Summary of 1976-2004 Warm Water Assessment

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This report summarizes gill net sampling carried out by the New York State Department of Environmental Conservation (NYSDEC) to assess fish stocks in New York waters of Lake Ontario's eastern basin. Warm water assessment is a long-term trend-through-time sampling program designed to provide an annual overview of the warm water fish community. The sampling provides information on a wide variety of species and variables, but is targeted at establishing abundance indices from catch per unit effort (CPUE) data, with emphasis on smallmouth bass, walleye, yellow perch, and white perch.

Sampling Procedures

The 1976-2004 warm water assessment utilized standardized gangs of sinking gill net, set overnight on bottom, parallel to the depth contours. Each net gang consisted of nine equal length net panels, 8 feet deep, and ranging in size from 2-6 inch stretch mesh by ½ inch size increments. Sampling was usually scheduled for the first two weeks of August, but has been started as early as July 29 and ended as late as August 25. Depth contours and depth strata boundaries all refer to the maximum water depth, although the nets actually sampled a band of water extending from bottom to approximately 8 feet above bottom.

From 1976-79, the sampling utilized 900 foot multifilament net gangs (each net panel 100 ft long), half set at the 17-foot depth contour (5 meters), and half set in deeper water between the 17-foot contour and the top of the thermocline. The 1976-79 sampling also excluded Chaumont, Black River, and Henderson Bays. In 1980, a number of significant modifications were made in the sampling. Net panel length was reduced from 100 to 50 feet (all other specifications remained the same); the number of net gangs set was increased; Chaumont, Black River, and Henderson Bays were included among the locations sampled; and a stratified random sample design was used to select netting sites. This new design used three depth strata (stratum 1, 12-30 ft; stratum 2, 31-50 ft; stratum 3, 51-100 ft), plus five area strata (Figure 1). Species diversity and mean catch were highest in depth strata 1 and 2, and sampling effort was concentrated there. Both were sampled in proportion to their surface areas, with 10 and 9 net gangs, respectively, scheduled each year. The area strata were used primarily to ensure that all major geographic areas within depth strata 1 and 2 were sampled each year in proportion to their respective surface areas. Sampling effort within depth stratum 3 has varied, with 4 net gangs scheduled in 1980-83, 8 net gangs in 1984-88, and 10 net gangs from 1989-2004.

In 1993, sampling was again modified by switching from multifilament gill nets to monofilament gill nets. This latest change was implemented in part to take advantage of the greater efficiency associated with handling monofilament gill nets, and in part due to cost and availability of multifilament netting of the proper specifications.

Corrections for changes in sample and net design that occurred between 1979 and 1993 have been described previously (Eckert 1986, 1998). Adjustments for differences in areas sampled in 1976-79 versus later years were made using the 1980-85 data. Assuming that the relative species distribution between areas of the eastern basin remained the same from 1976-85, the 1980-85 data

were used to calculate indices of relative species catch within the five geographic areas. These species specific area abundance indices were then

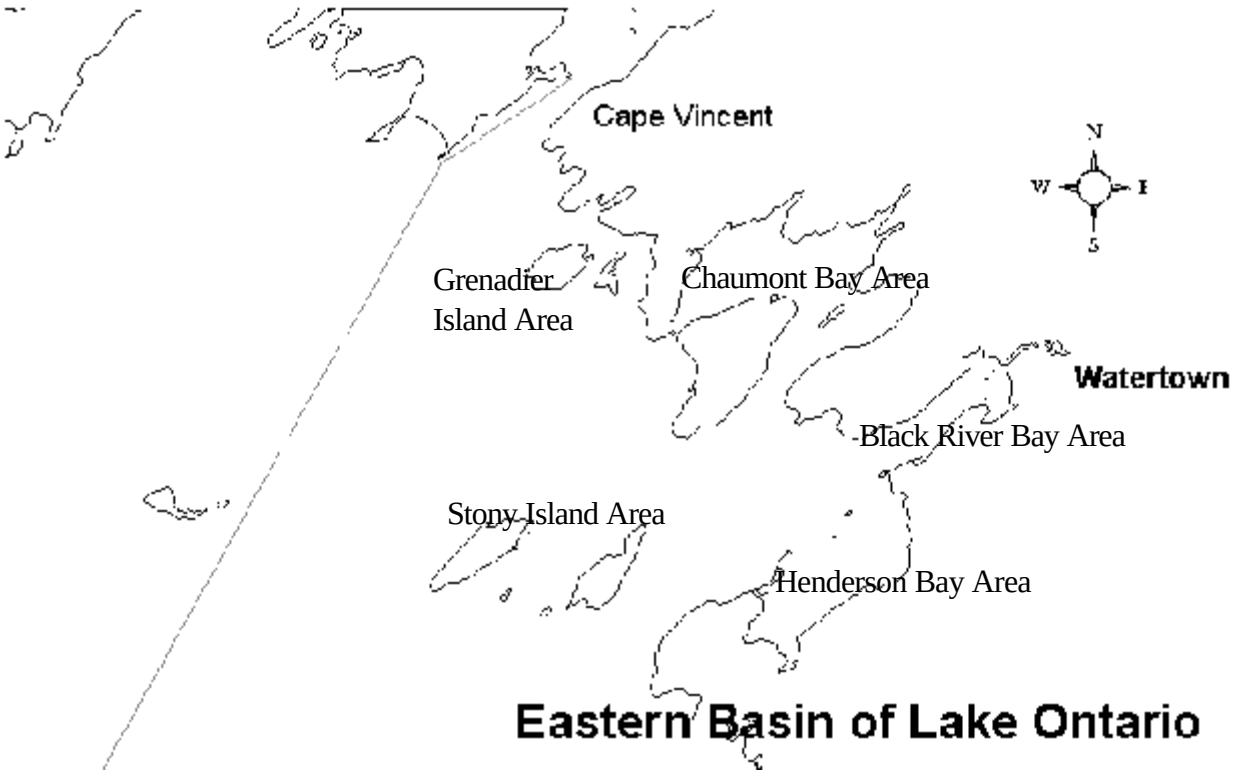


Figure 1. Map of New York waters of Lake Ontario's eastern basin showing the five area strata used in the DEC 1980-2004 warm water assessment.

used to adjust the 1976-79 data for those areas of the eastern basin which were not sampled. Adjustments for the change from multifilament to monofilament mesh gill nets were calculated from 34 paired mono/multifilament net gangs set in 1990-93. Significant differences in CPUE data were found among eight species. Multifilament nets caught significantly higher numbers of brown bullhead and pumpkinseed, while monofilament nets caught significantly higher numbers of white perch, rock bass, smallmouth bass, yellow perch, walleye and freshwater drum. No significant differences were detected in the ages or sizes of fish collected in the two net types. Correction factors were applied to the multifilament gill net catch data from 1976-92 to calculate "monofilament equivalent" catch values. Mean catch per standard 450 ft monofilament net gang, and 95% confidence limits, were calculated from raw (non-transformed) monofilament or "monofilament equivalent" catch data, using standard formulas for stratified random samples (Cochran 1977). Weighting factors for strata 1-3 were equal to their respective surface areas within New York waters of the eastern basin (stratum 1: 0.208; stratum 2: 0.188; stratum 3: 0.603).

Numbers of warm and cold water fish captured in deeper areas during the August assessment are largely dependent on water temperatures. Although a mix of warm and cold water species can be found in net gangs subjected to fluctuating water temperatures, experience had shown that catches of warm water fish were consistently zero in areas inundated by cold hypolimnetic waters. To avoid the unnecessary killing of cold water species such as lake trout, net gangs scheduled for locations in stratum 3 which had stable bottom temperatures less than 50°F were often deleted prior to 1996. Whenever a scheduled net gang was deleted due to cold water temperatures, catches of all warm water fish were simply assumed to equal zero. Beginning

in the mid 1990s, shifts in the distributions of alewives, rainbow smelt, and lake trout to greater depths were documented in Lake Ontario coincidental with the establishment of dreissenid mussels (O'Gorman et al. 2000). Due to concerns that factors such as increasing water clarity might also increase depth distributions of some warm water fish species, all scheduled net locations have been utilized since 1996 regardless of bottom water temperatures. These and other ecological changes might also affect fish distribution among the geographic areas of the eastern basin. Of particular concern was the possibility that predation by double-crested cormorants could significantly lower warm water fish abundance in the Stony Island area, due to the proximity of the Little Galloo Island nesting colony (Birt et al. 1987).

Results and Discussion

2004 Summary:

The 2004 warm water assessment was conducted as scheduled with 29 standard net gangs set at predetermined randomly chosen locations between August 9 and August 17 (Table 1). The net gangs

Table 1. Numbers of fish caught, stratified mean catch per standard 450 ft gill net gang, and 95% confidence intervals, for the 2004 warm water assessment netting conducted August 9 - August 17 in New York waters of Lake Ontario's eastern basin.

	Number Caught				Strat.	95% CI	
Common Name	Stratum 1	Stratum 2	Stratum 3	Total	CPUE	Lower	Upper
Warm Water Species:							
Lake Sturgeon	0	1	0	1	0.02	0	0.07
Longnose Gar	3	0	0	3	0.06	0	0.16
Northern Pike	5	3	0	8	0.17	0	0.33
Muskellunge	0	1	0	1	0.02	0	0.07
Common Carp	6	1	0	7	0.15	0	0.29
White Sucker	6	2	4	12	0.41	0	0.94
Silver Redhorse	9	11	0	20	0.42	0.04	0.80
Brown Bullhead	17	0	0	17	0.35	0.03	0.68
Channel catfish	9	29	0	38	0.79	0	2.10
White Perch	45	3	3	51	1.18	0	2.55
Rock Bass	55	42	1	98	2.09	0.82	3.35
Pumpkinseed	8	17	0	25	0.52	0	1.38
Smallmouth Bass	86	69	10	165	3.84	2	5.92
Largemouth Bass	1	0	0	1	0.02	0	0.07
Black Crappie	1	0	0	1	0.02	0	0.07
Yellow Perch	21	13	100	134	6.74	0	18.31
Walleye	53	28	0	81	1.69	0.98	2.40
Freshwater Drum	22	7	0	29	0.60	0.22	0.99
Warm Water Total	347	227	118	692	19.10	6.24	31.95
Standard Gill Net Gangs	10	9	10	29			
Cold Water & Misc Species:							

Chinook Salmon	0	0	3	3	
Burbot	0	1	2	3	

were set and retrieved by NYSDEC Cape Vincent and Watertown personnel utilizing the R/V Seth Green at the deeper, more exposed locations (nets set August 9 and 10), and two 19-24 foot boats at the shallower, more protected sites (nets set August 11,12 and 16). This allowed completion of the sampling in just six days (5 nights of netting). Nets set and retrieved by the R/V Seth Green were picked and processed onboard, while net gangs set and retrieved by the smaller boats were taken to Cape Vincent Fisheries Station to be picked and readied for resetting. The fish were all processed by staff from the Cape Vincent Station. The thermocline was quite shallow and variable throughout the week of August 9-12, the result of strong northeast winds on August 5-7. Bottom temperatures in the Stony Island area on August 9 were as low as 62°F at the 40-foot contour, and 58°F at the 56-foot contour. The thermocline moved deeper throughout the remainder of the week, with bottom temperatures as high as 75°F at the 56-foot contour by August 12. With the exception of one net gang set August 9 near Stony Island at the 40-foot contour, bottom temperatures of nets set in depth strata 1 and 2 were all above 68°F.

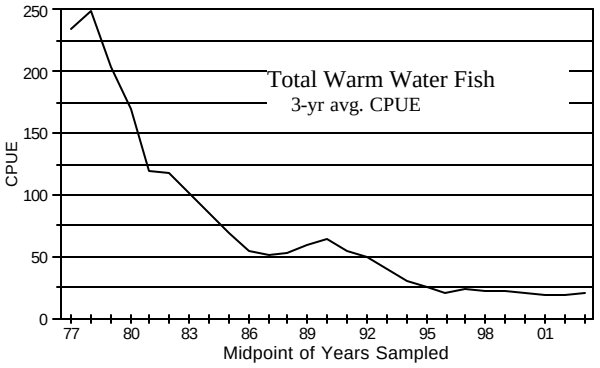
Species and numbers of fish captured in 2004 by depth strata, and stratified CPUE estimates with their corresponding 95% confidence limits, are presented in Table 1. As in other years, numbers of fish and warm water fish species diversity, were highest in strata 1 and 2, declining in stratum 3. Total catch of warm water species was 692 fish, with 50.1% in depth stratum 1, 32.8% in depth stratum 2, and just 17.1% in depth stratum 3. Smallmouth bass, yellow perch, rock bass and walleye were the most commonly captured species contributing 69.1% of the total number of warm water fish sampled (smallmouth bass 23.8%, yellow perch 19.4%, rock bass 14.2%, and walleye 11.7%). One lake sturgeon was captured in 2004 marking the eighth year among the last ten that at least one individual has been captured. Prior to 1995, only one lake sturgeon was captured in 19 years of sampling. Two unusual catches in the 2004 sampling were the capture of one large muskellunge (33.5 lbs) near the mouth of Black River Bay, and the complete absence of lake trout. The muskellunge was the first record of this species in the August warm water assessment, although fishermen have occasionally reported the species within the areas sampled. The lack of lake trout was surprising since lake trout are commonly caught in deeper, colder waters of depth stratum 3 in August, and the 2004 sampling included six net gangs set in waters colder than 54°F.

Species Trends 1976-2004:

Trends in abundance are most easily seen in graphs of 3-year moving average CPUE plotted against the midpoint of the three years averaged (i.e., average 1976-78 CPUE plotted against '77 [1977], average 1977-79 CPUE plotted against '78, up to, average 2002-2004 CPUE plotted against '03; see Figure 2 for an example). A 3-year moving average helps to dampen fluctuations due to yearly sample variation, making trends in the CPUE data easier to visualize. Statistical tests for trends in the catch data were conducted using regression analysis (SAS 1985, Proc REG, P=0.05) of the yearly CPUE estimates. Tests were routinely conducted for the entire 29-year sampling period, and for the 16-year period 1989-2004. This later time period was chosen since analysis of smallmouth bass data (Lantry et al. 2002) suggested that impacts from double-crested cormorant predation were reaching a threshold level around 1989. Additional species specific tests were conducted for other time periods when obvious changes were evident in the data. Yearly CPUE estimates for all warm water fish collected in the 1976-2004 assessment are shown in Table A1. Graphs of yearly CPUE estimates, including 95% confidence intervals for the 1980-2004 sampling, are presented in Figures A1-A5 for the total of all warm water fish, and for 14 of the more important warm

water species. Figures A1-A5 also contain smaller graphs of 3-year moving average CPUE.

