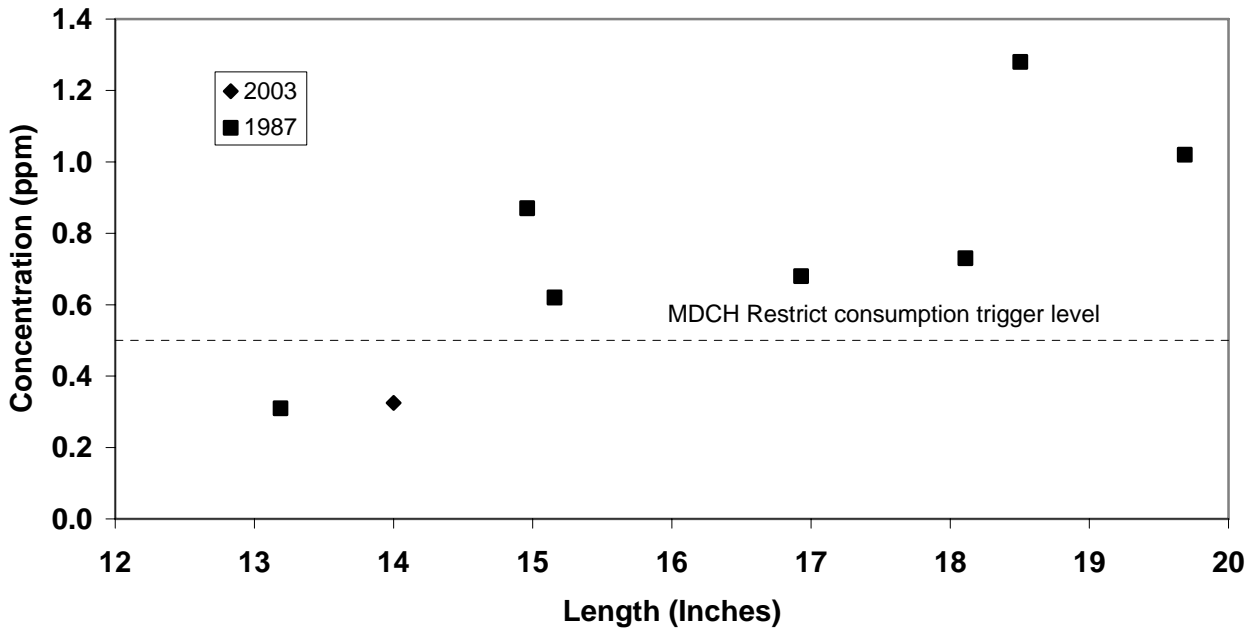


Figure 71. Total length versus total mercury concentration in walleye collected from Marion Lake, Gogebic County, in 1987 (ID 87070) and 2003 (ID 2003500).

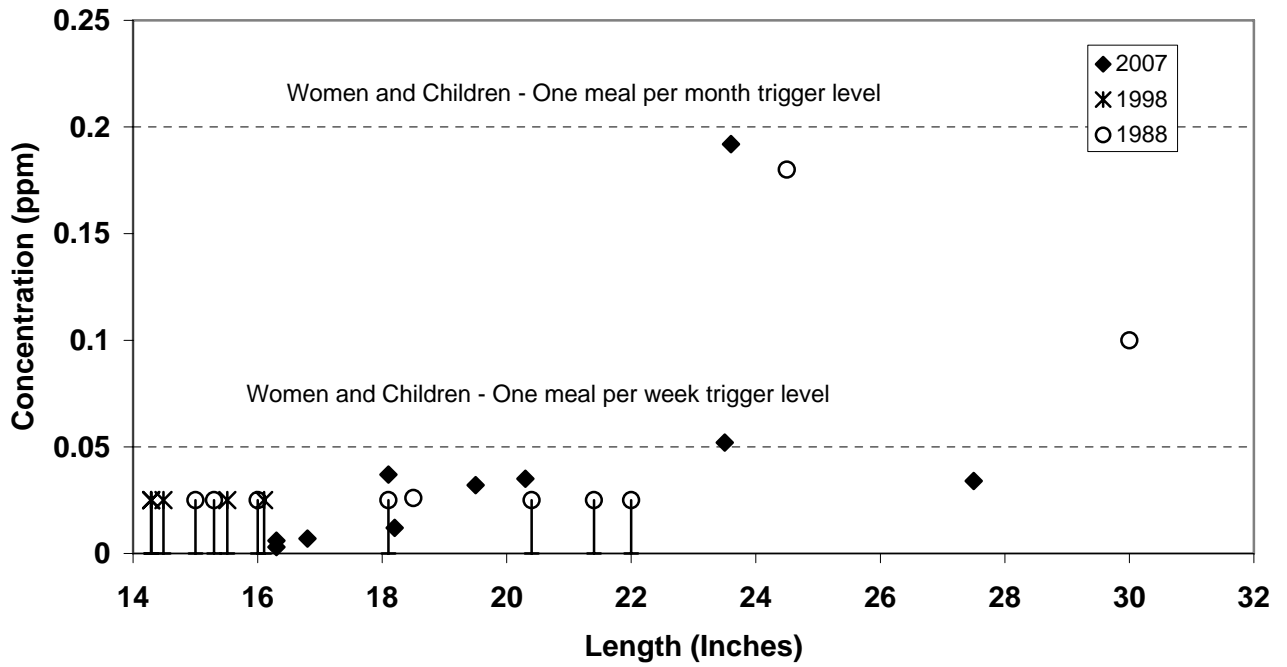


Figure 72. Total length versus total PCB concentration in walleye collected from Portage Lake, Houghton County, in 1988 (ID 88016), 1998 (ID 1998151), and 2007 (ID 2007247).

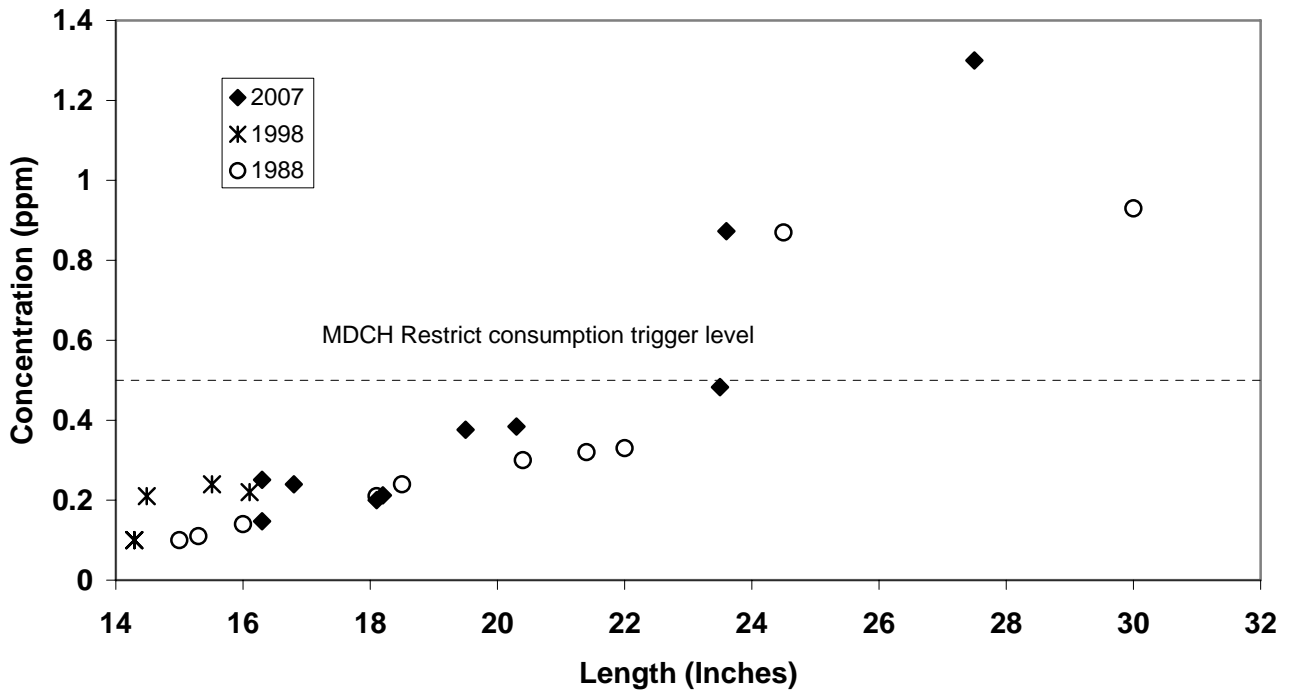


Figure 73. Total length versus mercury concentration in walleye collected from Portage Lake, Houghton County, in 1988 (ID 88016), 1998 (ID 1998151), and 2007 (ID 2007247).



Figure 74. Total length versus total PCB concentration in northern pike collected from Torch Lake, Houghton County, in 1988 (ID 88015), 2000 (ID 2000096), and 2007 (ID 2007257).

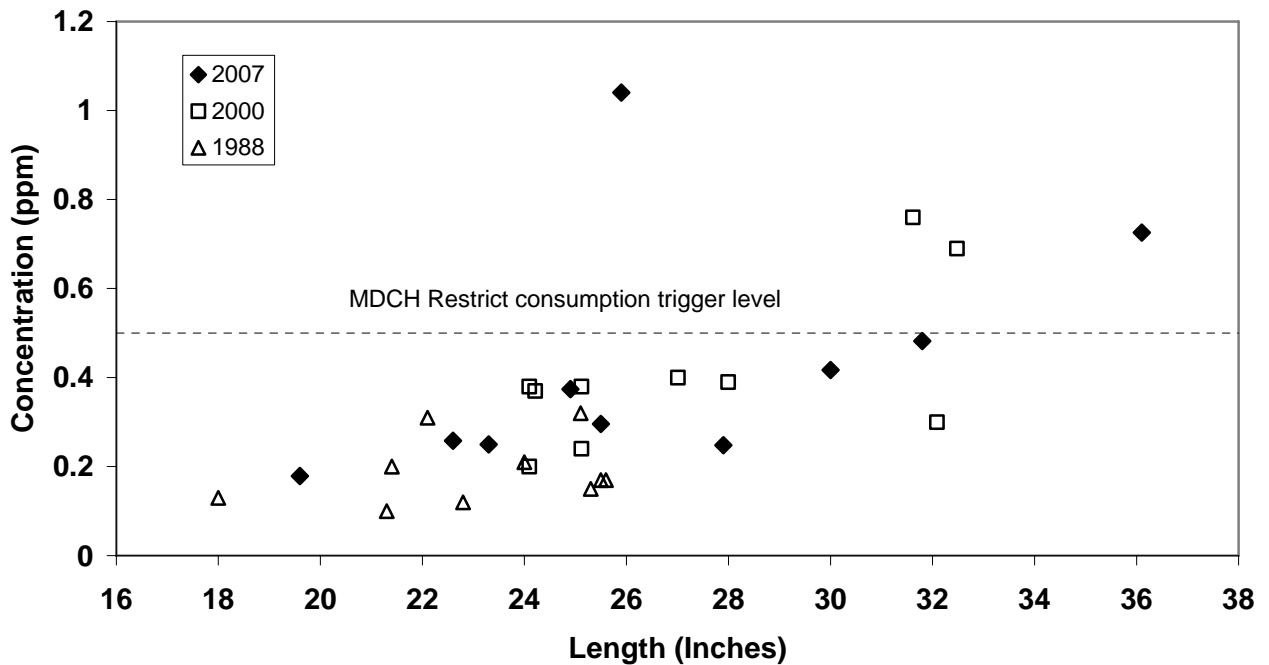


Figure 75. Total length versus total mercury concentration in northern pike collected from Torch Lake, Houghton County, in 1988 (ID 88015), 2000 (ID 2000096), and 2007 (ID 2007257).

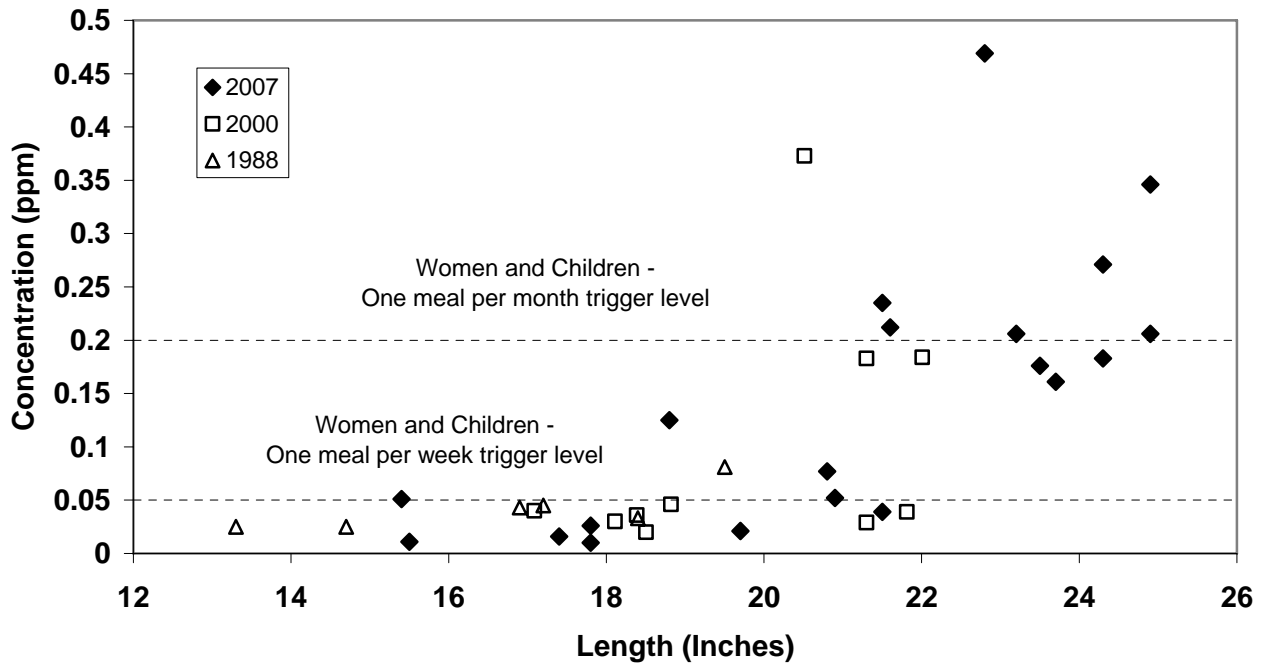


Figure 76. Total length versus total PCB concentration in walleye collected from Torch Lake, Houghton County, in 1988 (ID 88015), 2000 (ID 2000096), and 2007 (ID 2007257).

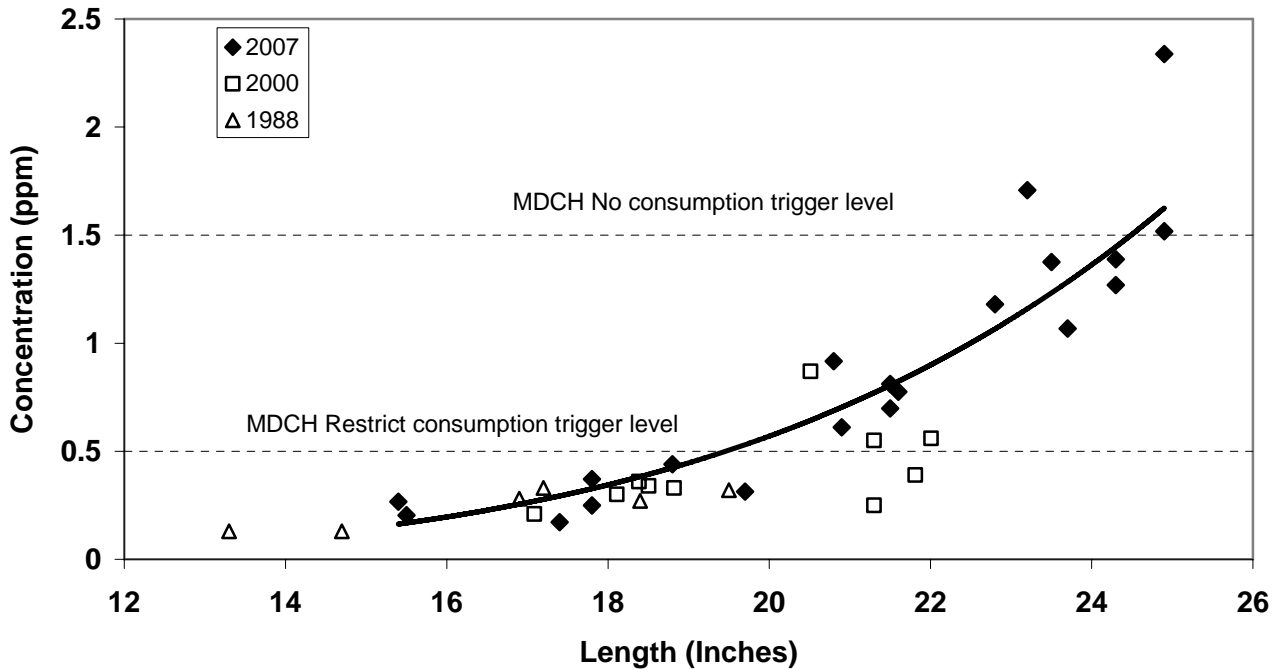


Figure 77. Total length versus total mercury concentration in walleye collected from Torch Lake, Houghton County, in 1988 (ID 88015), 2000 (ID 2000096), and 2007 (ID 2007257).

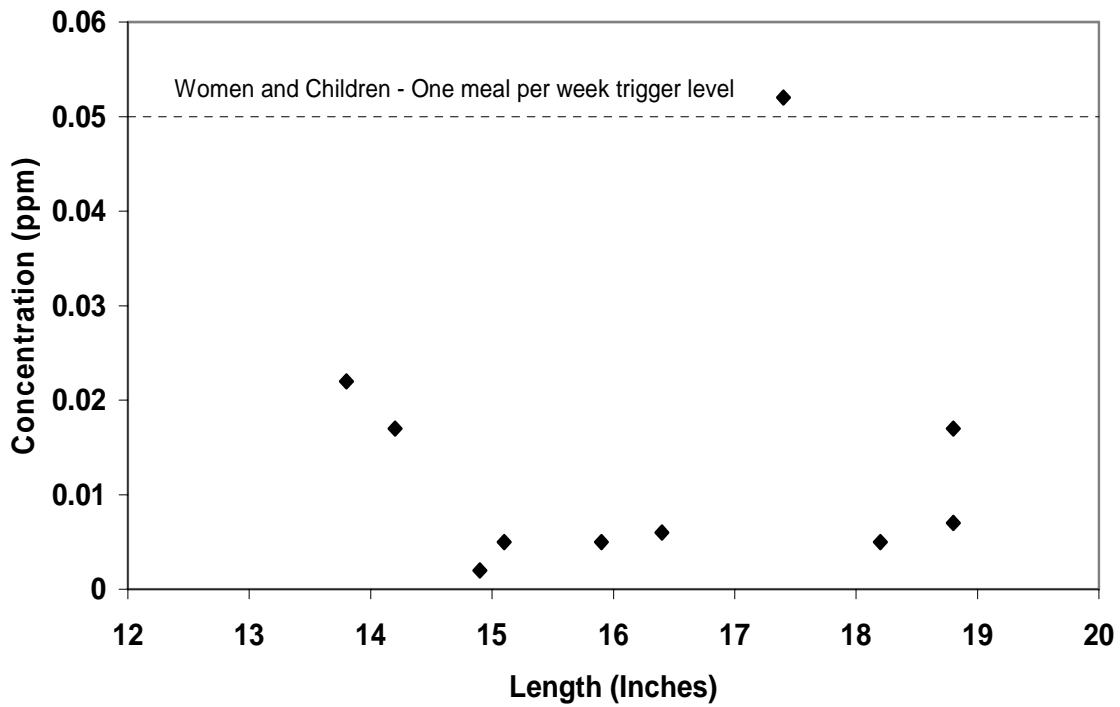


Figure 78. Total length versus total PCB concentration in white sucker collected from Torch Lake, Houghton County, in 2007 (ID 2007257).

