

PCB Levels in Fish from the Upper Hudson River

NYS Department of Health
Division of Environmental Health Assessment

July 1995

Background

From the 1940's until 1977, the General Electric Company (GE) released large amounts of polychlorinated biphenyls (PCBs) to the Hudson River at their transformer and capacitor manufacturing facilities at Hudson Falls and Fort Edward. Fish were found to be highly contaminated with PCBs in 1976, and the Commissioner of the Department of Health (DOH) certified that public health may be endangered. The Department of Environmental Conservation (DEC) closed recreational fishing in a 40-mile reach of the upper Hudson River between Hudson Falls and the Federal Dam at Troy (Figure 1). Under Section 11-0325 of the Environmental Conservation Law, DEC has the authority to restrict fishing when a public health threat has been certified by the Commissioner of Health or the Commissioner of Agriculture and Markets.

PCB Levels in Fish

Since 1975, NY Department of Environmental Conservation has collected and analyzed fish from the Hudson River for PCBs. Very high PCB levels were found in the 1970's collections of many fish species from these waters (selected data presented below and in Figure 2), with the highest average concentration of 576 parts per million (ppm) in carp from the Stillwater/Northumberland area of the river in 1977 (all data presented in Tables 1-3). The United States Food and Drug Administration (FDA) tolerance level for PCB in fish was 5 ppm at that time. However, in 1984, the FDA tolerance level for PCBs was reduced to 2 ppm.

Mean PCB Levels in Selected Upper Hudson River Fish, Selected Years

Species	1977	1983	1988	Year 1990	1991	1992	1993
<u>Above Feeder Dam</u>							
Brown Bullhead	-	-	-	-	0.12(20)	0.13(12)	0.43(18)*
Largemouth Bass	-	-	-	-	0.06(2)	0.14(12)	-
<u>Thompson Island Pool</u>							
Brown Bullhead	-	15(24)	15(20)	16(20)	5.3(20)	18(20)	19(9)
Largemouth Bass	73(19)	16(10)	8.4(21)	14(20)	3.9(7)	22(20)	43(20)
<u>Stillwater/Northumberland</u>							
Brown Bullhead	110(30)	17(20)	10(20)	9(20)	2.7(20)	9.7(20)	9.8(8)
Largemouth Bass	71(14)	7(20)	2.5(20)	2(20)	0.96(9)	6.9(20)	7.7(20)
<u>Albany/Troy</u>							
Brown Bullhead	38(30)	8(24)	2.4(23)	-	0.42(4)	3.1(2)	5.0(5)
Largemouth Bass	18(2)	-	3.7(19)	-	0.50(5)	2.3(9)	11(6)

Concentrations are reported as micrograms per gram wet weight ($\mu\text{g/g}$) or parts per million (ppm) in filets. The sample size (number of fish samples analyzed) is reported in parentheses. All fish were collected in May and June.

* Analytical data pending for seven additional brown bullhead collected above the Feeder Dam in 1993.

By the mid-1980's, PCB levels in fish from the upper Hudson River had declined significantly, although average PCB levels in many species still exceeded the 2 ppm FDA tolerance level. In 1989, DEC and DOH staff began to re-examine the fishing ban, and DEC intensified its extensive fish monitoring program. However, in September 1991, General Electric (GE) discovered substantial increases in river water PCB concentrations which were traced to the failure of an old wooden gate in a mill beside the GE Hudson Falls facility. Fish taken from the Thompson Island Pool of the upper Hudson River in May and June of 1992 and 1993 had PCB levels as high as those reported in the early 1980's (Table 2), although these same increases were not seen in fish at Catskill. Analysis of fish collected in 1993 are mostly completed, but PCB data for fish from 1994 collections will not be available until later this year.

PCB Levels in Water

Investigations since 1989 found that PCBs were leaking to the Hudson River near Hudson Falls. Spills of PCBs at the GE Hudson Falls plant prior to the late 1970's have saturated the rock beneath the plant with pure PCB oils. These oils are migrating to the river through the rock fractures. Many of these fractures are in raceways inside an old wallpaper mill, which is on the cliff face beneath the Hudson Falls plant and was abandoned in the 1930's. Historically, these raceways were closed off; and although they were full of water, little or no flow went through them. In September 1991, a wooden gate failed on the upper raceway, allowing water to flow through the mill, including the upper and lower raceways and the tailrace tunnel, scouring out tons of PCBs.

GE and the US Geological Survey (USGS) have collected water samples for PCB analysis at several locations in the river. These water data provide additional information about PCB contamination to the river. From the late 1980's until 1991, the USGS and GE measured PCB concentrations of 30 to 100 nanograms per liter (ng/L) in the water at locations between Hudson Falls and Albany. Because of the wooden gate failure, the PCB water concentrations were greater than 4,000 ng/L for about a week in September 1991 from Hudson Falls to Albany. These levels declined somewhat, but remained about 500 ng/L from Hudson Falls to the Thompson Island Dam for the summer of 1992.