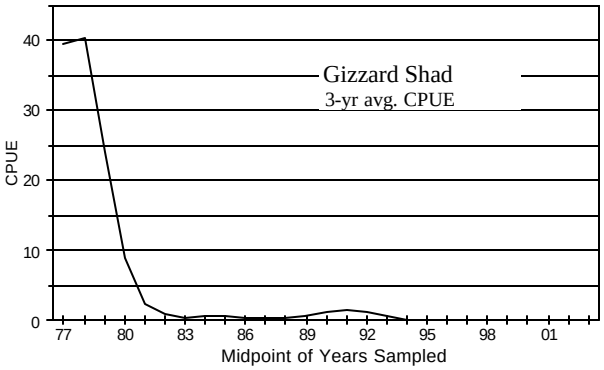
Overall the warm water fish community in New York waters of Lake Ontario's eastern basin has undergone significant change during the 29-year sampling period, declining from a high of



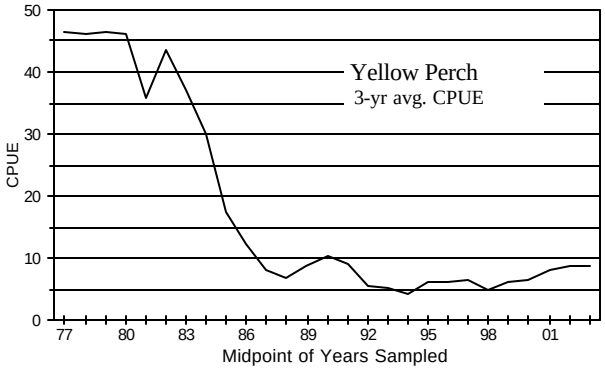
approximately 200-250 fish per net gang in 1976-79, to just under 20 fish per net gang in 2000-2004 (Figure 2, Table A1 and Figure A1). This has involved significant declines among most species that were abundant at the start of the assessment program. The stratified mean catch for all warm water species in 2004 was 19.10 fish per standard 450 ft net gang, a 16.7% decrease compared to the 2003 overall CPUE.

Figure 2. 3-year moving average CPUE for the total of all warm water fish species from the 1976-2004 DEC Lake Ontario warm water assessment.

Gizzard shad, white perch, yellow perch, rock bass, and alewife, were all abundant, important members of the warm water community in 1976-79, and have all shown fairly consistent, statistically significant, patterns of declining abundance over the 29-year sampling period. Of these species, gizzard shad showed the earliest and most precipitous decline in abundance, declining from a high of approximately 50 fish per net gang in 1977 and 1978 to less than one fish per net gang in 1982 (Figures 3 and A3, Table A1). Gizzard shad abundance has remained low since, with zero catches in 1995-97 and again in



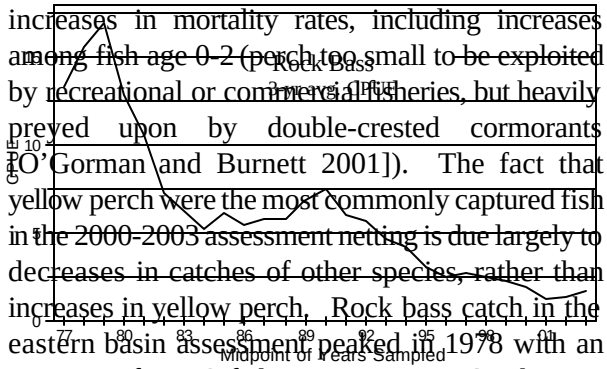
2001, 2003 and 2004. White perch was arguably the most common pan fish throughout Lake Ontario in the 1970s with catches in the eastern basin averaging 90 fish per net gang in 1976-79 (Figures 3 and A2, Table A1). White perch catches declined consistently through the 1980s and early 1990s, reaching a low of just 0.06 fish per net gang in 1995. Abundance has increased slightly in recent years, averaging 0.93 fish per net gang from 2000-2004, but white perch catches remain very low compared to 1976-1979, are highly variable, and tend to be



concentrated in the larger embayments. Yellow

Figure 3. 3-year moving average CPUE for gizzard shad, white perch, and yellow perch from the 1976-2004 DEC Lake Ontario warm water assessment.

perch was the second most common pan fish in the eastern basin assessment with catches averaging over 50 fish per net gang from 1976-1979. Yellow perch catches declined dramatically in the early and mid 1980s, reaching a low of 2.16 fish per net gang in 1988 (Figures 3 and A1, Table A1). Catches increased in 1989 and have remained comparatively stable since, averaging 7.16 fish per net gang from 1989-2004 and showing no statistically significant trends. Fall trawl sampling conducted by the USGS Oswego Biological Field Station showed increased production of age-0 yellow perch in 1991-95 (O'Gorman and Burnett 2001), raising expectations for increased abundance and increased gill net catches in subsequent years. However, these stronger year classes were apparently negated by increases in mortality rates, including increases among fish age 0-2 (perch too small to be exploited by recreational or commercial fisheries, but heavily preyed upon by double-crested cormorants [O'Gorman and Burnett 2001]). The fact that yellow perch were the most commonly captured fish in the 2000-2003 assessment netting is due largely to decreases in catches of other species, rather than increases in yellow perch. Rock bass catch in the eastern basin assessment peaked in 1978 with an estimate of 22.13 fish per net gang. Catch rates declined sharply in the early 1980s, remained fairly



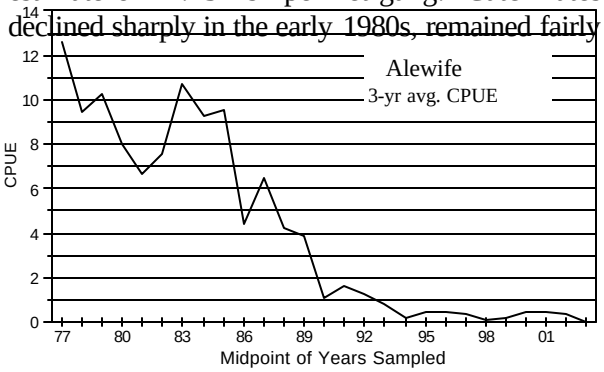
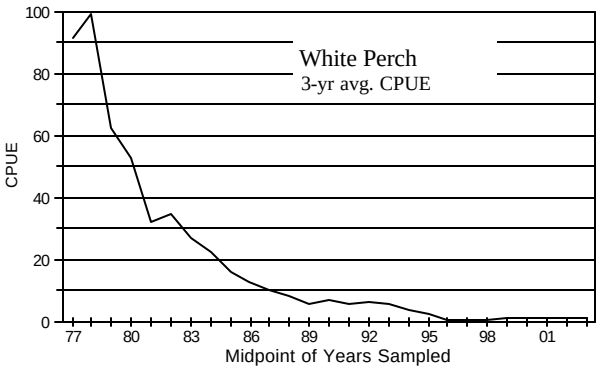


Figure 4. 3-year moving average CPUE for rock bass and alewife from the 1976-2004 DEC Lake Ontario warm water assessment.

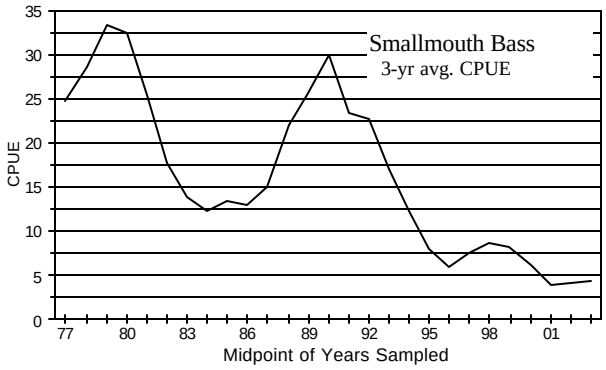
stable through the early 1990s, but then began a second more gradual decline that continued through 2002 when catch dropped to 1.10 fish per net gang (Figures 4 and A2, Table A1). Rock bass CPUE estimates increased to 1.84 and 2.09 in 2003 and 2004 (67.3% and 90.0% increases, respectively,



compared to 2002), but the overall pattern from 1989-2004 remains a statistically significantly downward trend ($P<0.0001$). Alewife catch data show higher yearly variation, with an overall pattern of declining catches from the late 1970s through the early 1990s, followed by consistently low catches through 2004 (Figures 4 and A5, Table A1). Other sampling programs confirm lower alewife abundance in Lake Ontario as well as shifts in temporal distribution, particularly in the eastern basin since the mid 1990s (O'Gorman et al. 2000, O'Gorman et al. 2004). Alewife catches in the warm water netting are also potentially influenced by gill net selectivity. Since only larger adult alewives are readily captured in the smallest mesh sizes used (2 inch stretch mesh), comparatively small changes in age composition or growth rate may significantly change vulnerability to the standard net gangs used.

Smallmouth bass have always been an important component of the Lake Ontario warm water community, and the most commonly sought species in the eastern basin recreational fishery

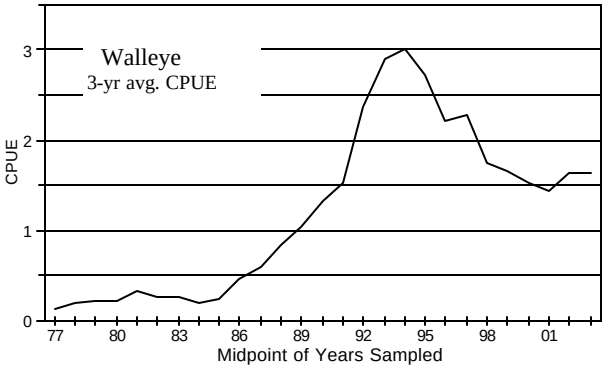
(McCullough and Einhouse 1999). From 1976-1979 smallmouth bass were typically the third or fourth most commonly captured fish in the assessment netting (Table A1), with catches averaging 27.6 fish per net gang, approximately half those of the most common species. As abundance of these other species declined, smallmouth bass became an increasingly larger proportion of the fish sampled, and since 1986 have been either the first or second most commonly captured species in the assessment netting. Smallmouth bass have shown a cyclic pattern of abundance over the 29-year sample period, with obvious peaks in CPUE estimates around 1980 and1989 (Figures 5 and A1). These peaks were directly attributable to recruitment of large numbers of bass from the strong 1973 and



1983 year classes, respectively (Chrisman and Eckert 1999). Catches of age 2-4 bass in the assessment netting also indicated strong year classes in 1987, 1988, 1995, and 1997 (Casselman et al. 2002, Eckert 2000). Despite the presence of these four strong year classes, smallmouth bass catches have shown a statistically significant decline from 1989-2004 ($P<0.0001$). This decline has been linked to increases in mortality of bass between ages 3 and 6, and coincides with documented increases in the number of double-crested cormorants and their predation on smallmouth bass (Chrisman and Eckert 1999; Lantry et al. 2002). The two lowest CPUE estimates among the years sampled were recorded in 2001 and 2002. In 2003, smallmouth bass CPUE rose slightly with an estimate of 5.43 fish per net gang, but then declined in 2004 to 3.84 fish per net gang, the third lowest yearly CPUE estimate.

Figure 5. 3-year moving average CPUE for smallmouth bass from the 1976-2004 DEC Lake Ontario warm water assessment.

The decline of smallmouth bass in the eastern basin in the 1990s was in direct contrast to bass populations along the southern shore of Lake Ontario. The NYSDEC fishing boat census documented a significant increase in smallmouth bass catch rates between 1985 and 2003, suggesting a corresponding increase in smallmouth bass abundance (Eckert 2004). This increase in smallmouth bass was corroborated by gill net sampling conducted near Pultneyville, NY (20 miles east of Rochester) in 1976-79 and in 2000-01, utilizing the same standard net gangs and methods as the eastern basin warm water assessment (Eckert and Pearsall 2002). Mean smallmouth bass CPUE at the Pultneyville site rose from 15.35 bass in 1976-79 to 82.62 bass in 2000-01, a 438% increase. Eastern basin mean CPUE estimates



declined from 27.59 bass in 1976-79 to just 4.00 bass in 2000-01, an 86% decrease.

Walleye is the only relatively common species that has shown statistically significant increases in CPUE ($P<0.0001$) over the 29-year sampling period (Figures 6 and A2, Table A1). Although the long-term trend is upwards, walleye catches did peak in 1993, and have shown a significant decline since ($P=0.0079$). The 2004 walleye estimate was 1.69 fish per net gang, a 20.3% decrease compared to

2003, but similar to 2000 and 2001. An unusually high proportion of the 2004 catch was contributed by small, younger fish. Of the 81 walleye caught in the 2004 assessment (Table 1), 21 were less than 13.5 inches long. By comparison, a total of only 17 walleyes less than 13.5 inches long were caught in the previous 28 years. All of the small walleye captured in 2004 were age-1, indicating the presence of a strong 2003 year class.

Figure 6. 3-year moving average CPUE for walleye from the 1976-2004 DEC Lake Ontario warm water assessment.

Of the seven remaining species considered common enough to measure trends in CPUE estimates (Figures 7 and A3-A5 and Table A1; SAS 1985, Proc REG), four species (northern pike, brown bullhead, common carp, and white sucker) show statistically significant downward trends in abundance over the 29-year sampling period, one species (channel catfish) shows a cyclic pattern with

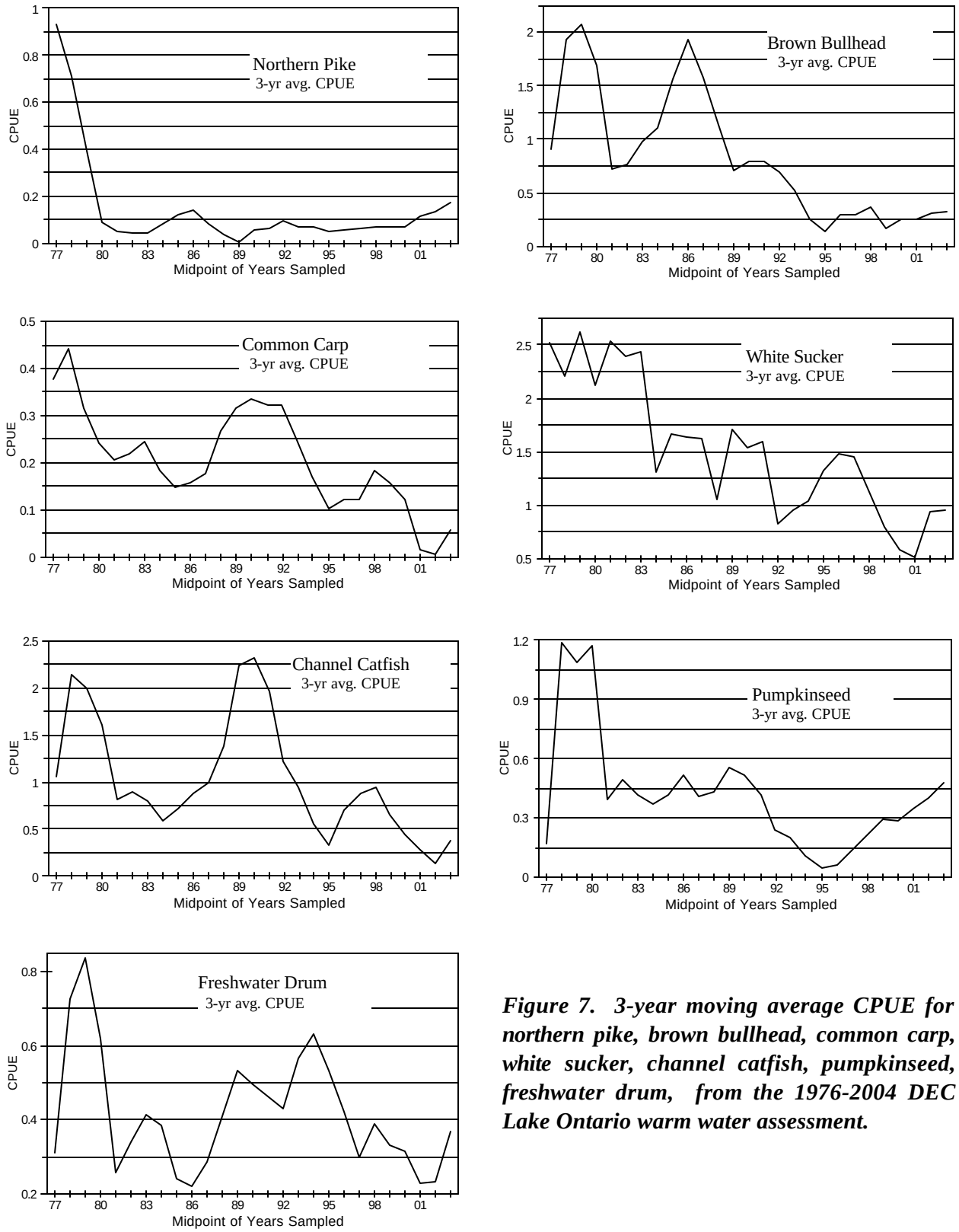


Figure 7. 3-year moving average CPUE for northern pike, brown bullhead, common carp, white sucker, channel catfish, pumpkinseed, freshwater drum, from the 1976-2004 DEC Lake Ontario warm water assessment.

