

To: James Colquhoun

From: Ron Sloan

Subject: Briefing on 1997 striped bass PCB results

Date: February 11, 1999

### **STRIPED BASS PCB DECLINE - COMMERCIAL REOPENING CONSIDERATION**

As Hudson River fish PCB data arrived from the contract laboratory over the past several months, it became apparent that the concentrations in striped bass were dramatically lower than in previous years. This is an extension of an encouraging trend and at least for this species, the monitoring vigil over the last 25 years is starting to bear testimony to the fact that if a natural system stops being insulted, conditions will start to shift favorably. This does not mean that the river has recovered, far from it. The data depicted in the accompanying graphs and tables, however, do exhibit an inescapable conclusion that PCB concentrations in striped bass from the traditional spring fishery are below 2 ppm. If these trends are consistent, and there is no reason to believe otherwise, consideration for reopening the striped bass commercial fishery is indicated. Continued commercial closure due solely to PCB contamination is no longer justified. Stock protection for striped bass, however, may require continued commercial restrictions in the Hudson River. The attached table summarizes the results on all 194 striped bass from the 1997 spring collection.

Simulation runs, similar to those used for assessing the expected proportions exceeding 2 ppm in marine striped bass, which were useful in forming decisions on the coastal commercial fishery, were also employed for the 1997 Hudson River data. This exercise focused on the traditional spring fishery, 176 fish sampled, in the lower estuary (i.e., downstream from Poughkeepsie).

In conducting the simulated random sampling of a subpopulation (in this case 10), from a larger population (e.g., a marketplace), each fish could receive equal emphasis. Alternatively, individuals based on their weight could receive a greater or lesser emphasis. For example, a large, highly contaminated individual would increase the overall average concentration in a simulated randomly sampled composite. This latter approach is assumed to be the expected method for compositing not only in the market but also under normal feeding conditions in the wild. Selecting equal portions from each prey item by a predator, including humans, is not an expected behavior. However, both selection alternatives were explored. In any given simulation, the model stabilizes in terms of variability at about 3000+ iterations (Figure 1). For purposes of reporting the proportion of simulated random samples exceeding 2 ppm, 4000 iterations were used.

In Figures 2 thru 7, note that as concentrations have declined over time, the percent exceeding 2 ppm has also decreased. This holds true for whether equal portions of fish or the size of the fish are factored into the simulation. In 1997 all the simulations of striped bass in the lower estuary in

the spring would have generated a less than 5 percent exceedance of the 2 ppm tolerance level (Figures 2 and 3). The percent of simulated composites on a fish weight basis (unequal portions analyzed) which exceed 2 ppm, however, are much less for females than males, 0 percent vs. 10.4 percent in 1997 (Figures 4 and 6). This sexual dichotomy was also apparent for the equal portions analyzed scenario, females were 0 percent and males were 9.0 percent (Figures 5 and 7, respectively).

A simple t-test comparison of PCB concentrations between 1996 and 1997 reinforces the apparent decrease in PCB contamination between the two years that is apparent on the simulations. Table 2 provides the statistical detail for females, males, and both sexes combined. Males averaged **1.25 ppm** in 1997 compared to **1.95 ppm** in 1996. Females averaged **0.58 ppm** and **0.92 ppm** for the two years. PCB declines are apparent for both sexes over time (Figure 8). The higher concentrations in the males dampens some of the enthusiasm for the encouraging trend in contamination since there have also been major changes in the sex ratio of striped bass over the years in the lower estuary. How such changes may influence a reopening of the commercial fishery is unclear. The proportion of males exceeding 2 ppm at **9 percent** in 1997 is considerably greater than the target criteria of less than 5 percent. However, the 1997 shift in the sex ratio to 2.41 males to one female does favor an overall simulation, sexes combined, of a percent exceedance less than 5 percent. General increases in the sex ratio had been evident since 1977 to a high of 4.67 in 1995 but since then the ratio has dropped back with the 1998 ratio being 1.35 (Figure 9). It is anticipated that with a greater proportion of females in the population currently under analysis that the PCB concentrations overall will be lower for 1998 than they were in 1997 at least for the spring lower estuary fishery.

The principal determinant of PCB in striped bass, particularly in the lower estuary, continues to be the more highly chlorinated types of PCB, i.e., Aroclor 1254 and above (Figure 10a) and will be the principal determinant of future trends. In some years, a greater portion of the total mix was of the lesser-chlorinated varieties, e.g., 1993 compared to 1990, which may be a function of fresher upstream source conditions. At Albany, the striped bass also exhibit similar encouraging declines since 1993, although the concentrations are higher and probably reflect the closer proximity to the major source(s) and conditions currently are similar to those seen in the mid- to late-1980s (Figure 10b). The increase between 1992 and 1993 presumably was due to the 'new' source influence from the Hudson Falls area which was evident in 1991 water samples. Note the relatively greater proportion in the early 1990s of the total PCB mix was comprised of the lesser-chlorinated materials. Remedial efforts have brought much of this problem under control which is reflected by concentrations in fish, including striped bass. Unfortunately, sampling for striped bass at Albany did not occur in 1997.

#### **PCB DECLINE NOT AS APPARENT IN OTHER SPECIES**

Results for the other species sampled in 1997 which included largemouth and smallmouth bass, brown bullhead, white perch and yellow perch were not as favorable toward reflecting a decline in PCB concentrations. The attached summary table for the 1997 data includes results for the other species in the river from all the locations sampled (Table 1). Trends are summarized graphically for some of these species.

Largemouth and smallmouth bass at Albany, about rivermile 150, had a pattern of changes, similar to that observed in striped bass. Again, concentrations in these species in recent years are comparable to those seen in the late 1980s whether it is on a wet weight, arithmetic basis or a lipid-based, log10 transform, used to better satisfy statistical constraints (Figure 11). A similar pattern is also seen for the lipid-based concentrations which are usually used to evaluate PCB trends, and again the higher-chlorinated, Aroclor 1254 and above, component is the principal determinant of future trends (Figure 12). Near rivermile 175, the Stillwater area, levels in these same species have diminished somewhat but not significantly (Figure 13). A similar, or general lack of, shift is evident in the brown bullhead for this same area (Figure 14).

Although concentrations are lower, the same kind of pattern is observed for the resident bass species at Catskill (rivermile 112) (Figure 15). At Griffin Island in the Thompson Island Pool (near rivermile 190), however, the concentrations in bass, have fluctuated significantly, perhaps in response to changes in the source conditions (Figure 16), but the higher-chlorinated portion has remained stable throughout the 1983-1997 period. For brown bullhead from this location (Figure 17), concentrations have also fluctuated in the interval 1986 to 1997, but the total PCB levels for this species seem to be more linked to changes in the heavier types of PCBs.

Yearling pumpkinseed originally selected for their presumed localized movement, and lesser exposure were thought to provide a more sensitive index to changing PCB conditions. They may exhibit a shorter response time but interpreting what they are responding to is not as easily determined. In Figure 18, for example, note that initially in the late 1970s, there was a generally rapid decline in concentrations probably due to eliminating the direct discharges of PCBs to the river but conditions stabilized in the system particularly at the downstream sampling locations. Note the increase in 1980 at Albany (depicted as RM 154) which may have been in response to a localized dredging activity but there was a subsequent decline the following year. Generally, conditions in the upriver locations were not as stable. The gaps in the data arose because of the difficulty in some years of obtaining fish due to the possibility they were subject to local extirpations caused by sampling effort. The apparent decline in 1997 for the upper river points, may be an artifact since these samples were analyzed by different methodology and ages were not determined, although they were of the same sizes as yearling fish. At Albany concentrations did decline through the mid-1980s followed by a period of relative stability with some fluctuations (Figure 19). At Newburgh, concentrations reached a low point in 1992, but since then have been relatively stable (Figure 20).

Just as there have been trends through time, there is a spatial pattern. The downstream gradient has been evident for many years and the 1997 graph is similar to earlier depictions. Concentrations decline with distance away from the major source area in the upper river and over the same distance, the heavier types of PCBs become more dominant.

## ADDITIONAL CONTAMINANTS

In 1997 contaminants besides PCBs were analyzed. Table 1 summarizes several organochlorine pesticides which includes the DDT and chlordane complexes and some other chlorinated compounds. Table 3 summarizes results on mercury and cadmium. For the most part, concentrations are relatively low or below detection limits. Mercury is present in most places and in all species with some black bass and striped bass individuals above 1 ppm, the federal action level. Total DDT is about 0.5 ppm in some species. The action level for DDT is 5 ppm and the guideline for protection of piscivorous wildlife is 0.1 ppm. With few exceptions, PAHs were below detection limits at the locations sampled (Table 4). Phenanthrene was found in two samples, a white catfish and a largemouth bass, at Catskill (5 ppb) and fluorene was determined in a striped bass at the Tappan Zee Bridge (10 ppb). Although concentrations of dioxins and dibenzofurans are relatively low, they are of some concern to fish-eating wildlife, but not to the same degree as PCBs (Table 5).

Overall, levels of these other xenobiotics are not as problematic as the concern posed by the PCBs.

## CONCLUSIONS

- PCB concentrations in striped bass have reached the point where continued limitations on the commercial fishery due solely to PCBs are not justified. However, stock protection may necessitate continued restrictions on commercial take.
- Male striped bass have higher PCB concentrations than females.
- Striped bass sex ratios have dropped to the extent that females make up 43 percent of the sample in the lower estuary for 1998 compared to only 18 percent in 1995.
- "Marketplace" simulations for striped bass from the lower estuary in the spring of 1997 had a 3.3 percent exceedance of 2 ppm and an overall average total PCB concentration of 1.06 ppm.
- PCB concentrations in resident species remain high and declines for these other species are not as readily discernible.
- PCB concentrations decrease with distance downstream.
- The more highly chlorinated forms of PCB are found throughout the river with the PCB in the lower river predominated by "Aroclor 1254 and above."
- Other contaminants are present in the Hudson River but they do not represent as great a problem as do PCBs.
- Continued monitoring is warranted.

### OTHER CONSIDERATIONS

For the 1999 sampling year, a complete execution of the collection plan is envisioned given the encouraging results from 1997. We are beginning to receive data from the 1998 samples but these results are not expected to be complete until April of 1999.

Dennis Keane, under contract, has been working diligently in putting this information together for review by all the interested parties. The product presented here is a collaborative result between Albany and Mr. Keane's more remote work site in North Conway, New Hampshire. The simulations depicted herein were generated from a Foxpro program developed from earlier programs written in Basic. The early programs were entirely rewritten to be Windows compatible (also more user friendly) and to allow greater flexibility in using other data files representing different waters or situations and contaminants besides PCBs.



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1. Summary statistics - average (minimum-maximum) - for pesticides in fish from the Hudson River collected in the spring of 1997.

Concentrations expressed in parts per million (ppm) on a wet weight basis in standard fillets unless noted otherwise. Other measurements are of total length in millimeters (mm) and whole body weight in grams (g).