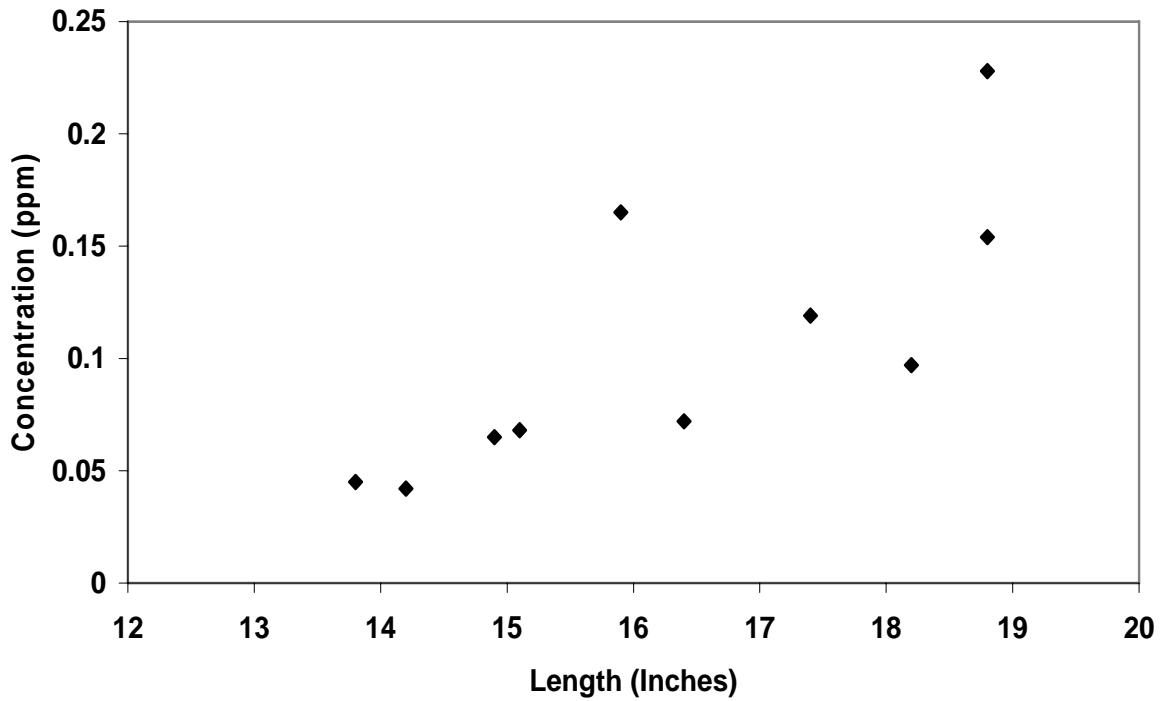
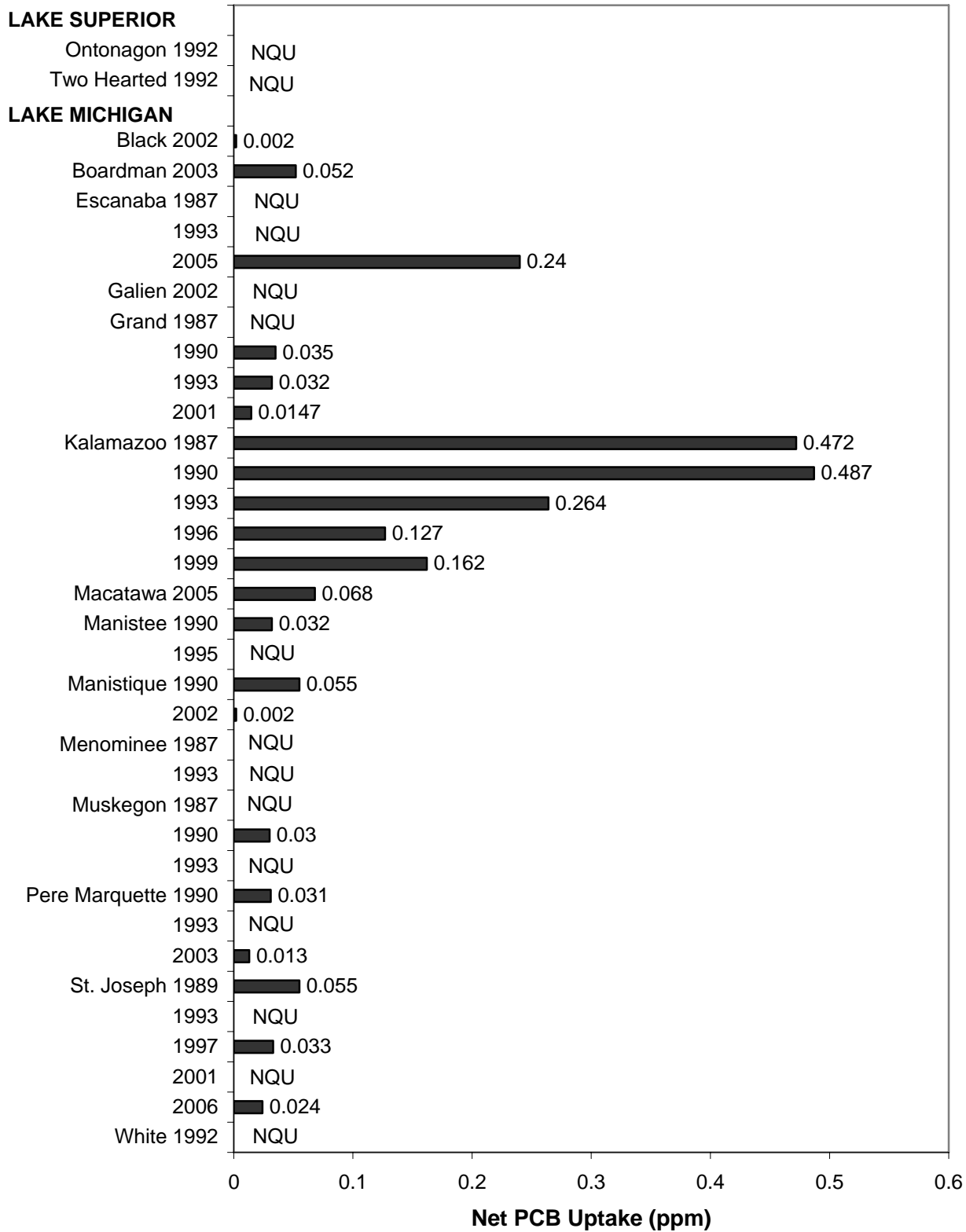


Figure 79. Total length versus total mercury concentration in white sucker collected from Torch Lake, Houghton County, in 2007 (ID 2007257).



**Figure 80. Net uptake of total PCB in caged fish from the mouths of selected Michigan rivers (NQU = no quantifiable uptake).**

**LAKE HURON**

Au Gres 1991 NQU

Au Sable 1991

1996 NQU

Saginaw 1986

1988 1.26

1992 0.372

1993 0.474

1998 0.2805

2002 0.21

2005 0.261

Tawas 2006 NQU

Thunder Bay 1989

1996 NQU

**LAKE ERIE**

Belle 1997 0.012

Black 1993 0.009

2007 NQU

Clinton 1989 0.079

1992 0.336

1996 0.166

1997 0.188

1999 0.159

2000 0.147

Clinton-Spillway 1989 0.043

Clinton-Spillway 1992 NQU

Huron 1991 NQU

1996 0.046

2002 NQU

Ottawa 2005 0.434

Pine 1997 0.017 4.1

Raisin 1988 1.6

1991 1.07

1998 0.6678

2004 0.338

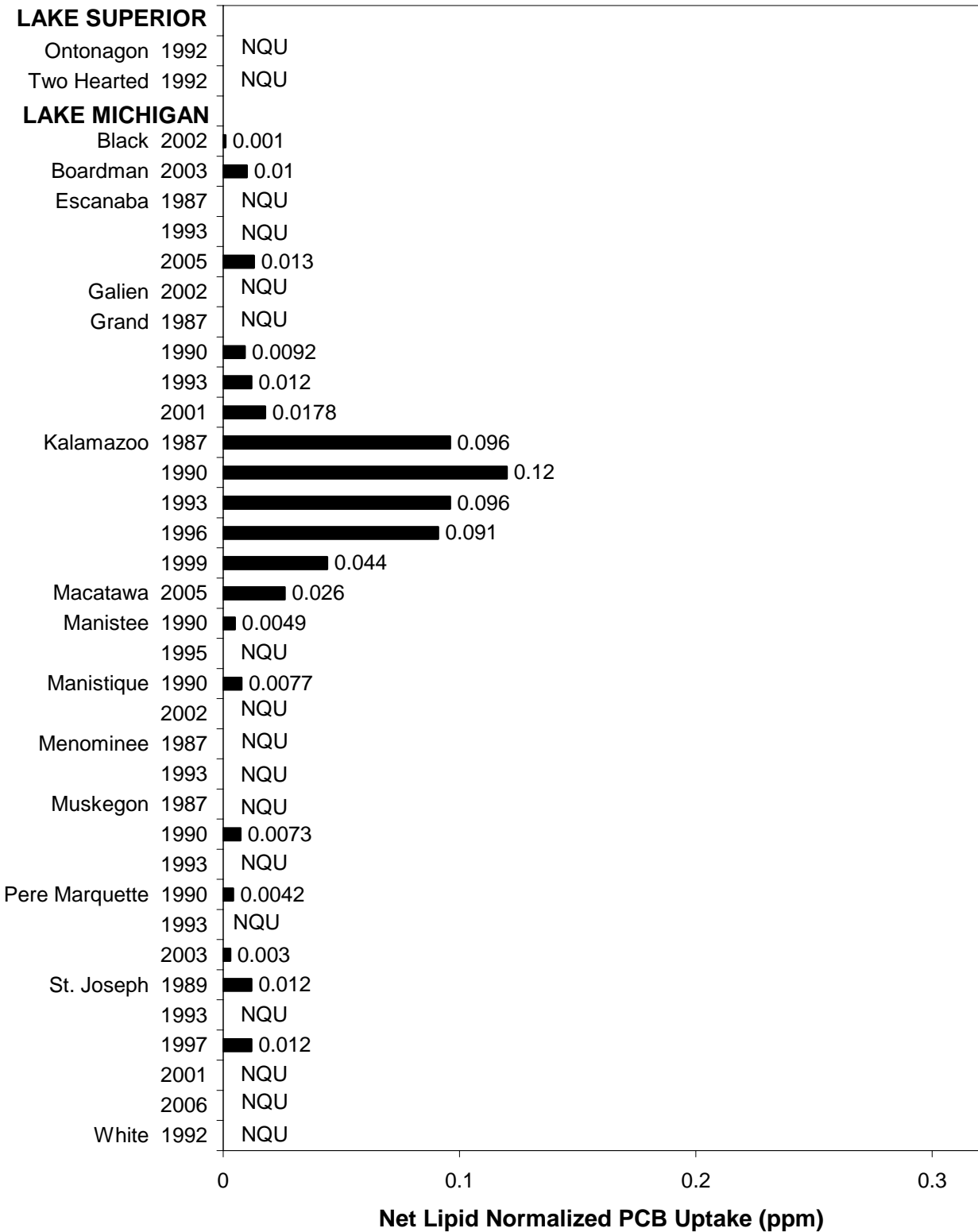
Rouge 1992 0.445

1995 0.204

2000 0.11



Figure 80. Continued.



**Figure 81. Net uptake of lipid normalized total PCB in caged fish from the mouths of selected Michigan rivers (NQU = no quantifiable uptake).**

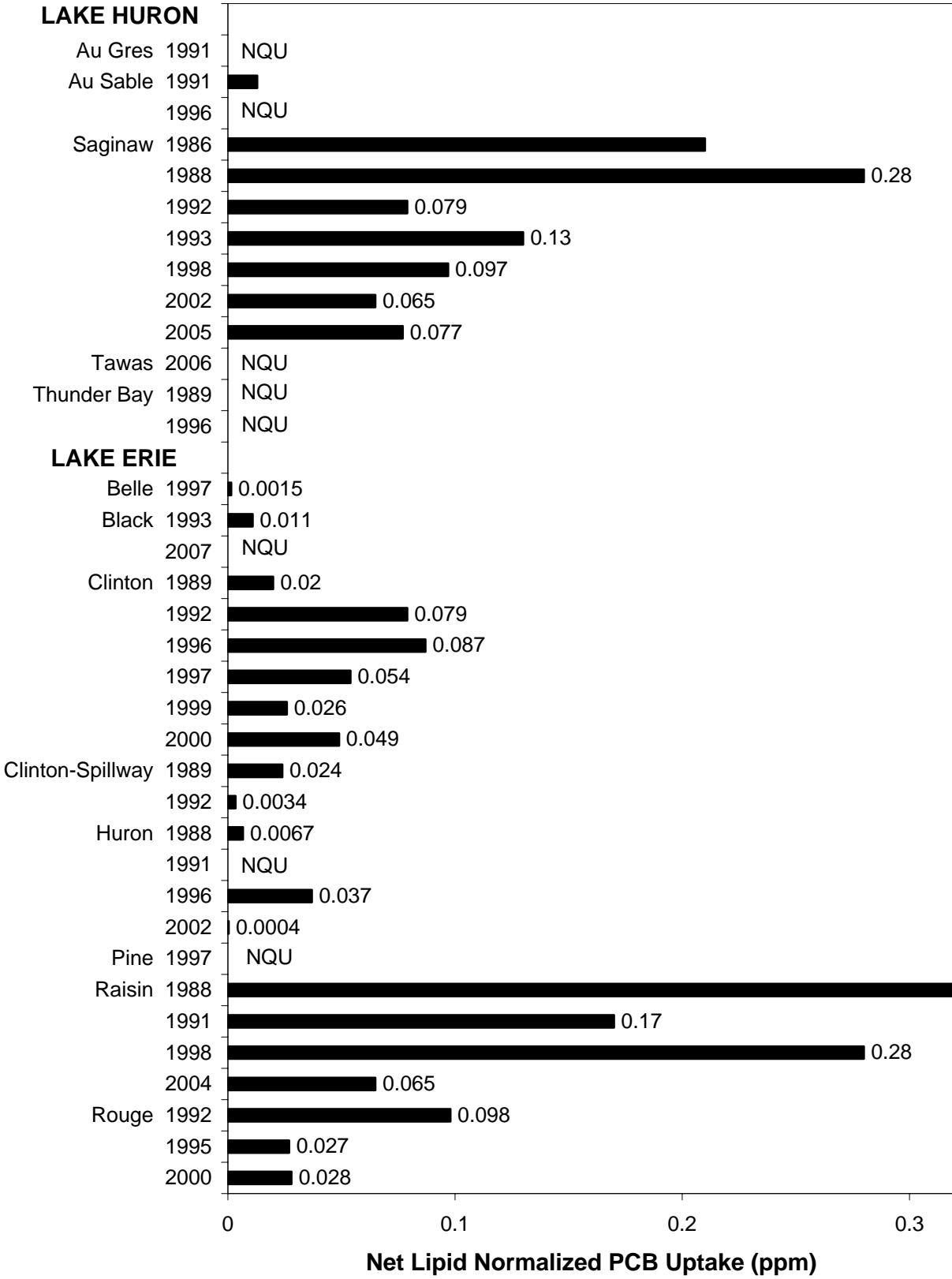


Figure 81. Continued

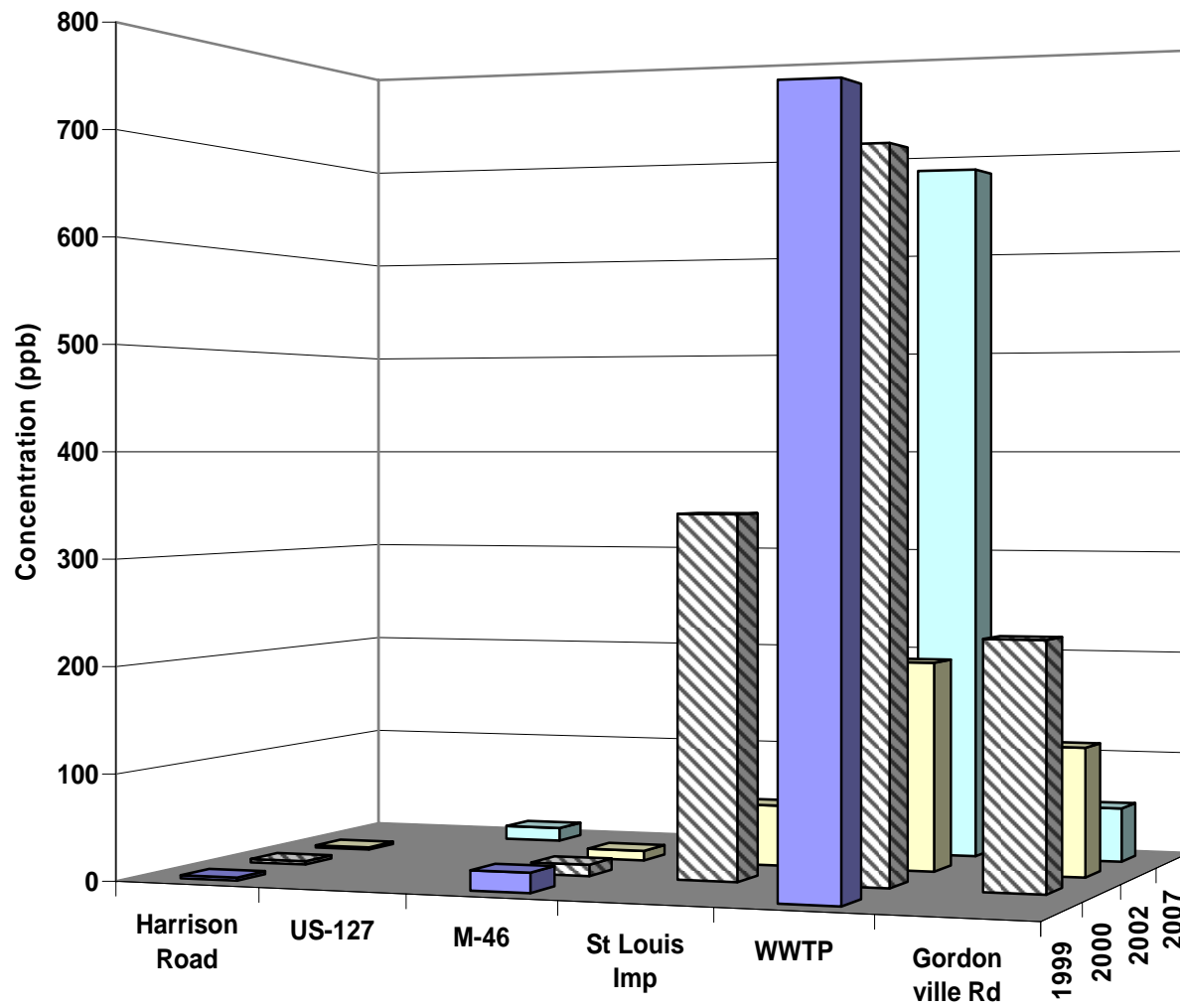


Figure 82. Comparison of mean net uptake of lipid-normalized total DDT across years at six sites on the Pine River.

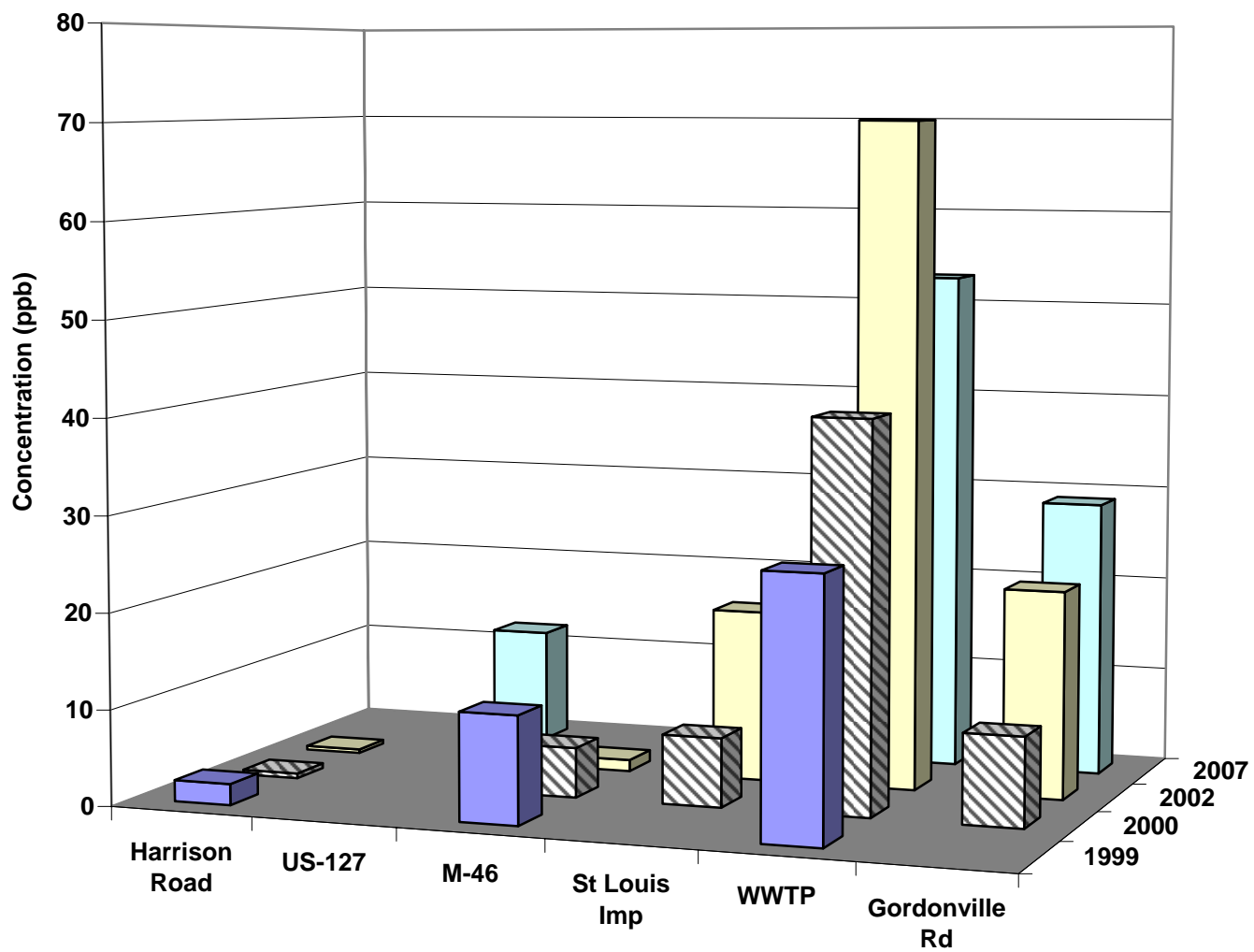


Figure 83. Comparison of mean net uptake of lipid-normalized total PCB across years at six sites on the Pine River.