significant declines since 1989, and two species (pumpkinseed and freshwater drum) show yearly variations but no significant trends. Northern pike shows an early and dramatic decline in CPUE over the years sampled similar to gizzard shad (P=0.0092), but in contrast to gizzard shad, was never a major component of the warm water catch in the eastern basin. Northern pike catches have increased slightly in the last three years, but show no statistically significant trend since 1979 (P=0.2869). Brown bullhead, common carp, and white sucker all show significant patterns of declining abundance over the 29-year sampling period (P=0.0049, 0.0012, and 0.0020, respectively), although yearly CPUE estimates are more variable than for the more abundant species. Brown bullhead and common carp also show significant declines in CPUE since 1989 (P=0.0292, and 0.0.0013, respectively), while white sucker does not (P=0.2405). Channel catfish show a cyclic pattern of abundance with peaks around 1979 and 1990. Regression analysis shows no significant trends over the 29-year sample period (P=0.0806), but does show a significant downward trend in CPUE since 1989 (P=0.0027). Pumpkinseed and freshwater drum both show peaks in gill net catches before 1980, but the yearly CPUE estimates are quite variable. Regression analysis shows no statistically significant trends over the entire 29-year sample period, or in more recent years.

Distribution Shifts:

Analysis of changes in depth or geographic distribution was attempted using relative catches of smallmouth bass, yellow perch, walleye, and rock bass (the four most common and recreationally important species over the range of years sampled), plus the total of all warm water species. Relative CPUE values were calculated separately each year for the three depth strata, and the five area strata (depth strata 1 and 2 only), from the 1980-2004 sampling. The mean catch in each of the three depth strata in any given year was divided by the highest depth strata value for that year; and similarly, the mean catch in each of the five area strata was divided by the highest area strata value for that year. This resulted in a value of 1.0 for the depth and area strata that had the highest mean catch for that species or species group in that particular year. Values for the remaining two depth and four area strata were less than 1.0 and directly proportional to the catch within that strata (Tables A2-A6, Figures A6-A15). Trends in the relative CPUE values over the 25 years sampled were tested using regression analysis (SAS 1985, Proc REG, P=0.05).

Relative catches of all warm water fish (Table A2, Figure A6) showed no significant trends in any of the depth strata, with typically the highest, least variable catches in depth stratum 1 (12-30 ft, 25-year average 0.96), lower, more variable catches in depth stratum 2 (31-50 ft; average 0.79); and the lowest and most variable catches in depth stratum 3 (51-100 ft; average 0.34). Walleye catches are also highest in depth stratum 1 (Table A5, Figure A9; highest relative catch in 22 of 25 years, average 0.95), but walleye do show statistically significant increases in relative catch in depth stratum 2 (P=0.0011) and stratum 3 (P=0.0320). Smallmouth bass, yellow perch, and rock bass, all had slightly higher average relative catches in depth stratum 2 than in stratum 1, and all showed some statistically significant trends in relative catches. Smallmouth bass (Table A3, Figure A7) show a statistically significant trend towards higher relative catch in depth stratum 1 (P=0.0156), with the highest relative catches in stratum 1 in 10 of the last 13 years (despite this, 25-year average relative catch remains higher in stratum 2). Yellow perch (Table A4, Figure A8) show the opposite, with a significant downward trend in relative catches in depth stratum 1 (P=0.0053), and a borderline significant downward trend in stratum 2 (P=0.0567). Rock bass (Table A6, Figure A10) relative catches show statistically significant trends in all three depth strata. An upward trend in stratum 1 (P=0.0014, highest relative catches in 8 of the last 9 years), and downward trends in depth stratum 2 (P=0.0035) and stratum 3 (P=0.0487, but results were strongly influenced by just two unusually high data points in 1980 and 1989). Although some changes in depth

distribution are apparent among the different species, catches of all warm water species continue to be reduced by cold water temperatures, and have remained at or near zero in the August sampling wherever bottom temperatures were consistently below 50°F.

Graphs of relative CPUE by area strata are given in Figures A11-A15. Relative catches of all warm water species (Table A2, Figure A11) show a statistically significant upward trend in Chaumont Bay (P=0.0329), and statistically significant downward trends in the Henderson Bay (P=0.0174) and Stony Island areas (P=0.0290). Smallmouth bass relative catches (Table A3, Figure A12) show significant downward tends in the Grenadier Island (P=0.0219) and Stony Island (P<0.0001) areas, and a significant upward trend in the Chaumont Bay area (P=0.0119). Relative catch data for yellow perch (Table A4, Figure A13) show only one statistically significant trend, a downward trend in the Stony Island areas (P=0.0170). This downward trend in the Stony Island area is particularly striking, and may be directly related to predation by double-crested cormorants (Birt et al. 1987, O'Gorman and Burnett 2001). Although relative catches of yellow perch were never high in the Stony Island area, catches have been zero in 13 of the last 17 years (5 net gangs per year, 12-50 ft depths). Significant trends in relative catches for both walleye and rock bass were confined to the Stony Island area. Walleye (Table A5, Figure A15) show a significant upward trend in the Stony Island area (P=0.0158, highest relative catches in 12 of the last 14 years), while rock bass (Table A6, Figure A15) show a downward trend (P=0.0300).

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Table A1. Stratified mean catch per unit effort data from the 1976-2004 warm water assessment netting conducted late July through mid August in New York waters of Lake Ontario's eastern basin.

	Mean Catch per 450 ft Monofilament Gill Net Gang											
	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Lake Sturgeon	0	0	0	0	0	0.02	0	0	0	0	0	0
Longnose Gar	0	0	0	0	0.04	0	0	0.04	0	1.19	0.04	0
Bowfin	0	0	0	0	0.02	0.02	0	0	0	0	0	0
American Eel	0	0	0.06	0.03	0	0	0	0	0	0	0	0
Alewife	20.96	2.07	14.83	11.57	4.30	8.18	7.53	6.90	17.65	3.35	7.61	2.32
Gizzard Shad	17.82	53.45	47.38	19.95	4.52	2.78	0.10	0.29	0.87	0.50	0.48	0.44
Northern Pike	0.83	1.04	0.93	0.16	0.08	0.02	0.04	0.06	0.02	0.17	0.17	0.08
Muskellunge	0	0	0	0	0	0	0	0	0	0	0	0
Goldfish X Carp	0	0	0	0.17	0	0	0	0	0	0	0	0
Common Carp	0.25	0.55	0.33	0.45	0.17	0.10	0.35	0.21	0.17	0.17	0.10	0.20
Golden Shiner	0	0	0	0	0.02	0	0	0	0.04	0.02	0	0
Spottail Shiner	0	0	0	0	0	0	0	0.15	0	0	0	0
Quillback	0	0	0	0.31	0.04	0.06	0	0.04	0	0	0.02	0
Longnose Sucker	0	0	0	0	0.02	0	0	0	0	0	0	0
White Sucker	4.04	0.63	2.90	3.11	1.84	1.42	4.34	1.40	1.58	0.93	2.47	1.49
Silver Redhorse	0.06	0.05	0.20	0.43	0.04	0.10	0.15	0.38	0.06	0	0.02	0.02
Shorthead Redhorse	0	0	0	0	0	0	0	0	0	0	0	0
Brown Bullhead	1.12	0.20	1.41	4.17	0.66	0.23	1.29	0.76	0.86	1.70	2.14	1.96
Channel Catfish	0.41	1.03	1.75	3.64	0.60	0.56	1.27	0.86	0.29	0.63	1.25	0.77
Stonecat	0	0.04	0.26	0.08	0	0.23	0.30	0.02	0.04	0.06	0.04	0
Trout-perch	0	0	0	0	0	0.15	0.15	0	0.08	0	0	0.08
White Perch	63.00	136.42	74.11	86.98	26.20	44.53	25.98	34.02	20.78	12.23	13.94	11.14
White Bass	0	0	0.13	0	0.02	0.06	0.26	0	0.06	0.02	0.06	0.06
Rock Bass	7.10	10.75	22.13	13.94	14.69	10.09	7.06	4.69	6.99	3.96	7.58	4.76
Pumpkinseed	0	0.44	0.06	3.06	0.14	0.32	0.73	0.43	0.09	0.59	0.57	0.40
Bluegill	0	0	0	0	0	0	0.04	0	0	0	0	0
Smallmouth Bass	24.51	24.05	26.04	35.74	38.02	23.47	14.55	14.96	12.44	9.76	18.14	10.89
Largemouth Bass	0	0	0	0	0	0	0	0	0	0	0	0
Black Crappie	0	0	0	0.04	0.02	0.02	0.02	0.06	0.02	0.10	0	0
Yellow Perch	69.09	26.20	44.44	67.32	27.63	43.81	36.07	50.85	24.02	15.35	13.32	8.36
Walleye	0.05	0.20	0.12	0.27	0.28	0.12	0.59	0.09	0.09	0.41	0.19	0.75
Freshwater Drum	0.19	0	0.74	1.43	0.34	0.09	0.34	0.59	0.31	0.25	0.16	0.25
Total	209.43	257.13	237.81	252.83	119.72	136.42	101.19	116.82	86.50	51.38	68.30	43.98

Table A1 (continued). Stratified mean catch per unit effort data from the 1976-2004 warm water assessment netting.

	Mean Catch per 450 ft Monofilament Gill Net Gang											
	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Lake Sturgeon	0	0	0	0	0	0	0	0.02	0	0.02	0.06	0.04
Longnose Gar	0	0	0.08	0	0	0.48	0.35	0	0	0.02	0.02	0.08
Bowfin	0	0	0	0	0.02	0	0	0	0	0	0	0
American Eel	0	0	0.02	0	0	0	0	0	0	0	0	0
Alewife	9.64	0.59	1.29	1.27	2.26	0.18	0	0.48	0.92	0	0.06	0.12
Gizzard Shad	0.24	0.69	1.26	1.39	1.79	0.12	0.06	0	0	0	0.08	0.08
Northern Pike	0	0.02	0	0.15	0.04	0.10	0.06	0.04	0.04	0.08	0.06	0.06
Muskellunge	0	0	0	0	0	0	0	0	0	0	0	0
Goldfish X Carp	0	0	0	0	0	0	0	0	0	0	0	0
Common Carp	0.23	0.37	0.35	0.29	0.33	0.35	0.06	0.10	0.15	0.12	0.10	0.33
Golden Shiner	0	0	0	0	0	0	0	0	0	0	0	0
Spottail Shiner	0	0	0	0	0.06	0	0	0	0	0	0	0
Quillback	0.02	0.04	0.04	0.08	0	0.04	0	0	0.04	0	0.04	0
Longnose Sucker	0	0	0	0	0	0	0	0	0	0	0	0
White Sucker	0.91	0.75	3.47	0.41	0.88	1.18	0.81	1.13	2.01	1.31	1.02	1.02
Silver Redhorse	0.07	0.17	0.29	0.22	0.18	0	0.08	0.12	0.02	0.13	0.12	0.10
Shorthead Redhorse	0	0	0	0	0	0	0.02	0	0	0.02	0	0
Brown Bullhead	0.61	0.84	0.66	0.86	0.87	0.35	0.35	0.06	0	0.83	0.06	0.21
Channel Catfish	0.97	2.40	3.34	1.20	1.35	1.12	0.35	0.19	0.47	1.42	0.75	0.68
Stonecat	0	0.02	0	0.02	0	0	0	0	0	0	0	0
Trout-perch	0.15	0	0	0.12	0	0	0	0	0	0	0	0
White Perch	4.87	7.95	4.36	7.83	5.49	5.04	6.01	0.06	0.31	0.48	0.29	1.36
White Bass	0.13	0.08	0	0.10	0	0.02	0	0	0	0	0.04	0
Rock Bass	4.94	7.53	8.08	6.86	3.09	6.99	3.99	1.41	3.79	2.33	2.13	3.08
Pumpkinseed	0.25	0.64	0.78	0.14	0.34	0.23	0.04	0.06	0.04	0.08	0.29	0.27
Bluegill	0	0	0	0	0	0	0	0	0	0	0	0
Smallmouth Bass	15.92	39.05	21.72	29.40	19.13	19.91	11.99	5.01	6.98	6.03	9.36	10.68
Largemouth Bass	0	0	0	0	0	0	0	0	0	0	0.02	0
Black Crappie	0.02	0.02	0.06	0	0	0.04	0	0	0	0	0.02	0
Yellow Perch	2.19	10.06	13.61	6.97	6.72	2.78	5.87	3.68	8.76	5.53	5.01	4.47
Walleye	0.80	0.96	1.31	1.68	1.59	3.84	3.29	1.91	2.97	1.76	2.13	1.32
Freshwater Drum	0.45	0.53	0.62	0.34	0.43	0.52	0.74	0.63	0.23	0.41	0.25	0.50
Total	42.42	72.71	61.35	59.34	44.57	43.32	34.08	14.91	26.73	20.58	21.94	24.40

Table A1 (continued). Stratified mean catch per unit effort data from the 1976-2004 warm water assessment netting.