Location (approx. rivermile)	Species	Number of analyses	Average Length	Average Weight	Percent Lipid	Total PCB	Lipid PCB
George Washington Bridge (12)	Striped bass	40	735 (561 - 994)	4427 (1740 - 10659)	4.28 (1.22 - 9.36)	0.85 (0.214 - 4.4)	23.34 (4.206 - 106.796)
Tappan Zee Bridge (27)	Striped bass	51	659 (538 - 975)	3114 (1740 - 9040)	4.8 (1.8 - 10.15)	1.19 (0.194 - 7.19)	23.66 (7.297 - 92.179)
Stony Point (40)	Striped bass	49	638 (483 - 864)	2916 (1080 - 7710)	5.14 (0.81 - 10.46)	0.83 (0.238 - 2.46)	18.73 (4.327 - 64.815)
Newburgh (59)	Atlantic sturgeon	1	109 (109 - 109)	4 (4.1 - 4.1)	1.3	1.12	85.77
Fall Samples	Pumpkinseed (0+)	11	85 (79 - 100)	8 (6 - 15)	4.91 (4.15 - 5.23)	1.16 (0.81 - 1.38)	23.57 (19.058 - 29.24)
	Pumpkinseed (1+)	16	112 (109 - 117)	30 (20 - 34)	3.56 (2 - 4.6)	1.05 (0.85 - 1.58)	29.48 (0.85 - 1.58)
	Pumpkinseed (2+)	5	137 (135 - 144)	66 (62 - 69)	3.76 (2.91 - 4.56)	3.4 (3.1 - 3.8)	91.97 (82.192 - 106.529)
	Pumpkinseed (3+)	3	140 (133 - 148)	67 (60 - 78)	2.30 (2.05 - 2.46)	2.19 (2.02 - 2.44)	95.26 (84.167 - 102.439)
	Pumpkinseed (4+)	1	145	78	3.08	1.98	64.29
Clinton to Blue Point (73)	Striped bass	22	649 (553 - 759)	2941 (1890 - 4880)	6.07 (2.9 - 10.92)	1.082 (0.565 - 2.61)	19.43 (7.051 - 53.157)
Poughkeepsie (76)	Striped bass	12	644 (547 - 952)	3193 (1880 - 9525)	6.09 (3.51 - 10.14)	2.06 (0.375 - 12.4)	34.10 (5.716 - 200.647)
Catskill (112)	American eel	10	366 (254 - 550)	111 (20 - 320)	6.09 (0.98 - 17.6)	1.16 (0.05 - 4.015)	20.31 (5.102 - 47.515)
	Largemouth bass	20	374 (307 - 472)	880 (420 - 1860)	2.18 (0.74 - 3.66)	3.12 (0.05 - 8.487)	142.19 (2.674 - 262.727)
	Striped bass	20	690 (467 - 1011)	4235 (1000 - 13947)	3.09 (0.81 - 7.34)	1.72 (0.51 - 6.6)	63.58 (15.549 - 235)
	White catfish	23	415 (345 - 499)	1154 (560 - 2160)	4.68 (1.64 - 8.38)	4.92 (1.92 - 9.6)	113.17 (33.5 - 233.618)
	White perch	20	173 (146 - 220)	71 (40 - 140)	1.61 (0.8 - 3.89)	1.1 (0.274 - 2.8)	67.66 (19.296 - 126.901)
Y - Troy (147)	Largemouth bass	12	116 (-9 - 134)	42 (-9 - 57)	1.16 (0.53 - 2.62)	3.75 (0.73 - 13.453)	276.98 (107.353 - 519.421)
Fall Samples	Pumpkinseed (1+)	4	111 (108 - 117)	31 (28 - 34)	3.42 (3.36 - 3.46)	2.56 (1.53 - 3.08)	74.32 (45.476 - 90.588)
	Pumpkinseed (2+)	16	126 (120 - 134)	46 (41 - 57)	3.07 (2.49 - 4.92)	2.88 (1.41 - 4.30)	94.90 (44.14 - 141.07)
	Smallmouth bass	7	335 (273 - 448)	511 (235 - 1100)	1.16 (0.65 - 2.14)	5.96 (1.1 - 17.2)	387.16 (110 - 829.016)
	White perch	20	175 (150 - 220)	77 (45 - 170)	2.44 (0.88 - 4.54)	4.39 (2 - 6.4)	213.48 (58.811 - 446.591)
	Yellow perch	1	213 (213 - 213)	130 (130 - 130)	1.96	1.32	67.35
Stillwater to Coveville (175)	Brown bullhead	20	312 (264 - 355)	483 (275 - 765)	3.8 (1.63 - 8.58)	5.5 (0.41 - 13.4)	154.09 (11.94 - 449.08)
	Largemouth bass	20	361 (235 - 529)	798 (180 - 2300)	1.01 (0.6 - 1.93)	3.77 (1.38 - 8.91)	386.37 (130.556 - 774.684)
	Yellow perch	8	191 (143 - 252)	91 (25 - 185)	1.73 (1.35 - 2.23)	1.54 (0.28 - 4.607)	95.96 (18.919 - 341.259)
Thompson Island Pool (189)	Brown bullhead	20	260 (200 - 336)	287 (100 - 665)	3.32 (0.92 - 5.34)	14.46 (3.8 - 52.27)	435.94 (117.808 - 1416.531)
	Largemouth bass	13	316 (232 - 447)	580 (165 - 1560)	1.49 (0.74 - 3.11)	13.26 (4.8 - 57.36)	880.95 (250.804 - 2223.256)
	Yellow perch	8	208 (172 - 265)	124 (60 - 260)	1.7 (1.36 - 2.75)	6.02 (2.12 - 15.2)	334.5 (126.19 - 774.051)
Above Feeder Dam (210)	Brown bullhead	20	310 (257 - 349)	446 (260 - 640)	3.55 (0.6 - 6.76)	0.5 (0.083 - 4.685)	13.94 (2.446 - 116.542)
	Largemouth bass	3	285 (280 - 289)	340 (315 - 375)	0.87 (0.7 - 1)	0.19 (0.145 - 0.215)	21.56 (20.6 - 23.37)
Fall Samples	Pumpkinseed (1+)	18	79 (68 - 88)	10 (6.1 - 15)	3.2 (1.48 - 4.62)	0.25 (0.05 - 0.76)	8.09 (1.082 - 27.737)
	Smallmouth bass	1	448 (448 - 448)	1200 (1200 - 1200)	1.46	0.33	22.26
	Yellow perch	19	217 (161 - 276)	146 (50 - 275)	1.78 (1.19 - 2.2)	0.16 (0.05 - 0.596)	9.6 (2.66 - 50.084)

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Location (approx. rivermile)	Species	Number of analyses	Total DDT	Total Chlordane	Total Endrin	Total Endosulfan
George Washington Bridge (12)	Striped bass	37	0.151 (0.05 - 0.317)	0.04 (<0.01 - 0.2)	<0.01	<0.01
Tappan Zee Bridge (27)	Striped bass	50	0.23 (0.071 - 0.977)	0.037 (0.015 - 0.119)	<0.01	<0.01
Stony Point (40)	Striped bass	48	-	-	-	-
Denning Pt. (59)	Atlantic sturgeon	1	-	-	-	-
Fall Samples	Pumpkinseed (0+)	11	-	-	-	-
	Pumpkinseed (1+)	16	-	-	-	-
	Pumpkinseed (2+)	5	-	-	-	-
	Pumpkinseed (3+)	3	-	-	-	-
	Pumpkinseed (4+)	1	-	-	-	-
Clinton to Blue Point (73)	Striped bass	16	0.131 (0.077 - 0.191)	0.033 (0.021 - 0.048)	<0.01	<0.01
Poughkeepsie (76)	Striped bass	8	0.227 (0.04 - 0.419)	0.046 (0.022 - 0.075)	<0.01	<0.01
Catskill (112)	American eel	7	0.259 (0.03 - 0.594)	0.02 (0.015 - 0.024)	<0.01	<0.01
	Largemouth bass	20	0.135 (0.059 - 0.355)	<0.01	<0.01	<0.01
	Striped bass	11	0.113 (0.052 - 0.308)	0.024 (<0.01 - 0.044)	<0.01	<0.01
	White catfish	23	0.237 (0.075 - 0.535)	0.014 (<0.01 - 0.0217)	<0.01	<0.01
	White perch	20	0.019 (0.015 - 0.021)	<0.02	<0.02	<0.02
Albany - Troy (147)	Largemouth bass	12	0.055 (0.025 - 0.096)	0.008 (<0.01 - 0.0162)	<0.01	<0.01
	Pumpkinseed (1+)	4	-	-	-	-
	Pumpkinseed (2+)	16	-	-	-	-
	Smallmouth bass	7	-	-	-	-
	White perch	19	0.08 (<0.04 - 0.13)	<0.04	<0.04	<0.04
	Yellow perch	1	<0.032	<0.032	<0.032	<0.032
Stillwater to Coveville (175)	Brown bullhead	20	<0.01	<0.01	<0.01	<0.01
	3 Largemouth bass	20	<0.01	<0.01	<0.01	<0.01
	Yellow perch	8	0.016 (<0.044 - 0.02)	<0.044	<0.044	<0.044
Thompson Island Pool (189)	Brown bullhead	20	<0.01	<0.01	<0.01	<0.01
	Largemouth bass	13	0.006 (<0.01 - 0.01)	<0.01	<0.01	<0.01
	Yellow perch	8	<0.021	<0.021	<0.021	<0.021
Above Feeder Dam (210)	Brown bullhead	20	0.02 (0.006 - 0.033)	<0.01	<0.01	<0.01
	Largemouth bass	3	0.01 (0.0094 - 0.011)	<0.01	<0.01	<0.01
	Pumpkinseed (1+)	18	-	-	-	-
	Smallmouth bass	1	0.023	<0.01	<0.01	<0.01
	Yellow perch	19	0.009 (<0.01 - 0.014)	<0.01	<0.01	<0.01

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Location (approx. rivermile)	Species	Number of analyses	Dieldrin	Aldrin	Mirex	Total Heptachlor	Total HCH
George Washington Bridge (12)	Striped bass	37	<0.01	<0.01	<0.01	<0.01	<0.01
Tappan Zee Bridge (27)	Striped bass	50	0.007 (0.005 - 0.017)	<0.01	<0.01	<0.01	<0.01
Stony Point (40)	Striped bass	48	-	-	-	-	-
Denning Pt. (59)  Fall Samples	Atlantic sturgeon	1	-	-	-	-	-
	Pumpkinseed (0+)	11	-	-	-	-	-
	Pumpkinseed (1+)	16	-	-	-	-	-
	Pumpkinseed (2+)	5	-	-	-	-	-
	Pumpkinseed (3+)	3	-	-	-	-	-
	Pumpkinseed (4+)	1	-	-	-	-	-
Clinton to Blue Point (73)	Striped bass	16	<0.01	<0.01	<0.01	<0.01	<0.01
Poughkeepsie (76)	Striped bass	8	<0.01	<0.01	<0.01	<0.01	<0.01
Catskill (112)	American eel	7	<0.01	<0.01	<0.01	<0.01	<0.01
	Largemouth bass	20	<0.01	<0.1	<0.1	<0.01	<0.01
	Striped bass	11	<0.01	<0.01	<0.01	<0.01	<0.01
	White catfish	23	<0.01	<0.04	<0.1	<0.01	<0.01
	White perch	20	<0.02	<0.02	<0.02	<0.02	<0.02
Albany - Troy (147)	Largemouth bass	12	<0.01	<0.15	<0.1	<0.01	<0.01
	Pumpkinseed (1+)	4	-	-	-	-	-
	Pumpkinseed (2+)	16	-	-	-	-	-
	Smallmouth bass	7	-	-	-	-	-
	White perch	19	<0.04	<0.04	<0.04	<0.04	<0.04
	Yellow perch	1	<0.032	<0.032	<0.032	<0.032	<0.032
Stillwater to Coveville (175)	Brown bullhead	20	<0.01	<0.2	<0.2	<0.01	<0.01
	3 Largemouth bass	20	<0.01	<0.15	<0.15	<0.01	<0.01
	Yellow perch	8	<0.044	<0.15	<0.15	<0.044	<0.044
Thompson Island Pool (189)	Brown bullhead	20	<0.01	<0.4	<0.4	<0.01	<0.01
	Largemouth bass	13	<0.01	<0.6	<0.6	0.006 (<0.01 - 0.01)	<0.01
	Yellow perch	8	<0.021	<0.3	<0.3	<0.021	<0.021
Above Feeder Dam (210)	Brown bullhead	20	<0.01	<0.01	<0.01	<0.01	<0.01
	Largemouth bass	3	<0.01	<0.01	<0.01	<0.01	<0.01
	Pumpkinseed (1+)	18	-	-	-	-	-
	Smallmouth bass	1	<0.01	<0.01	<0.01	<0.01	<0.01
	Yellow perch	19	<0.01	<0.01	<0.01	<0.01	<0.01

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Table 1. (Continued)

Location (approx. rivermile)	Species	Number of analyses	Toxaphene	Meoxychl
George Washington Bridge (12)	Striped bass	37	<0.05	<0.01
Tappan Zee Bridge (27)	Striped bass	50	<0.05	<0.01
Stony Point (40)	Striped bass	48	-	-
Denning Pt. (59)	Atlantic sturgeon	1	-	-
Fall Samples	Pumpkinseed (0+)	11	-	-
	Pumpkinseed (1+)	16	-	-
	Pumpkinseed (2+)	5	-	-
	Pumpkinseed (3+)	3	-	-
	Pumpkinseed (4+)	1	-	-
Clinton to Blue Point (73)	Striped bass	16	<0.05	<0.01
Poughkeepsie (76)	Striped bass	8	<0.05	<0.01
Catskill (112)	American eel	7	<0.05	<0.01
	Largemouth bass	20	<0.05	<0.01
	Striped bass	11	<0.05	<0.01
	White catfish	23	<0.05	<0.01
	White perch	20	<0.1	<0.02
Albany - Troy (147)	Largemouth bass	12	<0.05	<0.01
	Pumpkinseed (1+)	4	-	-
	Pumpkinseed (2+)	16	-	-
	Smallmouth bass	7	-	-
	White perch	19	<0.2	<0.04
	Yellow perch	1	<0.16	<0.032
Stillwater to Coveville (175)	Brown bullhead	20	<0.05	<0.01
	3 Largemouth bass	20	<0.05	<0.01
	Yellow perch	8	<0.05	<0.044
Thompson Island Pool (189)	Brown bullhead	20	<0.05	<0.01
	Largemouth bass	13	<0.05	<0.01
	Yellow perch	8	<0.1	<0.021
Above Feeder Dam (210)	Brown bullhead	20	<0.05	<0.01
	Largemouth bass	3	<0.05	<0.01
	Pumpkinseed (1+)	18	-	-
	Smallmouth bass	1	<0.1	<0.01
	Yellow perch	19	<0.05	0.017 (<0.01 - 0.051)

Table 2. T-Test for 1996/1997 Striped bass from Hudson River (0 - 90 Rivermiles)

Sex	Stat	Year	
		1996	1997
Males	Mean	1.95	1.25
	N	131	123
	df		252
	t'		3.77
	p		2.07E-04
Females	Mean	0.92	0.58
	N	38	51
	df		87
	t'		4.04
	p		1.14E-04
All	Mean	1.72	1.06
	N	169	174
	df		341
	t'		4.6
	p		6.11E-06

3. Summary statistics - average (minimum-maximum) - for cadmium (Cd) and mercury (Hg) in fish from the Hudson River collected in the spring of 1997.

Concentrations expressed in parts per million (ppm) on a wet weight basis in standard fillets unless noted otherwise. Other measurements are of total length in millimeters (mm) and whole body weight in grams (g).