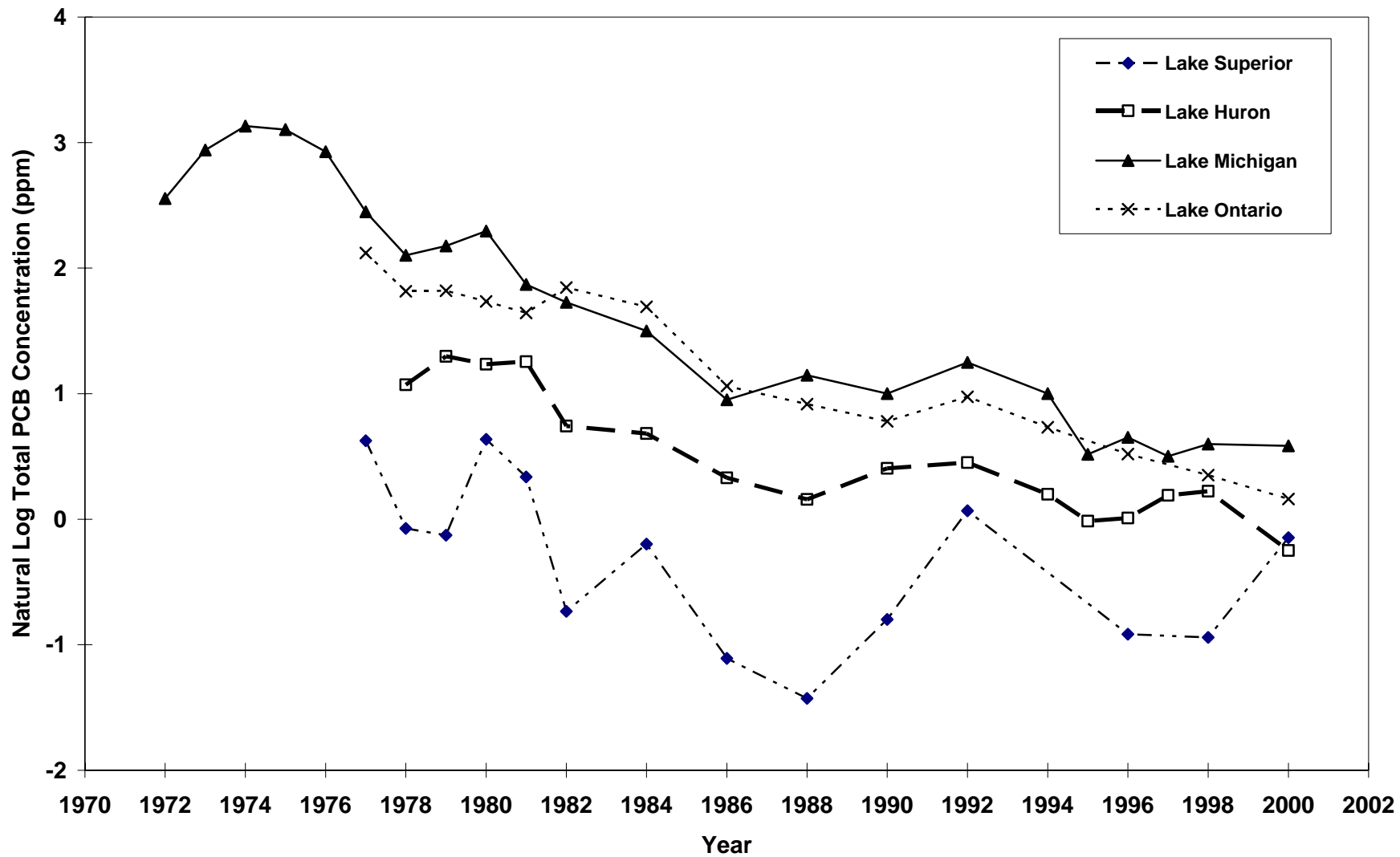


Figure 84. Natural log of average total PCB concentrations in whole lake trout from the Great Lakes, 1970-2000 (DeVault et al. 1996; USEPA unpublished data).

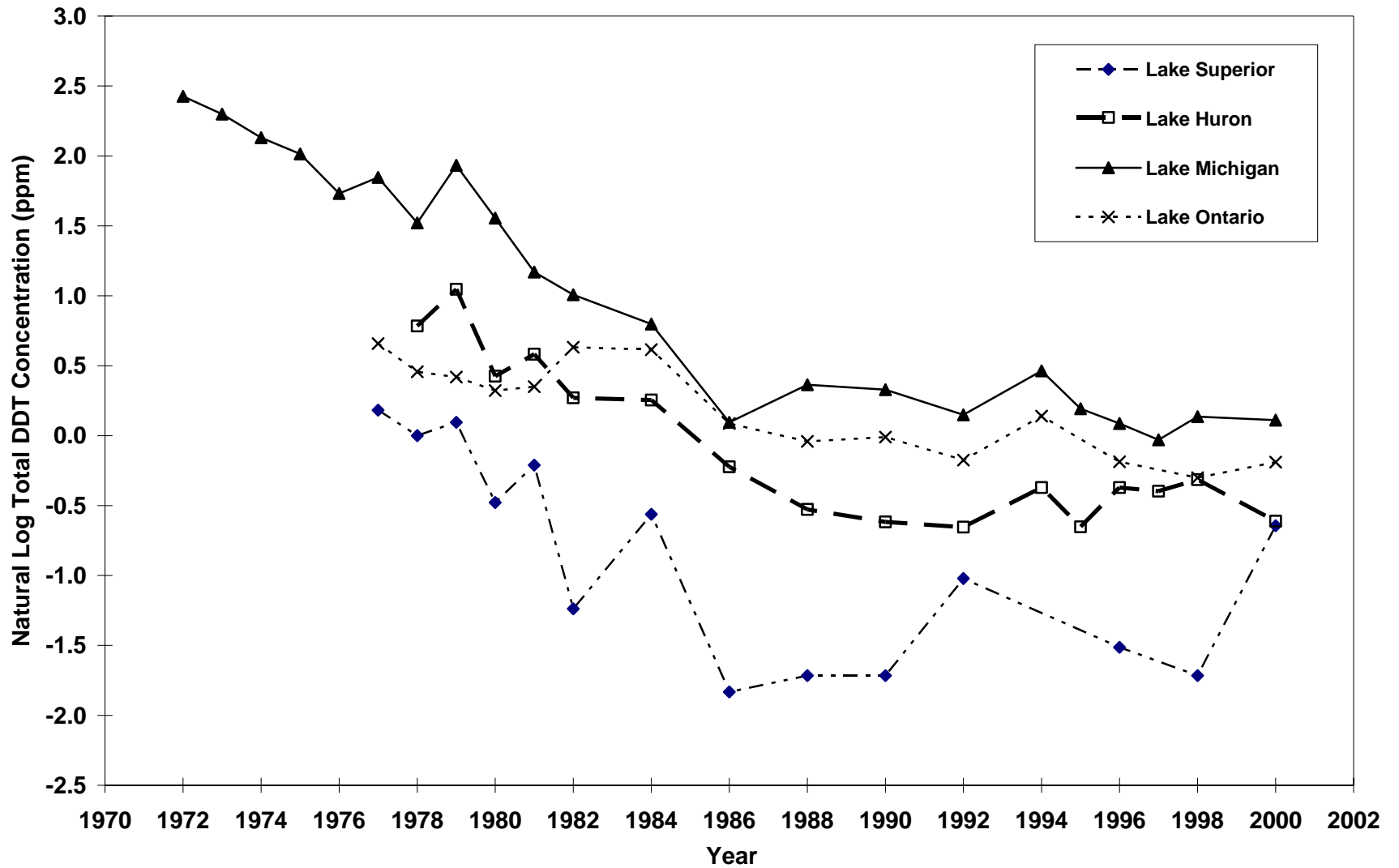


Figure 85. Natural log of average total DDT concentrations in whole lake trout from the Great Lakes, 1970-2000 (DeVault et al. 1996; USEPA unpublished data).

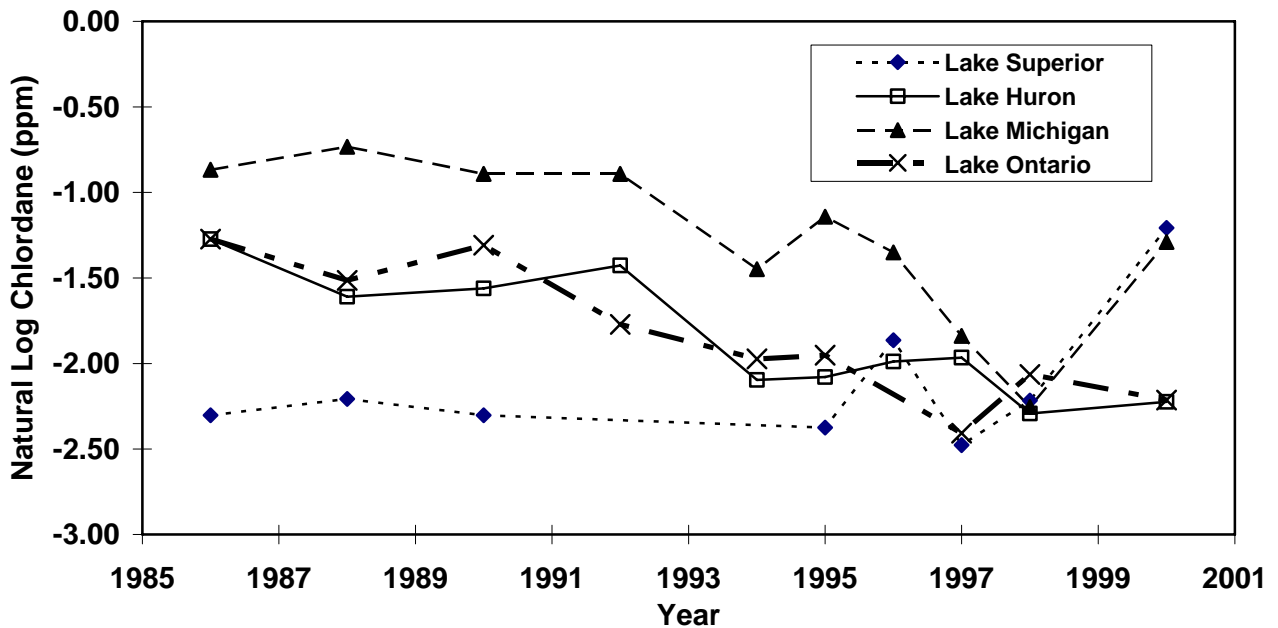


Figure 86. Natural log of average total chlordane concentrations in whole lake trout from the Great Lakes, 1986-2000 (DeVault et al. 1996, USEPA unpublished data).

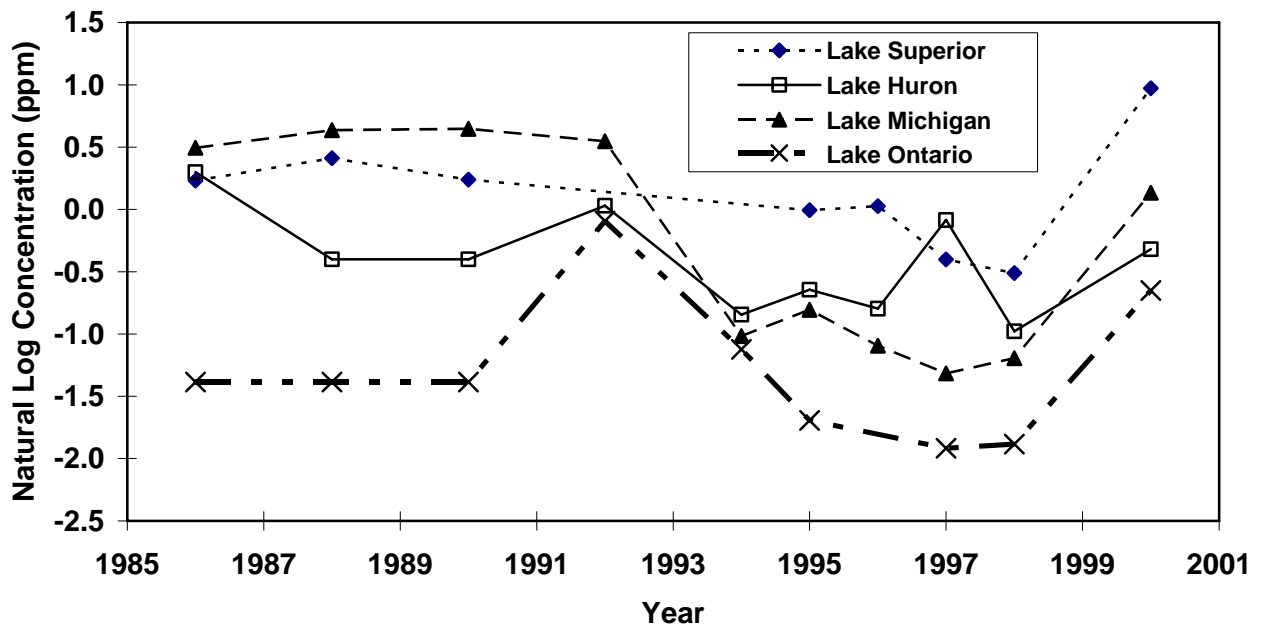


Figure 87. Natural log of average apparent toxaphene concentrations in whole lake trout from the Great Lakes, 1986-2000 (DeVault et al. 1996; USEPA unpublished data). Concentrations were below the quantification level in Lake Ontario fish collected between 1986 and 2000.

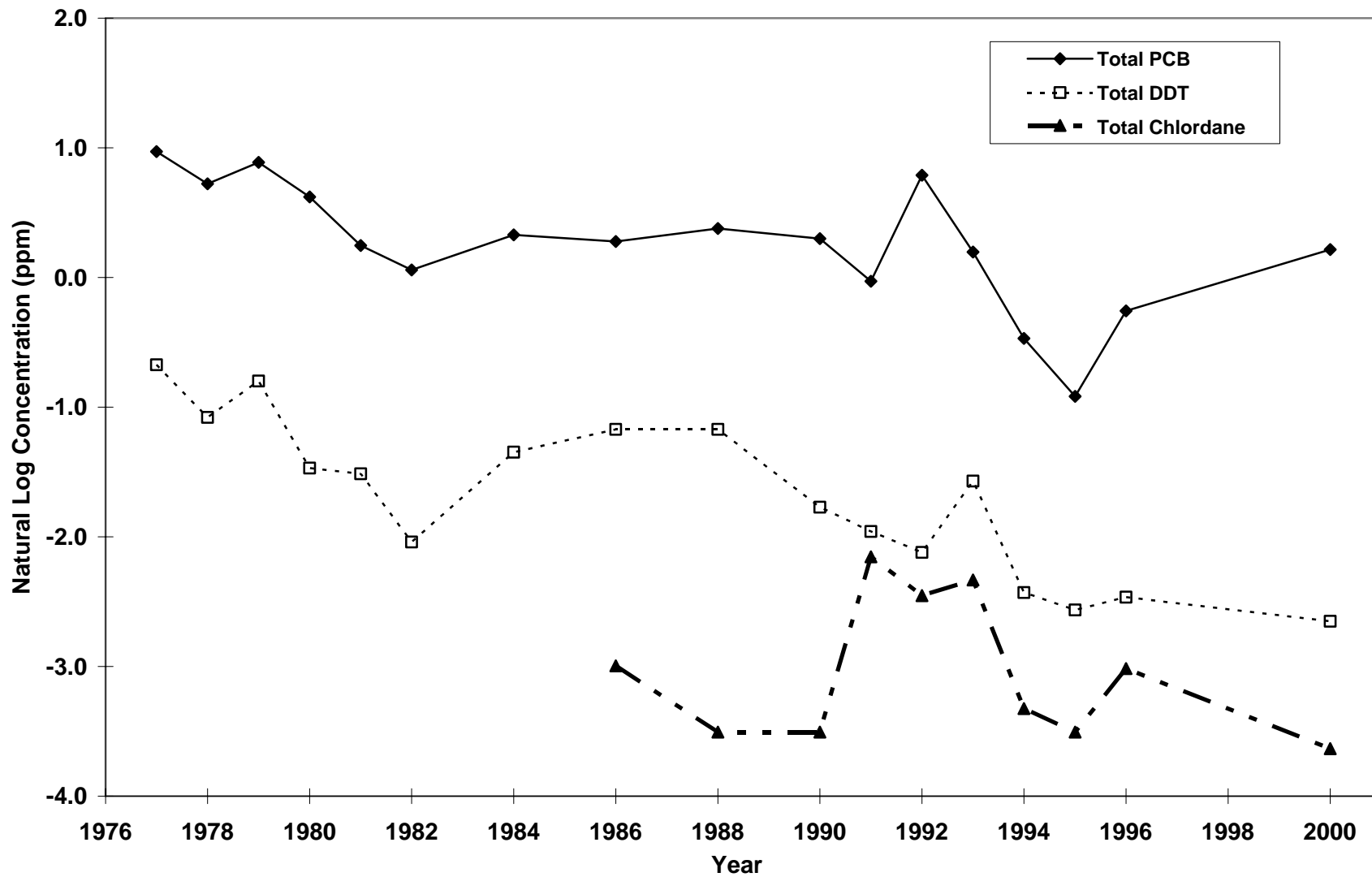


Figure 88. Natural log of average total PCB, total DDT, and total chlordane concentrations in whole walleye from Lake Erie 1986-2000 (DeVault et al. 1996; USEPA unpublished data).

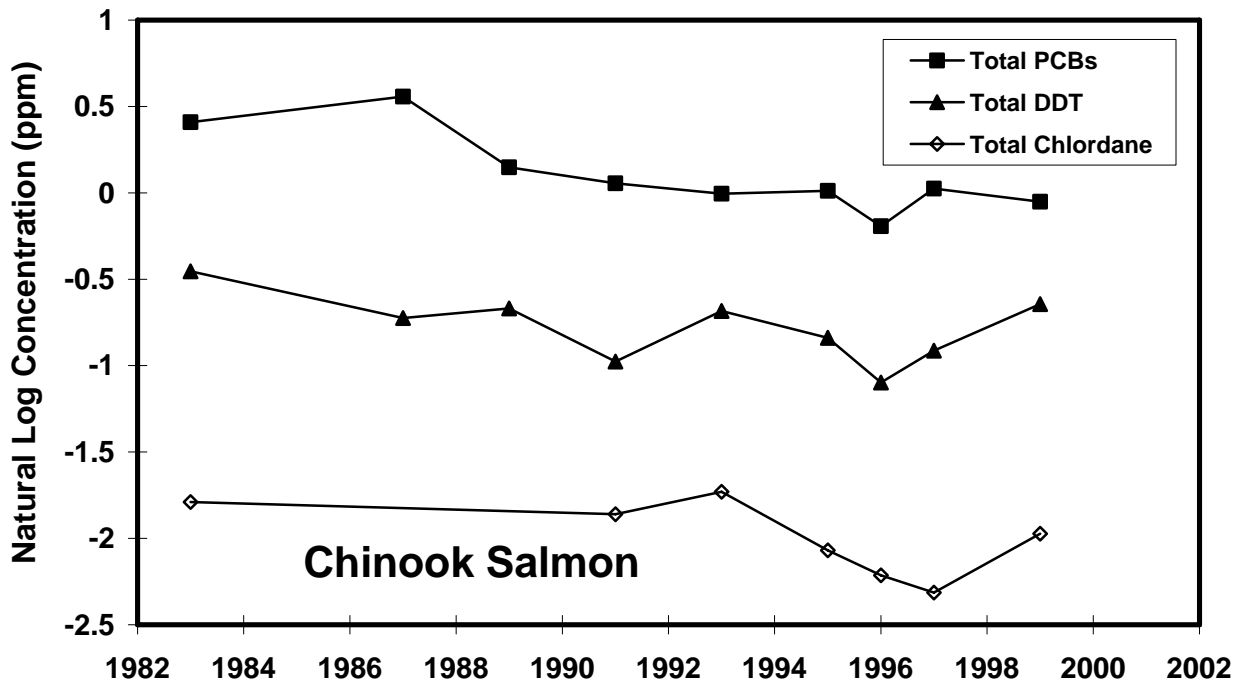


Figure 89. Natural log of average total PCB, total DDT, and total chlordane concentrations in coho and chinook salmon fillet samples from Lake Michigan.