	Mean Catch per 450 ft Monofilament Gill Net Gang				
	2000	2001	2002	2003	2004
Lake Sturgeon	0.10	0.02	0	0.04	0.02
Longnose Gar	0	0.02	0	0	0.06
Bowfin	0	0	0	0	0
American Eel	0	0	0	0	0
Alewife	0.26	0.95	0.02	0.08	0
Gizzard Shad	0.13	0	0.06	0	0
Northern Pike	0.08	0.07	0.19	0.15	0.17
Muskellunge	0	0	0	0	0.02
Goldfish X Carp	0	0	0	0	0
Common Carp	0.04	0	0	0.02	0.15
Golden Shiner	0	0	0	0	0
Spottail Shiner	0	0	0	0	0
Quillback	0	0	0	0	0
Longnose Sucker	0	0	0	0	0
White Sucker	0.35	0.38	0.78	1.66	0.41
Silver Redhorse	0.12	0.05	0.17	0.10	0.42
Shorthead Redhorse	0	0.02	0	0	0
Brown Bullhead	0.21	0.32	0.21	0.40	0.35
Channel Catfish	0.54	0.09	0.21	0.12	0.79
Stonecat	0	0	0	0	0
Trout-perch	0	0	0	0	0
White Perch	0.92	1.04	1.09	0.42	1.18
White Bass	0	0	0	0	0
Rock Bass	1.47	1.22	1.10	1.84	2.09
Pumpkinseed	0.31	0.28	0.46	0.46	0.52
Bluegill	0	0	0	0	0
Smallmouth Bass	5.01	2.99	3.76	5.43	3.84
Largemouth Bass	0	0	0	0	0.02
Black Crappie	0	0	0.06	0	0.02
Yellow Perch	8.58	6.37	9.65	9.82	6.74
Walleye	1.53	1.70	1.08	2.12	1.69
Freshwater Drum	0.25	0.20	0.23	0.27	0.60
Total	19.92	15.73	19.06	22.92	19.10

Table A2. Stratified mean catch per standard 450 ft gill net gang, 95% confidence intervals, relative annual CPUE by depth strata, and relative annual CPUE by area for depth strata 1 and 2, for all warm water fish from warm water assessment netting conducted late July through mid August in New York waters of Lake Ontario's eastern basin.

All Warm Water Fish Species

Year	Strat.	95% CI		Rel CPUE by Depth			Relative CPUE by Area (Strata 1&2)				
Sample	CPUE	Lower	Upper	Strat 1	Strat 2	Strat 3	Area 1	Area 2	Area 3	Area 4	Area 5
1980	119.72	86.40	153.04	1.00	0.76	0.39	0.63	0.43	0.32	1.00	0.41
1981	136.42	93.47	179.36	1.00	0.93	0.25	0.60	0.62	0.78	1.00	0.39
1982	101.19	71.72	130.65	0.94	1.00	0.21	0.89	0.61	0.86	1.00	0.51
1983	116.82	35.94	197.69	1.00	0.87	0.51	0.59	0.58	0.36	1.00	0.33
1984	86.50	62.65	110.34	1.00	0.58	0.13	0.51	0.39	0.65	1.00	0.45
1985	51.38	38.83	63.94	1.00	0.84	0.04	0.61	0.84	0.77	1.00	0.40
1986	68.30	42.17	94.44	0.96	1.00	0.41	0.64	0.86	0.87	1.00	0.50
1987	43.98	30.19	57.76	1.00	0.55	0.06	0.46	1.00	0.68	0.87	0.40
1988	42.42	29.70	55.13	1.00	0.77	0.36	0.43	0.49	0.51	1.00	0.62
1989	72.71	46.85	98.58	0.84	0.88	1.00	0.34	0.82	0.49	1.00	0.43
1990	61.35	41.54	81.16	0.84	1.00	0.51	0.99	1.00	0.69	0.97	0.53
1991	59.34	43.05	75.63	0.99	1.00	0.51	0.47	1.00	0.51	0.29	0.36
1992	44.57	31.62	57.53	1.00	0.68	0.44	0.77	1.00	0.39	0.92	0.29
1993	43.32	31.32	55.32	1.00	0.59	0.45	0.55	0.73	1.00	0.69	0.37
1994	34.08	23.91	44.25	1.00	0.90	0.21	0.38	1.00	0.87	0.78	0.45
1995	14.91	10.13	19.69	1.00	0.50	0.05	0.47	1.00	0.74	0.65	0.59
1996	26.73	13.48	39.99	0.94	1.00	0.50	0.54	0.61	1.00	0.15	0.41
1997	20.58	12.67	28.49	1.00	0.69	0.32	0.44	0.96	1.00	0.50	0.46
1998	21.94	14.58	29.30	1.00	0.59	0.25	0.68	1.00	0.44	0.60	0.43
1999	24.40	16.70	32.09	1.00	0.91	0.48	0.38	1.00	0.74	0.51	0.23
2000	19.92	11.48	28.36	0.79	1.00	0.37	0.65	0.68	0.37	1.00	0.24
2001	15.73	10.01	21.45	1.00	0.58	0.13	0.56	0.69	0.22	1.00	0.31
2002	19.06	10.46	27.66	0.74	1.00	0.24	0.60	0.79	1.00	0.83	0.22
2003	22.92	14.37	31.46	1.00	0.46	0.32	0.66	1.00	0.85	0.71	0.30
2004	19.10	6.24	31.95	1.00	0.73	0.34	1.00	0.72	0.83	0.73	0.37

Table A3. Stratified mean catch per standard 450 ft gill net gang, 95% confidence intervals, relative annual CPUE by depth strata, and relative annual CPUE by area for depth strata 1 and 2, for smallmouth bass from warm water assessment netting conducted late July through mid August in New York waters of Lake Ontario's eastern basin.

Smallmouth Bass

Year	Strat.	95% CI		Rel CPUE by Depth			Relative CPUE by Area (Strata 1&2)				
Sample	CPUE	Lower	Upper	Strat 1	Strat 2	Strat 3	Area 1	Area 2	Area 3	Area 4	Area 5
1980	38.02	17.40	58.64	0.56	0.61	1.00	1.00	0.36	0.07	0.27	0.98
1981	23.47	14.28	32.67	0.95	1.00	0.26	0.60	0.67	0.52	0.58	1.00
1982	14.55	6.04	23.07	0.58	1.00	0.23	1.00	0.81	0.44	0.33	0.86
1983	14.96	9.70	20.22	0.44	1.00	0.08	0.66	0.23	0.58	0.52	1.00
1984	12.44	7.03	17.86	1.00	0.95	0.03	1.00	0.16	0.21	0.47	0.85
1985	9.76	5.35	14.17	0.52	1.00	0.00	0.83	0.32	0.04	0.22	1.00
1986	18.14	7.51	28.76	0.57	1.00	0.70	0.86	0.34	0.52	0.35	1.00
1987	10.89	5.93	15.86	1.00	0.74	0.01	0.84	0.10	1.00	0.49	0.84
1988	15.92	9.96	21.87	0.96	1.00	0.26	0.47	0.29	0.33	0.76	1.00
1989	39.05	14.35	63.75	0.29	0.39	1.00	0.52	0.05	0.41	0.97	1.00
1990	21.72	13.13	30.31	0.38	1.00	0.57	1.00	0.28	0.02	0.45	0.68
1991	29.40	14.64	44.16	0.33	1.00	0.72	0.37	1.00	0.08	0.25	1.00
1992	19.13	11.45	26.80	1.00	0.86	0.96	0.74	0.50	0.08	1.00	0.41
1993	19.91	12.87	26.96	0.65	0.69	1.00	0.73	0.70	0.30	1.00	0.53
1994	11.99	7.75	16.23	1.00	0.94	0.60	0.48	0.72	0.00	1.00	0.93
1995	5.01	3.20	6.82	1.00	0.54	0.06	0.81	0.67	1.00	0.69	0.69
1996	6.98	2.99	10.97	1.00	0.98	0.37	0.59	1.00	0.91	0.10	0.34
1997	6.03	4.00	8.05	1.00	0.66	0.24	0.59	1.00	0.49	0.78	0.43
1998	9.36	4.95	13.78	1.00	0.44	0.46	0.55	1.00	0.27	0.81	0.84
1999	10.68	6.84	14.51	1.00	0.98	0.51	0.27	1.00	0.59	0.31	0.23
2000	5.01	2.65	7.38	0.93	1.00	0.48	1.00	0.80	0.28	0.80	0.86
2001	2.99	1.46	4.51	1.00	0.31	0.00	0.23	1.00	0.09	0.38	0.40
2002	3.76	1.71	5.81	0.74	1.00	0.08	0.11	0.73	1.00	0.32	0.32
2003	5.43	3.05	7.80	1.00	0.89	0.27	0.35	0.59	1.00	0.79	0.27
2004	3.84	1.76	5.92	1.00	0.89	0.12	1.00	0.30	0.56	0.46	0.42

Table A4. Stratified mean catch per standard 450 ft gill net gang, 95% confidence intervals, relative annual CPUE by depth strata, and relative annual CPUE by area for depth strata 1 and 2, for yellow perch from warm water assessment netting conducted late July through mid August in New York waters of Lake Ontario's eastern basin.

Yellow Perch

Year	Strat.	95% CI		Rel CPUE by Depth			Relative CPUE by Area (Strata 1&2)				
Sample	CPUE	Lower	Upper	Strat 1	Strat 2	Strat 3	Area 1	Area 2	Area 3	Area 4	Area 5
1980	27.63	19.64	35.63	1.00	0.96	0.44	1.00	0.59	0.77	0.83	0.14
1981	43.81	18.68	68.93	0.99	1.00	0.54	0.41	0.41	1.00	0.40	0.39
1982	36.07	17.09	55.06	1.00	0.72	0.23	0.84	0.42	1.00	0.30	0.26
1983	50.85	6.58	95.12	1.00	0.72	1.00	0.48	0.56	0.11	1.00	0.07
1984	24.02	12.30	35.73	0.59	1.00	0.42	0.65	0.88	1.00	0.57	0.50
1985	15.35	7.47	23.23	0.94	1.00	0.14	0.41	0.59	0.60	1.00	0.04
1986	13.32	1.54	25.10	1.00	0.74	0.58	0.31	0.65	1.00	0.65	0.06
1987	8.36	3.02	13.71	1.00	0.96	0.17	0.14	1.00	0.33	0.29	0.02
1988	2.19	0.30	4.08	0.65	1.00	0.12	0.80	1.00	0.00	0.83	0.00
1989	10.06	2.93	17.18	0.43	1.00	0.80	0.01	1.00	0.34	0.36	0.00
1990	13.61	3.52	23.70	0.59	1.00	0.44	0.14	0.82	1.00	0.21	0.08
1991	6.97	1.69	12.24	1.00	0.77	0.34	0.01	0.78	1.00	0.05	0.00
1992	6.72	1.82	11.63	0.66	1.00	0.70	0.15	0.85	1.00	0.47	0.00
1993	2.78	0.59	4.97	0.74	1.00	0.33	0.01	0.49	0.00	1.00	0.00
1994	5.87	1.29	10.44	0.93	1.00	0.01	0.00	0.26	1.00	0.64	0.00
1995	3.68	0.31	7.05	1.00	0.62	0.06	0.00	1.00	0.62	0.44	0.00
1996	8.76	2.75	14.77	0.39	1.00	0.90	0.10	0.32	1.00	0.19	0.00
1997	5.53	0.32	10.74	0.63	0.76	1.00	0.10	0.09	1.00	0.28	0.00
1998	5.01	1.27	8.74	0.68	1.00	0.09	0.73	1.00	0.32	0.61	0.00
1999	4.47	1.39	7.54	0.69	0.34	1.00	0.00	0.36	0.27	1.00	0.00
2000	8.58	1.25	15.91	0.33	1.00	0.48	0.25	0.07	0.16	1.00	0.01
2001	6.37	1.17	11.58	0.80	1.00	0.27	0.39	0.04	0.07	1.00	>0.01
2002	9.65	2.11	17.18	0.23	1.00	0.36	0.75	0.05	0.89	1.00	0.00
2003	9.82	2.91	16.72	1.00	0.28	0.62	0.93	1.00	0.35	0.67	0.00
2004	6.74	0.00	18.31	0.21	0.14	1.00	0.07	1.00	0.08	0.00	0.23

Table A5. Stratified mean catch per standard 450 ft gill net gang, 95% confidence intervals, relative annual CPUE by depth strata, and relative annual CPUE by area for depth strata 1 and 2, for walleye from warm water assessment netting conducted late July through mid August in New York waters of Lake Ontario's eastern basin.

Walleye

Year	Strat.	95% CI		Rel CPUE by Depth			Relative CPUE by Area (Strata 1&2)				
Sample	CPUE	Lower	Upper	Strat 1	Strat 2	Strat 3	Area 1	Area 2	Area 3	Area 4	Area 5
1980	0.28	0.00	0.71	1.00	0.14	0.00	1.00	0.00	0.00	0.00	0.13
1981	0.12	0.01	0.24	1.00	0.00	0.00	0.40	1.00	0.00	0.67	0.00
1982	0.59	0.15	1.04	1.00	0.13	0.00	1.00	0.00	0.31	0.42	1.00
1983	0.09	0.00	0.24	1.00	0.56	0.00	0.00	0.00	0.00	1.00	0.30
1984	0.09	0.00	0.20	1.00	0.00	0.00	0.00	0.75	0.00	1.00	0.60
1985	0.41	0.06	0.76	1.00	0.00	0.00	0.29	0.71	0.00	0.00	1.00
1986	0.19	0.02	0.35	1.00	0.22	0.00	0.27	1.00	0.00	0.00	0.53
1987	0.75	0.34	1.16	1.00	0.46	0.00	0.78	0.56	0.83	0.19	1.00
1988	0.80	0.26	1.34	1.00	0.77	0.10	1.00	0.38	0.00	0.38	0.15
1989	0.96	0.03	1.90	1.00	0.35	0.11	0.22	0.07	0.00	0.19	1.00
1990	1.31	0.62	2.00	1.00	0.77	0.04	1.00	0.35	0.14	0.46	0.56
1991	1.68	0.31	3.05	1.00	0.67	0.07	0.26	0.20	0.16	0.11	1.00
1992	1.59	0.78	2.40	1.00	0.56	0.03	0.54	0.05	0.10	0.63	1.00
1993	3.84	1.78	5.91	1.00	0.75	0.40	0.35	0.05	0.11	0.24	1.00
1994	3.29	1.80	4.78	0.75	1.00	0.22	0.59	0.28	0.13	0.11	1.00
1995	1.91	0.78	3.05	1.00	0.32	0.03	0.83	0.38	0.21	0.28	1.00
1996	2.97	1.01	4.92	1.00	0.61	0.10	0.66	0.04	0.11	0.02	1.00
1997	1.76	0.85	2.68	0.38	1.00	0.11	0.42	0.20	0.20	0.18	1.00
1998	2.13	1.02	3.24	1.00	0.95	0.67	0.60	0.15	0.10	0.40	1.00
1999	1.32	0.64	2.00	1.00	0.60	0.31	0.24	0.20	0.10	0.27	1.00
2000	1.53	0.58	2.48	0.64	1.00	0.20	1.00	0.27	0.08	0.05	0.37
2001	1.70	0.50	2.91	1.00	0.66	0.12	0.52	0.21	0.07	0.23	1.00
2002	1.08	0.31	1.85	1.00	0.29	0.09	0.42	0.24	0.00	0.06	1.00
2003	2.12	1.28	2.96	1.00	0.71	0.09	0.57	0.27	0.12	0.40	1.00
2004	1.69	0.98	2.40	1.00	0.59	0.00	0.63	0.57	1.00	0.33	0.63

Table A6. Stratified mean catch per standard 450 ft gill net gang, 95% confidence intervals, relative annual CPUE by depth strata, and relative annual CPUE by area for depth strata 1 and 2, for rock bass from warm water assessment netting conducted late July through mid August in New York waters of Lake Ontario's eastern basin.