Under supervision of DEC and DOH, GE undertook numerous remedial actions and others are planned to intercept PCBs at the Hudson Falls plant site before they enter the river. On April 15, 1993, a dam was completed to close off water flow to the raceways in the mill below the Hudson Falls facility. During the first week of May 1993, a combined sewer overflow into the raceways was repaired. These actions stopped the flow of water through the mill, and the PCB concentrations in the river rapidly declined to about 50, 100 to 300, and 50 ng/L at Ft. Edward, the Thompson Island Dam and downstream of the Northumberland Dam, respectively.

This summer Niagara Mohawk will divert the river around the area of the GE facility at Hudson Falls to work on a dam. This will provide an opportunity for further remedial work. These actions are expected to reduce PCB concentrations in the river even further; however, further monitoring will be needed to confirm this.

Fish rapidly accumulate PCBs from food and especially from water, but they excrete PCBs relatively slowly. Therefore, PCB levels in fish are much higher than the concentrations in the waters they inhabit. PCB levels in the 1991 fish, which were collected in May and June 1991, had not increased because PCB levels in the water did not increase until the fall. By 1992 and 1993, fish had been exposed to high PCB concentrations in the water, and their PCB levels increased. Knowing that the water concentrations have declined to 1991 levels or lower, PCB levels in fish are also expected to decline.

Risk Management

Studies have shown that PCBs can cause cancer and reproductive and developmental effects in animals. We don't know whether PCBs cause cancer in humans, but some studies suggest that PCBs may cause developmental effects in infants whose mothers were exposed to PCBs. The latest data show that PCB levels in fish from these waters are still elevated, generally exceeding the FDA 2 ppm tolerance level. Therefore, consumption of fish from these waters is a concern, and the DOH advises that anglers EAT NONE of the fish caught from this part of the upper Hudson River. DOH and DEC have an extensive public information and education program to inform anglers about continued contamination of fish.

DOH and DEC expect that the proposed catch-and-release regulation will result in minimal consumption of fish from these waters, particularly because it will be accompanied by the fish consumption advisory and an extensive public information and education program. Although people will come into direct contact with the fish and, hence, with PCBs, the amount of PCBs which will be taken into their bodies by skin contact alone is extremely low, if any. Catch-and-release angling will allow the benefits of sport-angling in these abundant fisheries without appreciable increases in public health risk from PCBs. These benefits are considerable, including the personal enjoyment of productive sport-angling by thousands of people in an area of great natural beauty, as well as the economic benefits which should accompany the large number of anglers who will patronize local businesses.

DOH and DEC Actions

On May 1, 1995 the DOH Commissioner responded to the DEC Commissioner's request that, based on PCB levels in the water and fish, there was no compelling public health reason for keeping these waters closed to recreational fishing as long as the opening is accompanied with a strong educational and informational program and fish consumption health advisories remain in effect.

On May 31, 1995, DEC proposed changing the regulation for the Hudson River between Hudson Falls and the Federal Dam at Troy to permit catch-and-release fishing.

DEC, in consultation with DOH, recently developed a program for public information and education on implementing catch-and-release fishing for the upper Hudson River. The primary purpose of this program is to assure that anglers and riverside residents do not mistakenly perceive that changes in fishing regulations indicate that fish from the river are safe to eat. This will be accomplished by posting signs at access/parking sites on the river, distribution of informational brochures, video and radio public service announcements, coordination with local government and business contacts, briefing of outdoor writers, news releases, and direct contact with anglers by DEC law enforcement and fishery management staff.

Opportunity for Public Review and Comment

The regulation proposed by DEC to permit catch-and-release fishing in these waters is subject to a public review and comment period through July 31, 1995. Public information meetings and hearings are scheduled for 7:00 PM on July 17 at the Knickerbocker Elementary School in Lansingburgh and on July 24 at the Stillwater Central School. Written comments can be submitted and documents can be requested at the following address:

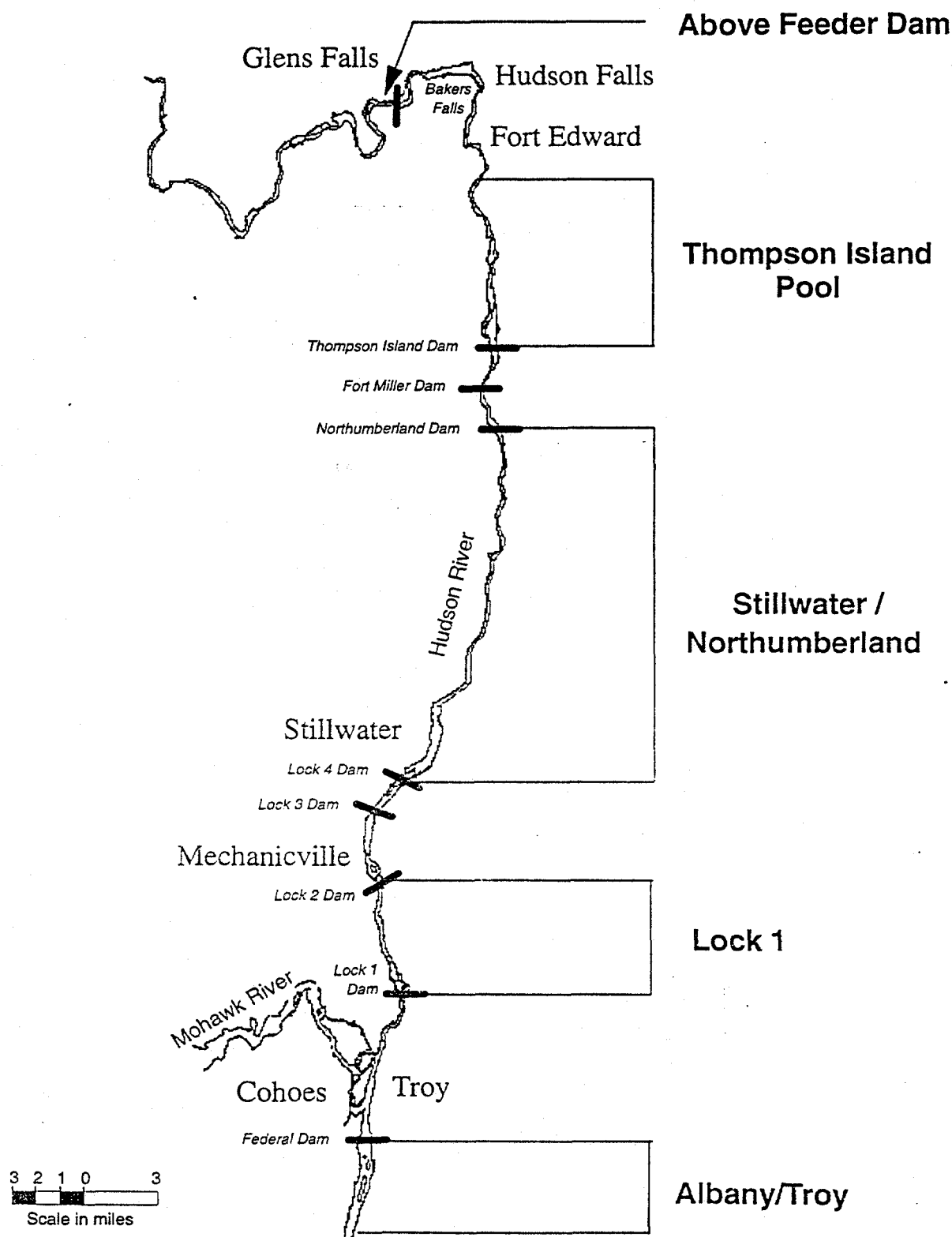
Patrick Festa
N.Y.S. Department of Environmental Conservation
50 Wolf Road
Albany, N.Y. 12233-4753

References and Documents Reviewed

- Armstrong, R. and R. Sloan. 1980. Trends in Levels of Several Known Chemical Contaminants in Fish from New York State Waters. NYS DEC, Albany, NY.
- Haggard, J. 1995. General Electric Company. Personal communication to Robert Montione.
- NYS DEC. 1978. Toxic Substances in Fish and Wildlife: 1977 Annual Report, Volume 1. Albany, NY.
- NYS DEC. 1979. Toxic Substances in Fish and Wildlife: 1978 Annual Report, Volume 2. Albany, NY.
- NYS DEC. 1981. Toxic Substances in Fish and Wildlife: 1979 and 1980 Annual Reports, Volume 4, Number 1. Albany, NY.
- NYS DEC. 1981. Toxic Substances in Fish and Wildlife: May 1 to November 1, 1981, Volume 4, Number 2. Albany, NY.
- NYS DEC. 1982. Toxic Substances in Fish and Wildlife: November 1, 1981 to April 30, 1982, Volume 5, Number 1. Albany, NY.
- NYS DEC. 1995. Bureau of Environmental Protection Fish Contaminant Database. Albany, NY.
- Spagnoli, J.J. and L.C. Skinner. 1977. PCB's in Fish from Selected Waters of New York State. Pest. Monit. J. 11(2):69-87.
- TAMS Consultants, Inc. 1991. Phase 1 Report - Review Copy, Interim Characterization and Evaluation. Hudson River PCB Reassessment RI/FS. EPA Contract No. 68-S9-2001.
- Thomann, R.V. 1989. Bioaccumulation Model of Organic Chemical Distribution in Aquatic Food Chains. Environ. Sci. Technol. 23:699-707.
- Weigel, Jay. 1995. US Geological Service. Personal communication to Robert Montione, NYS Department of Health.