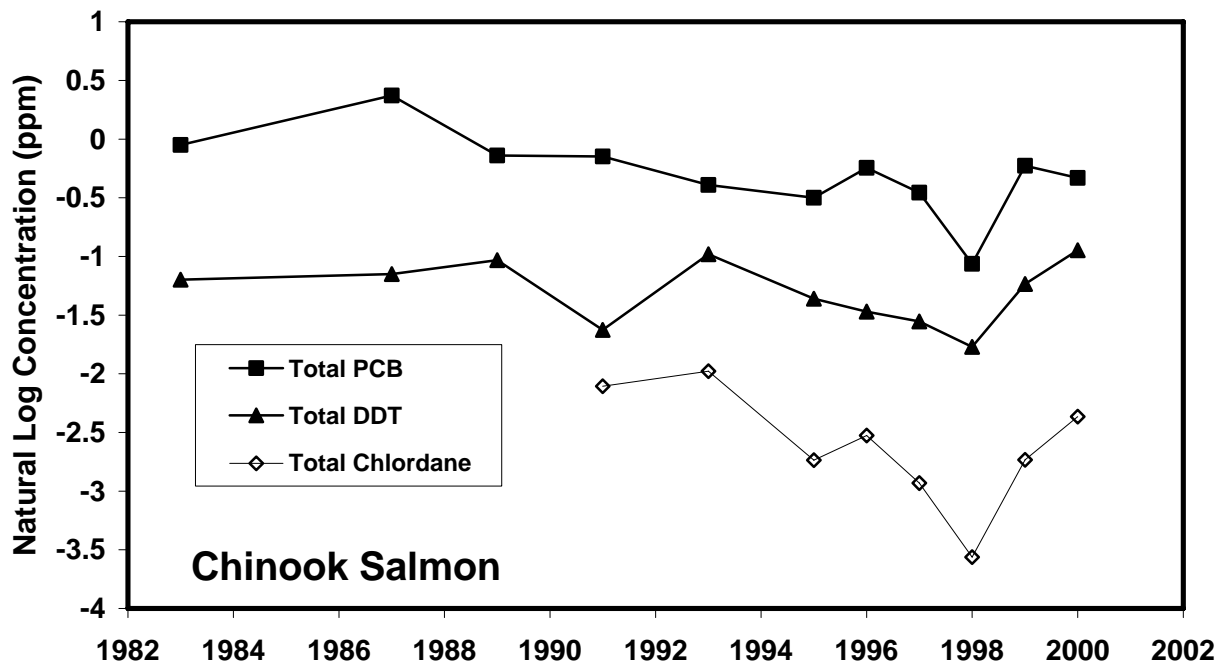


Figure 90. Natural log of average total PCB, total DDT, and total chlordane concentrations in coho and chinook salmon fillet samples from Lake Huron.

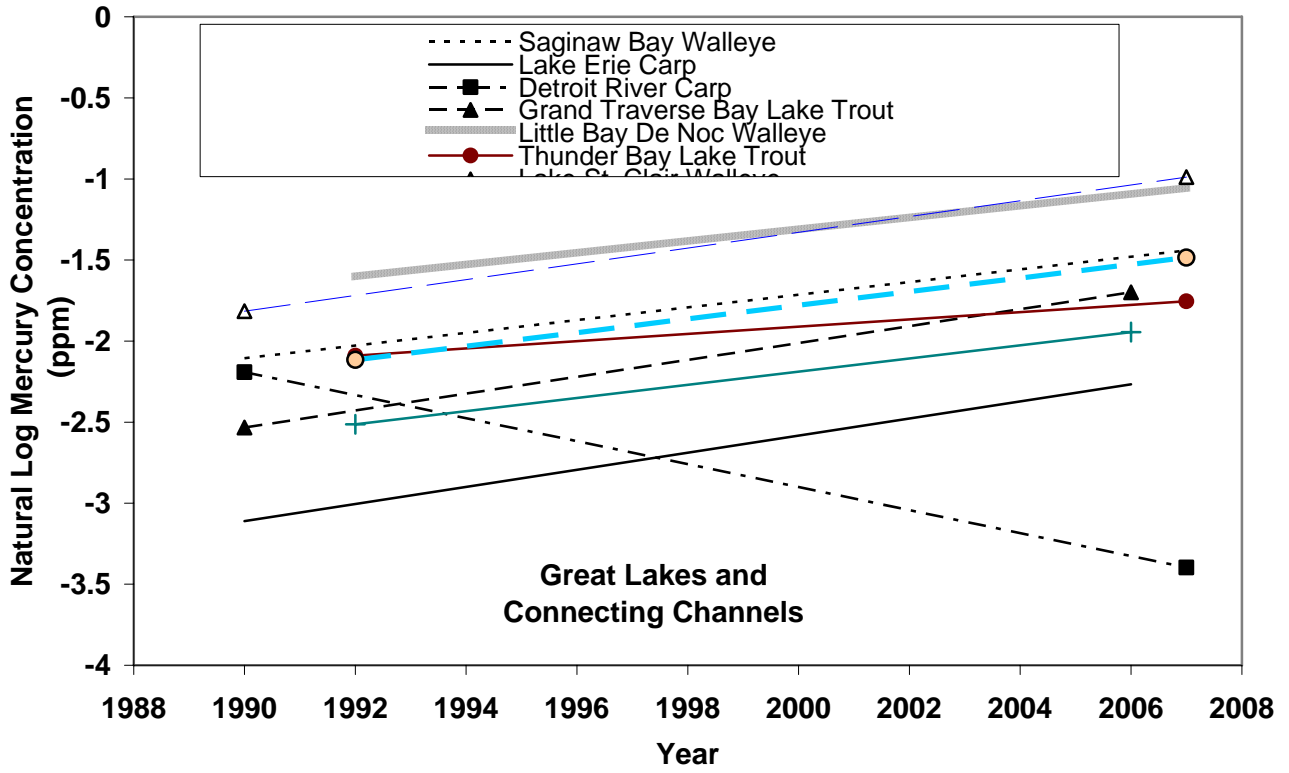
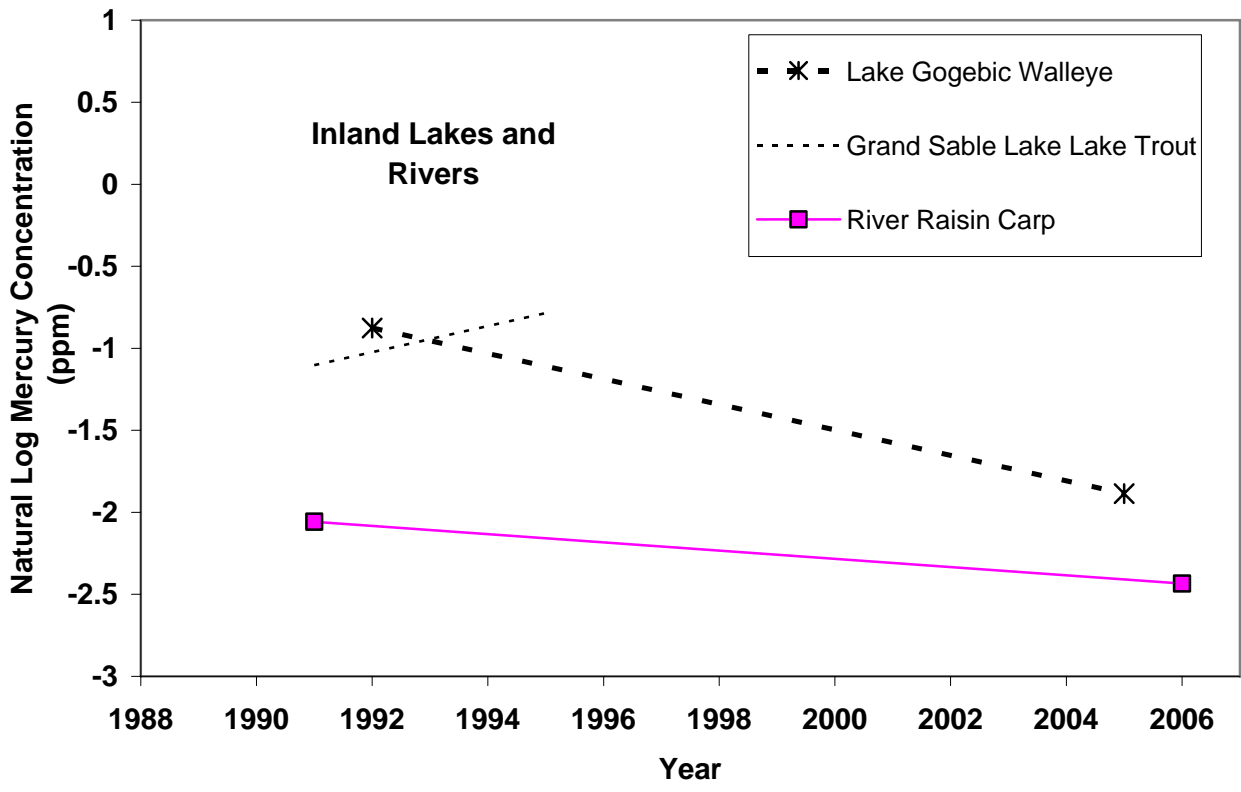


Figure 91. Temporal changes in mercury concentrations at selected whole fish trend monitoring sites.

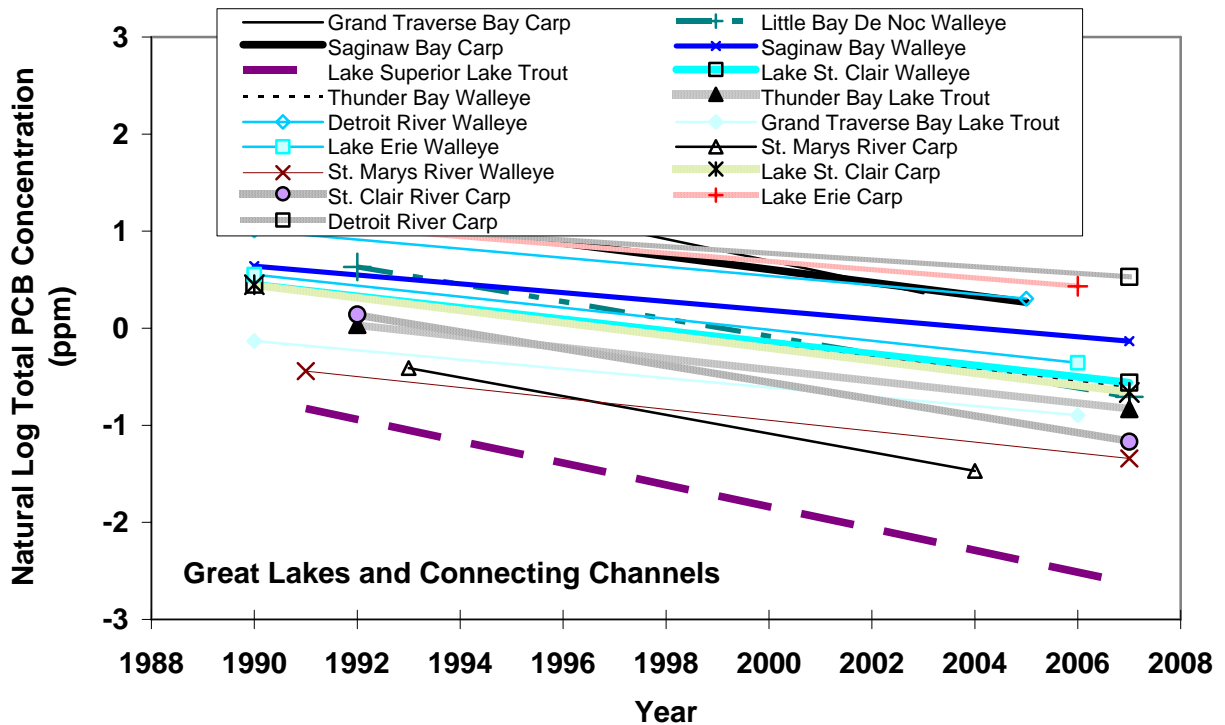
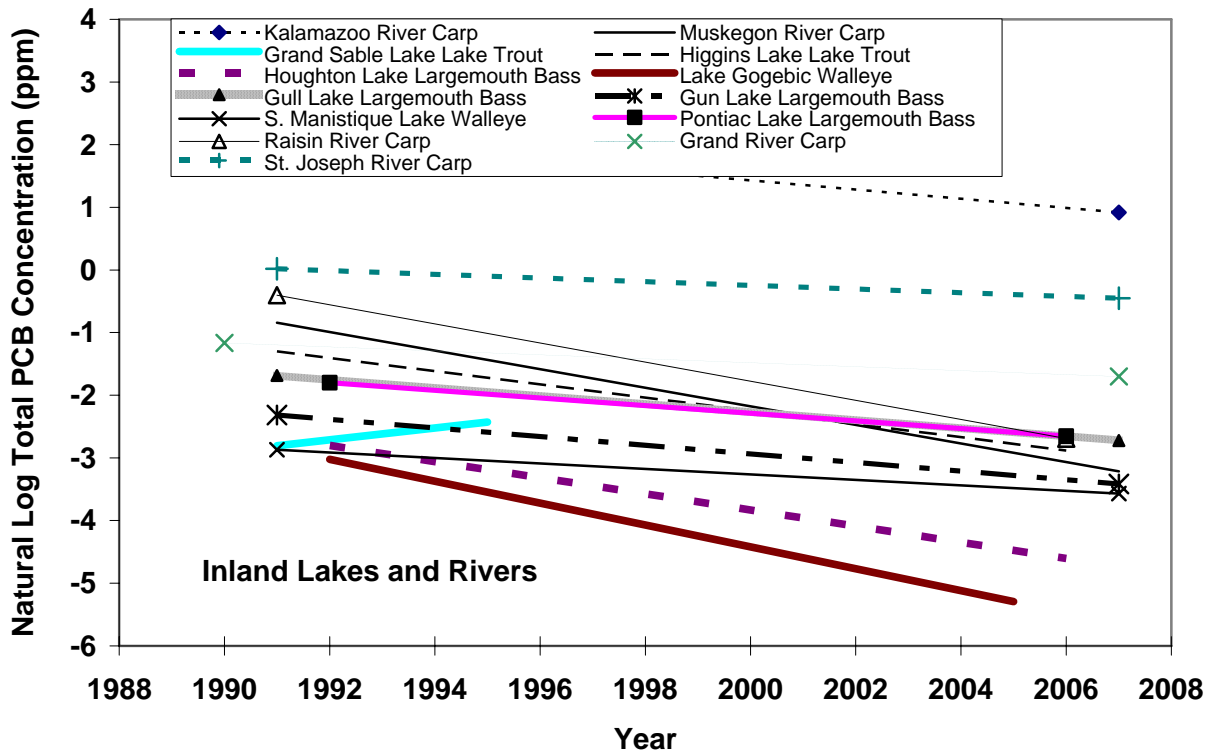


Figure 92. Temporal changes in total PCB concentrations at selected whole fish trend monitoring sites.

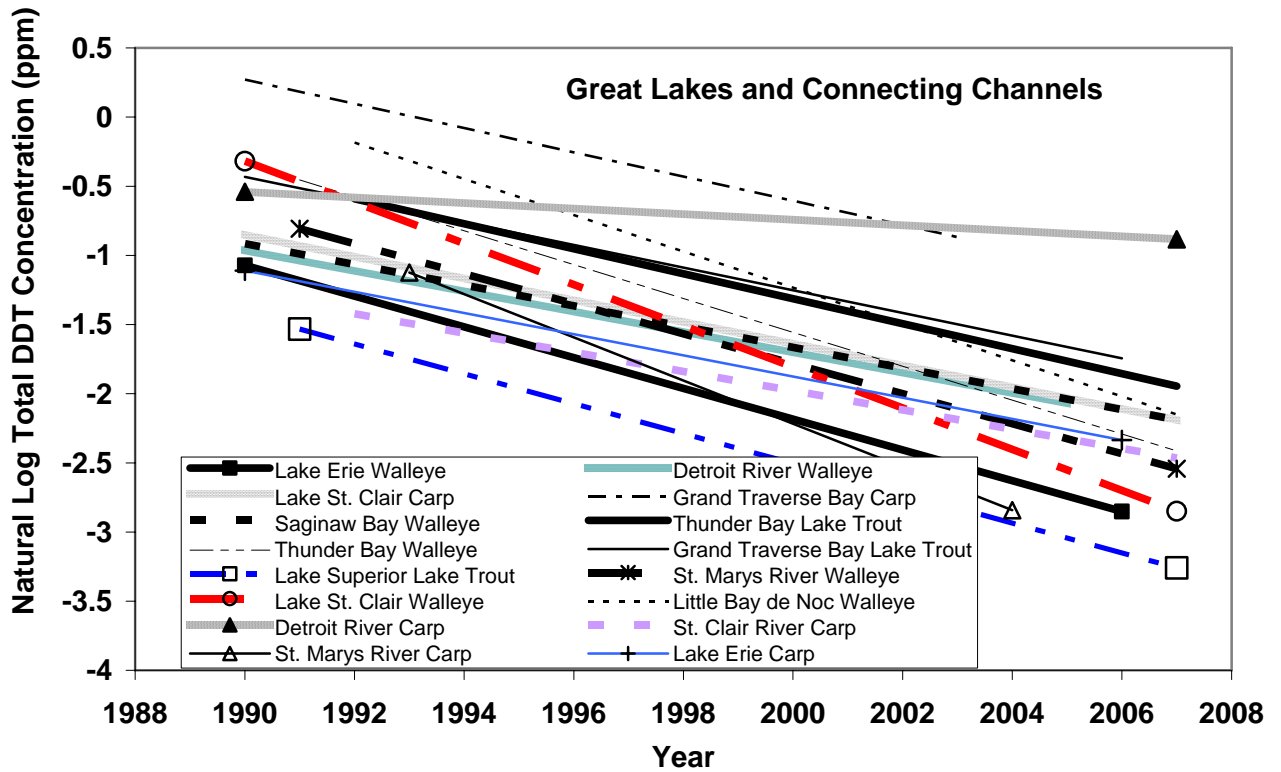
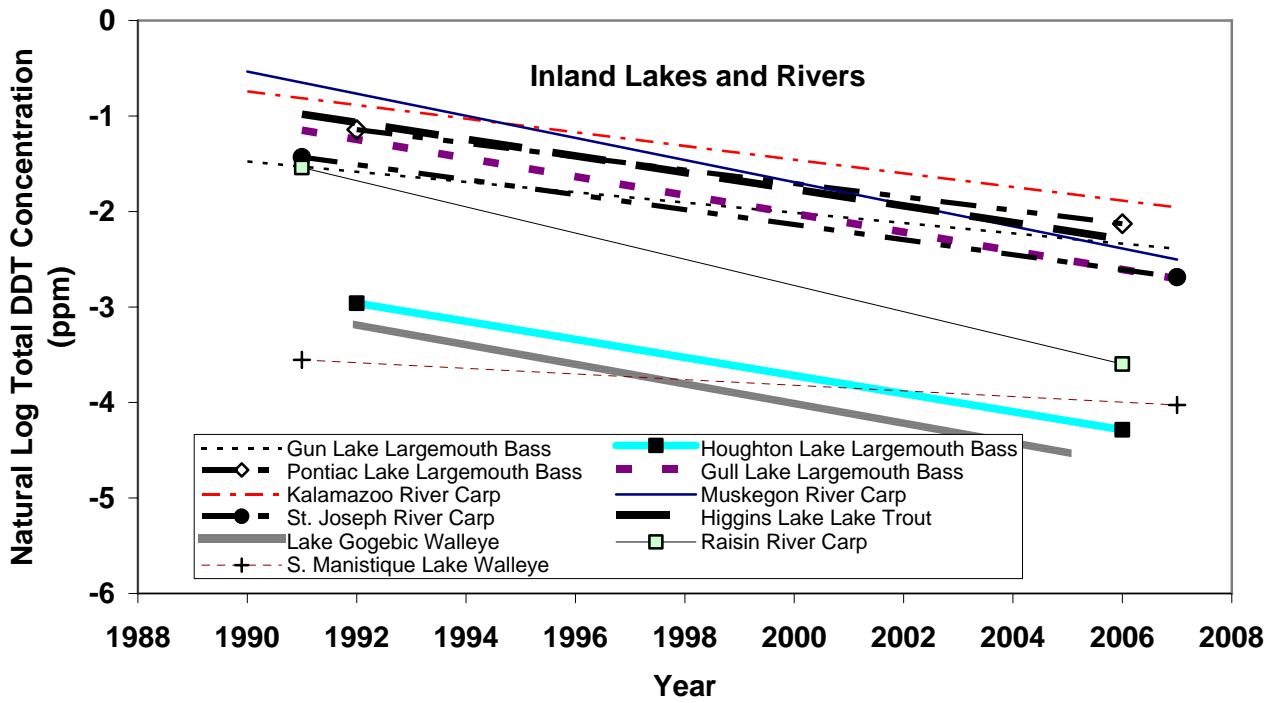


Figure 93. Temporal changes in total DDT concentrations at selected whole fish trend monitoring sites.