Rock Bass

Year	Strat.	95% CI		Rel CPUE by Depth			Relative CPUE by Area (Strata 1&2)				
Sample	CPUE	Lower	Upper	Strat 1	Strat 2	Strat 3	Area 1	Area 2	Area 3	Area 4	Area 5
1980	14.69	8.59	20.79	0.72	1.00	0.75	1.00	0.23	0.44	0.18	0.66
1981	10.09	5.21	14.96	0.50	1.00	0.27	0.70	0.11	1.00	0.30	0.24
1982	7.06	2.86	11.27	0.38	1.00	0.21	0.81	0.11	1.00	0.28	0.62
1983	4.69	1.93	7.45	0.59	1.00	0.08	1.00	0.08	0.75	0.19	0.18
1984	6.99	3.00	10.98	0.53	1.00	0.24	1.00	0.18	0.33	0.20	0.87
1985	3.96	1.78	6.14	0.64	1.00	0.04	1.00	0.03	0.05	0.10	0.56
1986	7.58	4.05	11.11	0.44	1.00	0.27	0.89	0.07	1.00	0.41	0.46
1987	4.76	2.05	7.46	1.00	0.39	0.06	1.00	0.12	0.90	0.28	0.93
1988	4.94	2.04	7.84	0.90	1.00	0.36	0.80	0.08	1.00	0.19	0.66
1989	7.53	3.16	11.91	0.33	0.91	1.00	1.00	0.00	0.77	0.10	0.55
1990	8.08	3.36	12.80	1.00	0.67	0.31	0.35	0.00	0.11	1.00	0.27
1991	6.86	2.79	10.93	0.58	1.00	0.24	1.00	0.15	0.85	0.12	0.07
1992	3.09	1.67	4.50	0.61	1.00	0.46	1.00	0.41	0.27	0.41	0.27
1993	6.99	1.50	12.48	1.00	0.72	0.27	1.00	0.03	0.81	0.08	0.21
1994	3.99	1.17	6.81	0.39	1.00	0.18	1.00	0.00	0.12	0.12	0.54
1995	1.41	0.42	2.40	0.93	1.00	0.09	0.61	0.00	0.56	0.11	1.00
1996	3.79	0.00	7.74	1.00	0.71	0.52	1.00	0.05	0.87	0.03	0.42
1997	2.33	0.89	3.77	1.00	0.39	0.04	0.19	0.76	1.00	0.14	0.50
1998	2.13	0.97	3.28	1.00	0.27	0.15	1.00	0.03	0.65	0.08	0.48
1999	3.08	0.89	5.26	0.57	1.00	0.23	1.00	0.12	0.45	0.44	0.11
2000	1.47	0.67	2.27	1.00	0.53	0.13	1.00	0.25	0.83	0.11	0.27
2001	1.22	0.45	1.99	1.00	0.77	0.00	1.00	0.03	0.62	0.23	0.30
2002	1.10	0.21	1.99	1.00	0.34	0.56	1.00	0.23	0.83	0.25	0.07
2003	1.84	0.67	3.00	1.00	0.39	0.00	0.52	0.17	1.00	0.31	0.11
2004	2.09	0.82	3.35	1.00	0.85	0.02	1.00	0.23	0.18	0.58	0.16

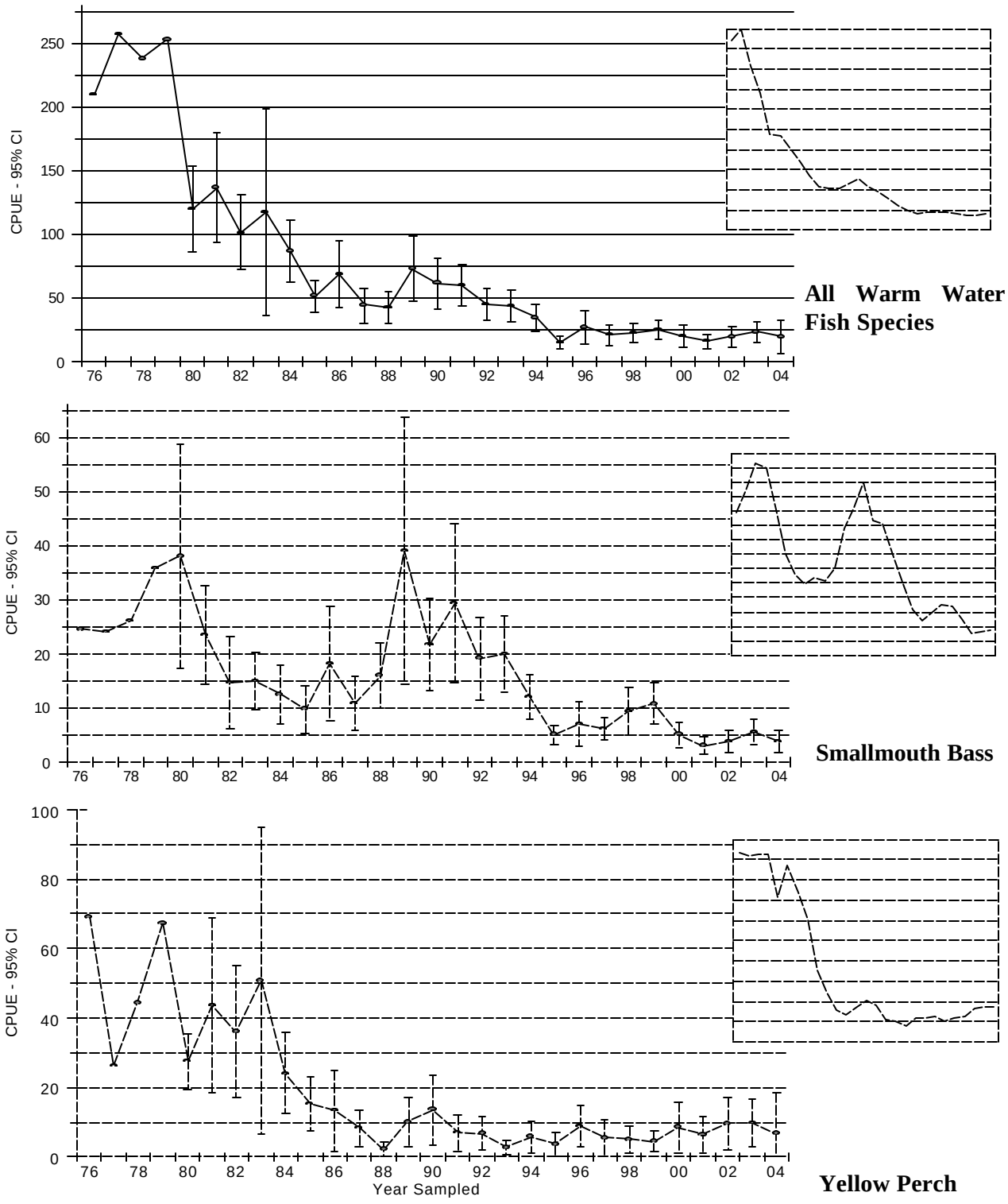

Figure A1. Stratified mean catch per 450 ft gill net gang and 95% confidence intervals for all warm water fish, smallmouth bass, and yellow perch, from the 1976-2004 warm water assessment conducted

in New York waters of Lake Ontario's eastern basin. The inset graphs show 3-year moving average catch per unit effort data plotted against the mid point of the years sampled.

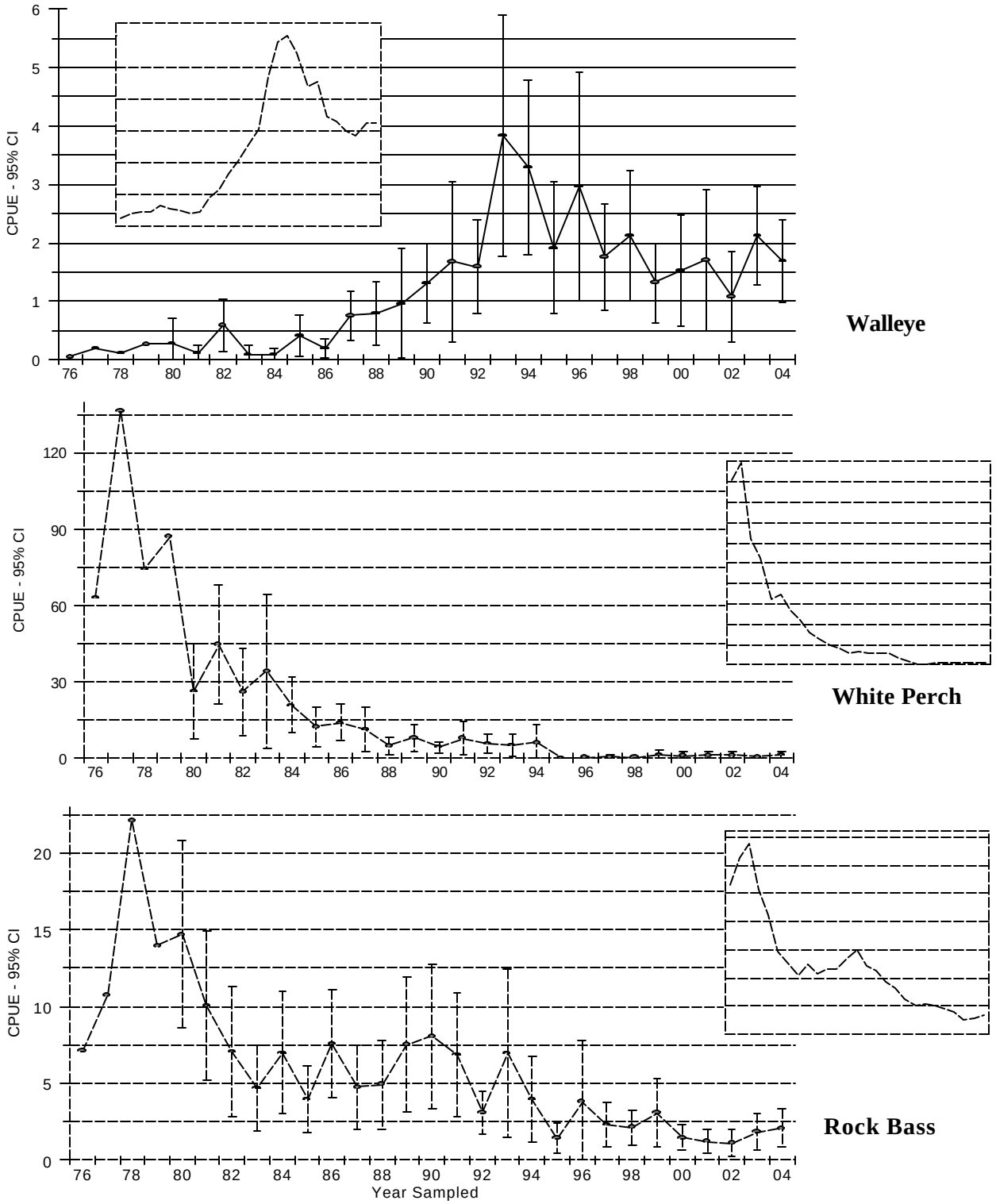

Figure A2. Stratified mean catch per 450 ft gill net gang and 95% confidence intervals for walleye, white perch, and rock bass, from the 1976-2004 warm water assessment conducted in New York waters of Lake Ontario's eastern basin. The inset graphs show 3-year moving average catch per unit

effort data plotted against the mid point of the years sampled.

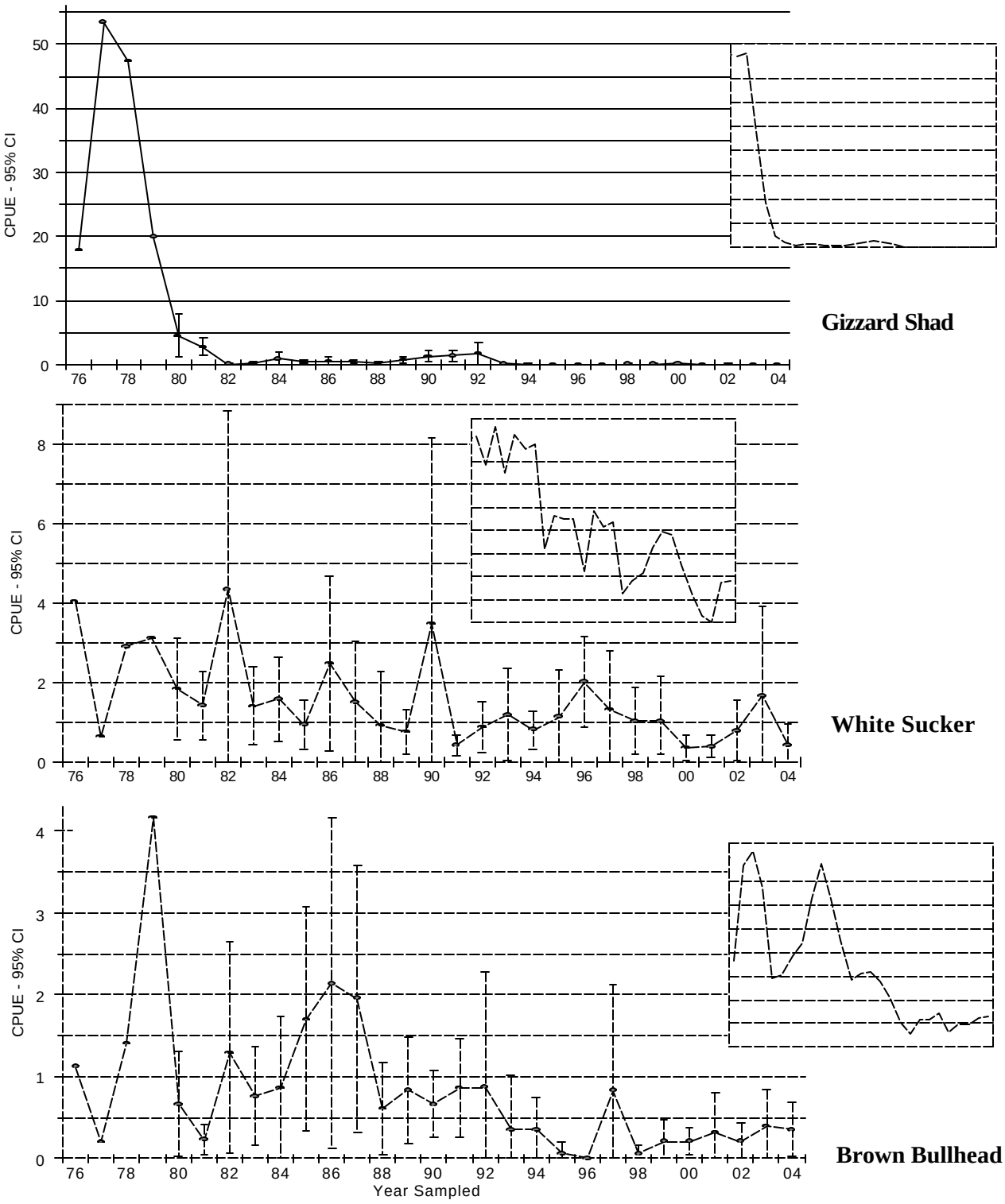

Figure A3. Stratified mean catch per 450 ft gill net gang and 95% confidence intervals for gizzard shad, white sucker, and brown bullhead, from the 1976-2004 warm water assessment conducted in

New York waters of Lake Ontario's eastern basin. The inset graphs show 3-year moving average catch per unit effort data plotted against the mid point of the years sampled.