51520405

Fish Sampling Locations in the Upper Hudson River



Mean PCB Levels in Upper Hudson River Fish

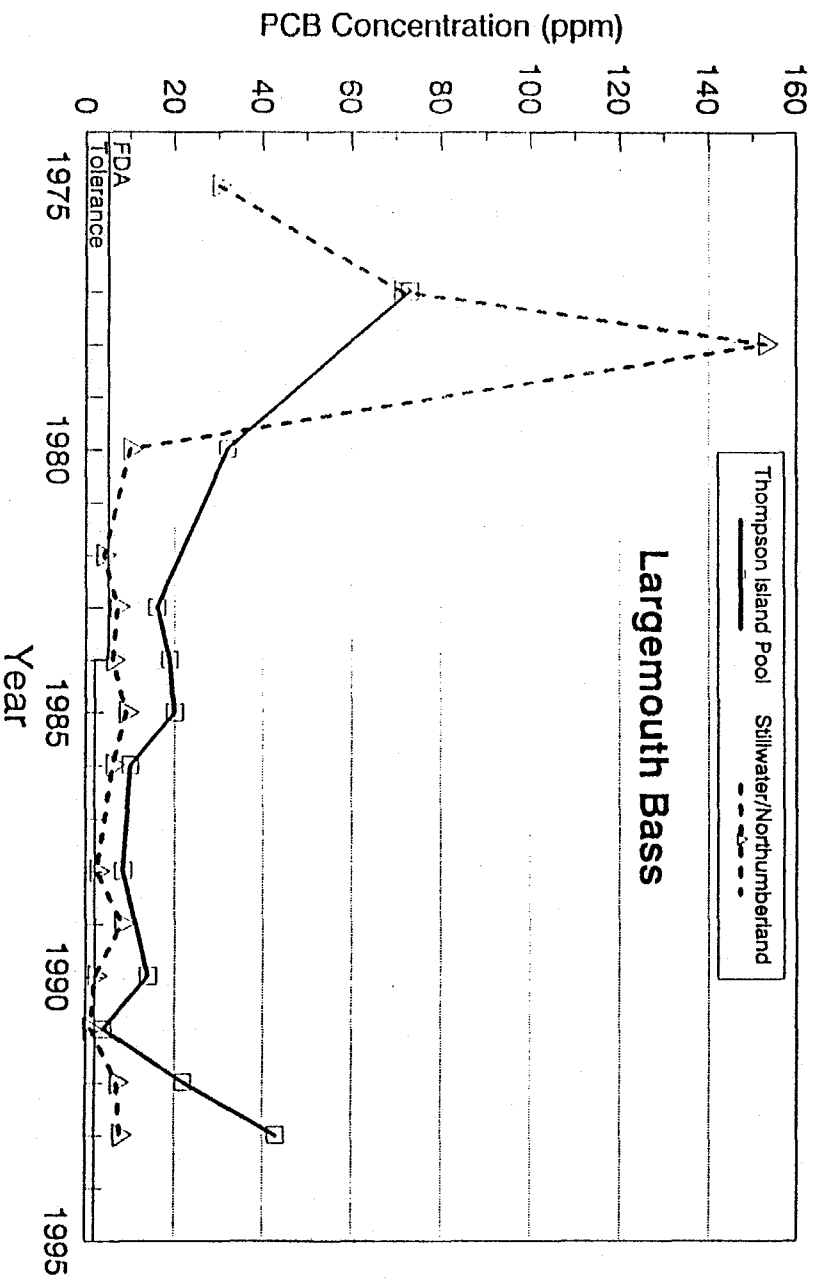
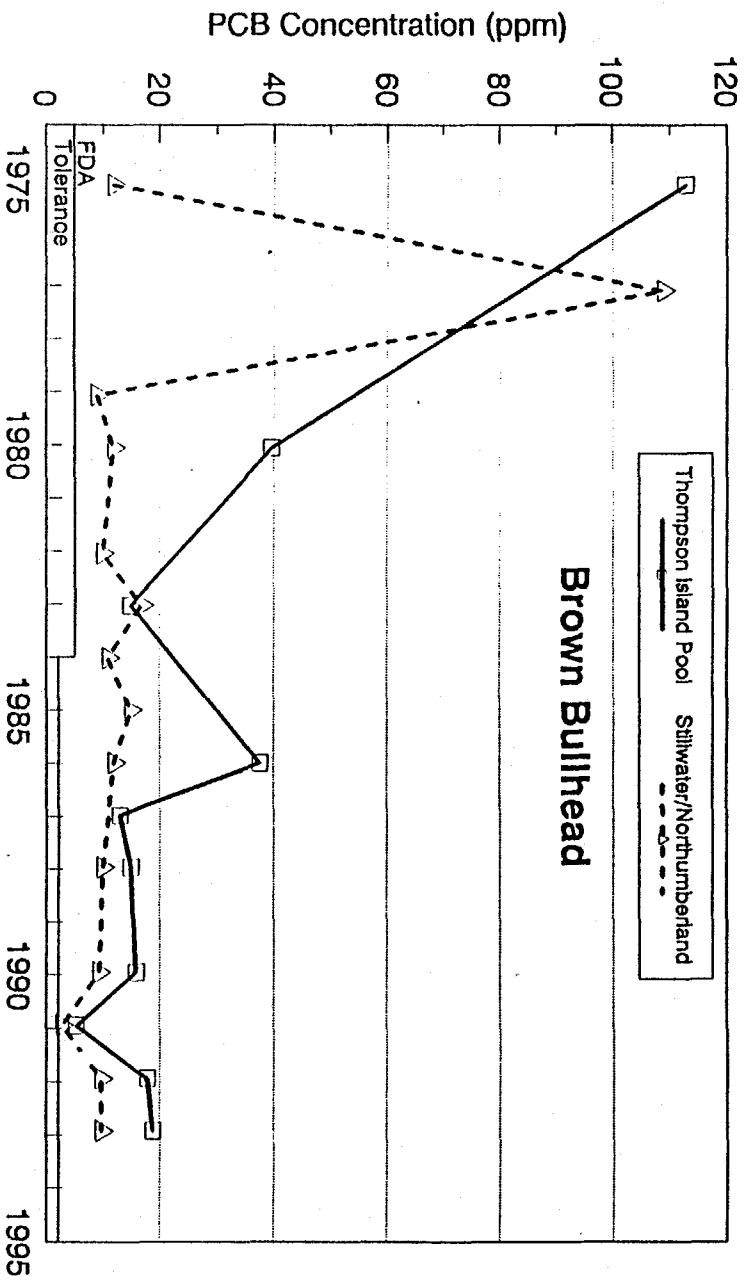