Location (approx. river mile)	Species	Number of analyses (Cd/Hg)	Length (mm)	Weight (g)	Cd (ppm)	Hg (ppm)
George Washington Bridge (12)	Striped bass	4/10	749 (561 - 994)	4914 (1870 - 10659)	0.006 (<0.01 - 0.01)	0.379 (0.2 - 0.76)
Appan Zee Bridge (27)	Striped bass	4/10	694 (538 - 975)	3874 (1760 - 9040)	0.018 (<0.01 - 0.03)	0.419 (0.21 - 1.1)
Anthony Point (40)	Striped bass	3/8	707 (511 - 862)	4155 (1380 - 7710)	<0.03	0.416 (0.25 - 0.6)
Newburgh (59) Fall Samples	Pumpkinseed (0+)	3/3	91 (81-100)	10 (6 - 15)	0.017 (<0.01 - 0.04)	0.037 (<0.04 - 0.3)
	Pumpkinseed (1+)	10/15	111 (106-117)	27 (20-34)	0.0112 (<0.01 - 0.02)	0.038 (<0.04 - 0.08)
	Pumpkinseed (2+)	2/5	137 (135 - 144)	66 (62 - 69)	0.02 (0.01 - 0.03)	0.116 (0.06 - 0.3)
	Pumpkinseed (3+)	1/3	140 (133 - 148)	67 (60-78)	0.02	0.063 (0.01 - 0.12)
	Pumpkinseed (4+)	1/1	145	78	0.02	0.29
Clinton Point (73)	Striped bass	4/10	680 (547 - 952)	3655 (1880 - 9525)	<0.01	0.384 (0.14 - 0.63)
Katiskill (112)	American eel	3/5	450 (321 - 550)	188 (60 - 320)	0.06 (0.04 - 0.09)	0.232 (0.16 - 0.32)
	Largemouth bass	5/5	434 (409 - 472)	1418 (1070 - 1860)	<0.01	1.126 (0.41 - 3)
	Striped bass	4/10	719 (467 - 1011)	5262 (1000 - 13947)	0.006 (<0.01 - 0.01)	0.602 (0.18 - 1.7)
	White catfish	3/6	468 (425 - 499)	1688 (1380 - 2160)	0.01 (<0.01 - 0.02)	0.448 (0.16 - 0.69)
	White perch	4/6	190 (152 - 220)	98 (50 - 140)	0.02 (<0.01 - 0.04)	0.318 (0.14 - 0.46)
Albany / Troy (147) Fall Samples	Largemouth bass	5/5	422 (396 - 448)	1204 (1030 - 1440)	<0.01	0.618 (0.41 - 0.74)
	Pumpkinseed (1+)	4/4	112 (108 - 117)	31 (28 - 34)	0.034 (<0.01 - 0.05)	0.064 (<0.04 - 0.14)
	Pumpkinseed (2+)	0/15	126 (120 - 134)	48 (40 - 57)	-	0.069 (<0.04 - 0.14)
	Smallmouth bass	0/4	375 (306 - 448)	701 (340 - 1100)	-	0.838 (0.45 - 1.3)
	White perch	3/4	201 (183 - 220)	119 (90 - 170)	0.009 (<0.01 - 0.02)	0.24 (0.12 - 0.34)
	Yellow perch	1/1	213 (213 - 213)	130 (130 - 130)	<0.01	0.15 (0.15 - 0.15)
Stillwater / Coveville (175)	Brown bullhead	0/5	349 (345 - 355)	694 (640 - 765)	-	0.104 (0.06 - 0.21)
	Largemouth bass	5/5	453 (413 - 529)	1430 (920 - 2300)	<0.01	0.62 (0.35 - 1.1)
	Yellow perch	3/5	214 (185 - 252)	124 (70 - 185)	<0.01	0.126 (0.08 - 0.22)
Thompson Island Pool (189)	Brown bullhead	0/5	317 (296 - 336)	497 (410 - 665)	-	0.104 (0.06 - 0.17)
	Largemouth bass	0/5	395 (296 - 447)	1040 (350 - 1560)	-	0.564 (0.24 - 0.94)
	Yellow perch	3/3	246 (231 - 265)	198 (165 - 260)	<0.01	0.26 (0.16 - 0.34)
Above Feeder Dam (201) Fall Samples	Brown bullhead	0/5	339 (330 - 349)	557 (415 - 640)	-	0.202 (0.13 - 0.25)
	Largemouth bass	0/1	285 (285 - 285)	330 (330 - 330)	-	0.4
	Pumpkinseed (1+)	5/5	86 (82 - 88)	13 (11 - 15)	<0.01	0.068 (<0.04 - 0.11)
	Smallmouth bass	0/1	448 (448 - 448)	1200 (1200 - 1200)	-	1
	Yellow perch	0/5	271 (266 - 276)	255 (215 - 275)	-	0.218 (0.14 - 0.35)

Yearling (1+) fish analyzed as whole specimens.

**Table 4. Summary statistics - average (minimum-maximum) - for Polyaromatic Hydrocarbons in fish from the Hudson River collected in the spring of 1997.**  
**Concentrations expressed in parts per billion (ppb) on a wet weight basis in standard fillets unless noted otherwise. Other measurements are of total length in millimeters (mm) and whole body weight in grams (g).**

Location (approx. rivermile)	Species	Number of analyses	Length (mm)	Weight (g)	Percent Lipid	Naphthalene	1-Methyl Naphthalene
George Washington Bridge (12)	Striped bass	3	765 (652 - 857)	5457 (2790 - 7700)	5.44 (3.2 - 8.84)	<50	<20
Tappan Zee Bridge (27)	Striped bass	3	750 (700 - 807)	4913 (3620 - 5860)	7.1 (4.04 - 9.16)	<50	<20
Catskill (112)	American eel	3	533 (523 - 550)	273 (240 - 320)		<50	<20
	Largemouth bass	3	448 (409 - 472)	1577 (1130 - 1860)	2.73 (2.13 - 3.66)	<50	<20
	White catfish	4	477 (458 - 499)	1775 (1560 - 2160)	3.47 (1.64 - 4.34)	<50	<20
	White perch	3	210 (198 - 220)	125 (100 - 140)	1.24 (1.07 - 1.42)	<100	<40
Albany to Troy (147)	Largemouth bass	4	421 (396 - 448)	1198 (1030 - 1440)	1.47 (0.75 - 2.59)	<50	<20
	White perch	3	207 (196 - 220)	135 (105 - 170)	1.75 (0 - 3.02)	<100	<40
	Yellow perch	1	213 (213 - 213)	130 (130 - 130)	1.96 (1.96 - 1.96)	<50	<20
Stillwater to Coveville (175)	Largemouth bass	3	474 (413 - 529)	1767 (1010 - 2300)	0.93 (0.6 - 1.18)	<50	<20
Thompson Island Pool (189)	Largemouth bass	3	292 (273 - 303)	410 (335 - 460)	1.61 (1.35 - 2.07)	<50	<20

Table 4. (Continued)

Location (approx. rivermile)	Species	Number of analyses	2-Methyl Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Fluoranthene	Anthracene	Pyrene
George Washington Bridge (12)	Striped bass	3	<20	<100	<50	<10	<5	<10	<5	<5
Tappan Zee Bridge (27)	Striped bass	3	<20	<100	<50	7 (<10 - 10)	<5	<10	<5	<5
Catskill (112)	American eel	3	<20	<100	<50	<10	<5	<10	<5	<5
	Largemouth bass	3	<20	<100	<50	<10	3 (<5 - 5)	<10	<5	<5
	White catfish	4	<20	<100	<50	<10	3 (<5 - 5)	<10	<5	<5
	White perch	3	<33	<200	<100	<20	<10	<20	<10	<10
Albany to Troy (147)	Largemouth bass	4	<20	<100	<50	<10	<5	<10	<5	<5
	White perch	3	<40	<200	<100	<20	<10	<20	<10	<10
	Yellow perch	1	<20	<100	<50	<10	<5	<10	<5	<5
Stillwater to Coveville (175)	Largemouth bass	3	<20	<100	<50	<10	<5	<10	<5	<5
Thompson Island Pool (189)	Largemouth bass	3	<20	<100	<50	<10	<5	<10	<5	<5

Table 4. (Continued)

Location (approx. rivermile)	Species	Number of analyses	Number of					
			Benzo(a)anthracene	Chrysene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenzo(a,h)anthracene
George Washington Bridge (12)	Striped bass	3	<5	<5	<5	<5	<5	<10
Tappan Zee Bridge (27)	Striped bass	3	<5	<5	<5	<5	<5	<10
Catskill (112)	American eel	3	<5	<5	<5	<5	<5	<10
	Largemouth bass	3	<5	<5	<5	<5	<5	<10
	White catfish	4	<5	<5	<5	<5	<5	<10
	White perch	3	<10	<10	<10	<10	<10	<20
Albany to Troy (147)	Largemouth bass	4	<5	<5	<5	<5	<5	<10
	White perch	3	<10	<10	<10	<10	<10	<20
	Yellow perch	1	<5	<5	<5	<5	<5	<10
Stillwater to Coveville (175)	Largemouth bass	3	<5	<5	<5	<5	<5	<10
Thompson Island Pool (189)	Largemouth bass	3	<5	<5	<5	<5	<5	<10

Table 4. (Continued)

Location (approx. rivermile)	Species	Number of analyses	Benzo(g,h,i)perylene
George Washington Bridge (12)	Striped bass	3	<10
Tappan Zee Bridge (27)	Striped bass	3	<10
Catskill (112)	American eel	3	<10
	Largemouth bass	3	<10
	White catfish	4	<10
	White perch	3	<20
Albany to Troy (147)	Largemouth bass	4	<10
	White perch	3	<20
	Yellow perch	1	<10
Stillwater to Coveville (175)	Largemouth bass	3	<10
Thompson Island Pool (189)	Largemouth bass	3	<10

Table 5. Summary statistics - average (minimum-maximum) - for Dioxins and Dibenzofurans in fish from the Hudson River collected in the spring of 1997.

Concentrations expressed in parts per trillion (ppt) on a wet weight basis in standard fillets unless noted otherwise. Other measurements are of total length in millimeters (mm) and whole body weight in grams (g).

Location (approx. rivermile)	Species	Number of analyses	Length	Weight	Cdd2378	Cdd12378	Cdd123678
59th and Roosevelt	Striped bass	2	706 (648 - 763)	3777 (2935 - 4619)	1.95 (1.9 - 2)	0.32 (<0.2 - 0.54)	0.25 (<0.3 - 0.35)
Breezy Point Jetty	Striped bass	1	676	3346	0.46	<0.1	<0.2
Marine Parkway Bridge	Striped bass	3	581 (576 - 590)	0.223 (2103 - 2363)	0.223 (<0.2 - 0.52)	<0.2	<0.3
South of Williamsburgh	Striped bass	1	656	2972	2	<0.1	<0.1
Coney Island	Striped bass	2	723 (718 - 727)	1 (3713 - 4547)	1 (<0.2 - 1.9)	<0.3	<0.3
Govenors Island	Striped bass	3	644 (612 - 691)	1.82 (2554 - 3228)	1.82 (0.36 - 3.1)	0.3 (<0.2 - 0.46)	<0.2
Old Orchard Shoal	Striped bass	3	682 (608 - 744)	0.268 (2500 - 4250)	0.268 (<0.2 - 0.63)	<0.2	<0.3
George Washington Bridge (12)	Striped bass	4	876 (786 - 994)	1.813 (5880 - 10659)	1.8125 (0.75 - 3.5)	0.425 (<0.5 - 1.1)	0.308 (<0.6 - 0.53)
Tappan Zee Bridge (27)	Striped bass	4	812 (724 - 975)	0.638 (3280 - 9040)	0.6375 (0.36 - 0.85)	0.408 (<0.5 - 0.73)	0.22 (<0.6 - 0.33)
Clinton to Blue Point (73)	Striped bass	2	699 (638 - 759)	1.485 (2830 - 4880)	1.485 (0.97 - 2)	0.95 (0.8 - 1.1)	0.455 (<0.3 - 0.76)
Poughkeepsie (76)	Striped bass	2	834 (715 - 952)	0.815 (4040 - 9525)	0.815 (0.63 - 1)	0.83 (0.46 - 1.2)	0.28 (<0.4 - 0.36)
Catskill (112)	American eel	3	533 (523 - 550)	0.095 (240 - 320)	0.095 (<0.07 - 0.17)	0.113 (<0.09 - 0.25)	0.403 (<0.3 - 0.96)
	Largemouth bass	5	434 (409 - 472)	0.376 (1070 - 1860)	0.376 (0.23 - 0.69)	0.212 (<0.32 - 0.55)	0.476 (<0.4 - 0.94)
	Striped bass	4	856 (686 - 1011)	0.565 (3740 - 13947)	0.565 (<0.2 - 0.81)	0.51 (<0.6 - 0.96)	<0.6
	White catfish	5	476 (458 - 499)	1.072 (1560 - 2160)	1.072 (0.41 - 2.2)	0.832 (0.28 - 1.6)	1.246 (0.56 - 2.8)
	White perch	3	176 (174 - 178)	0.733 (70 - 80)	0.733 (<0.3 - 2)	0.397 (<0.5 - 0.84)	0.45 (<0.7 - 0.85)
Albany to Troy (147)	Largemouth bass	5	422 (396 - 448)	0.334 (1030 - 1440)	0.334 (<0.1 - 0.73)	0.326 (<0.5 - 0.65)	0.428 (<0.2 - 0.86)
	White perch	4	207 (196 - 220)	0.608 (105 - 170)	0.6075 (0.17 - 1.1)	0.483 (<0.1 - 0.89)	0.448 (<0.1 - 0.87)
	Yellow perch	1	213	130	<0.2	<0.3	<0.5
Stillwater to Coveville (175)	Largemouth bass	3	474 (413 - 529)	0.045 (1010 - 2300)	<0.1	<0.3	<0.3
	Yellow perch	3	234 (208 - 252)	0.063 (120 - 185)	<0.2	<0.3	<0.2
Thompson Island Pool (189)	Largemouth bass	3	292 (273 - 303)	0.048 (335 - 460)	<0.1	<0.1	<0.3
	Yellow perch	3	246 (231 - 265)	0.097 (165 - 260)	<0.3	<0.4	<0.4

Table 5. (continued)