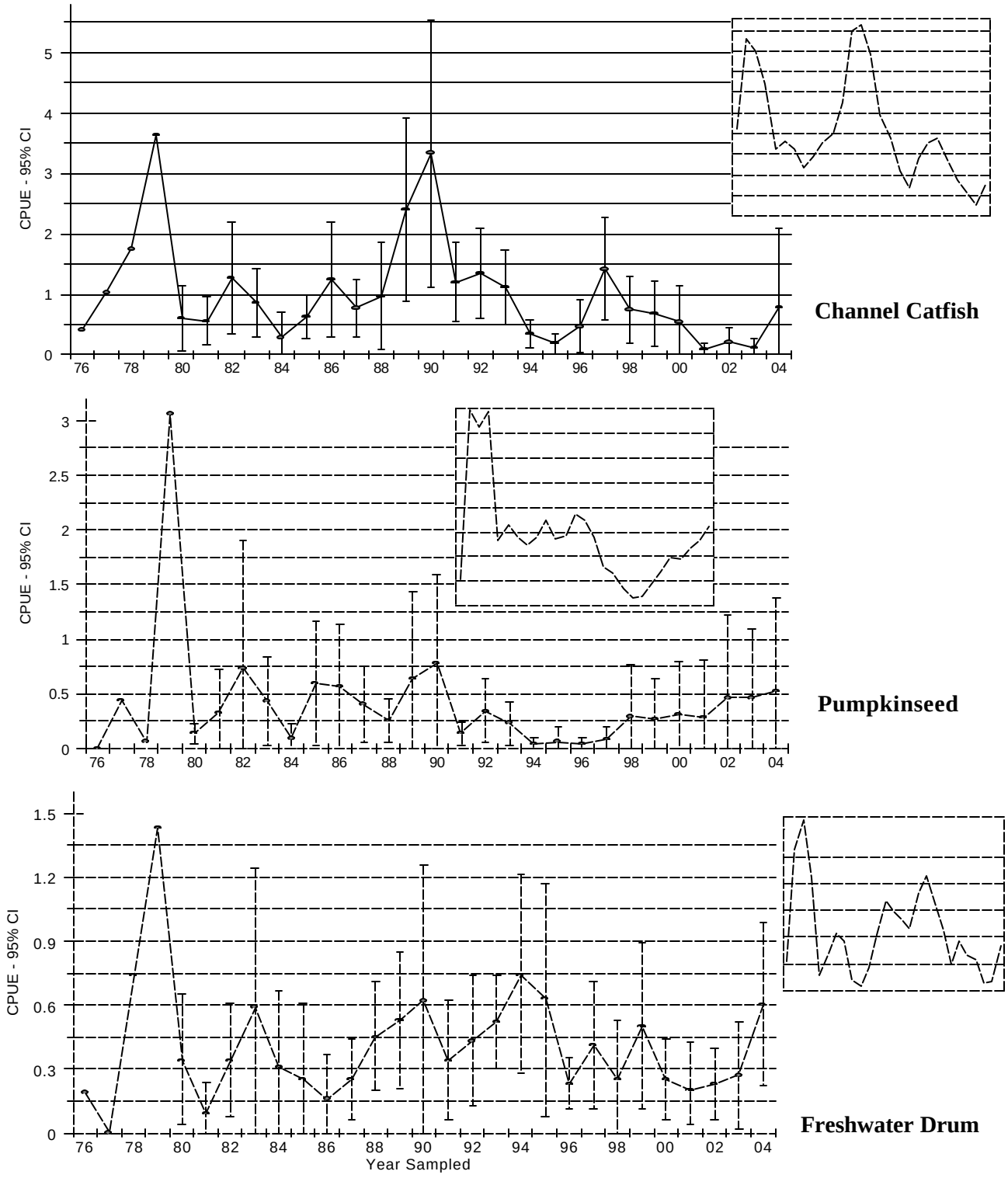

Figure A4. Stratified mean catch per 450 ft gill net gang and 95% confidence intervals for channel catfish, pumpkinseed, and freshwater drum, from the 1976-2004 warm water assessment conducted in New York waters of Lake Ontario's eastern basin. The inset graphs show 3-year moving average

catch per unit effort data plotted against the mid point of the years sampled.

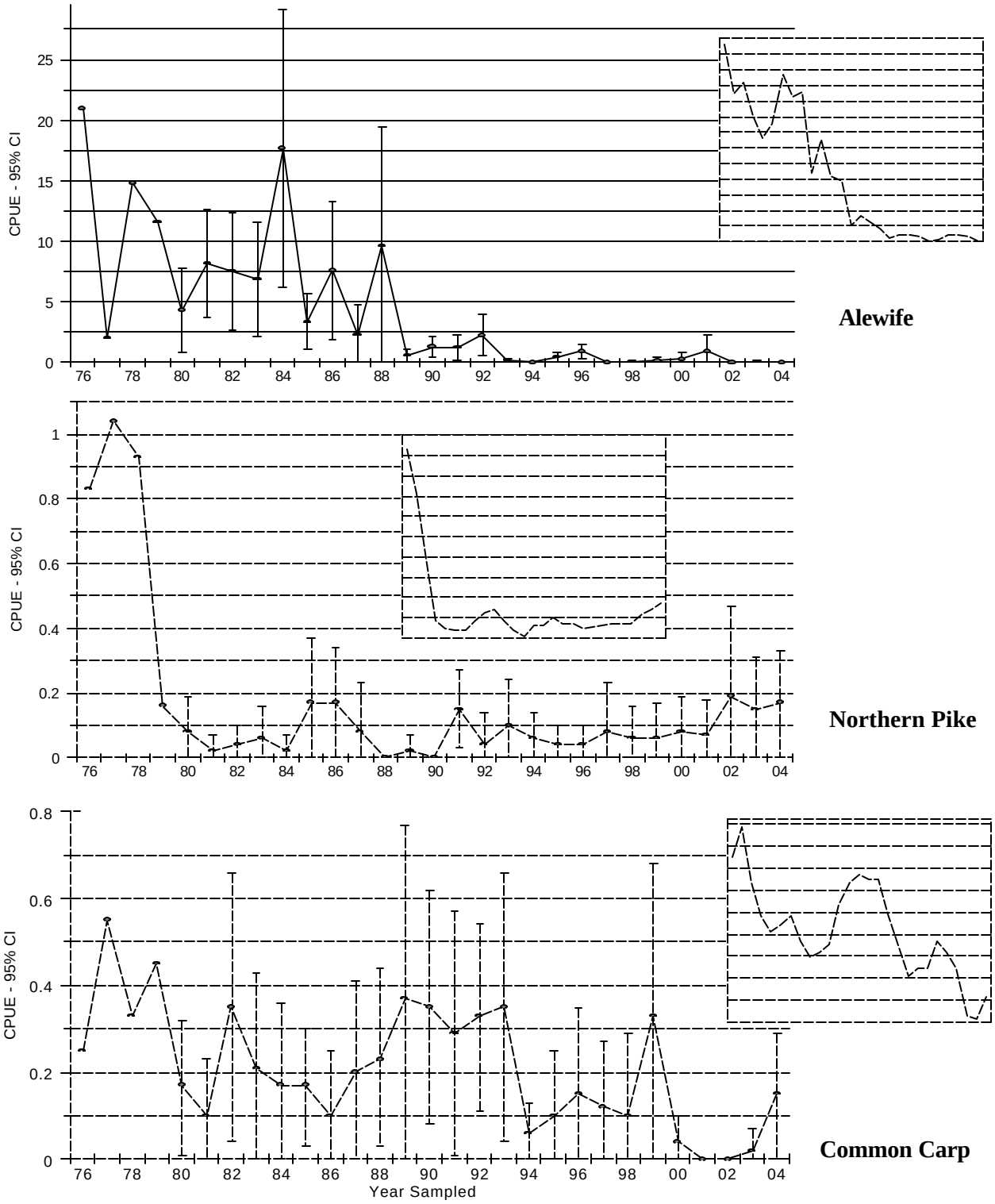

Figure A5. Stratified mean catch per 450 ft gill net gang and 95% confidence intervals for alewife, northern pike, and common carp, from the 1976-2004 warm water assessment conducted in New York waters of Lake Ontario's eastern basin. The inset graphs show 3-year moving average catch per unit

effort data plotted against the mid point of the years sampled.

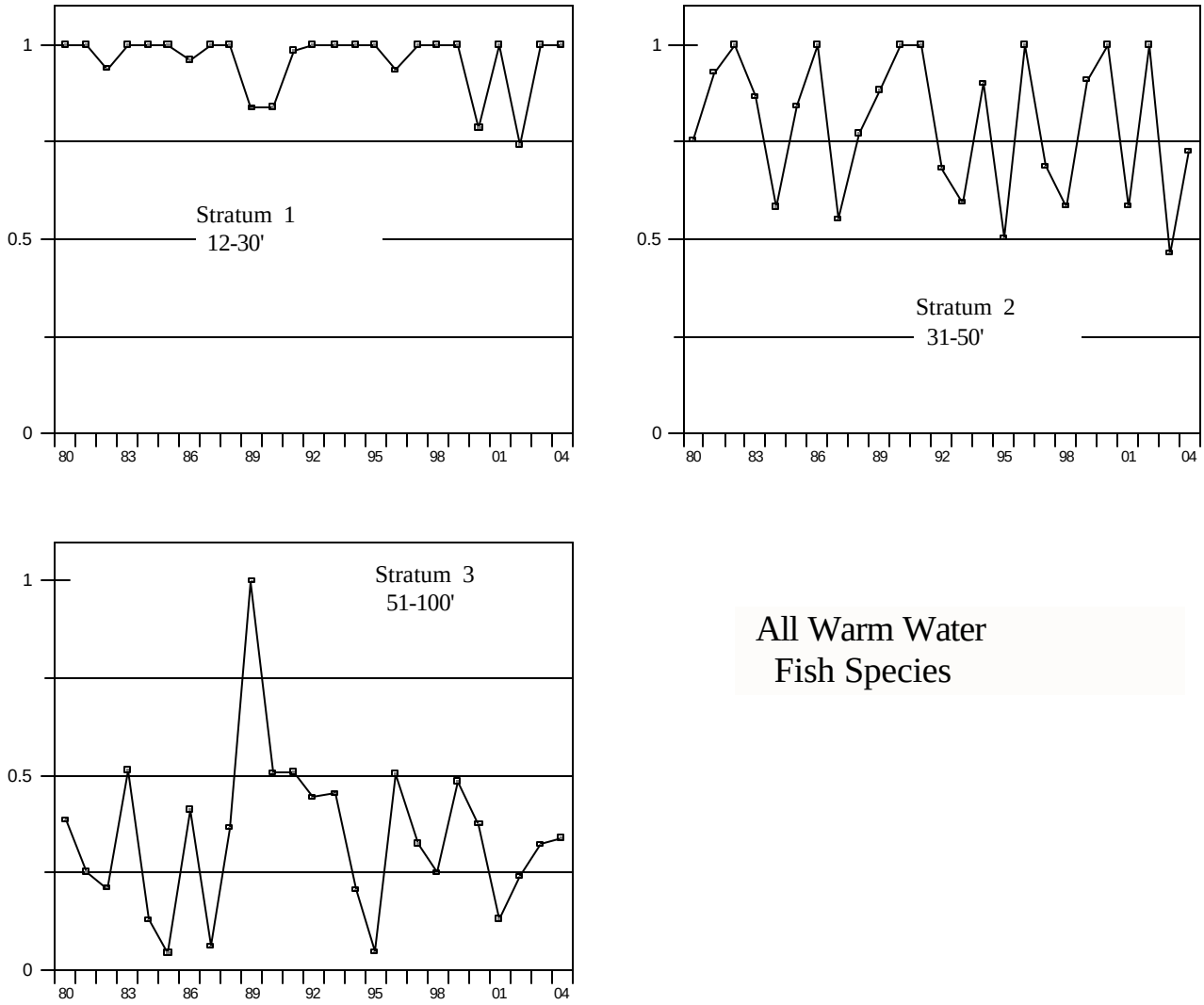

Figure A6. Relative CPUE by depth strata for all warm water fish species collected in warm water assessment netting in New York waters of Lake Ontario's eastern basin, 1980-2004. Relative CPUE on Y-axis, year collected on X-axis.

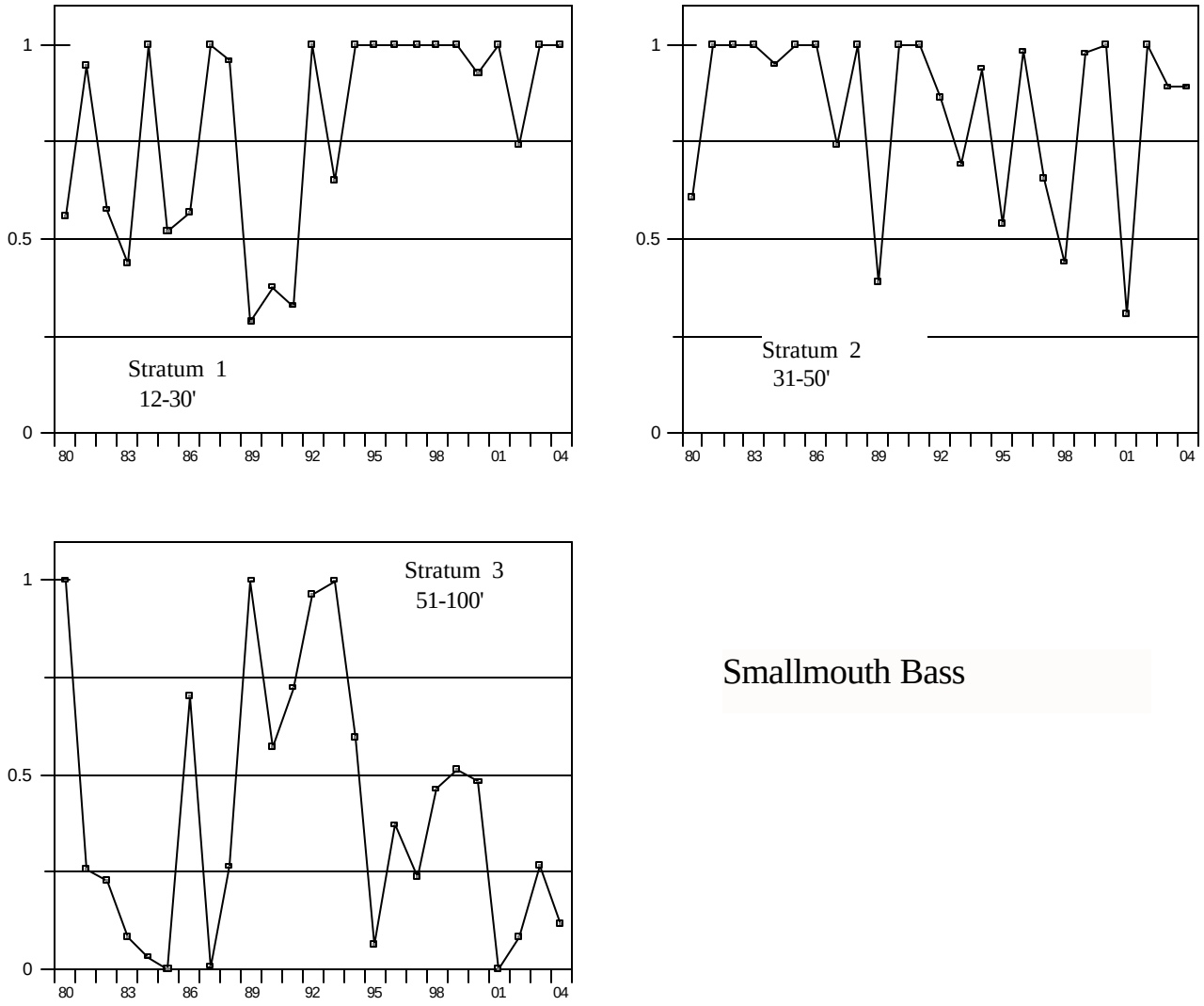

Figure A7. Relative CPUE by depth strata for smallmouth bass collected in warm water assessment netting in New York waters of Lake Ontario's eastern basin, 1980-2004. Relative CPUE on Y-axis, year collected on X-axis.