Table 1
Mean PCB Levels in Upper Hudson River Fish, 1975-1982 Collections

Location/ Fish Species	Year						
	1975	1977	1978	1979	1980	1981	1982
<u>Above Feeder Dam (RM 201)</u>							
Black crappie	-	-	-	-	-	-	-
Brown bullhead	-	-	-	-	-	-	-
Chain pickerel	-	-	-	-	-	-	-
Largemouth bass	-	-	-	-	-	-	-
Pumpkinseed	-	-	-	-	-	-	-
Rock bass	-	-	-	-	-	-	-
Smallmouth bass	-	-	-	-	-	-	-
Walleye	-	-	-	-	-	-	-
Yellow perch	-	-	-	-	-	-	-
<u>Thompson Island Pool (RM 188-197)</u>							
Black crappie	-	-	-	-	-	-	-
Bluegill	-	-	-	-	-	-	-
Brown bullhead	114(5)	-	-	-	40(28)	-	-
Carp/Goldfish	-	568(19)	-	-	201(50)	-	-
Chain pickerel	-	-	-	-	-	-	-
Largemouth bass	-	73(19)	-	-	32(18)	-	-
Northern pike	-	-	-	-	-	-	-
Pumpkinseed	-	-	-	-	16(24)	-	-
Rock bass	-	-	-	-	8(17)	-	-
Smallmouth bass	123(1)	-	-	-	-	-	-
Walleye	41(3)	-	-	-	-	-	-
Yellow perch	51(3)	-	-	-	21(24)	-	-
<u>Stillwater/Northumberland (RM 168-183)</u>							
American eel	291(2)	-	-	-	-	-	30(20)
Black crappie	-	-	-	-	-	-	-
Bluegill	-	-	-	-	-	-	-
Brown bullhead	12(1)	110(30)	-	9(30)	12(30)	-	10(20)
Carp/Goldfish	-	576(16)	300(30)	-	73(30)	-	12(20)
Largemouth bass	30(4)	71(14)	153(30)	-	10(26)	-	4(20)
Northern pike	-	-	-	-	-	-	-
Pumpkinseed	-	-	-	-	-	-	-
White sucker	74(6)	21(17)	-	-	-	-	-
Yellow perch	-	-	-	-	1(7)	-	5(2)
<u>Lock 1 (RM 159)</u>							
Bluegill	-	-	-	-	-	-	-
Brown bullhead	-	-	-	-	-	-	-
Carp	-	-	-	-	-	-	-
Largemouth bass	-	-	-	-	-	-	-
Pumpkinseed	-	-	-	-	-	-	-
Rock bass	-	-	-	-	-	-	-
Smallmouth bass	-	-	-	-	-	-	-
Walleye	-	-	-	-	-	-	-
White perch	-	-	-	-	-	-	-
Yellow perch	-	-	-	-	-	-	-

Concentrations are reported as micrograms per gram wet weight ($\mu\text{g/g}$) or parts per million (ppm) in fillets, and the sample size (number of fish samples analyzed) is reported in parentheses. All fish collected in May and June, except in 1975 when fish were collected in July through September. Data from NYS Department of Environmental Conservation.