Location (approx. river mile)	Species	Number of analyses	Cdd123789	Cdd123478	Cdd1234678	Ocdd	Cdf2378	Cdf23478
59th and Roosevelt	Striped bass	2	<0.3	<0.3	<0.3	0.395 (<0.7 - 0.44)	4.9 (1.8 - 8)	1.295 (0.79 - 1.8)
Breezy Point Jetty	Striped bass	1	<0.2	<0.2	<0.3	<0.4	2	0.56
Marine Parkway Bridge	Striped bass	3	<0.2	<0.3	<0.3	<0.5	2.033 (1.6 - 2.4)	0.333 (<0.2 - 0.45)
South of Williamsburgh	Striped bass	1	<0.1	<0.1	<0.2	<0.56	3.3	1.1
Coney Island	Striped bass	2	<0.3	<0.3	<0.4	<0.6	3.95 (1.6 - 6.3)	1.18 (0.76 - 1.6)
Govenors Island	Striped bass	3	<0.2	<0.2	<0.2	0.542 (<0.45 - 1.2)	2.692 (<0.55 - 4.2)	0.932 (<0.19 - 1.6)
Old Orchard Shoal	Striped bass	3	<0.3	<0.3	<0.3	0.393 (<0.5 - 0.78)	1.053 (0.36 - 1.5)	0.397 (0.22 - 0.53)
George Washington Bridge (12)	Striped bass	4	<0.7	<0.7	<0.9	-2.7	4.7 (3.5 - 6.1)	2.225 (1.6 - 3.8)
Tappan Zee Bridge (27)	Striped bass	4	<0.5	<0.6	<0.6	<0.9	4.25 (1.1 - 6.1)	1.403 (<1.6 - 2.3)
Clinton to Blue Point (73)	Striped bass	2	<0.4	<0.5	<0.5	1.24 (0.88 - 1.6)	14.3 (9 - 19.6)	3.5 (2.9 - 4.1)
Poughkeepsie (76)	Striped bass	2	<0.1	<0.4	<0.4	<0.7	7.45 (3 - 11.9)	2.5 (1.6 - 3.4)
Catskill (112)	American eel	3	<0.2	<0.3	0.7 (<0.2 - 1.3)	1.363 (<0.98 - 2.1)	0.07 (<0.05 - 0.16)	0.155 (<0.07 - 0.4)
	Largemouth bass	5	<0.4	<0.4	0.248 (<0.5 - 0.31)	0.46 (<0.9 - 0.86)	3.16 (1.8 - 4.9)	0.642 (0.37 - 1)
	Striped bass	4	<0.6	<0.7	<0.8	-2	3.1 (1.8 - 3.9)	1.625 (1.1 - 2.3)
	White catfish	5	0.192 (<0.4 - 0.56)	0.204 (<0.5 - 0.52)	0.994 (0.42 - 2.2)	1.55 (<0.3 - 2.8)	1.742 (0.81 - 2.7)	3.46 (1.2 - 7.9)
	White perch	3	<0.8	<0.8	0.543 (<1 - 0.98)	1.37 (<1.9 - 2.2)	1.92 (<0.62 - 5.4)	1.45 (<0.3 - 4.1)

Table 5. (continued)

Location (approx. rivermile)	Species	Number of analyses	Cdf123478	Cdf123678	Cdf1234678	Cdf123789	Cdf1234678	Cdf1234789
59th and Roosevelt	Striped bass	2	0.105 (<0.1 - 0.16)	0.08 (<0.1 - 0.11)	0.155 (<0.2 - 0.21)	<0.2	<0.2	<0.3
Breezy Point Jetty	Striped bass	1	<0.1	<0.4	<0.4	<0.4	<0.2	<0.3
Marine Parkway Bridge	Striped bass	3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.3
South of Williamsburgh	Striped bass	1	<0.08	<0.07	<0.1	<0.1	<0.1	<0.1
Coney Island	Striped bass	2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.3
Govenors Island	Striped bass	3	0.08 (<0.1 - 0.14)	<0.1	<0.1	<0.1	<0.1	<0.2
Old Orchard Shoal	Striped bass	3	<0.2	<0.2	<0.2	<0.2	<0.29	<0.3
George Washington Bridge (12)	Striped bass	4	0.145 (<0.4 - 0.13)	0.123 (<0.3 - 0.14)	0.213 (<0.4 - 0.35)	<0.5	<0.1	<0.8
Tappan Zee Bridge (27)	Striped bass	4	<0.4	<0.3	0.203 (<0.4 - 0.36)	<0.5	<0.4	<0.6
Clinton to Blue Point (73)	Striped bass	2	0.32 (0.2 - 0.44)	0.195 (<0.2 - 0.29)	0.38 (0.36 - 0.4)	<0.3	<0.3	<0.4
Poughkeepsie (76)	Striped bass	2	0.12 (<0.3 - 0.09)	<0.2	0.175 (<0.3 - 0.2)	<0.3	<0.3	<0.1
Catskill (112)	American eel	3	0.097 (<0.1 - 0.19)	0.083 (<0.1 - 0.15)	0.16 (<0.2 - 0.33)	<0.2	0.143 (<0.2 - 0.28)	<0.2
	Largemouth bass	5	0.088 (<0.3 - 0.1)	0.109 (<0.2 - 0.24)	0.39 (<0.3 - 0.83)	<0.3	0.118 (<0.3 - 0.19)	<0.4
	Striped bass	4	<0.3	<0.3	<0.3	<0.4	<0.5	<0.7
	White catfish	5	0.195 (<0.3 - 0.39)	0.156 (<0.2 - 0.33)	0.58 (0.35 - 0.74)	<0.3	0.376 (0.22 - 0.52)	<0.6
	White perch	3	0.203 (<0.4 - 0.31)	<0.4	<0.5	<0.6	<0.6	<0.8
Albany to Troy (147)	Largemouth bass	5	0.129 (<0.1 - 0.27)	0.098 (<0.1 - 0.2)	0.352 (<0.1 - 0.8)	0.146 (<0.2 - 0.27)	0.237 (<0.2 - 0.6)	<0.4
	White perch	4	0.159 (<0.4 - 0.26)	0.105 (<0.08 - 0.15)	0.275 (<0.5 - 0.44)	<0.5	0.158 (<0.5 - 0.23)	<0.7
	Yellow perch	1	<0.3	<0.3	<0.4	<0.4	<0.4	<0.5
Stillwater to Coveville (175)	Largemouth bass	3	<0.2	<0.2	<0.2	<0.3	<0.3	<0.4
	Yellow perch	3	<0.1	<0.1	<0.2	<0.2	<0.2	<0.3
Thompson Island Pool (189)	Largemouth bass	3	<0.5	<0.2	<0.2	<0.2	<0.2	<0.3
	Yellow perch	3	<0.2	<0.2	<0.3	<0.3	0.14 (<0.3 - 0.12)	<0.4

Table 5. (continued)

Location (approx. rivermile)	Species	Number of analyses	Ocdf	Ttcd	Tpcd	Thcd	Thpcdd	Ttcd
39th and Roosevelt	Striped bass	2	<0.5	1.95 (1.9 - 2)	0.32 (<0.2 - 0.54)	0.25 (<0.3 - 0.35)	<0.3	5.6 (1.9 - 9.3)
Breezy Point Jetty	Striped bass	1	<0.3	0.46	<0.1	<0.2	<0.3	2
Marine Parkway Bridge	Striped bass	3	<0.4	<0.2	<0.2	<0.3	<0.3	2.033 (1.6 - 2.4)
South of Williamsburgh	Striped bass	1	<0.2	2	<0.1	<0.1	<0.2	4
Coney Island	Striped bass	2	<0.5	1 (<0.2 - 1.9)	<0.3	<0.3	<0.4	3.95 (1.6 - 6.3)
Govenors Island	Striped bass	3	<0.3	1.82 (0.36 - 3.1)	0.3 (<0.2 - 0.46)	<0.2	<0.2	2.725 (<0.55 - 4.2)
Old Orchard Shoal	Striped bass	3	0.317 (<0.4 - 0.65)	<0.63	<0.2	<0.3	<0.3	1.053 (0.36 - 1.5)
George Washington Bridge (12)	Striped bass	4	<1.6	1.813 (0.75 - 3.5)	0.425 (<0.5 - 1.1)	0.438 (<0.7 - 1)	0.3 (<0.9 - 0.3)	5.55 (3.9 - 8)
Tappan Zee Bridge (27)	Striped bass	4	<0.7	0.638 (0.36 - 0.85)	0.408 (<0.5 - 0.73)	0.22 (<0.6 - 0.33)	<0.6	6.125 (1.8 - 11.9)
Clinton to Blue Point (73)	Striped bass	2	<0.5	1.485 (0.97 - 2)	0.95 (0.8 - 1.1)	0.455 (<0.3 - 0.76)	<0.5	19.85 (13.4 - 26.3)
Poughkeepsie (76)	Striped bass	2	<0.1	0.815 (0.63 - 1)	0.83 (0.46 - 1.2)	0.385 (<0.4 - 0.57)	<0.4	8.65 (3.7 - 13.6)
Catskill (112)	American eel	3	<0.3	0.095 (<0.07 - 0.17)	0.113 (<0.09 - 0.25)	0.517 (<0.3 - 1.3)	0.7 (<0.2 - 1.3)	1.34 (0.25 - 2.8)
	Largemouth bass	5	<0.7	0.376 (0.23 - 0.69)	0.244 (<0.3 - 0.55)	0.476 (<0.4 - 0.94)	0.348 (<0.5 - 0.53)	3.82 (2 - 5.8)
	Striped bass	4	<1.5	0.565 (<0.2 - 0.81)	0.51 (<0.6 - 0.96)	<0.6	<0.8	4.275 (1.8 - 6.4)
	White catfish	5	0.298 (<1.1 - 0.69)	1.072 (0.41 - 2.2)	0.852 (0.28 - 1.6)	2.3 (1.4 - 4.7)	0.994 (0.42 - 2.2)	3.02 (2 - 4.4)
	White perch	3	<1.5	0.75 (<0.3 - 2)	0.397 (<0.5 - 0.84)	0.467 (<0.8 - 0.85)	0.543 (<1 - 0.98)	2.457 (<0.1 - 6.9)
Albany to Troy (147)	Largemouth bass	5	0.272 (<0.2 - 0.76)	0.334 (<0.1 - 0.73)	0.326 (<0.5 - 0.65)	0.428 (<0.2 - 0.86)	0.258 (<0.2 - 0.57)	2.704 (0.25 - 6.5)
	White perch	4	0.33 (<1.1 - 0.52)	0.608 (0.17 - 1.1)	0.483 (<0.1 - 0.89)	0.448 (<0.1 - 0.87)	0.445 (<0.8 - 0.68)	2.95 (1.2 - 5.9)
	Yellow perch	1	<0.6	<0.2	<0.3	0.99	11.6	1.2
Stillwater to Coveville (175)	Largemouth bass	3	<0.9	<0.1	<0.3	<0.3	<0.5	1.183 (0.61 - 2)
	Yellow perch	3	<0.3	<0.2	<0.3	<0.2	<0.3	1.433 (1.3 - 1.6)
Thompson Island Pool (189)	Largemouth bass	3	<0.4	<0.1	<0.1	<0.3	<0.3	3.567 (2.3 - 4.5)
	Yellow perch	3	<0.6	<0.3	<0.4	<0.4	0.517 (<0.5 - 0.99)	5.267 (2.3 - 9.5)

Table 5. (continued)

Location (approx. rivermile)	Species	Number of analyses	Tpcdf	Thcdf	Thpcdf	Total TEQ
59th and Roosevelt	Striped bass	2	3.95 (2.6 - 5.3)	0.72 (0.46 - 0.98)	<0.3	3.37 (2.62 - 4.11)
Breezy Point Jetty	Striped bass	1	<0.1	<0.1	<0.2	1.07
Marine Parkway Bridge	Striped bass	3	0.617 (<0.2 - 1.3)	<0.2	<0.2	0.73 (0.44 - 1.09)
South of Williamsburgh	Striped bass	1	1.9	0.28	<0.1	2.96 (2.96 - 2.96)
Coney Island	Striped bass	2	2.6 (1.3 - 3.9)	<0.2	<0.3	2.19 (1.77 - 2.61)
Govenors Island	Striped bass	3	1.657 (0.37 - 2.8)	0.363 (0.19 - 0.61)	<0.2	2.77 (0.54 - 4.64)
Old Orchard Shoal	Striped bass	3	0.653 (0.22 - 0.99)	<0.2	<0.3	0.66 (0.29 - 1.05)
George Washington Bridge (12)	Striped bass	4	3.95 (1.8 - 8.8)	0.305 (<0.4 - 0.77)	0.233 (<0.6 - 0.28)	3.79 (2.17 - 6.78)
Tappan Zee Bridge (27)	Striped bass	4	3.253 (0.81 - 5.8)	0.52 (<0.4 - 1.3)	<0.5	2.15 (1.06 - 2.93)
Clinton to Blue Point (73)	Striped bass	2	11.95 (7.9 - 16)	1.6 (1.4 - 1.8)	<0.4	5.43 (4.94 - 5.93)
Poughkeepsie (76)	Striped bass	2	7.45 (3.5 - 11.4)	0.475 (0.41 - 0.54)	0.18 (<0.3 - 0.21)	3.42 (2.09 - 4.76)
Catskill (112)	American eel	3	0.787 (0.66 - 1)	0.607 (0.27 - 1.2)	0.257 (<0.2 - 0.62)	0.38 (0.15 - 0.57)
	Largemouth bass	5	2.828 (0.82 - 7.2)	1.56 (0.13 - 4.7)	0.802 (<0.4 - 2.1)	1.34 (0.82 - 2.42)
	Striped bass	4	3.475 (2 - 5.8)	0.2 (<0.3 - 0.38)	<0.6	2.11 (1.3 - 3)
	White catfish	5	7.02 (2.6 - 11.9)	2.526 (0.93 - 3.9)	1.164 (0.83 - 1.6)	3.75 (1.43 - 7.55)
	White perch	3	2.45 (<0.3 - 7.1)	0.483 (<0.5 - 1.1)	<0.7	2.06 (0.25 - 5.33)
Albany to Troy (147)	Largemouth bass	5	1.99 (0.2 - 4.6)	1.29 (<0.1 - 3.1)	0.442 (<0.2 - 0.87)	1.15 (0.33 - 2.38)
	White perch	4	3.6 (1.3 - 5.6)	0.943 (0.27 - 1.7)	0.35 (<0.6 - 0.74)	2.13 (0.66 - 3.76)
	Yellow perch	1	1.2	<0.3	<0.4	0.67
Stillwater to Coveville (175)	Largemouth bass	3	<0.2	0.147 (<0.2 - 0.29)	<0.3	0.3 (0.2 - 0.41)
	Yellow perch	3	<0.2	0.102 (<0.2 - 0.16)	<0.2	0.28 (0.2 - 0.38)
Thompson Island Pool (189)	Largemouth bass	3	0.69 (0.43 - 1.2)	0.293 (<0.2 - 0.47)	<0.2	0.43 (0.35 - 0.53)
	Yellow perch	3	0.483 (<0.3 - 1.2)	<0.3	0.173 (<0.4 - 0.12)	0.83 (0.55 - 1.21)