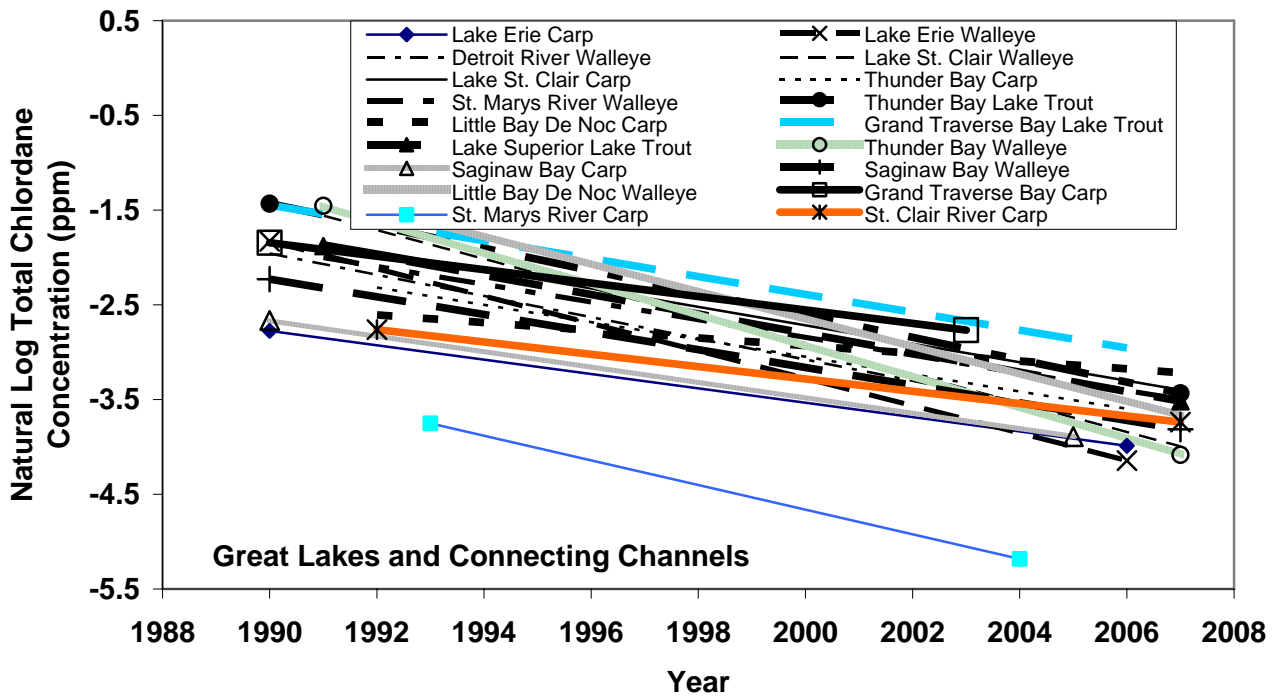
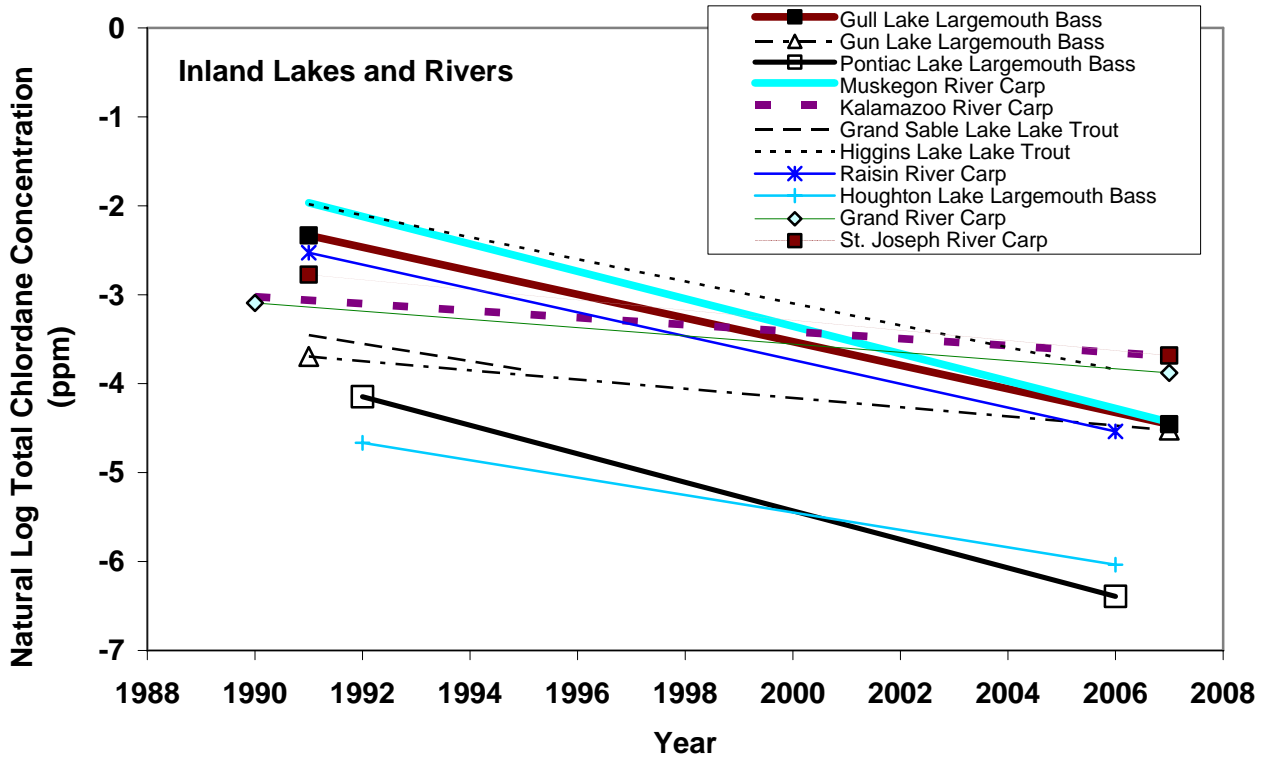


Figure 94. Temporal changes in total chlordane concentrations at selected whole fish trend monitoring sites.

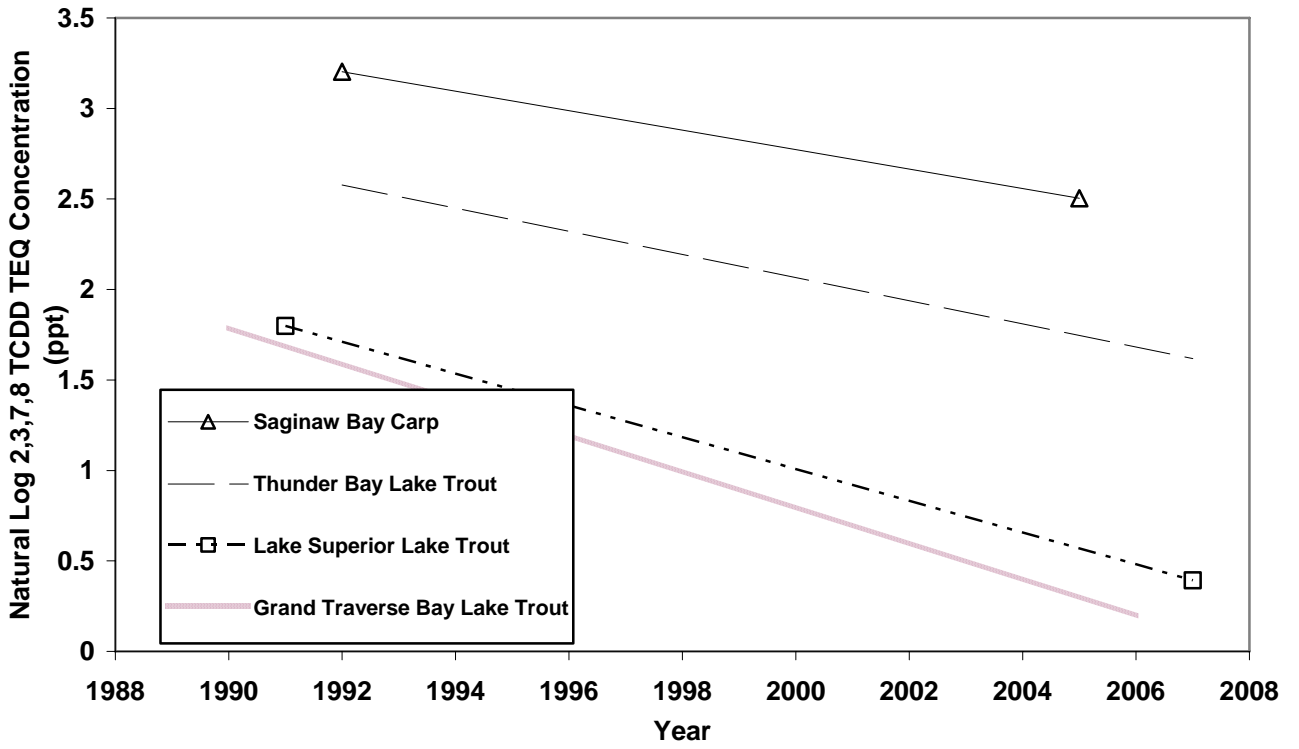


Figure 95. Temporal changes in 2,3,7,8 TCDD TEQ concentrations at selected whole fish trend monitoring sites.

## Appendix A. Inventory of Fish Contaminant Monitoring Sites and Species; 1980-2006.

| <u>Waterbody</u>              | <u>Location</u>                  | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                            |
|-------------------------------|----------------------------------|------------------|-------------|-------------------------------------------|
| Adrian Lake                   | Lenawee County                   | 90007            | Jun/13/1990 | Carp, Northern Pike                       |
| Antoine Lake                  | Dickinson County                 | 88004            | May/24/1988 | Largemouth Bass, Smallmouth Bass, Walleye |
| Antoine Lake                  | Dickinson County                 | 2005001          | Nov/10/2005 | Northern Pike, 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                           | 2005002          | Oct/03/2005 | 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                    |
| Au Train Lake                 | Alger County                     | 2005003          | Sep/12/2005 | Walleye, Yellow Perch                     |
| 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            |
| Bad River                     | Saginaw County                   | 2004003          | Jun/23/2004 | Carp, Channel Catfish, Northern Pike      |
| Baldwin River                 | Near M-37                        | 2003005          | Jul/16/2003 | Channel Catfish                           |
| Baldwin River                 | near M-37                        | 2005004          | Aug/18/2005 | Brown Trout                               |
| 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, Division St.       | 91004            | Oct/24/1991 | Carp, Smallmouth Bass                     |
| Battle Creek River            | Battle Creek, Division St.       | 2004004          | Jun/10/2004 | 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 Seven Lake (Seven Lakes)  | Oakland County                   | 2004133          | May/18/2004 | Largemouth Bass                           |
| Big Shag Lake                 | Marquette County                 | 2001003          | May/01/2001 | Northern Pike                             |

## Appendix A. Cont.

| <u>Waterbody</u>                      | <u>Location</u>                     | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                |
|---------------------------------------|-------------------------------------|------------------|-------------|---------------------------------------------------------------|
| Big South Branch Pere Marquette River | Walhalla Road                       | 2003007          | Jul/16/2003 | Channel Catfish                                               |
| 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                           | Maple Island Rd                     | 2005006          | Jun/29/2005 | Channel Catfish                                               |
| Black Creek                           | Mill Iron Rd                        | 2005007          | Jun/29/2005 | Channel Catfish                                               |
| Black Creek                           | Mouth                               | 2005008          | Jun/29/2005 | Channel Catfish                                               |
| Black Creek                           | Muskegon County, US-31              | 87013            | May/05/1987 | Brown Trout, Carp, White Sucker                               |
| Black Lake                            | Cheboygan County                    | 90052            | Feb/01/1989 | Lake Sturgeon                                                 |
| Black River                           | d/s Crowell @ Sheridan Line Rd      | 2007001          | Jul/25/2007 | Channel Catfish                                               |
| Black River                           | Mouth                               | 2002007          | Aug/02/2002 | Channel Catfish                                               |
| Black River                           | Port Huron, river mouth             | 93003            | Aug/31/1993 | Channel Catfish                                               |
| Black River                           | Port Huron, river mouth             | 2007003          | Jul/25/2007 | Channel Catfish                                               |
| Black River                           | Sanilac County, Crowell Impoundment | 89017            | Apr/20/1989 | Carp                                                          |
| Black River                           | Sanilac County, Crowell Impoundment | 2007263          | Nov/08/2007 | Carp                                                          |
| Black River                           | South Haven                         | 92016            | Aug/25/1992 | Carp, Northern Pike                                           |
| Black River                           | u/s Crowell off Old 51              | 2007004          | Jul/25/2007 | Channel Catfish                                               |
| Black River, South Branch             | Downstream of Bangor Dam            | 89020            | Jul/07/1989 | Carp, Largemouth Bass, Northern Pike, Rock Bass, White Sucker |
| Black River, South Branch             | Downstream of Bangor Dam            | 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                             |
| Blind Sucker Flooding                 | Luce County                         | 2007207          | Jun/19/2007 | Yellow Perch                                                  |
| Boardman Lake                         | Grand Traverse County               | 91006            | Sep/26/1991 | Northern Pike, Walleye, White Sucker                          |
| Boardman River                        | Beitner Rd                          | 2003011          | Jul/17/2003 | Channel Catfish                                               |
| Boardman River                        | Eighth St Bridge                    | 2003012          | Jul/17/2003 | Channel Catfish                                               |
| Boardman River                        | Union Street, downstream WWTP       | 2003013          | Jul/17/2003 | Channel Catfish                                               |
| Bob Lake                              | Houghton County                     | 2001134          | Oct/03/2001 | Walleye                                                       |
| Boot Lake                             | Schoolcraft County                  | 2004007          | Jun/23/2004 | 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                                 |
| Budd Lake                             | Clare Co                            | 2007268          | May/09/2007 | Largemouth Bass                                               |
| 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                                            |
| Caribou Lake                          | Chippewa County                     | 2006006          | Jun/13/2006 | Rock Bass, Smallmouth Bass                                    |
| Carney Lake                           | Dickinson County                    | 89031            | May/08/1989 | Northern Pike, Walleye                                        |
| Carp Creek                            | u/s Deer Lake                       | 2005013          | Aug/25/2005 | Brook Trout, White Sucker                                     |
| Carp Lake                             | Chippewa County                     | 87089            | Oct/23/1987 | Northern Pike, Walleye                                        |

## Appendix A. Cont.

| <u>Waterbody</u>   | <u>Location</u>                   | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                                 |
|--------------------|-----------------------------------|------------------|-------------|--------------------------------------------------------------------------------|
| 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         | Landfill Rd.                      | 2004009          | Aug/18/2004 | Brook Trout                                                                    |
| Carp River         | M-35                              | 84012            | Sep/27/1984 | Brook Trout, White Sucker, Yellow Perch                                        |
| Carp River         | M-35                              | 2004010          | Aug/17/2004 | Brook Trout, White Sucker                                                      |
| 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         | Above Caro                        | 2005014          | Aug/09/2005 | Redhorse Sucker, Rock Bass                                                     |
| 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         | Bridgeport                        | 2004011          | Jun/24/2004 | Carp, Channel Catfish                                                          |
| Cass River         | Caro Impoundment                  | 1998019          | Oct/27/1998 | Carp, Largemouth Bass                                                          |
| Cass River         | Caro Impoundment                  | 2006104          | Jul/13/2006 | Carp, Largemouth Bass                                                          |
| Cass River         | d/s Caro                          | 2006093          | Jan/13/2006 | Channel Catfish                                                                |
| Cass River         | d/s Cass City WWTP                | 2006094          | Jul/13/2006 | Channel Catfish                                                                |
| Cass River         | d/s Frankenmuth                   | 2006092          | Jul/13/2006 | Channel Catfish                                                                |
| 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         | Saginaw County, M-13              | 2006091          | Jul/13/2006 | Channel Catfish                                                                |
| Cass River         | Tuscola County, above Frankenmuth | 88009            | Jun/07/1988 | Redhorse Sucker, Rock Bass, Smallmouth Bass                                    |
| Cass River         | u/s Cass City WWTP                | 2006122          | Jul/13/2006 | Channel Catfish                                                                |
| 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                                                                           |
| Cheboyganing Creek | Saginaw County                    | 2004013          | Aug/09/2004 | Carp                                                                           |
| 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     | u/s Pine confluence               | 2007005          | Jul/25/2007 | Channel Catfish                                                                |

## Appendix A. Cont.

| <u>Waterbody</u>            | <u>Location</u>                        | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                  |
|-----------------------------|----------------------------------------|------------------|-------------|-------------------------------------------------|
| 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, Cisco Lake Chain       | 88030            | Jul/11/1988 | Northern Pike, Walleye                          |
| Cisco Lake                  | Gogebic County, Cisco Lake Chain       | 95031            | Aug/14/1995 | Bluegill, Walleye                               |
| Cisco Lake                  | Gogebic County, Cisco Lake Chain       | 1999005          | Apr/19/1999 | 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                                 |
| Clifford Lake               | Montcalm County                        | 2004014          | Jun/15/2004 | 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                                 |
| 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               | Ryan Road, Utica                       | 2004015          | Oct/07/2004 | Carp, Northern Pike, Rock Bass, White Sucker    |
| 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                      |

## Appendix A. Cont.

| <u>Waterbody</u> | <u>Location</u>                            | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                       |
|------------------|--------------------------------------------|------------------|-------------|------------------------------------------------------|
| 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                                         |
| Coldwater River  | Union City                                 | 2003019          | Jul/16/2003 | Channel Catfish                                      |
| Craig Lake       | Baraga County                              | 89074            | Aug/23/1989 | Walleye                                              |
| Craig Lake       | Baraga County                              | 91028            | Jun/04/1991 | Northern Pike, Walleye                               |
| Craig Lake       | Baraga County                              | 2005015          | Nov/08/2005 | Black Crappie, Northern Pike, Walleye, White Sucker  |
| Cranberry Lake   | Clare Co                                   | 2007212          | May/23/2007 | Largemouth Bass                                      |
| Crego Park Pond  | Lansing                                    | 86033            | Jul/29/1986 | Black Bullhead, Bluegill, Goldfish                   |
| Crockery Lake    | Ottawa County                              | 2006009          | Jun/06/2006 | Largemouth Bass                                      |
| 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                             |
| Dead River       | Forestville Basin                          | 2005017          | Jun/01/2005 | Northern Pike, Walleye                               |
| Deer Lake        | Alger County                               | 2004019          | Jun/02/2004 | Northern Pike                                        |
| 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                               |
| DEQ Control      | DEQ Control, Grand River u/s 6th St        | 2003601          | Sep/20/2003 | Control                                              |
| DEQ Control      | DEQ Control, Kalamazoo River at Trowbridge | 2004603          | Aug/26/2003 | Control                                              |
| DEQ Control      | DEQ Control, Kalamazoo River at Trowbridge | 2006603          | Aug/26/2003 | control                                              |
| DEQ Control      | DEQ Control, Kalamazoo River at Trowbridge | 2007603          | Jan/01/2008 | Control                                              |
| DEQ Control      | DEQ Control, Lake Huron at Tawas Bay       | 2006602          | Aug/19/2003 | control                                              |
| DEQ Control      | DEQ Control, Lake Huron at Tawas Bay       | 2007601          | Jan/01/2007 | Control                                              |