317895

Table 1 (continued)
Mean PCB Levels in Upper Hudson River Fish, 1975-1982 Collections

Location/ Fish Species	Year						
	1975	1977	1978	1979	1980	1981	1982
<u>Albany/Troy (RM 153)</u>							
American eel	82(11)	-	-	-	-	-	-
Black crappie	-	-	-	-	-	-	-
Bluegill	-	-	-	-	-	-	-
Brown bullhead	-	38(30)	25(11)	7(22)	2(21)	4(30)	5(10)
Carp	-	-	-	-	-	-	-
Chain pickerel	8.7(1)	-	-	-	-	-	-
Goldfish	-	-	137(30)	-	63(20)	-	-
Largemouth bass	8.0(10)	18(2)	-	-	18(1)	-	-
Northern pike	-	-	-	-	2(2)	-	-
Pumpkinseed	-	-	10(7)	-	-	-	-
Redbreast sunfish	-	-	-	-	-	-	-
Rock bass	-	-	-	-	-	-	-
Smallmouth bass	-	16(9)	-	-	-	-	-
Striped bass	-	21(10)	-	-	20(29)	-	-
Tiger muskellunge	-	-	-	-	-	-	-
Walleye	-	-	-	-	6(4)	-	-
White catfish	-	-	-	-	14(10)	-	-
White perch	-	118(30)	82(30)	-	17(30)	25(30)	16(20)
White sucker	-	16(10)	-	-	-	-	-
Yellow perch	-	9(20)	17(4)	-	3(15)	-	-
<u>Catskill (RM 112)</u>							
American eel	-	-	-	-	-	-	-
Black crappie	-	-	-	-	-	-	-
Brown bullhead	-	2.0(8)	-	-	-	-	-
Chain pickerel	-	-	-	-	1.0(2)	-	-
Largemouth bass	-	30(27)	29(18)	-	1.0(20)	1.9(35)	2.4(18)
Redbreasted sunfish	-	-	4.1(20)	-	2.6(20)	-	1.6(20)
Smallmouth bass	-	-	5.8(6)	-	-	-	3.5(3)
Walleye	-	-	-	-	5.6(1)	-	-
White catfish	-	22(1)	-	-	-	-	-
White perch	-	-	31(31)	-	-	4.2(19)	6.7(20)
Yellow perch	-	4.2(20)	-	-	0.98(10)	0.60(18)	1.4(4)

Concentrations are reported as micrograms per gram wet weight ($\mu\text{g/g}$) or parts per million (ppm) in filets, and the sample size (number of fish samples analyzed) is reported in parentheses. All fish collected in May and June, except in 1975 when fish were collected in July through September. Data from NYS Department of Environmental Conservation.

Table 2
Mean PCB Levels in Upper Hudson River Fish, 1983-1989 Collections

Location/ Fish Species	Year						
	1983	1984	1985	1986	1987	1988	1989
<u>Above Feeder Dam (RM 201)</u>							
Black crappie	-	-	-	-	-	-	-
Brown bullhead	-	-	-	-	-	-	-
Chain pickerel	-	-	-	-	-	-	-
Largemouth bass	-	-	-	-	-	-	-
Pumpkinseed	-	-	-	-	-	-	0.08(15)
Rock bass	-	-	-	-	-	-	-
Smallmouth bass	-	-	-	-	-	-	-
Walleye	-	-	-	-	-	-	-
Yellow perch	-	-	-	-	-	-	-
<u>Thompson Island Pool (RM 188-197)</u>							
Black crappie	-	-	-	-	-	-	-
Bluegill	-	-	-	-	-	-	-
Brown bullhead	15(24)	-	-	38(20)	13(25)	15(20)	-
Carp/Goldfish	110(18)	-	-	-	-	46(20)	-
Chain pickerel	-	-	-	-	-	-	-
Largemouth bass	16(10)	19(30)	20(20)	10(18)	-	8.4(21)	-
Northern pike	-	-	-	-	-	-	-
Pumpkinseed	-	-	-	-	-	-	20(15)
Rock bass	7(30)	-	-	-	-	-	-
Walleye	12(4)	-	-	-	-	-	-
Yellow perch	13(22)	-	-	47(9)	-	-	-
<u>Stillwater/Northumberland (RM 168-183)</u>							
American eel	30(20)	-	-	24(8)	-	-	-
Black crappie	-	-	-	-	-	-	-
Bluegill	-	-	-	-	-	-	-
Brown bullhead	17(20)	11(20)	15(19)	12(23)	-	10(20)	-
Carp/Goldfish	16(20)	27(11)	21(18)	3(2)	-	-	-
Largemouth bass	7(20)	6(22)	9(21)	6(21)	-	2.5(20)	8.0(15)
Northern pike	-	-	-	-	-	-	-
Pumpkinseed	-	-	-	-	-	-	8.0(15)
White sucker	-	-	-	-	-	-	-
Yellow perch	-	5(7)	-	-	-	-	-
<u>Lock 1 (RM 159)</u>							
Bluegill	-	-	-	-	-	-	-
Brown bullhead	-	-	-	-	3(14)	-	-
Carp	-	-	-	-	-	-	-
Largemouth bass	-	-	-	-	3(8)	-	-
Pumpkinseed	-	-	-	-	4(14)	-	-
Rock bass	-	-	-	-	-	-	-
Smallmouth bass	-	-	-	-	5(7)	-	-
Walleye	-	-	-	-	-	-	-
White perch	-	-	-	-	5(14)	-	-
Yellow perch	-	-	-	-	-	-	-