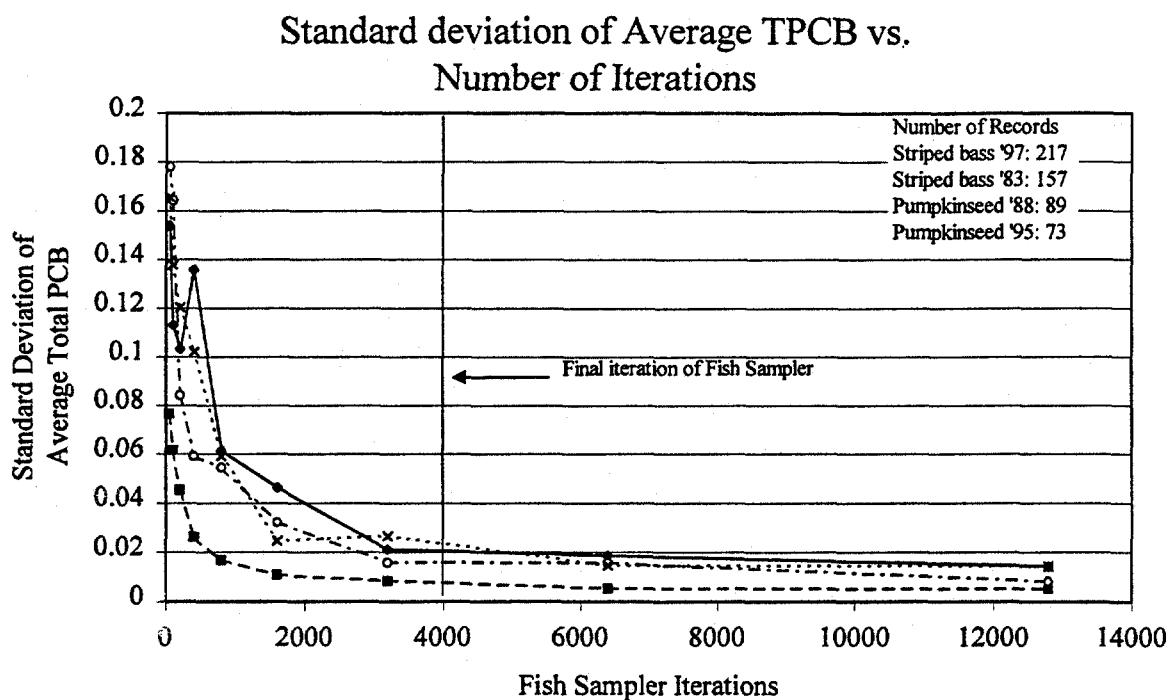


Figure 1.

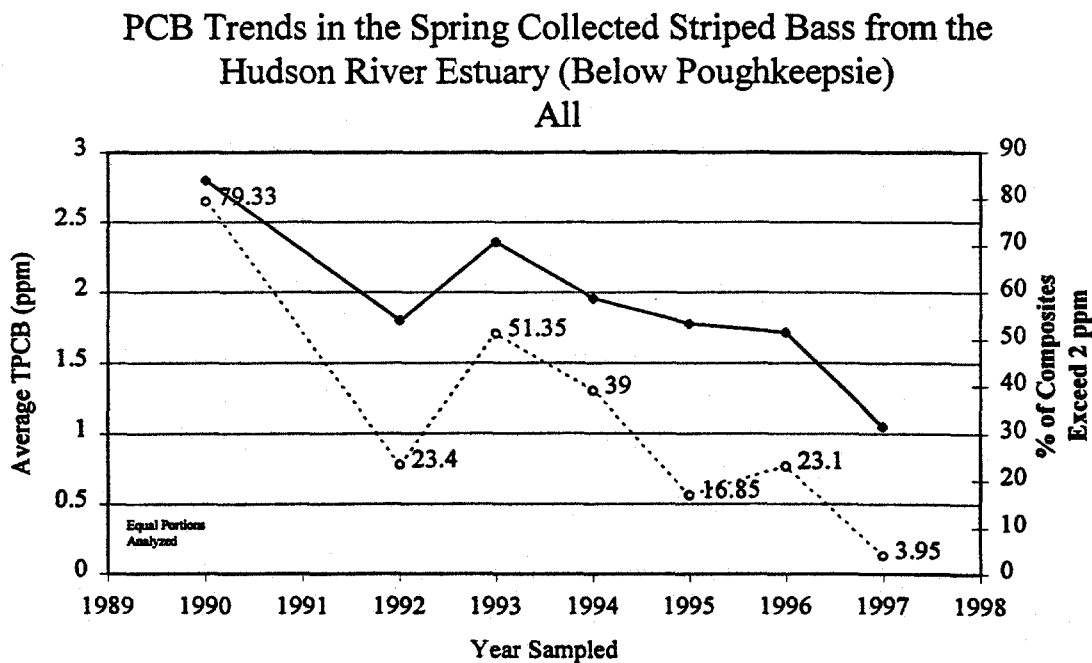
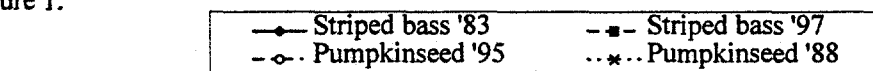
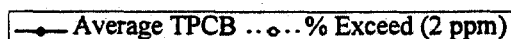


Figure 2.



# PCB Trends in the Spring Collected Striped Bass from the Hudson River Estuary (Below Poughkeepsie)

All

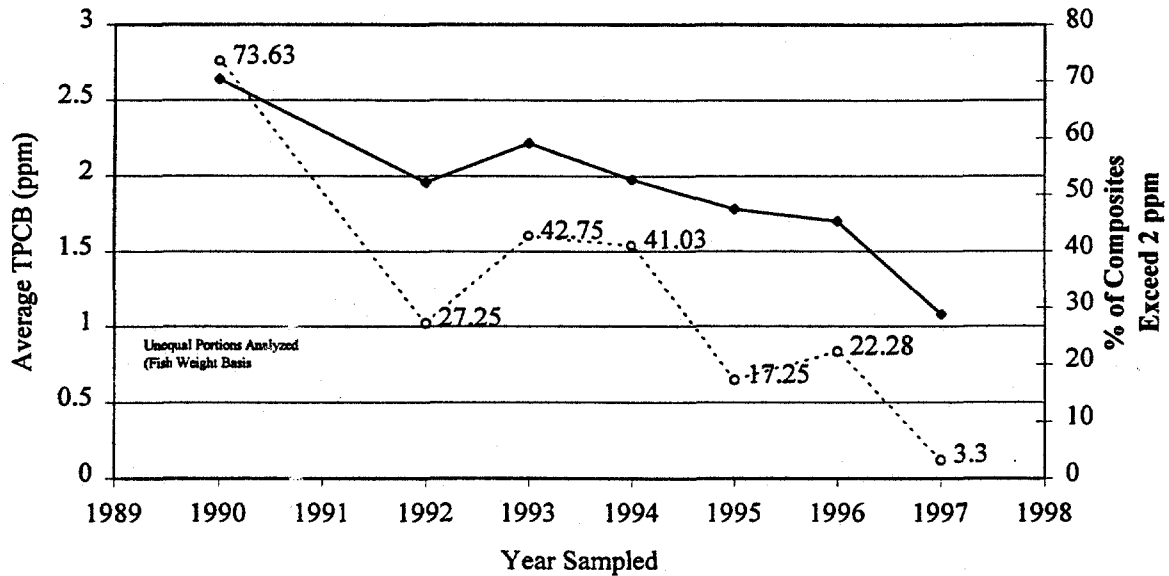


Figure 3.

—◆— Average TPCB ...○... % Exceed (2 ppm)

# PCB Trends in the Spring Collected Striped Bass from the Hudson River Estuary (Below Poughkeepsie)

Female

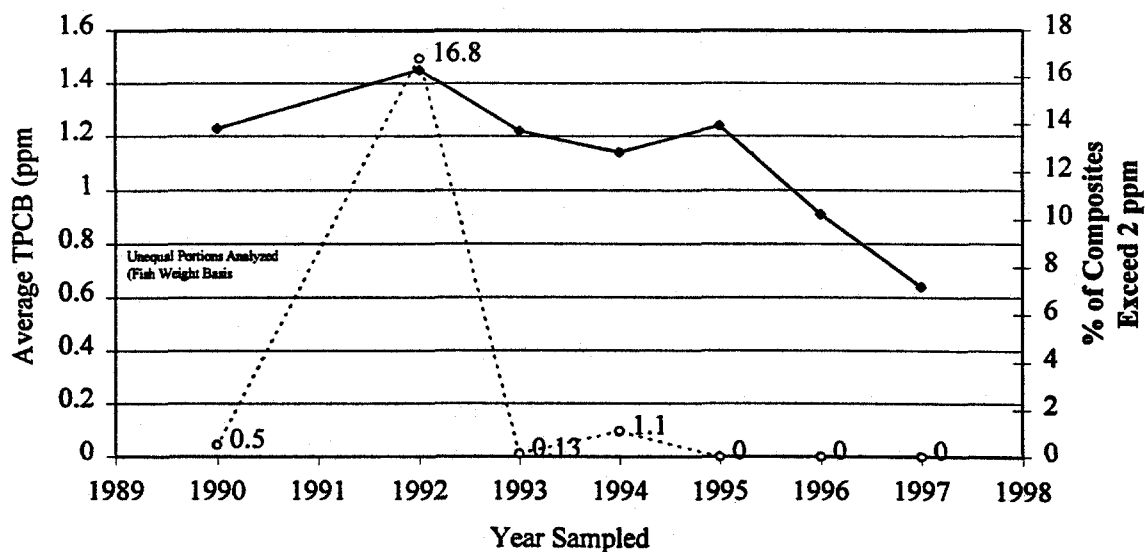


Figure 4.

—◆— Average TPCB ...○... % Exceed (2 ppm)

PCB Trends in the Spring Collected Striped Bass from the  
Hudson River Estuary (Below Poughkeepsie)

Female

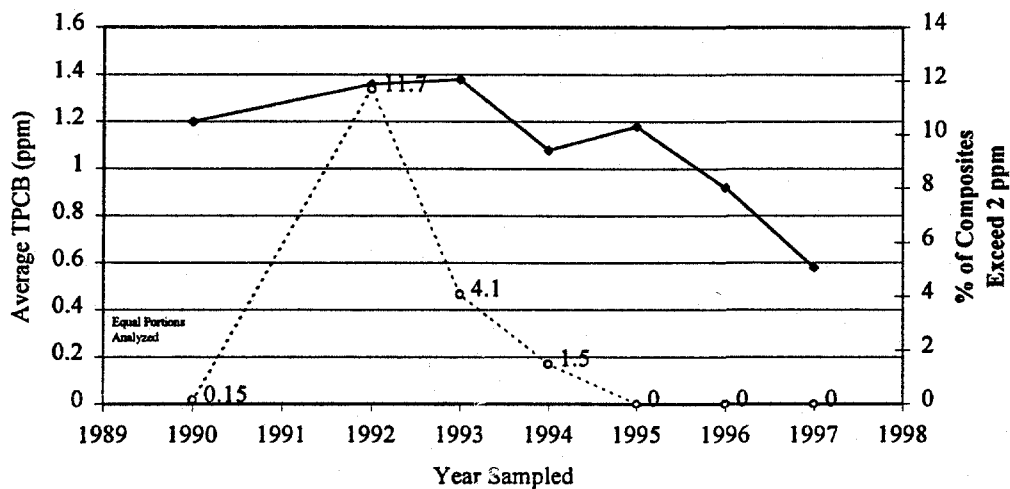


Figure 5.