Appendix A. Cont.

| <u>Waterbody</u> | <u>Location</u>                          | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                          |
|------------------|------------------------------------------|------------------|-------------|-------------------------------------------------------------------------|
| DEQ Control      | DEQ Control, Lake Huron at Tawas Bay     | 2007602          | Jan/01/2007 | Control                                                                 |
| 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                                                           |
| 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    | Grassy Island                            | 2004020          | Jul/20/2004 | Carp, Walleye                                                           |
| Detroit River    | Grassy Island                            | 2005018          | Jun/22/2005 | Walleye                                                                 |
| Detroit River    | Grassy Island                            | 2007100          | Jun/30/2007 | Carp                                                                    |
| Detroit River    | Michigan waters                          | 93068            | Apr/01/1993 | Lake Sturgeon                                                           |
| Detroit River    | Michigan waters                          | 2004021          | Jul/20/2004 | Carp, Freshwater Drum, Redhorse Sucker, Yellow Perch                    |
| Detroit River    | Michigan waters                          | 2005200          | Jan/01/2005 | 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                                                                 |
| Dinner Lake      | Gogebic County                           | 2004024          | Jun/11/2004 | Black Crappie, Largemouth Bass, Northern Pike, Smallmouth Bass, Walleye |
| Dodge Lake       | Schoolcraft County                       | 2006121          | Jun/14/2006 | Largemouth Bass, Northern Pike                                          |
| Dowagiac Creek   | Dutch Settlement Road, u/s LaGrange Lake | 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                                                                 |
| East Bass Lake   | Marquette County                         | 2007202          | Jun/05/2007 | Northern Pike                                                           |
| 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                                                              |
| Elk Lake         | Grand Traverse/Antrim County             | 2006012          | Apr/11/2006 | Brown Trout, Lake Trout, Northern Pike, Walleye                         |
| Ellsworth Lake   | Antrim County                            | 85065            | Nov/27/1985 | Bluegill, Largemouth Bass, Northern Pike, Rock Bass, Yellow Perch       |

## Appendix A. Cont.

| <u>Waterbody</u>          | <u>Location</u>                               | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                        |
|---------------------------|-----------------------------------------------|------------------|-------------|-------------------------------------------------------|
| 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         |
| Emerald Lake              | Newaygo County                                | 2004026          | Jun/23/2004 | Largemouth Bass, Northern Pike                        |
| 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            | Cataract Basin                                | 2004028          | Jul/27/2004 | Walleye                                               |
| Escanaba River            | CR 420                                        | 2005122          | Jun/29/2005 | Channel Catfish                                       |
| 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            | Escanaba, river mouth                         | 2005121          | Jun/29/2005 | 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                            |
| Fawn River                | St. Joseph County, Stubey Road                | 2005019          | Sep/14/2005 | Carp, Smallmouth Bass                                 |
| 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                        |
| Five Lakes                | Clare County                                  | 2004131          | May/11/2004 | Largemouth Bass                                       |
| Flat River                | Belding downstream WWTP                       | 2003028          | Aug/20/2003 | Channel Catfish                                       |
| Flat River                | Belding upstream WWTP                         | 2003027          | Aug/20/2003 | Channel Catfish                                       |
| Flat River                | Fallasberg Park, downstream of Fallasberg Dam | 1998035          | Oct/27/1998 | Carp                                                  |
| Flat River                | Greenville downstream WWTP                    | 2003026          | Aug/20/2003 | Channel Catfish                                       |
| Flat River                | Greenville upstream WWTP                      | 2003025          | Aug/20/2003 | Channel Catfish                                       |
| Flat River                | Ingalls Road, downstream of Belding           | 1998037          | Jul/30/1998 | Rock Bass                                             |
| Flat River                | Ingalls Road, downstream of Belding           | 2003031          | Jul/29/2003 | Rock Bass, White Sucker                               |
| Flat River                | Long Lake Road, upstream of Belding           | 1998036          | Jul/30/1998 | Rock Bass                                             |
| Flat River                | Lowell                                        | 2001017          | Jul/23/2001 | Channel Catfish                                       |
| Flat River                | Lowell downstream WWTP                        | 2003030          | Aug/20/2003 | Channel Catfish                                       |
| Flat River                | Lowell upstream WWTP                          | 2003029          | Aug/20/2003 | Channel Catfish                                       |

## Appendix A. Cont.

| <u>Waterbody</u> | <u>Location</u>                   | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                   |
|------------------|-----------------------------------|------------------|-------------|------------------------------------------------------------------|
| Flat River       | Miller Rd, upstream of Greenville | 2003032          | Jul/29/2003 | Rock Bass, White Sucker                                          |
| Fletcher Pond    | Alpena County                     | 2005020          | May/16/2005 | Northern Pike                                                    |
| Flint River      | Above Flint @ Bray                | 2003036          | Aug/21/2003 | Channel Catfish                                                  |
| Flint River      | Below Flint                       | 2003033          | Aug/21/2003 | Channel Catfish                                                  |
| Flint River      | Birch Run Road                    | 93005            | Aug/30/1993 | Carp                                                             |
| Flint River      | Downstream Ragnone WWTP           | 2003038          | Aug/21/2003 | Channel Catfish                                                  |
| 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      | Klam Road                         | 2003034          | Aug/21/2003 | Channel Catfish                                                  |
| Flint River      | M-15                              | 2003035          | Aug/21/2003 | Channel Catfish                                                  |
| 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                                                  |
| Flint River      | Saginaw County, river mouth       | 2003039          | Aug/21/2003 | Channel Catfish                                                  |
| Flint River      | Upstream Ragnone WWTP             | 2003037          | Aug/21/2003 | 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                                                             |
| Fremont Lake     | Newaygo County                    | 2005021          | Jun/22/2005 | Carp, Largemouth Bass                                            |
| Frenchman Lake   | Chippewa County                   | 2004029          | May/26/2004 | Northern Pike                                                    |
| 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                                 |
| Galien River     | New Buffalo                       | 2007215          | Sep/18/2007 | Carp                                                             |
| Gaylanta Lake    | Montmorency County                | 2003040          | May/08/2003 | Northern Pike                                                    |
| Glen Lake        | Leelanau County                   | 90053            | Oct/18/1990 | Lake Trout, Smallmouth Bass                                      |
| Glen Lake        | Leelanau County                   | 2007216          | Apr/17/2007 | Lake Trout, Rainbow Trout                                        |
| 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                             |
| Gourdneck Lake   | Kalamazoo County                  | 2005126          | May/26/2005 | Northern Pike                                                    |
| Grand Lake       | Presque Isle County               | 95015            | May/22/1995 | Rock Bass, Smallmouth Bass, Walleye                              |
| Grand River      | at Ionia                          | 2006103          | Jul/11/2006 | Carp, Channel Catfish, Redhorse Sucker, 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                                                             |

Appendix A. Cont.

| <u>Waterbody</u> | <u>Location</u>                      | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                            |
|------------------|--------------------------------------|------------------|-------------|---------------------------------------------------------------------------|
| Grand River      | Clinton County, State Road           | 90022            | Sep/06/1990 | Carp, Largemouth Bass, Smallmouth Bass                                    |
| Grand River      | Downstream of Dimondale              | 2004147          | Jun/16/2004 | Northern Pike                                                             |
| Grand River      | Eaton Rapids, Gale Road/Waverly Road | 2001021          | Oct/03/2001 | Carp, Largemouth Bass, Walleye, White Sucker                              |
| Grand River      | Eaton Rapids, Gale Road/Waverly Road | 2004146          | Jul/01/2004 | Channel Catfish, Northern Pike, Smallmouth Bass, Walleye                  |
| 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                                                                      |
| 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      | Grand Rapids, below 6th Street dam   | 2007300          | Jun/18/2007 | Northern Pike                                                             |
| 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, above 6th St. Dam       | 2005023          | Jul/14/2005 | Carp                                                                      |
| Grand River      | Kent County, above 6th St. Dam       | 2007101          | Sep/11/2007 | 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                     | 90021            | Aug/14/1990 | Carp, Walleye                                                             |
| Grand River      | Maple Grove Road                     | 2002113          | Oct/03/2002 | Northern Pike                                                             |
| Grand River      | Moores River Impoundment             | 89054            | Jul/27/1989 | Channel Catfish, Largemouth Bass, Northern Pike, Smallmouth Bass, Walleye |
| Grand River      | Moores River Impoundment             | 96013            | May/07/1996 | Carp, Largemouth Bass                                                     |
| Grand River      | Moores River Impoundment             | 2004148          | Jun/09/2004 | Northern Pike                                                             |
| 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                                                                |

## Appendix A. Cont.

| <u>Waterbody</u> | <u>Location</u>              | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                           |
|------------------|------------------------------|------------------|-------------|------------------------------------------|
| Gratiot Lake     | Keweenaw County              | 87038            | Jan/01/1987 | Rock Bass, Smallmouth Bass               |
| Gratiot Lake     | Keweenaw County              | 2005025          | May/25/2005 | Northern Pike, Smallmouth Bass, Walleye  |
| 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                          |
| Gull Lake        | Kalamazoo County             | 2005026          | Aug/09/2005 | Largemouth Bass                          |
| Gull Lake        | Kalamazoo County             | 2007102          | May/29/2007 | 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                          |
| 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                          |
| Gun Lake         | Barry County                 | 2005027          | Jul/07/2005 | Largemouth Bass                          |
| Gun Lake         | Barry County                 | 2006014          | Jun/01/2006 | Largemouth Bass                          |
| Gun Lake         | Barry County                 | 2007103          | Jun/01/2007 | 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             |
| Hanbury Lake     | Dickinson County             | 2005028          | May/02/2005 | Largemouth Bass                          |
| Hardwood Lake    | Ogemaw County                | 2004034          | Jun/02/2004 | 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                               |
| Higgins Lake     | Roscommon County             | 2005030          | Oct/12/2005 | Lake Trout                               |
| Hopkins Lake     | Shiawassee County            | 91033            | Sep/04/1991 | Largemouth Bass                          |
| Houghton Lake    | Roscommon County             | 87063            | Aug/05/1987 | Carp, Northern Pike, Walleye             |

Appendix A. Cont.

| <u>Waterbody</u>  | <u>Location</u>                       | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                              |
|-------------------|---------------------------------------|------------------|-------------|-----------------------------------------------------------------------------|
| 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                                                             |
| Houghton Lake     | Roscommon County                      | 2004037          | May/27/2004 | Largemouth Bass                                                             |
| Houghton Lake     | Roscommon County                      | 2006016          | May/24/2006 | Largemouth Bass                                                             |
| Hubbard Lake      | Alcona County                         | 89076            | Oct/16/1989 | Northern Pike, Walleye                                                      |
| Hubbard Lake      | Alcona County                         | 2006017          | May/10/2006 | Walleye, White Sucker                                                       |
| 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       | Ford Lake                             | 2006018          | May/16/2006 | 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                                                             |
| 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   | Above Otsego City Dam                 | 2006164          | Sep/05/2006 | Carp                                                                        |
| 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, 12 Mile Road     | 2006160          | Aug/08/2006 | Carp, Smallmouth Bass                                                       |

Appendix A. Cont.

| <u>Waterbody</u> | <u>Location</u>                   | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                                                                                                                                                        |
|------------------|-----------------------------------|------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 Dam               | 2006167          | Sep/07/2006 | Carp, Channel catfish, 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  | Kalamazoo Lake                    | 2006170          | Sep/29/2006 | Carp                                                                                                                                                                                                  |
| 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                                                                                                                                                                                                  |
| 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                                                                                                                                        |

Appendix A. Cont.

| <u>Waterbody</u> | <u>Location</u>               | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                           |
|------------------|-------------------------------|------------------|-------------|----------------------------------------------------------|
| 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  | Lake Allegan                  | 2005036          | Jun/16/2005 | Carp                                                     |
| Kalamazoo River  | Lake Allegan                  | 2006168          | Sep/27/2006 | Carp, Channel Catfish, Smallmouth Bass                   |
| Kalamazoo River  | Lake Allegan                  | 2007105          | Jun/01/2007 | 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  | Morrow Pond                   | 2006161          | Aug/29/2006 | Carp, 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  | Mosel Avenue                  | 2006162          | Sep/20/2006 | Carp, 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  | New Richmond                  | 2006169          | Oct/03/2006 | Carp, Channel Catfish, 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  | Otsego Dam Impoundment        | 2006165          | Sep/19/2006 | Carp                                                     |
| 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 Dam Reservoir       | 2006163          | Sep/22/2006 | 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                                          |
| 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                                    |

Appendix A. Cont.

| <u>Waterbody</u>              | <u>Location</u>            | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                           |
|-------------------------------|----------------------------|------------------|-------------|----------------------------------------------------------|
| Kalamazoo River               | Trowbridge Dam Impoundment | 2003142          | Aug/18/2003 | Carp, Smallmouth Bass                                    |
| Kalamazoo River               | Trowbridge Dam Impoundment | 2004143          | Aug/25/2004 | Carp                                                     |
| Kalamazoo River               | Trowbridge Dam Impoundment | 2006166          | Sep/06/2006 | Carp, Channel Catfish, 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               | Bay County, M-247          | 2004039          | Aug/10/2004 | 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                   |
| Kent Lake                     | Oakland County             | 2004040          | May/11/2004 | Black Crappie, Walleye                                   |
| King Lake                     | Baraga County              | 2005037          | Apr/30/2005 | Largemouth 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                                          |
| Klinger Lake                  | St. Joseph County          | 2006126          | Dec/05/2006 | Northern Pike                                            |
| Lake 27                       | Otsego County              | 95033            | Jun/10/1995 | Northern Pike                                            |
| Lake Ann                      | Benzie County              | 89013            | May/31/1989 | Northern Pike, Smallmouth Bass                           |
| Lake Cadillac                 | Wexford County             | 2004041          | Sep/28/2004 | Northern Pike, Smallmouth Bass                           |
| Lake Charlevoix               | Charlevoix County          | 90051            | Nov/01/1990 | Brown Trout, Lake Trout                                  |
| Lake Charlevoix               | Charlevoix County          | 2006023          | Apr/19/2006 | Walleye, White Sucker                                    |
| 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                     | Brest Bay                  | 2003051          | Oct/24/2003 | Walleye                                                  |
| Lake Erie                     | Brest Bay                  | 2004042          | Oct/08/2004 | Walleye                                                  |
| Lake Erie                     | Brest Bay                  | 2006027          | Apr/24/2006 | Carp, Walleye                                            |
| Lake Erie                     | Huron River, Flat Rock     | 84050            | Jan/01/1984 | Coho                                                     |
| Lake Erie                     | Huron River, Flat Rock     | 97018            | Oct/17/1997 | Chinook, Rainbow Trout                                   |
| Lake Erie                     | N. Maumee Bay              | 95008            | Apr/26/1995 | Carp                                                     |
| Lake Erie                     | N. Maumee Bay              | 2006025          | Sep/26/2006 | Carp, Largemouth Bass, Yellow Perch                      |
| Lake Erie                     | N. Maumee Bay              | 2006225          | Sep/26/2006 | Gizzard Shad                                             |
| 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                                                     |

## Appendix A. Cont.

| <u>Waterbody</u> | <u>Location</u>                  | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                   |
|------------------|----------------------------------|------------------|-------------|------------------------------------------------------------------|
| Lake Erie        | Off Monroe                       | 2006099          | Apr/24/2006 | Carp, Freshwater Drum, Smallmouth Bass, White Bass, Yellow Perch |
| 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 Erie        | Western Basin                    | 2004043          | Apr/20/2004 | Walleye, White Bass, White Perch                                 |
| 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                          |
| 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 Gogebic     | Gogebic/Ontonagon County         | 2005040          | Jun/10/2005 | Walleye                                                          |
| Lake Hudson      | Lenawee County                   | 89003            | Apr/03/1989 | Carp, Muskellunge, Northern Pike                                 |
| Lake Hudson      | Lenawee County                   | 2000032          | Jul/21/2000 | Carp, Largemouth 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       | Grindstone City                  | 2004130          | May/10/2004 | 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                                                       |

Appendix A. Cont.

| <u>Waterbody</u> | <u>Location</u>                       | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                                  |
|------------------|---------------------------------------|------------------|-------------|---------------------------------------------------------------------------------|
| 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                           | 2005042          | Oct/14/2005 | Carp, Walleye                                                                   |
| Lake Huron       | Saginaw Bay                           | 2007107          | Sep/04/2007 | Walleye                                                                         |
| Lake Huron       | Saginaw Bay, Au Gres                  | 87017            | Jun/22/1987 | Carp, Channel Catfish, Walleye, Yellow Perch                                    |
| 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, Bay Port                 | 2004046          | Sep/10/2004 | Carp, Channel Catfish, Walleye, White Bass, White Sucker, 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, Charity Island           | 2007270          | Sep/04/2007 | Freshwater Drum                                                                 |
| 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 | 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                                                                            |

Appendix A. Cont.

| <u>Waterbody</u> | <u>Location</u>           | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                         |
|------------------|---------------------------|------------------|-------------|------------------------------------------------------------------------|
| 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                                                          |
| 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               | 2004048          | May/20/2004 | Carp, Lake Trout                                                       |
| Lake Huron       | Thunder Bay               | 2004145          | May/24/2004 | Lake Trout                                                             |
| Lake Huron       | Thunder Bay               | 2005044          | Jun/08/2005 | Lake Trout, Walleye                                                    |
| Lake Huron       | Thunder Bay               | 2005161          | May/03/2005 | 9-spine stickleback, Smelt                                             |
| Lake Huron       | Thunder Bay               | 2006032          | Jun/14/2006 | Carp                                                                   |
| Lake Huron       | Thunder Bay               | 2007109          | Jun/11/2007 | Lake Trout, Walleye                                                    |
| Lake Huron       | Thunder Bay               | 2007130          | Aug/01/2007 | Alewife, Round goby                                                    |

Appendix A. Cont.

| <u>Waterbody</u>  | <u>Location</u>                | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                                                                      |
|-------------------|--------------------------------|------------------|-------------|---------------------------------------------------------------------------------------------------------------------|
| Lake Huron        | Thunder Bay                    | 2007269          | Oct/23/2007 | Lake Whitefish                                                                                                      |
| 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 Independence | Marquette County               | 2005045          | Apr/29/2005 | 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 Macatawa     | Ottawa County                  | 2005047          | May/16/2005 | Carp, Walleye                                                                                                       |
| Lake Margrethe    | Crawford County                | 95002            | Mar/31/1995 | Walleye                                                                                                             |
| Lake Margrethe    | Crawford County                | 2007227          | May/08/2007 | Walleye                                                                                                             |
| Lake Medora       | Keweenaw County                | 2004050          | Jun/15/2004 | Smallmouth Bass, 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 Michigamme   | Marquette County               | 2006035          | Apr/22/2006 | Rock Bass, Walleye                                                                                                  |
| 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                                                                                                          |
| 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                                                                                                             |

## Appendix A. Cont.

| <u>Waterbody</u> | <u>Location</u>              | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                        |
|------------------|------------------------------|------------------|-------------|-----------------------------------------------------------------------|
| 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           | 2004053          | May/18/2004 | Lake Trout                                                            |
| Lake Michigan    | Grand Traverse Bay           | 2006037          | Jun/02/2006 | Lake Trout                                                            |
| 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                                                           |
| Lake Michigan    | Green Bay                    | 2002054          | Apr/11/2002 | Brown Trout                                                           |
| Lake Michigan    | Green Bay                    | 2003148          | Apr/10/2003 | Brown Trout                                                           |
| Lake Michigan    | Green Bay                    | 2004054          | Apr/08/2004 | Smallmouth Bass, White Sucker                                         |
| 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    | Green Bay, Cedar River       | 2005050          | Apr/15/2005 | Longnose Sucker, Smallmouth Bass, Walleye, White Sucker               |
| Lake Michigan    | Kalamazoo River mouth        | 2003155          | May/17/2002 | Lake Sturgeon                                                         |
| Lake Michigan    | Lake Muskegon                | 2004200          | Apr/01/2004 | Lake Sturgeon                                                         |
| Lake Michigan    | Leland                       | 84049            | Aug/06/1984 | Chub                                                                  |
| Lake Michigan    | Little Bay De Noc            | 83017            | Oct/20/1983 | Lake Trout, Lake Whitefish                                            |