Concentrations are reported as micrograms per gram wet weight ($\mu\text{g/g}$) or parts per million (ppm) in fillets, and the sample size (number of fish samples analyzed) is reported in parentheses. All fish collected in May and June. Data from NYS Department of Environmental Conservation.

317897

Table 2 (continued)
Mean PCB Levels in Upper Hudson River Fish, 1983-1989 Collections

Location/ Fish Species	Year						
	1983	1984	1985	1986	1987	1988	1989
<u>Albany/Troy (RM 153)</u>							
Black crappie	-	-	-	-	-	-	-
Bluegill	-	-	-	-	-	-	-
Brown bullhead	8(24)	3(19)	4(18)	3(16)	-	2.4(23)	-
Carp	-	-	-	-	-	-	-
Goldfish	27(20)	-	-	-	-	-	-
Largemouth bass	-	-	-	-	-	3.7(19)	-
Northern pike	-	3(2)	-	5(5)	-	-	-
Pumpkinseed	-	-	-	-	-	-	3(15)
Redbreast sunfish	-	-	-	-	-	-	-
Rock bass	-	-	-	-	-	-	-
Smallmouth bass	-	-	-	-	-	2.0(6)	-
Tiger muskellunge	-	2(2)	-	-	-	-	-
Walleye	-	38(2)	-	-	-	-	-
White catfish	-	-	-	-	-	-	-
White perch	9(20)	-	-	-	-	-	-
White sucker	-	-	-	-	-	-	-
Yellow perch	1.1(14)	-	-	-	-	-	-
<u>Catskill (RM 112)</u>							
American eel	2.4(30)	-	-	-	-	-	-
Black crappie	-	-	-	-	-	-	-
Brown bullhead	-	-	-	-	-	-	-
Largemouth bass	8.1(20)	6.7(20)	6.7(20)	11(20)	-	5.9(20)	6.0(17)
Redbreasted sunfish	1.4(20)	1.6(19)	-	-	-	-	-
Smallmouth bass	-	4.2(6)	-	-	-	-	-
White perch	4.1(20)	4.6(20)	-	-	-	-	-
Yellow perch	1.8(21)	2.5(20)	-	-	-	-	-

Concentrations are reported as micrograms per gram wet weight ($\mu\text{g/g}$) or parts per million (ppm) in fillets, and the sample size (number of fish samples analyzed) is reported in parentheses. All fish collected in May and June. Data from NYS Department of Environmental Conservation.

Table 3
Mean PCB Levels in Upper Hudson River Fish, 1990-1994 Collections

Location/ Fish Species	Year				
	1990	1991	1992	1993	1994
<u>Above Feeder Dam (RM 201)</u>					
Black crappie	-	0.07(3)	0.19(11)	-	-
Brown bullhead	-	0.12(20)	0.13(12)	0.38(18)*	-
Carp	-	-	1.8(4)	3.9(2)*	-
Chain pickerel	-	0.02(2)	0.03(6)	(2)**	-
Largemouth bass	-	0.06(2)	0.14(12)	0.16(1)	-
Pumpkinseed	-	0.04(20)	0.10(11)	(20)**	-
Rock bass	-	0.02(2)	0.02(3)	-	-
Smallmouth bass	-	0.02(1)	0.12(2)	-	-
Walleye	-	0.10(2)	-	-	-
Yellow perch	-	0.10(20)	0.18(11)	0.24(14)	-
<u>Thompson Island Pool (RM 188-197)</u>					
Black crappie	-	7.1(9)	31(12)	39(20)	-
Bluegill	-	3.6(20)	6.4(12)	(3)**	-
Brown bullhead	16(20)	5.3(20)	18(20)	19(9)	20(19)**
Carp/Goldfish	13(4)	-	-	100(1)*	17(1)**
Chain pickerel	-	0.56(5)	5.1(11)	5.3(5)**	-
Largemouth bass	14(20)	3.9(7)	22(20)	43(20)	15(20)**
Northern pike	-	3.2(1)	65(1)	110(1)**	-
Pumpkinseed	-	4.2(20)	13(12)	(15)**	-
Rock bass	-	-	0.4(4)	-	-
Smallmouth bass	-	-	12(4)	-	-
Walleye	-	5.2(7)	30(4)	-	-
Yellow bullhead	-	-	-	11(2)	-
Yellow perch	-	6.9(20)	13(11)	48(20)**	-
<u>Stillwater/Northumberland (RM 168-183)</u>					
American eel	-	-	-	-	-
Black crappie	-	0.91(11)	8.6(5)	4.5(20)**	-
Bluegill	-	1.6(20)	2.3(12)	(15)**	-
Brown bullhead	9.3(20)	2.7(20)	9.7(20)	9.8(8)	6.5(15)**
Carp/Goldfish	46(9)	-	39(7)	63(3)	5.5(6)**
Chain pickerel	-	-	-	2.8(1)**	-
Largemouth bass	2(20)	0.96(9)	6.9(20)	7.7(20)	6.2(19)**
Northern pike	-	3.5(13)	3.9(3)	5.8(4)**	3.2(1)**
Pumpkinseed	-	1.2(20)	5.9(12)	(20)**	-
Redbreast sunfish	-	-	-	-	-
Walleye	-	-	-	3.5(2)**	-
White sucker	-	-	-	-	-
Yellow bullhead	-	-	-	8.2(2)	7.2(5)**
Yellow perch	-	0.80(20)	4.6(12)	4.9(4)**	-