—◆— Average TPCB ...○... % Exceed (2 ppm)

PCB Trends in the Spring Collected Striped Bass from the  
Hudson River Estuary (Below Poughkeepsie)

Male

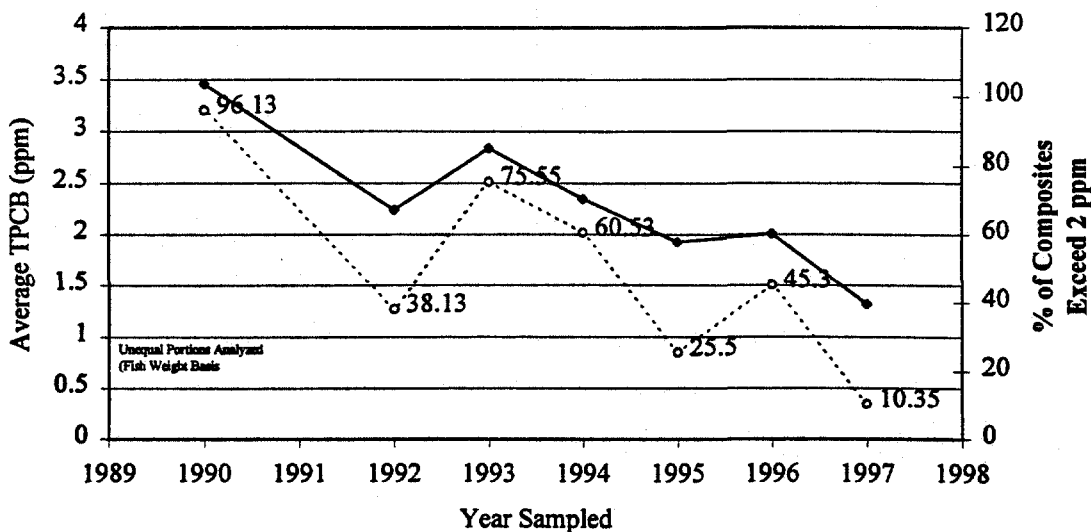


Figure 6.

—◆— Average TPCB ...○... % Exceed (2ppm)

# PCB Trends in the Spring Collected Striped Bass from the Hudson River Estuary (Below Poughkeepsie)

Male

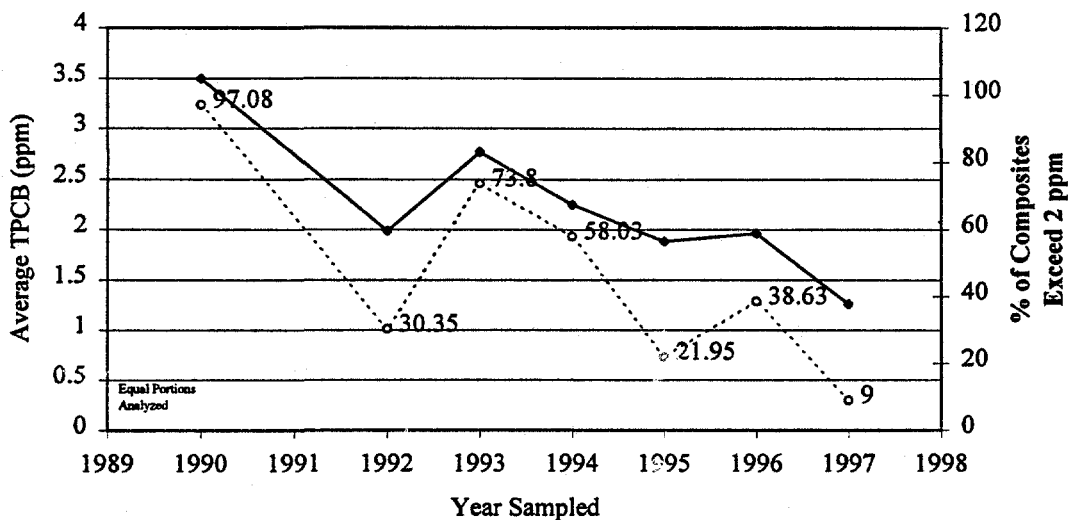


Figure 7.

—●— Average TPCB ...○... % Exceed (2 ppm)

## TPCB vs Year Sampled For Striped Bass (0 - 90 River Mile)

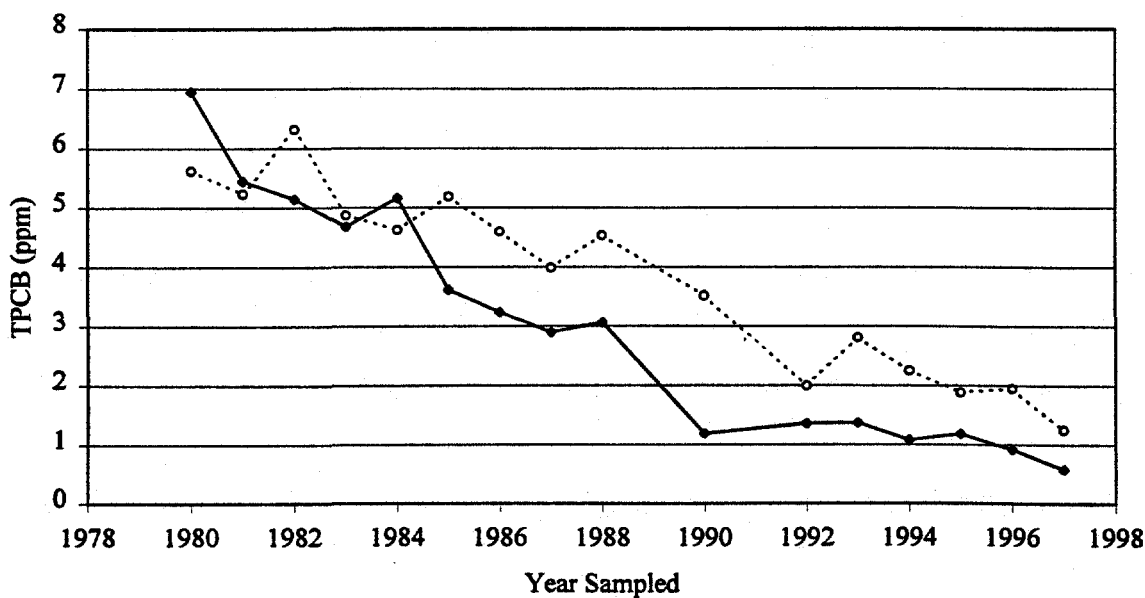


Figure 8.

—●— Female ...○... Male

### M/F Sex Ratio by Year Sampled for Striped Bass (0- 90 River Miles)

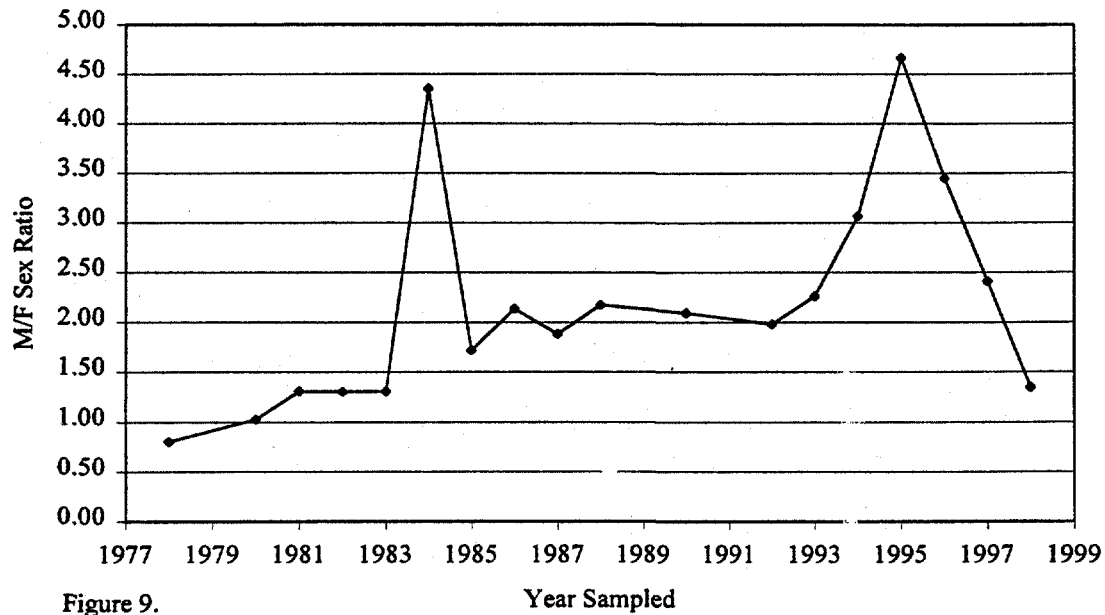


Figure 9.

### Tidal Estuary for Striped Bass (0 - 90 river Miles)\*

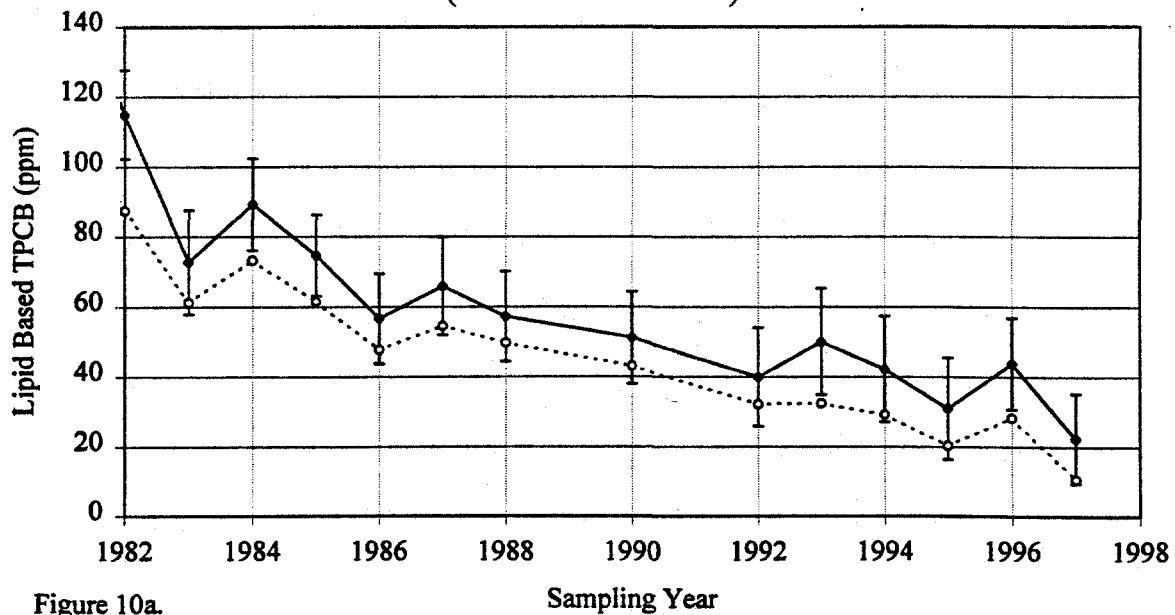


Figure 10a.

\*Error bars 95% pooled confidence interval

—●— Total PCB ...○... Aroclor 1254 and Above

# Upper Hudson Estuary for Striped Bass (Albany to Troy)

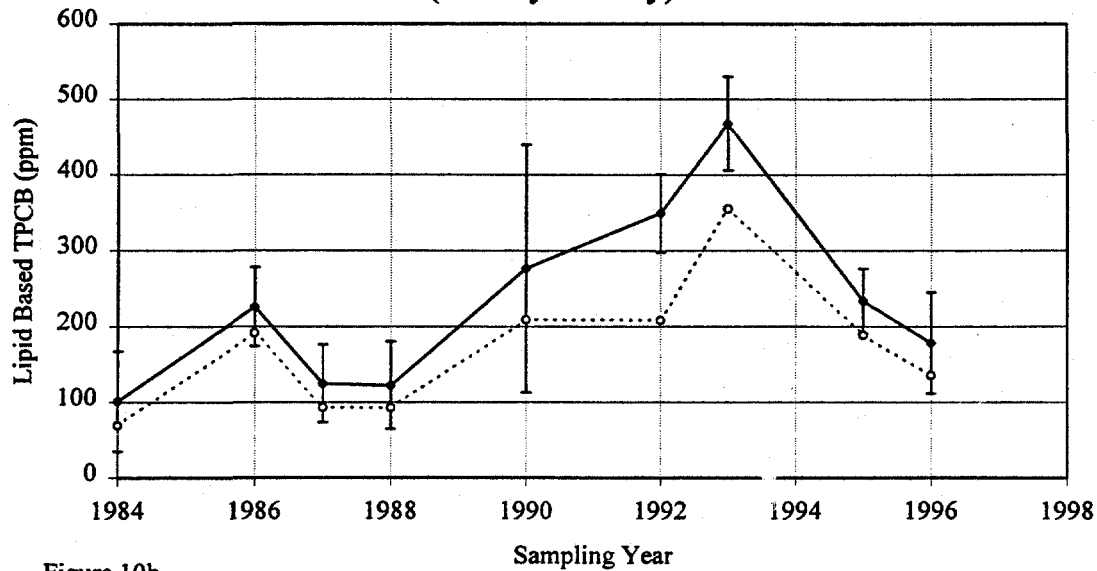


Figure 10b.