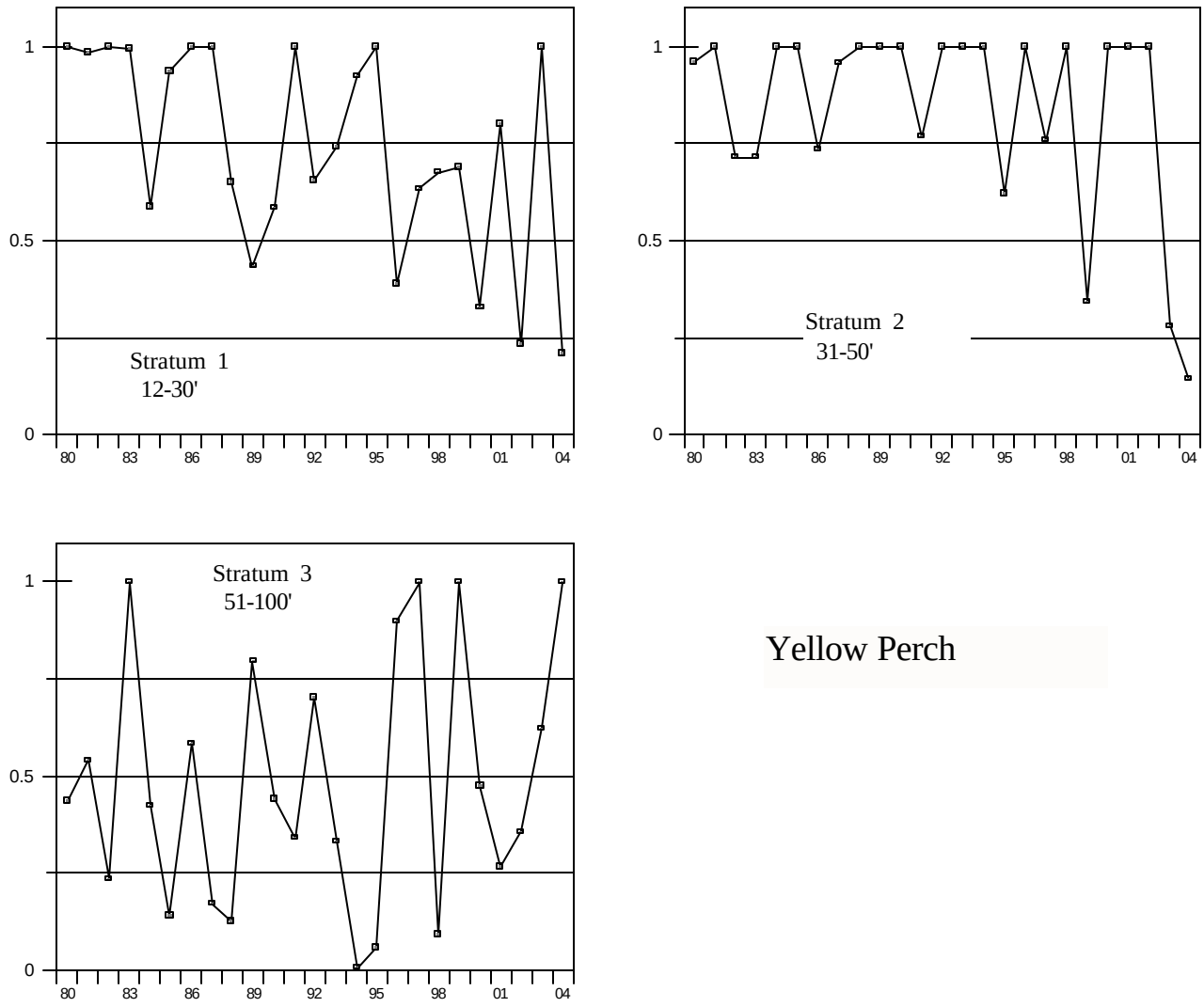

Figure A8. Relative CPUE by depth strata for yellow perch collected in warm water assessment netting in New York waters of Lake Ontario's eastern basin, 1980-2004. Relative CPUE on Y-axis, year collected on X-axis.

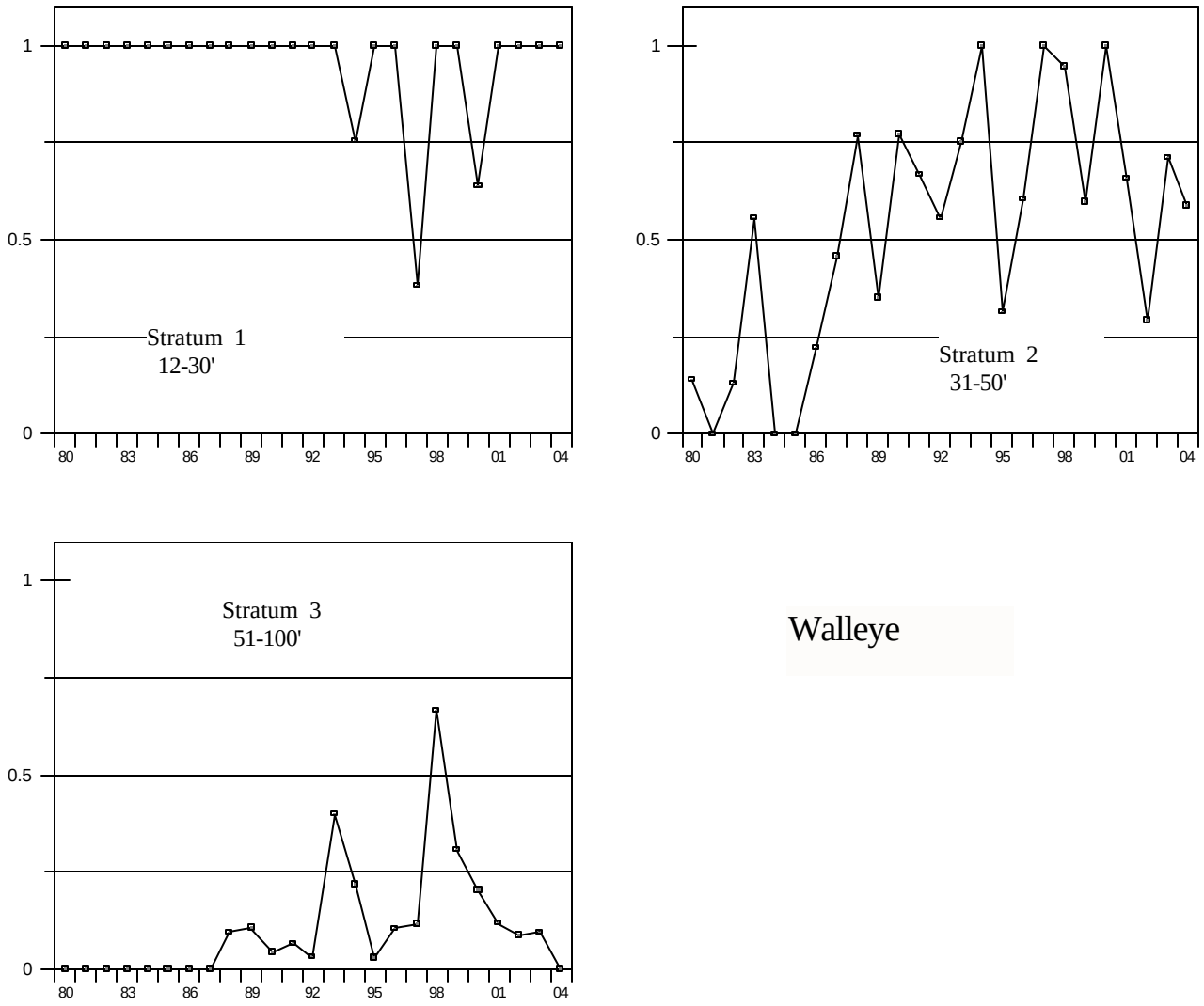

Figure A9. Relative CPUE by depth strata for walleye collected in warm water assessment netting in New York waters of Lake Ontario's eastern basin, 1980-2004. Relative CPUE on Y-axis, year collected on X-axis.

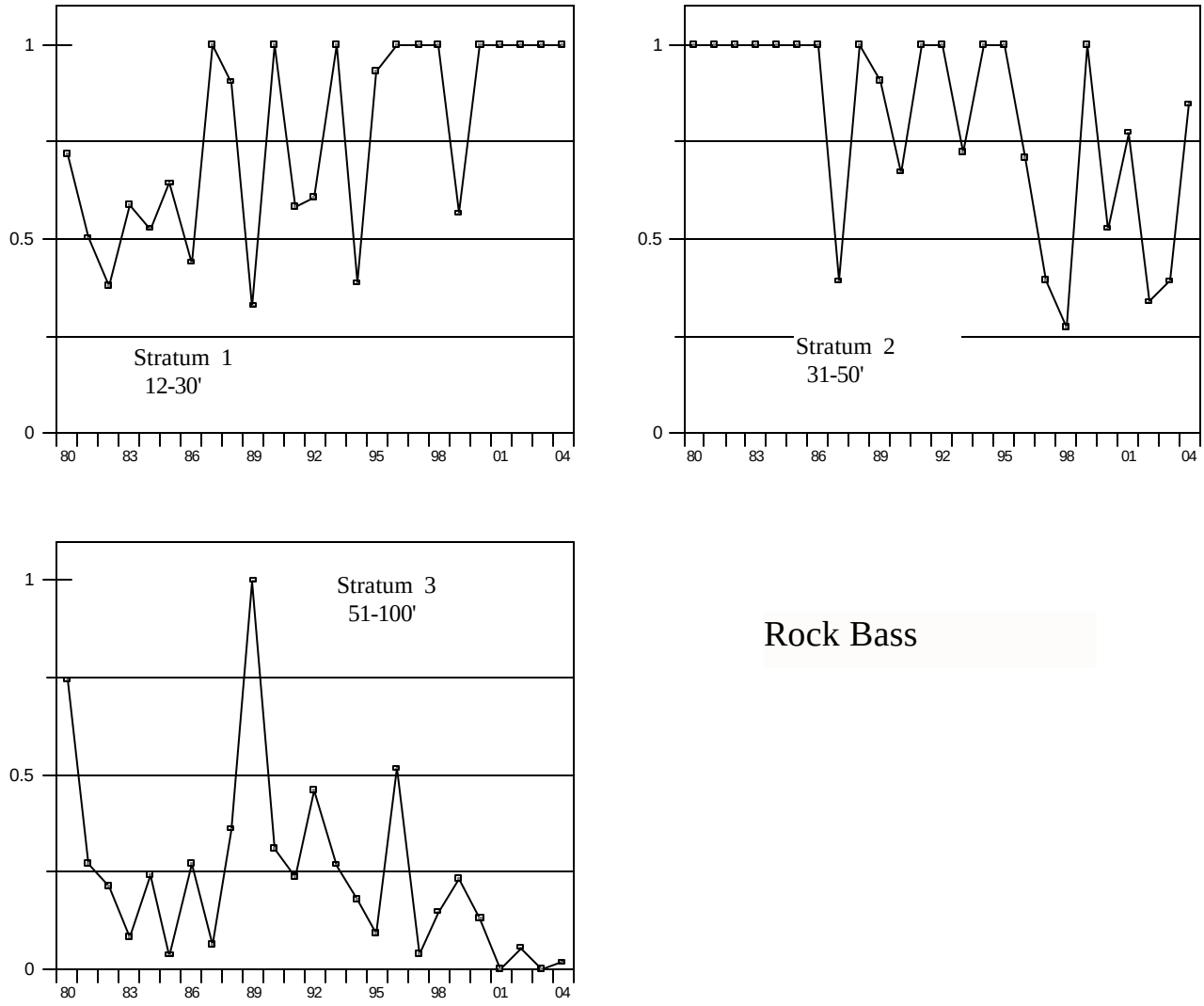

Figure A10. Relative CPUE by depth strata for rock bass collected in warm water assessment netting in New York waters of Lake Ontario's eastern basin, 1980-2004. Relative CPUE on Y-axis, year collected on X-axis.