Concentrations are reported as micrograms per gram wet weight ($\mu\text{g/g}$) or parts per million (ppm) in fillets, and the sample size (number of fish samples analyzed) is reported in parentheses. All fish collected in May and June. Data from NYS Department of Environmental Conservation.

* Analytical results are incomplete. Additional fish samples are pending.

** Analytical results not yet available. The numbers in parentheses are the number of fish being analyzed.

Table 3 (continued)
Mean PCB Levels in Upper Hudson River Fish, 1990-1994 Collections

Location/ Fish Species	Year				
	1990	1991	1992	1993	1994
<u>Lock 1/Waterford (RM 157-159)</u>					
Black crappie	-	0.35(4)	-	-	-
Bluegill	-	1.5(20)	1.5(11)	-	-
Brown bullhead	-	1.0(2)	-	-	-
Carp	-	12(7)	23(4)	-	-
Largemouth bass	-	1.5(12)	2.9(12)	-	-
Northern pike	-	-	3.4(5)	-	-
Pumpkinseed	-	0.43(11)	2.6(8)	-	-
Rock bass	-	0.48(11)	1.9(3)	-	-
Smallmouth bass	-	1.2(19)	4.5(12)	-	-
Tiger muskellunge	-	0.64(1)	-	-	-
Walleye	-	0.84(5)	-	-	-
White perch	-	4.1(20)	6.3(21)	-	-
Yellow perch	-	0.47(3)	1.7(10)	-	-
<u>Albany/Troy (RM153)</u>					
American eel	-	-	9.1(10)	9.0(11)**	-
Black crappie	-	0.54(5)	2.3(10)	3.6(3)**	-
Bluegill	-	0.74(9)	1.5(11)	-	-
Brown bullhead	-	0.42(4)	3.1(2)	5.0(5)	-
Carp	-	7.1(3)	9.3(5)	-	-
Goldfish	-	3.3(1)	8.7(1)	3.9(4)**	-
Largemouth bass	-	0.50(5)	2.3(9)	11(6)	-
Northern pike	-	1.3(2)	5.5(5)	5.2(8)**	-
Pumpkinseed	-	0.46(20)	1.6(14)	(15)**	-
Redbreast sunfish	-	0.69(20)	2.8(9)	-	-
Rock bass	-	0.59(8)	1.1(2)	-	-
Smallmouth bass	-	2.7(16)	6.3(15)	12(17)	11(20)
Tiger muskellunge	-	-	-	4.4(9)**	-
Walleye	-	2.7(2)	4.7(2)	8.5(2)**	-
White catfish	-	-	5.4(3)	8.8(1)**	-
White perch	1(20)	3.3(20)	7.1(20)	3.5(20)	4.6(19)*
White sucker	-	-	-	-	-
Yellow perch	-	0.53(7)	2.8(11)	1.4(2)**	-
<u>Catskill (RM 112)</u>					
American eel	-	-	2.7(10)	4.6(10)	-
Black crappie	-	-	1.9(3)	1.4(2)	-
Brown bullhead	-	-	-	-	-
Largemouth bass	-	-	5.8(10)	5.1(2)	1(20)
Redbreasted sunfish	-	-	-	-	-
Rock bass	-	-	-	-	-
Smallmouth bass	-	-	4.9(11)	-	-
White catfish	-	-	-	-	-
White perch	-	-	-	2.1(20)	1.6(20)
Yellow perch	-	-	0.98(3)	1.2(16)	0.56(10)

Concentrations are reported as micrograms per gram wet weight ($\mu\text{g/g}$) or parts per million (ppm) in fillets, and the sample size (number of fish samples analyzed) is reported in parentheses. All fish collected in May and June. Data from NYS Department of Environmental Conservation.

* Analytical results are incomplete. Additional fish samples are pending.

** Analytical results not yet available. The numbers in parentheses are the number of fish being analyzed.