## Appendix A. Cont.

| <u>Waterbody</u> | <u>Location</u>            | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                             |
|------------------|----------------------------|------------------|-------------|------------------------------------------------------------|
| 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 Bay De Noc          | 2004150          | Sep/10/2004 | Carp, Redhorse Sucker, Rock Bass, Smallmouth Bass, Walleye |
| Lake Michigan    | Little Bay De Noc          | 2005051          | Apr/14/2005 | Carp, Walleye                                              |
| Lake Michigan    | Little Bay De Noc          | 2007112          | Apr/18/2007 | Carp, Walleye                                              |
| 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    | Manistee River             | 2004055          | Apr/01/2004 | Rainbow Trout                                              |
| 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                                                     |
| 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                                                 |

## Appendix A. Cont.

| <u>Waterbody</u> | <u>Location</u>                   | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                      |
|------------------|-----------------------------------|------------------|-------------|-------------------------------------|
| 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    | South Haven                       | 2004051          | Jun/15/2004 | Round Goby                          |
| 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                             |
| 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                             |

Appendix A. Cont.

| <u>Waterbody</u> | <u>Location</u>                   | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                                               |
|------------------|-----------------------------------|------------------|-------------|----------------------------------------------------------------------------------------------|
| 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    | St. Joseph River, Berrien Springs | 2004060          | Mar/26/2004 | Rainbow Trout                                                                                |
| 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                                                                        |
| 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                                                                              |

Appendix A. Cont.

| <u>Waterbody</u> | <u>Location</u>     | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                                                                                       |
|------------------|---------------------|------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 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   | L'Anse Creuse Bay   | 2005055          | Jun/01/2005 | Carp, Walleye                                                                                                                        |
| Lake St. Clair   | L'Anse Creuse Bay   | 2007113          | May/28/2007 | 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   | Michigan waters     | 2005201          | Jun/14/2005 | Lake Sturgeon                                                                                                                        |
| 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 | Lake Trout, Lake Whitefish, Siscowet                                                                                                 |
| 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 Harbor | 84005            | Jun/15/1984 | Lake Trout                                                                                                                           |
| Lake Superior    | Huron Bay           | 2006111          | Apr/20/2006 | Rainbow Trout, Walleye                                                                                                               |
| 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                                                                                                                           |

## Appendix A. Cont.

| <u>Waterbody</u>              | <u>Location</u>               | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                           |
|-------------------------------|-------------------------------|------------------|-------------|------------------------------------------|
| 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 | Siscowet                                 |
| Lake Superior                 | Keweenaw Bay                  | 2004063          | May/04/2004 | Lake Trout                               |
| Lake Superior                 | Keweenaw Bay                  | 2006043          | Apr/17/2006 | Rainbow Trout                            |
| Lake Superior                 | Keweenaw Bay                  | 2007114          | Aug/01/2007 | Lake Trout                               |
| Lake Superior                 | Keweenaw Bay                  | 2007230          | May/15/2007 | Lake Herring, Siscowet                   |
| Lake Superior                 | Keweenaw Bay                  | 2007231          | May/15/2007 | Lake Whitefish                           |
| Lake Superior                 | Keweenaw Bay, Keystone Point  | 92073            | Jul/31/1992 | Lake Whitefish, Siscowet                 |
| 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 | Siscowet                                 |
| Lake Superior                 | Laughing Whitefish River      | 88036            | Sep/27/1988 | Chinook                                  |
| Lake Superior                 | Manitou Island                | 87072            | Jun/26/1987 | Siscowet                                 |
| 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 | Siscowet                                 |
| Lake Superior                 | Marquette                     | 92074            | Aug/18/1992 | Lake Whitefish, Siscowet                 |
| Lake Superior                 | Marquette                     | 93089            | Jul/01/1993 | Lake Whitefish                           |
| Lake Superior                 | Marquette                     | 95065            | Dec/13/1995 | Siscowet                                 |
| Lake Superior                 | Marquette                     | 96038            | Jun/10/1996 | Lake Trout, Lake Whitefish, Siscowet     |
| Lake Superior                 | Marquette                     | 2002060          | May/13/2002 | Lake Trout, Lake Whitefish               |
| Lake Superior                 | Marquette                     | 2007267          | May/01/2007 | 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 | Siscowet                                 |
| 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/ Sturgeon River  | 2007254          | Dec/20/2006 | Burbot, Burbot Liver                     |
| 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 | Siscowet                                 |
| Lake Superior                 | West of Keweenaw Peninsula    | 92077            | Jul/13/1992 | Siscowet                                 |
| 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                          |

Appendix A. Cont.

| <u>Waterbody</u>    | <u>Location</u>             | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                            |
|---------------------|-----------------------------|------------------|-------------|-------------------------------------------|
| 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 Black Creek  | DPW Wetland                 | 2004136          | Jul/01/2004 | Channel Catfish                           |
| Little Black Creek  | Mouth                       | 2004137          | Jul/01/2004 | Channel Catfish                           |
| Little Black Creek  | US-31                       | 2004134          | Jul/01/2004 | Channel Catfish                           |
| Little Lake         | Marquette County            | 2002043          | May/24/2002 | Walleye                                   |
| Little Oxbow Lake   | Gogebic County              | 2005056          | Nov/01/2005 | Largemouth Bass, Walleye                  |
| Little Round Lake   | Alger Co.                   | 2006199          | Nov/19/2006 | Bluegill                                  |
| 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            |
| Long Lake           | Iron County                 | 2007235          | Apr/17/2007 | Walleye                                   |
| Long Lake           | Kalamazoo County            | 2002064          | Oct/16/2002 | Black Crappie                             |
| Long Lake           | Kalamazoo County            | 2003153          | Mar/28/2003 | Brown Bullhead                            |
| Long Lake           | Kent Co.                    | 2006044          | Jun/15/2006 | Largemouth Bass                           |
| Long Lake           | Montmorency County          | 2006046          | May/11/2006 | Smallmouth Bass                           |
| Long Lake           | Presque Isle County         | 2004066          | Apr/14/2004 | Smallmouth Bass, White Sucker             |
| Long Lake           | Presque Isle County         | 2006045          | May/25/2006 | Brown Bullhead, Smallmouth Bass           |
| Long Lake           | St. Joseph County/Colon Twp | 2001142          | Nov/19/2001 | Brown Bullhead, Largemouth Bass           |
| Looking Glass River | Cutler Rd                   | 2007006          | Jul/25/2007 | Channel Catfish                           |
| 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    |
| Lost Lake           | Presque Isle County         | 2007237          | Jun/05/2007 | Largemouth 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                           |
| Macatawa River      | d/s River St. Bridge        | 2005060          | Jun/24/2005 | Channel Catfish                           |
| Macatawa River      | N. Buoy 11                  | 2005059          | Jun/29/2005 | Channel Catfish                           |
| Macatawa River      | u/s 112th Ave               | 2005061          | Jun/29/2002 | Channel Catfish                           |
| 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 |

Appendix A. Cont.

| <u>Waterbody</u>              | <u>Location</u>                            | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                             |
|-------------------------------|--------------------------------------------|------------------|-------------|------------------------------------------------------------|
| Manistique River              | d/s Manistique Papers Dam                  | 2004072          | Aug/02/2004 | Carp, Redhorse Sucker, Rock Bass, Smallmouth Bass, Walleye |
| Manistique River              | d/s Manistique Papers Dam                  | 2007238          | Apr/17/2007 | 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                                    |
| Maple River                   | d/s M-21                                   | 2007007          | Jul/25/2007 | Channel Catfish                                            |
| Maple River                   | u/s Matherton                              | 2006150          | Jul/11/2006 | Carp                                                       |
| Marion Lake                   | Gogebic County                             | 87070            | Jul/29/1987 | Rock Bass, Walleye                                         |
| Marquette State Fish Hatchery | Marquette                                  | 2006200          | Oct/17/2006 | Brook Trout, Lake Trout, Splake                            |
| Marten Lake                   | Iron County                                | 85019            | Oct/25/1985 | Brown Bullhead, Northern Pike                              |
| McCormick Lake                | Montmorency County                         | 2004074          | Jun/02/2004 | Brown Trout                                                |
| MDCH Control                  | MDCH Lab                                   | 2006610          | Jan/01/2006 | control                                                    |
| MDCH Control                  | MDCH Lab                                   | 2007800          | Jan/01/2007 | Control                                                    |
| MDCH Control                  | MDCH Lab                                   | 2007801          | Jan/01/2007 | Control                                                    |
| MDCH Control                  | MDCH Lab                                   | 2007802          | Jan/01/2007 | Control                                                    |
| MDCH Control                  | MDCH Lab                                   | 2007803          | Jan/01/2008 | Control                                                    |
| MDCH Control                  | MDCH Lab                                   | 2007804          | Jan/01/2007 | Control                                                    |
| 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                             |
| Menominee River               | Chalk Hills Impoundment                    | 97040            | May/27/1997 | Redhorse Sucker                                            |
| 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               | Dickinson County, Vulcan                   | 86058            | Oct/09/1986 | Northern Pike, Redhorse Sucker, Smallmouth Bass, Walleye   |
| 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                                              |

Appendix A. Cont.

| <u>Waterbody</u>    | <u>Location</u>                           | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                                                 |
|---------------------|-------------------------------------------|------------------|-------------|------------------------------------------------------------------------------------------------|
| 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     | Menominee, river mouth                    | 2006097          | Apr/10/2006 | Carp, Walleye                                                                                  |
| Menominee River     | Sturgeon Falls Impoundment                | 1999080          | May/25/1999 | Northern Pike                                                                                  |
| Menominee River     | Upper Scott Flowage, Chappee 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 |
| Middle Straits Lake | Oakland County                            | 2007240          | May/09/2007 | Northern Pike                                                                                  |
| Milakokia Lake      | Mackinac County                           | 85061            | Jun/18/1985 | Walleye, White Sucker                                                                          |
| Milakokia Lake      | Mackinac County                           | 94031            | Jun/21/1994 | Walleye, White Sucker, Yellow Perch                                                            |
| Milakokia Lake      | Mackinac County                           | 2007241          | May/22/2007 | Walleye                                                                                        |
| Mill Creek          | Washtenaw County                          | 89021            | Jul/24/1989 | White Sucker                                                                                   |
| Millecoquins Lake   | Mackinac County                           | 89038            | May/11/1989 | Northern Pike, Walleye                                                                         |
| Millecoquins Lake   | Mackinac County                           | 92071            | Aug/05/1992 | Lake Sturgeon                                                                                  |
| Millecoquins Lake   | Mackinac County                           | 2006049          | May/01/2006 | Rock Bass, Walleye                                                                             |
| 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                                                                                |
| Montcalm Lake       | Montcalm County                           | 2004062          | May/20/2004 | Largemouth Bass                                                                                |
| 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                                                        |
| Murphy Lake         | Tuscola Co                                | 2007243          | Apr/12/2007 | Northern Pike                                                                                  |
| 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                                                  |

Appendix A. Cont.

| <u>Waterbody</u>      | <u>Location</u>                  | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                |
|-----------------------|----------------------------------|------------------|-------------|-----------------------------------------------|
| 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 Lake         | Muskegon County                  | 2006050          | Jun/06/2006 | 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        | 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        | Newaygo County, Croton Dam Pond  | 2005070          | Jul/06/2005 | Carp                                          |
| Muskegon River        | Newaygo County, Croton Dam Pond  | 2007115          | Sep/11/2007 | 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                |
| Nettie Lake           | Presque Isle County              | 2005114          | Sep/21/2005 | Smallmouth Bass                               |
| Nevins Lake           | Montcalm County                  | 2004076          | Sep/07/2004 | Largemouth Bass                               |
| 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                                       |
| 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                                       |

## Appendix A. Cont.

| <u>Waterbody</u>                          | <u>Location</u>           | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                                                         |
|-------------------------------------------|---------------------------|------------------|-------------|--------------------------------------------------------------------------------------------------------|
| 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                                                                                          |
| Ormes Lake                                | Gogebic County            | 2005071          | Nov/01/2005 | Largemouth Bass                                                                                        |
| Osmun Lake                                | Oakland County            | 1999048          | Jul/07/1999 | Carp, Largemouth Bass                                                                                  |
| Osterhout Lake                            | Allegan County            | 2007265          | May/24/2007 | Largemouth Bass                                                                                        |
| Otsego Lake                               | Otsego Co                 | 2007244          | May/22/2007 | Walleye                                                                                                |
| Ottawa Lake                               | Iron County               | 86005            | May/22/1986 | Northern Pike, Rock Bass, Walleye                                                                      |
| Ottawa River                              | Mouth                     | 93047            | Sep/29/1993 | Carp, Largemouth Bass                                                                                  |
| Ottawa River                              | Mouth                     | 2005074          | Jun/28/2005 | Channel Catfish                                                                                        |
| Ottawa River                              | Mouth                     | 2006109          | Sep/26/2006 | Carp, Largemouth Bass                                                                                  |
| Ottawa River                              | Mouth                     | 2006226          | Sep/26/2006 | Gizzard Shad                                                                                           |
| 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                                  | M 139                     | 2006053          | Jul/13/2006 | Channel Catfish                                                                                        |
| Ox Creek                                  | Mouth                     | 2001092          | Jul/30/2001 | Channel Catfish                                                                                        |
| Ox Creek                                  | Mouth                     | 2006054          | Jul/13/2006 | 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                             | Above Ox Creek            | 2006056          | Jul/13/2006 | Channel Catfish                                                                                        |
| Paw Paw River                             | Below Ox Creek            | 2001094          | Jul/30/2001 | Channel Catfish                                                                                        |
| Paw Paw River                             | d/s Hartford @ 6750th     | 2006060          | Jul/13/2006 | Channel Catfish                                                                                        |
| Paw Paw River                             | Maple Lake                | 2006048          | Sep/27/2006 | Carp, Largemouth Bass                                                                                  |
| Paw Paw River S. Br.                      | C. Rd. 358                | 2006062          | Jul/13/2006 | Channel Catfish                                                                                        |
| Paw Paw River, S. Br.                     | d/s Maple Lake @3750th    | 2006061          | Jul/13/2006 | Channel Catfish                                                                                        |
| Peach Lake                                | Ogemaw County             | 2004080          | May/18/2004 | Northern Pike                                                                                          |
| 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                      | Downstream Ludington WWTP | 2003090          | Jul/16/2003 | Channel Catfish                                                                                        |
| Pere Marquette River                      | Lake County               | 2004081          | Sep/03/2004 | Brown Trout                                                                                            |
| 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                                                                                        |
| Pere Marquette River                      | Scottville Rd             | 2003088          | Jul/16/2003 | Channel Catfish                                                                                        |
| Pere Marquette River                      | South Branch Rd           | 2003087          | Jul/16/2003 | Channel Catfish                                                                                        |
| Pere Marquette River                      | Upstream Ludington WWTP   | 2003089          | Jul/16/2003 | Channel Catfish                                                                                        |
| Pere Marquette River, Little Branch       | 17 Mile Rd                | 2003071          | Jul/16/2003 | Channel Catfish                                                                                        |
| Pere Marquette River, Little South Branch | Lake County               | 2004082          | Aug/24/2004 | Brown Trout, White Sucker                                                                              |

Appendix A. Cont.

| <u>Waterbody</u>                          | <u>Location</u>                    | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                                |
|-------------------------------------------|------------------------------------|------------------|-------------|-------------------------------------------------------------------------------|
| Pere Marquette River, Little South Branch | Taylor Bridge                      | 94032            | Aug/17/1993 | Brown Trout                                                                   |
| Pickereel Lake                            | Dickinson County                   | 87082            | Sep/24/1987 | Largemouth Bass, Northern Pike                                                |
| Pickereel Lake                            | Emmet County                       | 89069            | May/23/1989 | Largemouth Bass, Smallmouth Bass, Walleye                                     |
| Pigeon River                              | Ottawa Co, at 136th Ave            | 2005129          | Jun/28/2005 | White Sucker                                                                  |
| Pigeon River                              | Vistula Rd.                        | 2005076          | Sep/14/2005 | Redhorse Sucker, Rock Bass, Smallmouth Bass                                   |
| 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                                | Gordonville Road                   | 2007008          | Jul/25/2007 | 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                                                                          |
| 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, Northern hogsucker, 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                                | St. Louis WWTP Bridge              | 1999052          | Jun/24/1999 | Channel Catfish                                                               |
| Pine River                                | St. Louis WWTP Bridge              | 2000069          | Jul/20/2000 | Channel Catfish                                                               |
| Pine River                                | St. Louis WWTP Bridge              | 2002013          | Jul/16/2002 | Channel Catfish                                                               |
| Pine River                                | St. Louis WWTP Bridge              | 2007013          | Jul/25/2007 | Channel Catfish                                                               |

Appendix A. Cont.

| <u>Waterbody</u>                 | <u>Location</u>                | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                   |
|----------------------------------|--------------------------------|------------------|-------------|------------------------------------------------------------------|
| Pine River                       | US-127                         | 2007012          | Jul/25/2007 | Channel Catfish                                                  |
| Platte Lake                      | Benzie County                  | 2004151          | Jul/11/2004 | Channel Catfish, Northern Pike, Smallmouth Bass, Walleye         |
| Platte Lake                      | Benzie County                  | 2005160          | Sep/02/2005 | Rock Bass                                                        |
| Platte River                     | Burnt Mill Road, Benzie County | 1998087          | Aug/05/1998 | Brown Trout, White Sucker                                        |
| Platte River State Fish Hatchery | Honor                          | 2007501          | May/11/2007 | Chinook, Coho                                                    |
| 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                                                  |
| Pontiac Lake                     | Oakland County                 | 2006065          | May/23/2006 | 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                    | Bryant Mill Pond               | 2006172          | Sep/18/2006 | Carp, White Sucker                                               |
| Portage Creek                    | Kalamazoo, Crosstown Pkwy.     | 89059            | Aug/30/1989 | Channel Catfish                                                  |
| Portage Creek                    | Monarch Pond                   | 2001045          | Oct/17/2001 | Carp                                                             |
| Portage Creek                    | Monarch Pond                   | 2006171          | Sep/19/2006 | 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                     | Houghton County                | 2007247          | Apr/19/2007 | Walleye                                                          |
| Portage Lake                     | Jackson County                 | 89042            | May/23/1989 | Black Crappie, Largemouth Bass, Northern Pike                    |
| Portage Lake                     | Manistee County                | 90008            | Jun/12/1990 | Largemouth Bass, Northern Pike, Smallmouth Bass                  |
| Portage Lake                     | Manistee County                | 2004144          | Oct/11/2004 | Carp, Largemouth Bass, Northern Pike                             |
| 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                                                  |
| Pretty Lake                      | Luce County                    | 2004083          | Jun/22/2004 | Walleye                                                          |
| Proud Lake                       | Oakland County                 | 2006066          | May/25/2006 | Carp, Largemouth Bass                                            |
| Rabbit River                     | d/s Hamilton Dam               | 2003098          | Sep/17/2003 | Carp, Largemouth Bass, Northern Pike, Redhorse Sucker, Rock Bass |
| Rabbit River                     | d/s Hamilton, d/s 133TH        | 2003099          | Aug/20/2003 | Channel Catfish                                                  |
| Rabbit River                     | u/s Hamilton Dam               | 2003096          | Sep/17/2003 | Carp, Largemouth Bass, Northern Pike, Redhorse Sucker            |
| Rabbit River                     | u/s Hamilton, d/s 38th St      | 2003097          | Aug/20/2003 | Channel Catfish                                                  |
| Rainbow Lake                     | Montcalm County                | 90045            | Sep/21/1990 | Largemouth Bass, Northern Pike                                   |
| Raisin River                     | Above Monroe Dam               | 91050            | Sep/25/1991 | Carp                                                             |

## Appendix A. Cont.

| <u>Waterbody</u>           | <u>Location</u>                 | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                    |
|----------------------------|---------------------------------|------------------|-------------|---------------------------------------------------|
| 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               | Above Monroe Dam                | 2004086          | Oct/06/2004 | Carp                                              |
| Raisin River               | Above Monroe Dam                | 2006067          | Sep/06/2006 | Carp                                              |
| Raisin River               | Below Turning Basin             | 1998091          | Sep/10/1998 | Channel Catfish                                   |
| Raisin River               | Below Turning Basin             | 2004089          | Aug/11/2004 | Channel Catfish                                   |
| Raisin River               | Monroe County, above Monroe Dam | 87024            | Jun/09/1987 | Carp, Smallmouth Bass                             |
| Raisin River               | Monroe County, above Monroe Dam | 2004085          | Oct/06/2004 | Carp                                              |
| 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               | Monroe, river mouth             | 2004091          | Aug/11/2004 | Channel Catfish                                   |
| Raisin River               | Near Grand Trunk RR Bridge      | 1998092          | Sep/10/1998 | Channel Catfish                                   |
| Raisin River               | Near Grand Trunk RR Bridge      | 2004088          | Aug/11/2004 | 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         | Morrison Lake                   | 2007242          | Apr/06/2007 | 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                          |
| Robinson Lake              | Newaygo County                  | 2004095          | May/06/2004 | Northern Pike                                     |
| 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 M-153                     | 2005077          | Nov/04/2005 | Carp, Redhorse Sucker                             |
| Rouge River                | Below Newburgh Lake             | 2000116          | Oct/04/2000 | Channel Catfish                                   |