\*Error bars 95% pooled confidence interval

—●— Total PCB ...○... Aroclor 1254 and Above

# Below Troy Dam (Largemouth and Smallmouth Bass)

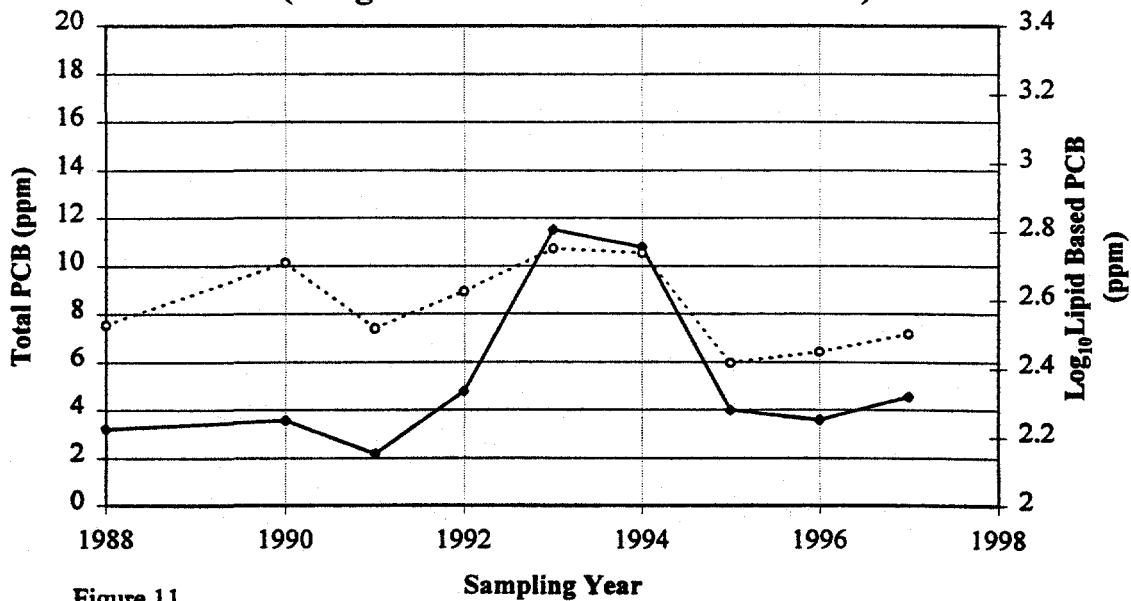


Figure 11.

—●— TPCB ...○... Log Lipid PCB

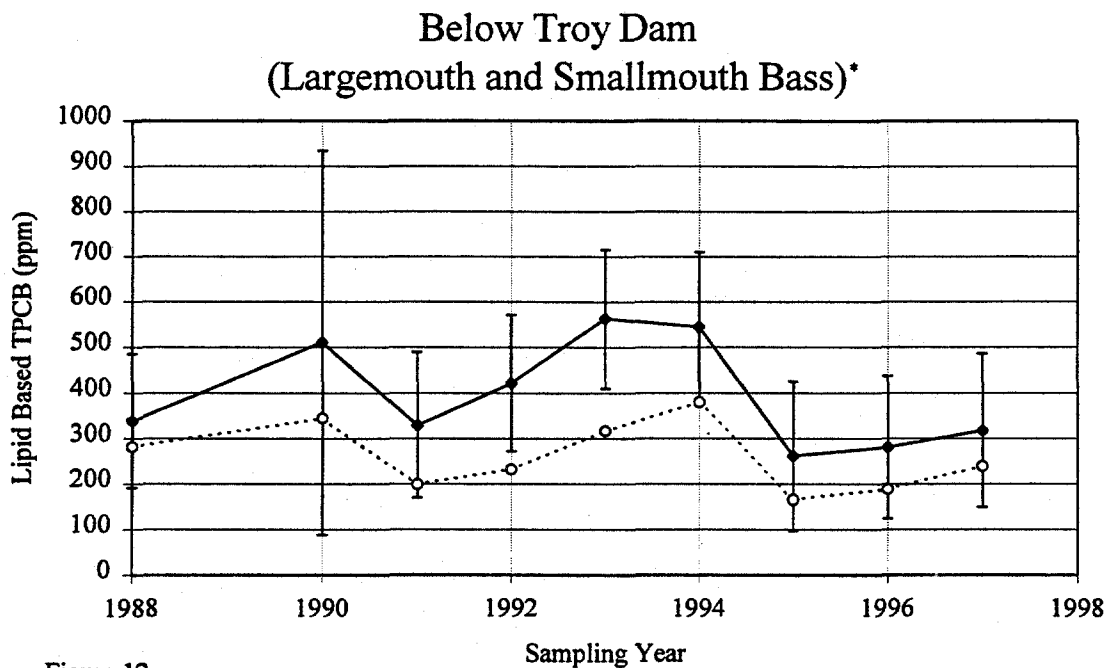


Figure 12.

\*Error bars 95% pooled confidence interval

—●— Total PCB ...○... Aroclor 1254 and Above

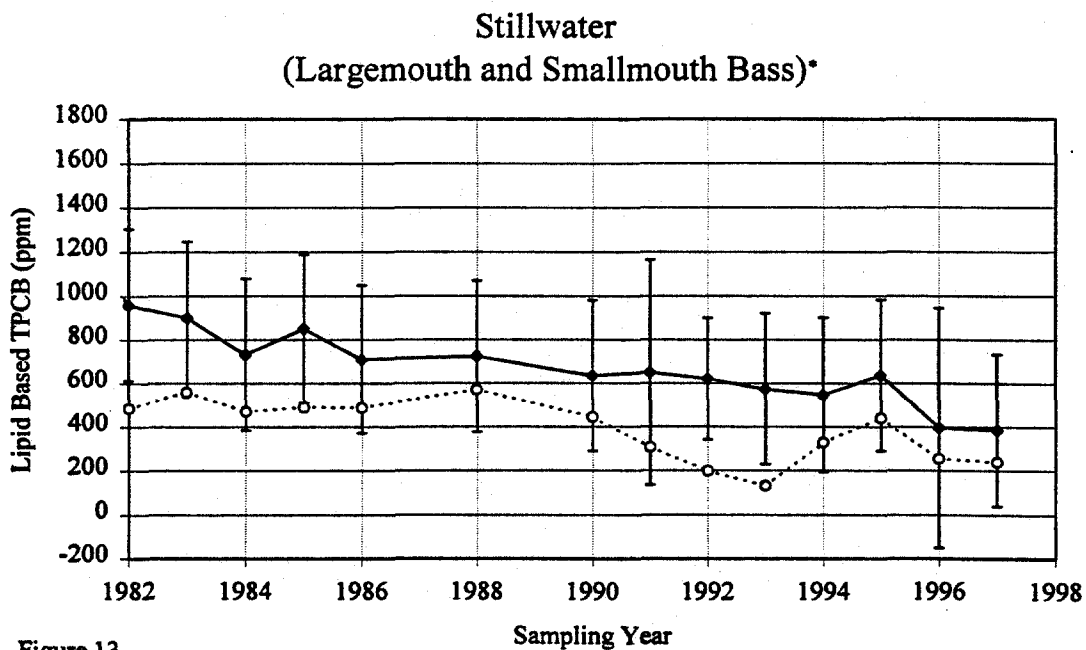


Figure 13.

\*Error bars 95% pooled confidence interval

—●— Total PCB ...○... Aroclor 1254 and Above

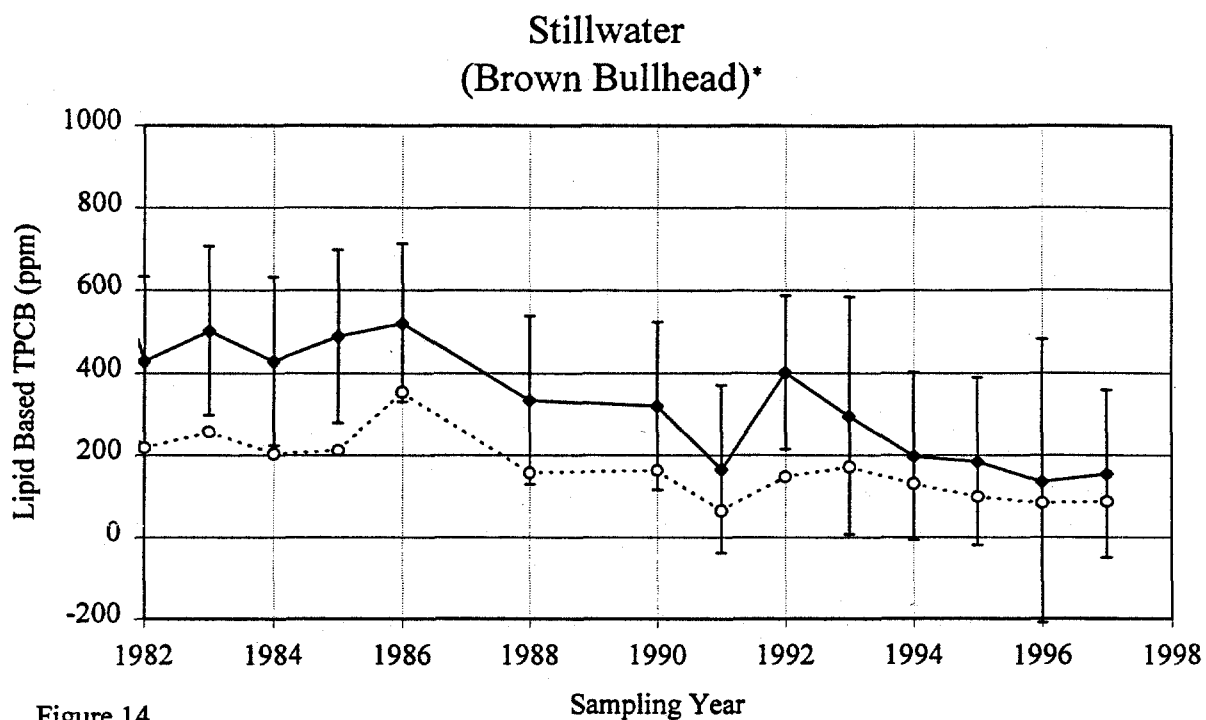


Figure 14.

\*Error bars 95% pooled confidence interval

—●— Total PCB ..○.. Aroclor 1254 and Above

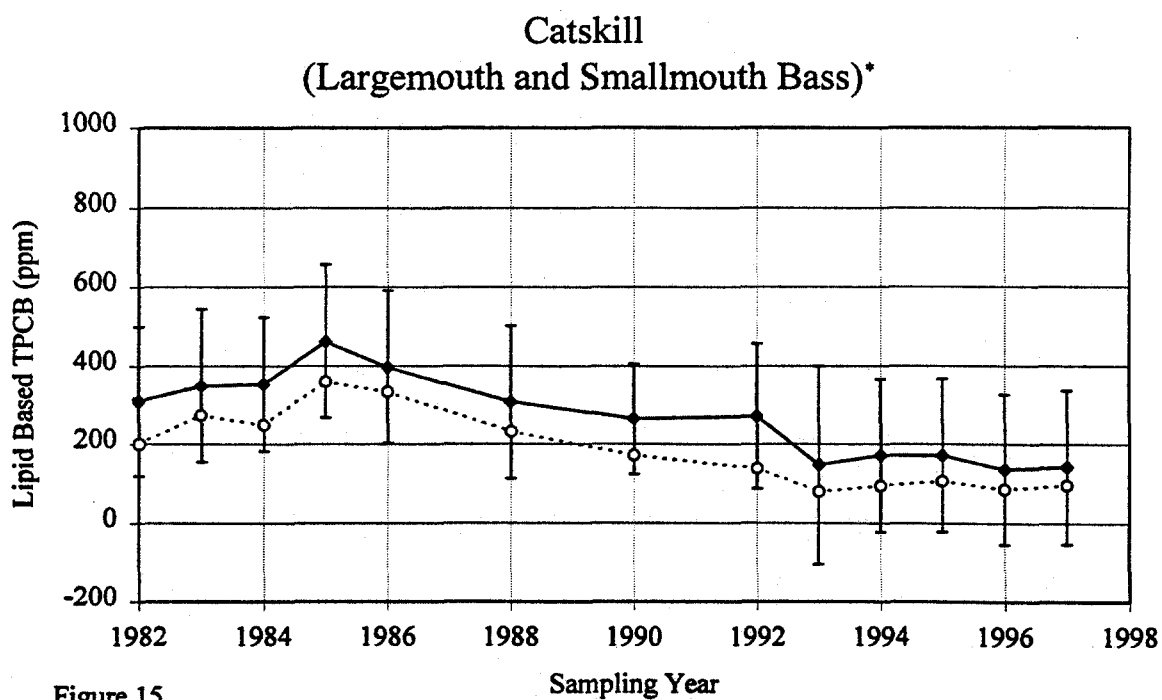


Figure 15.

\*Error bars 95% pooled confidence interval

—●— Total PCB ..○.. Aroclor 1254 and Above

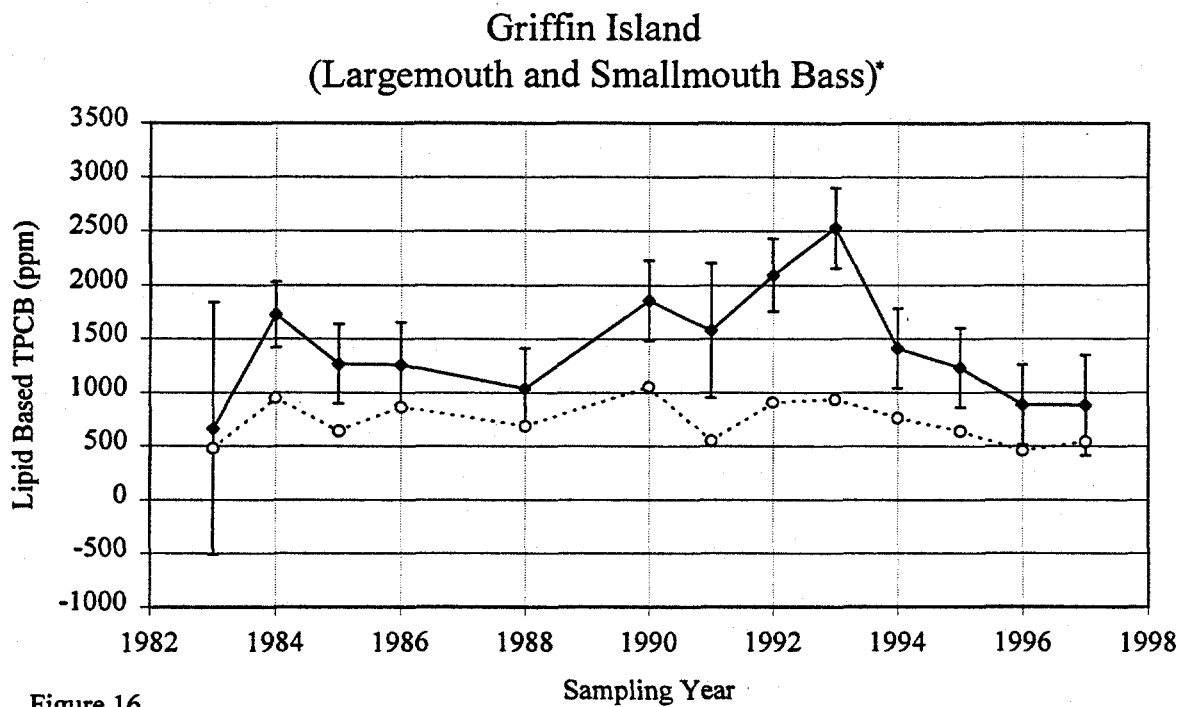


Figure 16.