## Appendix A. Cont.

| <u>Waterbody</u>           | <u>Location</u>                    | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                 |
|----------------------------|------------------------------------|------------------|-------------|----------------------------------------------------------------|
| Rouge River                | Below Phoenix Lake                 | 2000077          | Aug/28/2000 | Channel Catfish                                                |
| 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, Gulley Road          | 87025            | Jun/16/1987 | Carp                                                           |
| Rouge River, Middle Branch | d/s Nankin Dam                     | 2005078          | Nov/03/2005 | Carp, Rock Bass, White Sucker                                  |
| 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 | Newburgh Lake                      | 2005079          | Jun/02/2005 | 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 | u/s Nankin Dam                     | 2005080          | Nov/03/2005 | Carp, Northern Pike, Rock Bass, 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                                         |
| Round Lake                 | Marquette County, Champion Twp     | 2005081          | Jun/07/2005 | Largemouth Bass                                                |
| 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                                                  |

Appendix A. Cont.

| <u>Waterbody</u>   | <u>Location</u>                              | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                                |
|--------------------|----------------------------------------------|------------------|-------------|-------------------------------------------------------------------------------|
| Ruppert Lake       | Kalamazoo County                             | 2004099          | May/28/2004 | Largemouth Bass                                                               |
| Rush Lake          | Van Buren County                             | 2004100          | Mar/23/2004 | Northern Pike                                                                 |
| Saginaw Bay        | Gull Island                                  | 2005083          | Jun/27/2005 | Channel Catfish                                                               |
| Saginaw River      | Bay County                                   | 86014            | Jun/10/1986 | Carp, Walleye                                                                 |
| Saginaw River      | Bay County                                   | 2003200          | Oct/14/2003 | Lake Sturgeon                                                                 |
| Saginaw River      | Bay County, LaFayette                        | 84013            | Aug/09/1984 | Carp, Northern Pike, White Bass                                               |
| Saginaw River      | Bay County, LaFayette                        | 2004113          | Aug/09/2004 | Carp                                                                          |
| 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      | Bay County, river mouth                      | 2005084          | Jun/27/2005 | Channel Catfish                                                               |
| Saginaw River      | d/s Middle Ground Island<br>(7th St. Bridge) | 2005088          | Jun/27/2005 | Channel Catfish                                                               |
| Saginaw River      | Detroit & Mack RR                            | 2005086          | Jun/27/2005 | Channel Catfish                                                               |
| Saginaw River      | Downstream Wilder Rd                         | 2005085          | Jun/27/2005 | Channel Catfish                                                               |
| Saginaw River      | Saginaw County, Crow<br>Island               | 92036            | Jul/15/1992 | Carp                                                                          |
| Saginaw River      | Saginaw County, Saginaw                      | 88021            | Aug/01/1988 | Channel Catfish                                                               |
| Saginaw River      | Truman Parkway Bridge                        | 2005087          | Jun/27/2005 | Channel Catfish                                                               |
| Saginaw River      | u/s Middle Ground Island                     | 1998097          | Sep/04/1998 | Channel Catfish                                                               |
| Saginaw River      | u/s Middle Ground Island                     | 2002027          | Jul/16/2002 | Channel Catfish                                                               |
| Saginaw River      | u/s Middle Ground Island                     | 2005289          | Jun/27/2005 | 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,<br>Walleye                                    |
| Sebewaing River    | Huron County                                 | 88037            | Oct/20/1988 | Carp, Northern Pike                                                           |
| Sebewaing River    | Huron County                                 | 2004114          | Aug/11/2004 | 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<br>Road             | 81007            | Jun/03/1981 | Carp, Northern hogsucker,<br>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<br>Road            | 87062            | Jul/28/1987 | Carp, Largemouth Bass, Rock Bass                                              |
| Shiawassee River   | Saginaw County below<br>Chesaning            | 87064            | Aug/05/1987 | Carp, Rock Bass, Smallmouth Bass                                              |
| Shiawassee River   | Saginaw County, Miller<br>Road               | 88024            | Aug/18/1988 | Channel Catfish                                                               |
| Shiawassee River   | Shiawassee County, Byron<br>Road             | 81006            | Jun/03/1981 | Black Crappie, Carp, Northern<br>Pike, Redhorse Sucker, Rock<br>Bass, Sunfish |
| Shiawassee River   | Shiawassee County, Byron<br>Road             | 85002            | Jul/17/1985 | Carp, Redhorse Sucker, Rock<br>Bass, Smallmouth Bass                          |

## Appendix A. Cont.

| <u>Waterbody</u>               | <u>Location</u>                     | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                                    |
|--------------------------------|-------------------------------------|------------------|-------------|-----------------------------------------------------------------------------------|
| Shiawassee River               | Shiawassee County, New Lothrop Road | 81008            | Jun/03/1981 | Black Crappie, Carp, Minnow, Northern hogsucker, 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 | 1/2 mile d/s of Howell              | 2004106          | Aug/11/2004 | Channel Catfish                                                                   |
| Shiawassee River, South Branch | Between M59 & Byron                 | 2004101          | Jul/13/2004 | Carp, Rock Bass, White Sucker                                                     |
| Shiawassee River, South Branch | Chase Lake Road                     | 2004108          | Aug/11/2004 | Channel Catfish                                                                   |
| Shiawassee River, South Branch | Howell                              | 2004105          | Aug/11/2004 | Channel Catfish                                                                   |
| 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               |
| 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                                      |
| Shiawassee River, South Branch | Marr Road                           | 2004107          | Aug/11/2004 | Channel Catfish                                                                   |
| Shiawassee River, South Branch | u/s Byron                           | 2004109          | Aug/11/2004 | Channel Catfish                                                                   |
| Shiawassee River, South Branch | u/s M-59                            | 2004104          | Aug/11/2004 | Channel Catfish                                                                   |
| 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 Lake                    | Grand Traverse Co                   | 2007251          | Jun/05/2007 | Walleye                                                                           |
| Silver Lead Creek              | Marquette County, K.I. Sawyer AFB   | 96056            | Nov/04/1996 | Brook Trout                                                                       |
| Silver Lead Creek              | Marquette County, K.I. Sawyer AFB   | 2006072          | May/15/2006 | 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 Dam            | 2002006          | Aug/02/2002 | Channel Catfish                                                                   |
| South Branch Black River       | Upstream of Bangor Dam              | 2002005          | Aug/02/2002 | Channel Catfish                                                                   |
| South Groveland Pond           | Dickinson County                    | 2003146          | Jun/04/2003 | Walleye                                                                           |

## Appendix A. Cont.

| <u>Waterbody</u>      | <u>Location</u>            | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                            |
|-----------------------|----------------------------|------------------|-------------|-------------------------------------------|
| 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                                   |
| South Manistique Lake | Mackinac County            | 2005095          | Apr/28/2005 | Walleye                                   |
| South Manistique Lake | Mackinac County            | 2007116          | Apr/16/2007 | Walleye                                   |
| Sporley Lake          | Marquette County           | 93058            | Jun/01/1993 | White Sucker                              |
| Sporley Lake          | Marquette County           | 2004117          | May/10/2004 | Splake                                    |
| 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       | Algonac                    | 2005097          | Jun/22/2005 | Carp                                      |
| St. Clair River       | Algonac                    | 2007118          | Jun/28/2007 | Carp                                      |
| St. Clair River       | Marine City                | 91031            | May/14/1991 | Walleye                                   |
| St. Clair River       | Marine City                | 2006076          | May/20/2006 | Carp, 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 Constantine          | 2003117          | Jul/16/2003 | Channel Catfish                           |
| St. Joseph River      | Below Niles                | 97066            | Sep/16/1997 | Channel Catfish                           |
| St. Joseph River      | Below Sturgis Dam          | 2003115          | Jul/16/2003 | Channel Catfish                           |
| St. Joseph River      | Below Three Rivers         | 2003116          | Jul/16/2003 | Channel Catfish                           |
| St. Joseph River      | Below Union City           | 2003113          | Jul/16/2003 | Channel Catfish                           |
| St. Joseph River      | Below Union Lake           | 2003114          | Jul/16/2003 | Channel Catfish                           |
| 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      | Benton Harbor, river mouth | 2006077          | Jul/13/2006 | 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                           |

## Appendix A. Cont.

| <u>Waterbody</u>        | <u>Location</u>                    | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                        |
|-------------------------|------------------------------------|------------------|-------------|-----------------------------------------------------------------------|
| St. Joseph River        | Berrien Springs, below Dam         | 2001089          | Jul/30/2001 | Channel Catfish                                                       |
| St. Joseph River        | Chapin Lake                        | 83033            | May/01/1983 | 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                                                                  |
| St. Joseph River        | Chapin Lake                        | 95051.1          | 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        | Chapin Lake                        | 2005098          | Oct/27/2005 | Carp, Largemouth Bass,<br>Smallmouth Bass                             |
| St. Joseph River        | Chapin Lake                        | 2005099          | Oct/27/2005 | Carp                                                                  |
| St. Joseph River        | Chapin Lake                        | 2007119          | Sep/18/2007 | Carp                                                                  |
| St. Joseph River        | Constantine Impoundment            | 1998110          | Jun/24/1998 | Channel Catfish, Redhorse Sucker                                      |
| St. Joseph River        | Mottville downstream of Ritz       | 2003118          | Jul/16/2003 | Channel Catfish                                                       |
| St. Joseph River        | St. Joseph County,<br>Constantine  | 92031            | Apr/02/1992 | Carp, Walleye                                                         |
| St. Joseph River        | St. Joseph County, Three<br>Rivers | 92032            | Apr/03/1992 | Walleye                                                               |
| St. Joseph River        | State Line, Berrien County         | 97067            | Sep/16/1997 | Channel Catfish                                                       |
| St. Joseph River        | State Line, Berrien County         | 2003119          | Jul/16/2003 | Channel Catfish                                                       |
| St. Joseph River        | Sturgis Impoundment                | 2004119          | Oct/14/2004 | Carp, Largemouth Bass                                                 |
| St. Marys River         | Michigan Waters                    | 95046            | Aug/01/1995 | Northern Pike, Walleye, Yellow<br>Perch                               |
| St. Marys River         | Michigan Waters                    | 2004120          | Apr/19/2004 | Northern Pike, Walleye                                                |
| 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                      | 95004.1          | Apr/17/1995 | Carp                                                                  |
| St. Marys River         | Munuscong Bay                      | 1998112          | Apr/29/1998 | Carp, Walleye                                                         |
| St. Marys River         | Munuscong Bay                      | 2001102          | Apr/23/2001 | Walleye                                                               |
| St. Marys River         | Munuscong Bay                      | 2004121          | Sep/08/2004 | Carp                                                                  |
| St. Marys River         | Munuscong Bay                      | 2004149          | Sep/07/2004 | Northern Pike                                                         |
| St. Marys River         | Munuscong Bay                      | 2005101          | Apr/18/2005 | Walleye                                                               |
| St. Marys River         | Munuscong Bay                      | 2007117          | Apr/19/2007 | 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<br>Sucker                               |
| Stanley Lake            | Iron County                        | 90013            | May/31/1990 | Largemouth Bass, Smallmouth<br>Bass, Walleye                          |
| Stanley Lake            | Iron County                        | 2001143          | Sep/10/2001 | Walleye                                                               |
| Stevenson Lake          | Isabella County                    | 2002096          | May/08/2002 | Brown Bullhead, Largemouth<br>Bass, Northern Pike, Yellow<br>Bullhead |
| Stony Creek Impoundment | Macomb County                      | 89025            | Apr/16/1989 | Crappie, Northern Pike, Walleye                                       |
| Sudden Lake             | Ontonagon County                   | 2001144          | Oct/03/2001 | Walleye                                                               |
| Sullivan Creek          | USFWS-Sullivan Creek<br>Hatchery   | 2005124          | May/03/2005 | Lake Trout                                                            |
| Sunday Lake             | Gogebic County                     | 2003126          | May/29/2003 | Black Crappie, Northern Pike,<br>Walleye, Yellow Perch                |

## Appendix A. Cont.

| <u>Waterbody</u>             | <u>Location</u>                  | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                  |
|------------------------------|----------------------------------|------------------|-------------|-------------------------------------------------|
| Sunset Lake                  | Iron County                      | 88049            | Oct/11/1988 | Northern Pike, Walleye                          |
| Swan Creek                   | Monroe County                    | 86059            | Oct/09/1986 | White Sucker                                    |
| Swartz Creek                 | Swartz Creek Golf Course         | 2003127          | Aug/21/2003 | Channel Catfish                                 |
| Sylvan Lake                  | Newaygo County                   | 2004141          | Jun/22/2004 | Largemouth Bass, Northern Pike                  |
| Tahquamenon River            | Dollarville                      | 1998114          | Jul/06/1998 | Walleye, White Sucker                           |
| Tahquamenon River            | Luce County, Slater's Landing    | 88028            | Aug/08/1988 | Northern Pike, Walleye                          |
| Tahquamenon River            | Luce County, Slater's Landing    | 2005105          | Jul/14/2005 | Walleye, Yellow Perch                           |
| Tannery Creek                | Emmet County                     | 87058            | Jul/21/1987 | Brook Trout                                     |
| Tawas River                  | Iosco County                     | 88058            | Oct/14/1988 | Northern Pike, White Sucker                     |
| Tawas River                  | Mouth                            | 2006098          | Jul/13/2006 | Channel Catfish                                 |
| Teal Lake                    | Marquette County                 | 2004122          | May/11/2004 | Smallmouth Bass, Walleye                        |
| Teal Lake                    | Marquette County                 | 2005106          | Jun/01/2005 | Walleye                                         |
| Tepee Lake                   | Iron County                      | 2003145          | Jun/19/2003 | Northern Pike                                   |
| 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                | Livingston County                | 2005107          | May/18/2005 | Black Crappie, Carp, Northern Pike              |
| Thompson Lake                | St. Joseph County                | 2002036          | Jun/25/2002 | Brown Bullhead, Largemouth Bass                 |
| Thompson State Fish Hatchery | Manistique                       | 2006201          | Apr/04/2006 | Atlantic Salmon, Brown Trout, Rainbow Trout     |
| Thompson State Fish Hatchery | Manistique                       | 2007500          | Mar/27/2007 | Brown Trout, Chinook, Rainbow Trout             |
| Thornapple River             | Ada Impoundment                  | 2005130          | Jul/19/2005 | Carp, Smallmouth Bass                           |
| Thornapple River             | Cascade Impoundment              | 2005131          | Jul/19/2005 | Smallmouth Bass                                 |
| Thornapple River             | d/s Nashville                    | 2006100          | Jun/14/2006 | White Sucker                                    |
| Thornapple River             | Gresham Highway                  | 1998117          | Jul/02/1998 | White Sucker                                    |
| Thornapple River             | LaBarge Impoundment              | 2006102          | Jun/20/2006 | Carp                                            |
| Thornapple River             | Middleville Impoundment          | 2006101          | Jun/14/2006 | 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                |
| Thornapple River             | Thornapple Lake, Barry County    | 2006081          | Apr/12/2006 | Largemouth Bass                                 |
| Thousand Island Lake         | Gogebic County, Cisco Lake Chain | 1999065          | Apr/23/1999 | Walleye                                         |
| Thread Creek                 | Above Impoundment @ Perry        | 2003129          | Aug/21/2003 | Channel Catfish                                 |
| Thread Creek                 | Genesee County                   | 93017            | Aug/30/1993 | Carp, Northern Pike                             |
| Thread Creek                 | M-54 (Dort)                      | 2003130          | Aug/21/2003 | Channel Catfish                                 |
| Thread Creek                 | Near mouth @ Clifford            | 2003131          | Aug/21/2003 | Channel Catfish                                 |
| Thread Creek                 | Thread Lake                      | 2000092          | Sep/28/2000 | Carp, Largemouth Bass                           |
| Thunder Bay River            | 4-Mile Pond                      | 2006082          | May/25/2006 | Smallmouth 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 County, Lake Besser       | 2006083          | May/24/2006 | Brown Bullhead, Smallmouth Bass                 |
| 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                                 |

Appendix A. Cont.

| <u>Waterbody</u>    | <u>Location</u>                      | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                              |
|---------------------|--------------------------------------|------------------|-------------|-------------------------------------------------------------|
| 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                       |
| Tittabawassee River | Sanford Lake                         | 92065            | Sep/15/1992 | Carp                                                        |
| Tittabawassee River | Sanford Lake                         | 1999081          | May/20/1999 | Black Crappie, Channel Catfish, Rock Bass                   |
| Tobico Marsh        | Bay County                           | 96054            | May/21/1996 | Carp, Northern Pike                                         |
| Tobico Marsh        | Bay County                           | 2007256          | May/30/2007 | Carp, Largemouth Bass, Northern Pike                        |
| 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                                             |
| 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                     |

## Appendix A. Cont.

| <u>Waterbody</u>              | <u>Location</u>                    | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>                                                                                     |
|-------------------------------|------------------------------------|------------------|-------------|----------------------------------------------------------------------------------------------------|
| Torch Lake                    | Houghton County                    | 2007257          | Apr/25/2007 | Northern Pike, Walleye, White Sucker                                                               |
| Tucker Lake                   | Leelanau County                    | 2005127          | Jun/03/2005 | Brown Bullhead                                                                                     |
| 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                  | Baraga County                      | 2005108          | Jun/06/2005 | Largemouth Bass, Northern Pike, Yellow Perch                                                       |
| Unnamed Lake                  | Washtenaw County                   | 89007            | May/02/1989 | Bullhead, Largemouth Bass                                                                          |
| Van Auken Lake                | Van Buren County                   | 2004125          | Mar/23/2004 | Northern Pike                                                                                      |
| 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                                             |
| Walloon Lake                  | Charlevoix County                  | 2006086          | Apr/18/2006 | Brown Bullhead, Northern Pike, Rainbow Trout, Smallmouth Bass, Walleye, White Sucker               |
| 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                                                                     |
| Weldon Creek                  | Benson Road                        | 2003137          | Jul/16/2003 | Channel Catfish                                                                                    |
| 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                    | Muskegon County                    | 2004126          | Sep/13/2004 | Carp, Smallmouth Bass, Walleye                                                                     |
| White Lake                    | Muskegon County                    | 2007258          | Jun/12/2007 | Carp, Northern Pike                                                                                |
| White Lake                    | Oakland Co.                        | 2001111          | Oct/18/2001 | Brown Bullhead, Rock Bass                                                                          |
| White Lake                    | Oakland Co.                        | 2007259          | Jun/05/2007 | Walleye                                                                                            |
| 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                                                                                       |
| Wolf Creek                    | Montcalm County, Vickeryville Road | 92015            | Jun/01/1992 | Brown Trout, Rock Bass                                                                             |
| Wolf Lake State Fish Hatchery | Mattawan                           | 2006202          | Mar/21/2006 | Chinook, Lake Sturgeon, Muskellunge, Rainbow Trout                                                 |

Appendix A. Cont.

| <u>Waterbody</u> | <u>Location</u>   | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>        |
|------------------|-------------------|------------------|-------------|-----------------------|
| Woodland Lake    | Livingston County | 2000104          | May/02/2000 | Carp, Largemouth Bass |

## Appendix B. Inventory of Whole Fish Trend Monitoring Sites and Species.

| <u>Waterbody</u> | <u>Location</u>                | <u>Visit ID#</u> | <u>Date</u> | <u>Species</u>           |
|------------------|--------------------------------|------------------|-------------|--------------------------|
| 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            |
| Detroit River    | Grassy Island                  | 2004020          | Jul/20/2004 | Carp, Walleye            |
| Detroit River    | Grassy Island                  | 2005018          | Jun/22/2005 | Walleye                  |
| Detroit River    | Grassy Island                  | 2007100          | Jun/30/2007 | Carp                     |
| 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 River      | Kent County, above 6th St. Dam | 2005023          | Jul/14/2005 | Carp                     |
| Grand River      | Kent County, above 6th St. Dam | 2007101          | Sep/11/2007 | 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          |
| Gull Lake        | Kalamazoo County               | 2005026          | Aug/09/2005 | Largemouth Bass          |
| Gull Lake        | Kalamazoo County               | 2007102          | May/29/2007 | 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          |
| Gun Lake         | Barry County                   | 2005027          | Jul/07/2005 | Largemouth Bass          |
| Gun Lake         | Barry County                   | 2007103          | Jun/01/2007 | 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               |
| Higgins Lake     | Roscommon County               | 2005030          | Oct/12/2005 | 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          |





