\*Error bars 95% pooled confidence interval

—●— Total PCB ..○.. Aroclor 1254 and Above

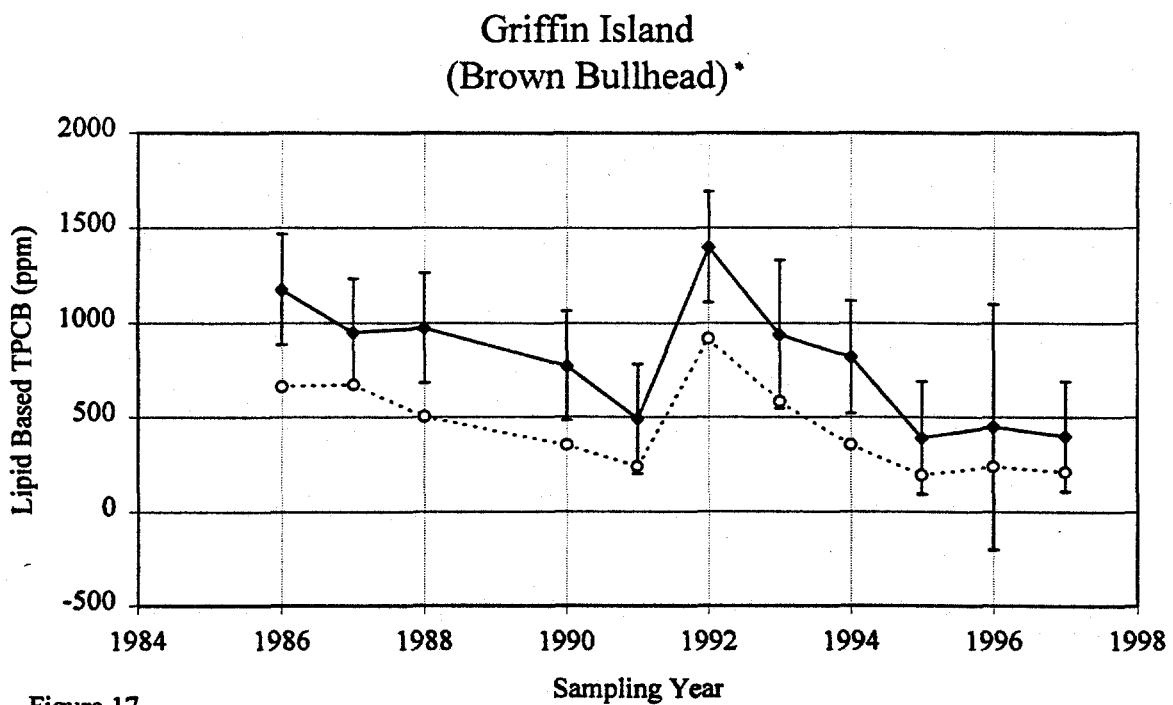


Figure 17.

\*Error bars 95% pooled confidence interval

—●— Total PCB ..○.. Aroclor 1254 and Above

### Hudson River LPCB vs Year Sampled (For 1 Year PKSD)

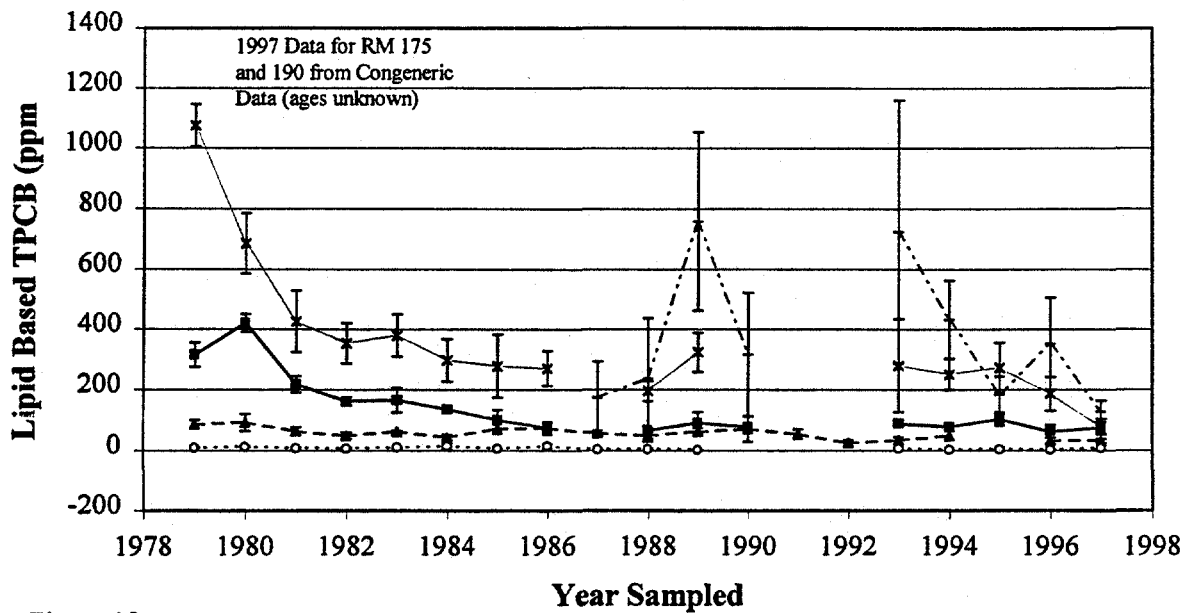


Figure 18.

--▲-- RM 58    --■-- RM 154    ...○... RM 201    --+-- RM 190    --x-- RM 175

### Albany South Basin (PKSD 1+)\*

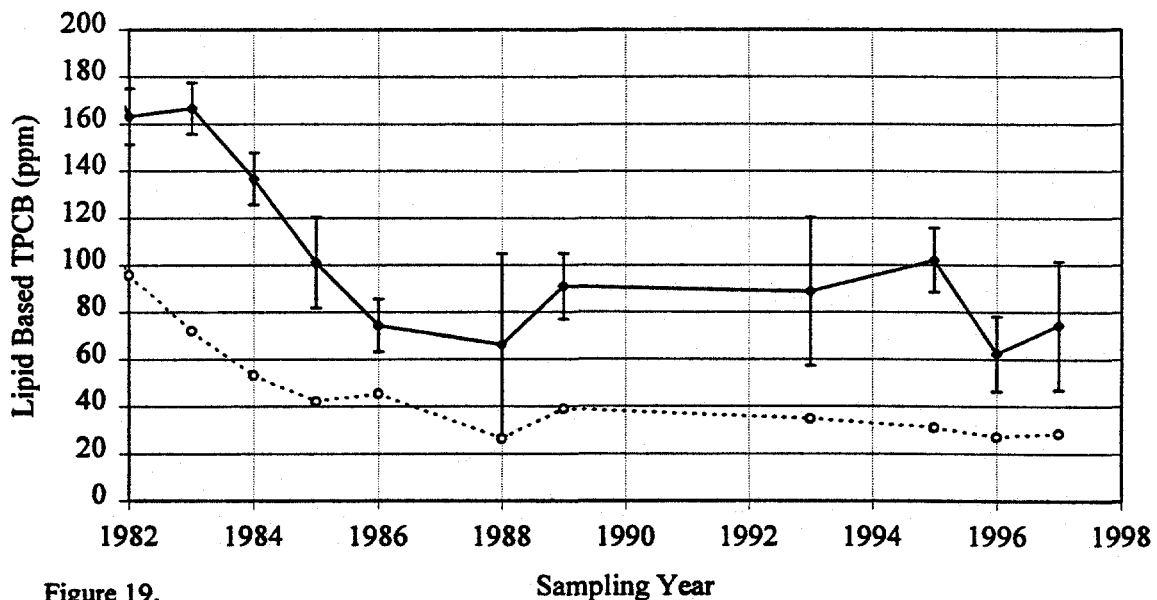


Figure 19.

\*Error bars 95% pooled confidence interval

—●— Total PCB    ...○... Aroclor 1254 and Above

Newburgh (RM 60)  
(PKSD 1+) \*

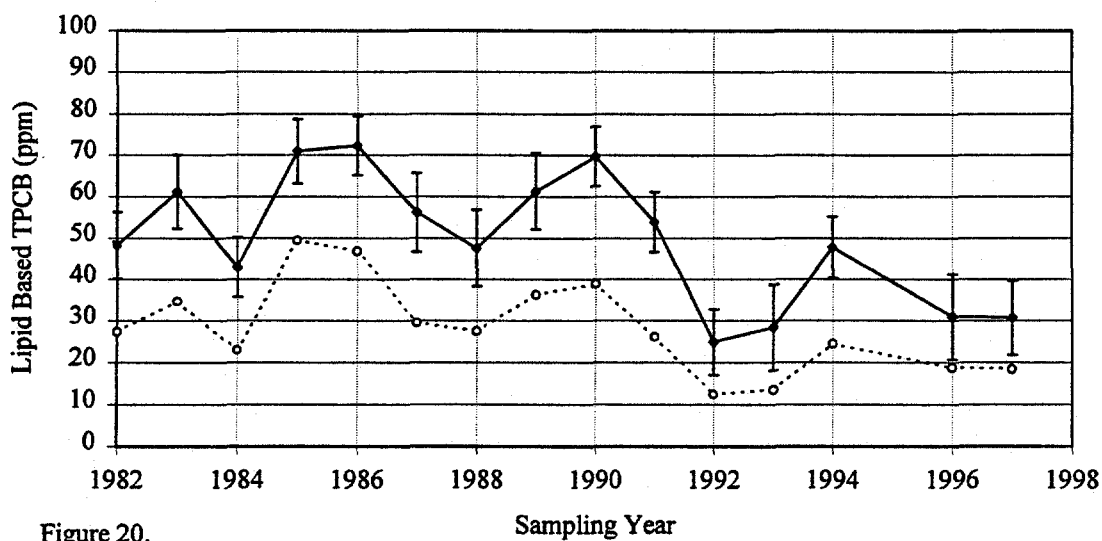


Figure 20.

\*Error bars 95% pooled confidence interval

—●— TPCB ...○... Aroclor 1254 and Above

Lipid Based TPCB vs River Mile for  
All Species (1997)

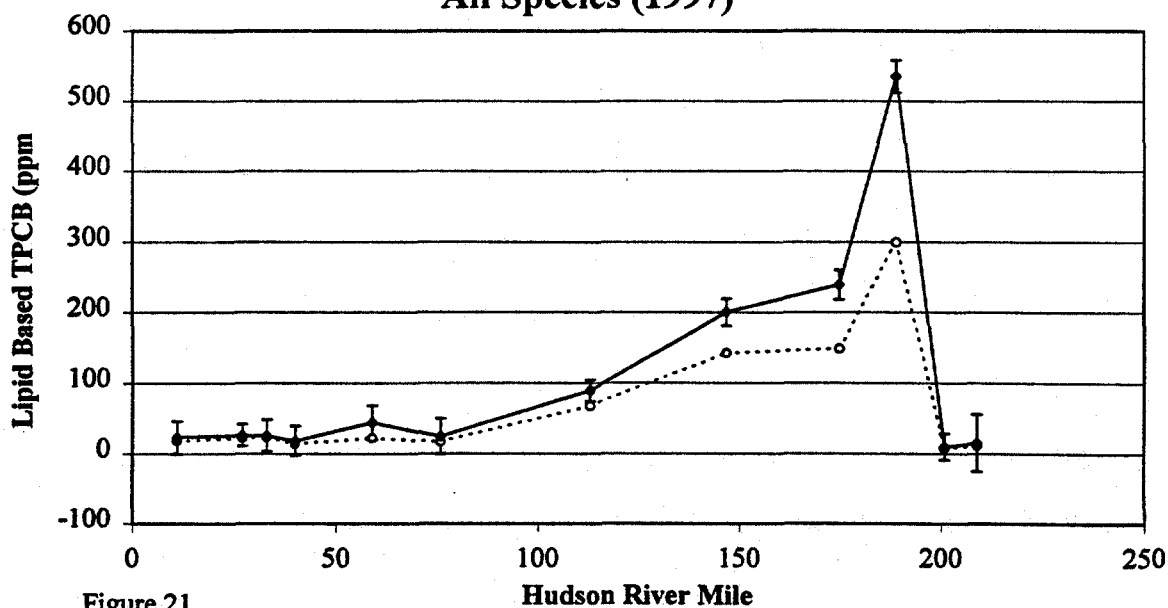


Figure 21.

Error bars are Pooled 5% confidence interval

...○... Aroclor 1254 and Above —●— Total PCB (ppm)