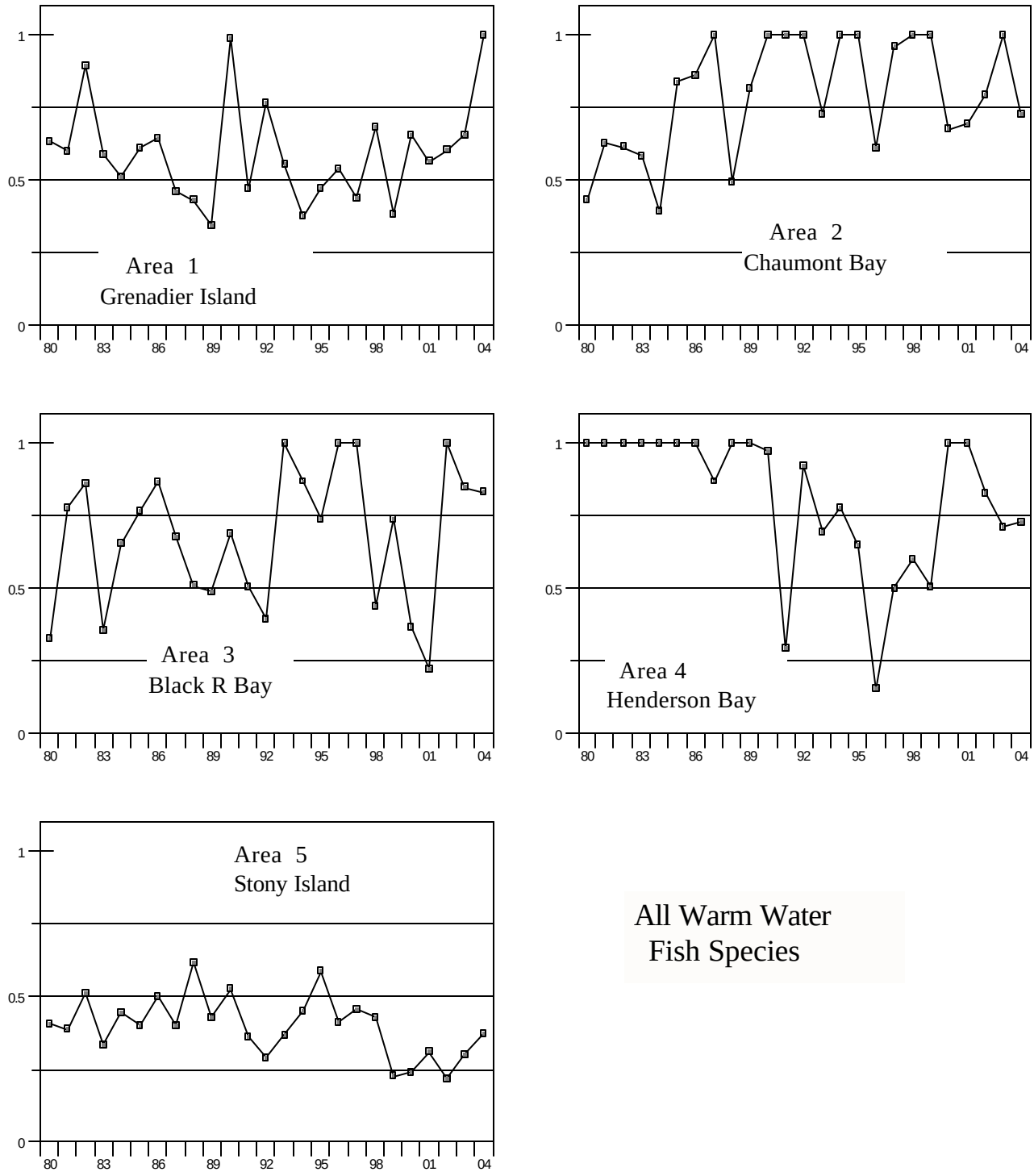

Figure A11. Relative CPUE by geographic area for all warm water fish species collected in depth strata 1 and 2 in warm water assessment netting in New York waters of Lake Ontario's eastern basin, 1980-2004. Relative CPUE on Y-axis, year collected on X-axis.

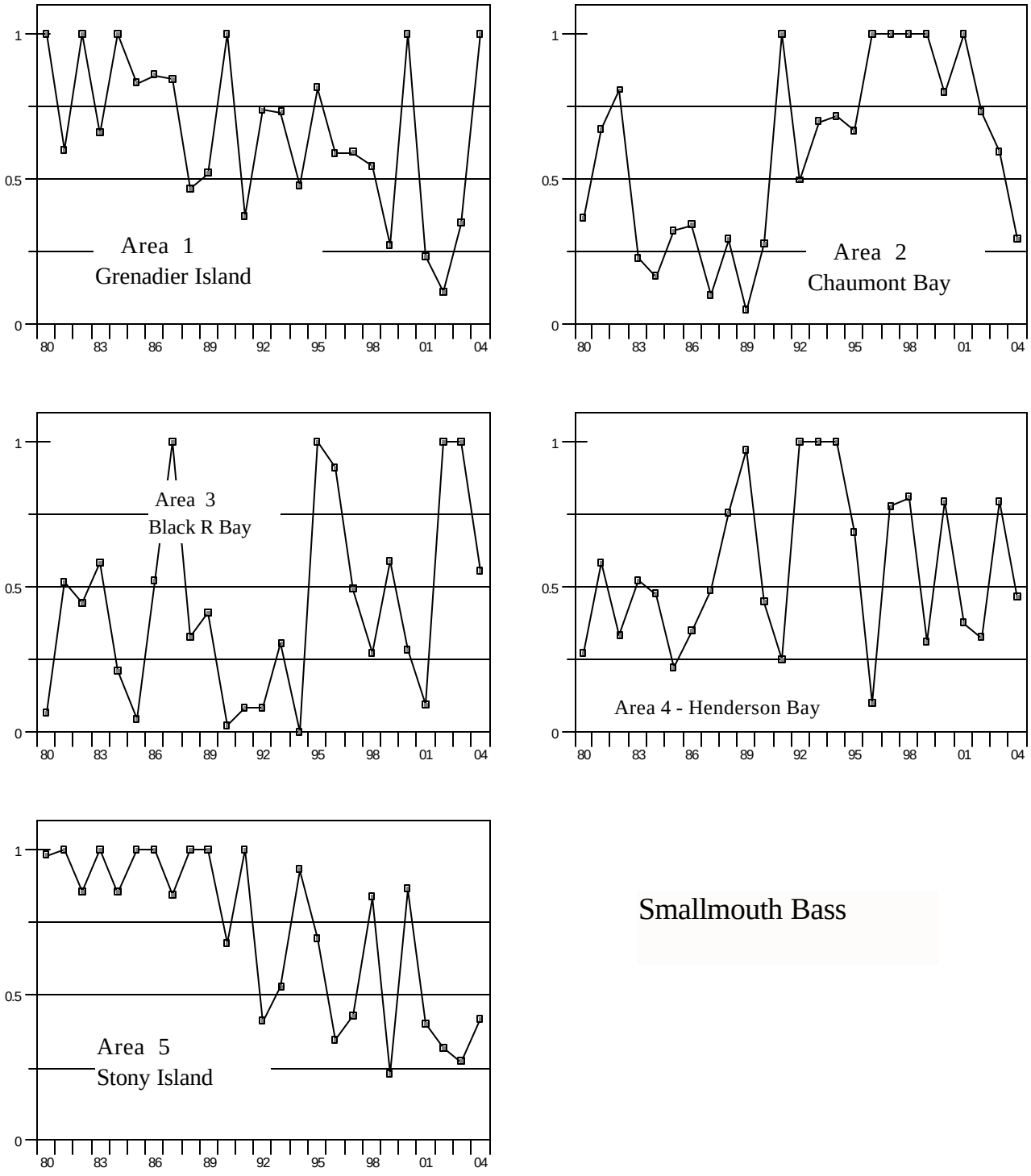

Figure A12. Relative CPUE by geographic area for smallmouth bass collected in depth strata 1 and 2 in warm water assessment netting in New York waters of Lake Ontario's eastern basin, 1980-2004.

Relative CPUE on Y-axis, year collected on X-axis.

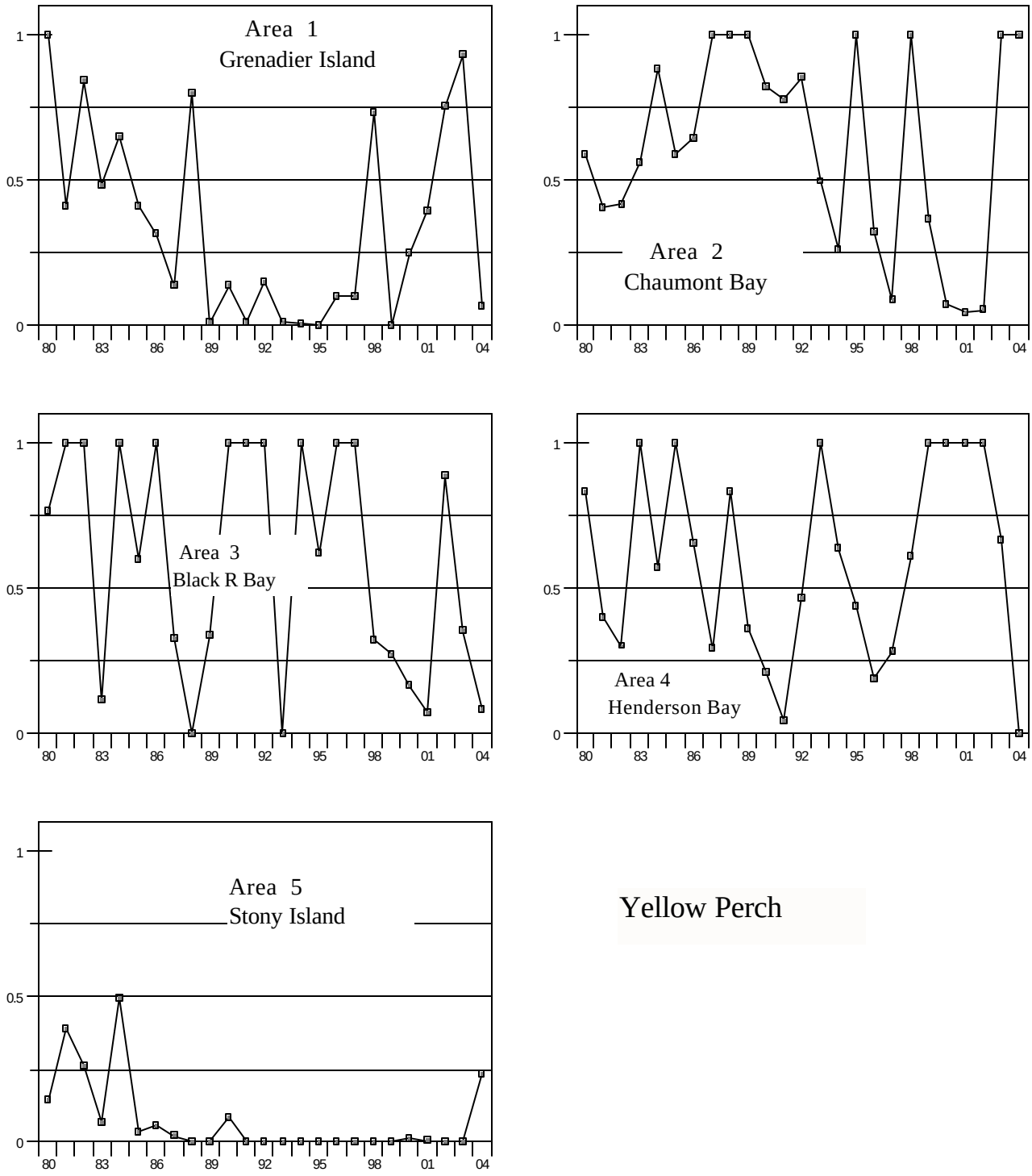

Figure A13. Relative CPUE by geographic area for yellow perch collected in depth strata 1 and 2 in warm water assessment netting in New York waters of Lake Ontario's eastern basin, 1980-2004. Relative CPUE on Y-axis, year collected on X-axis.

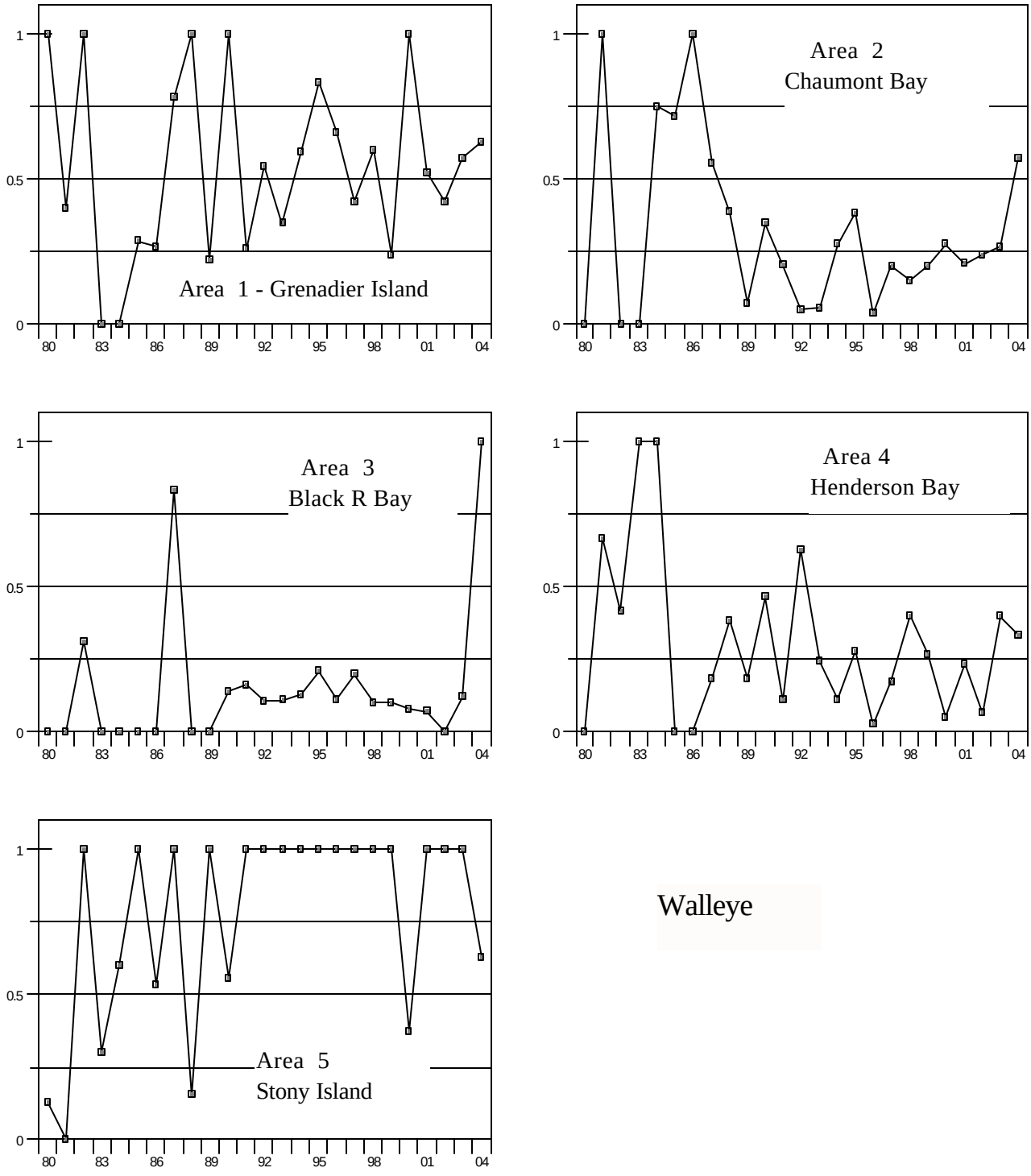

Figure A14. Relative CPUE by geographic area for walleye collected in depth strata 1 and 2 in warm water assessment netting in New York waters of Lake Ontario's eastern basin, 1980-2004. Relative

CPUE on Y-axis, year collected on X-axis.

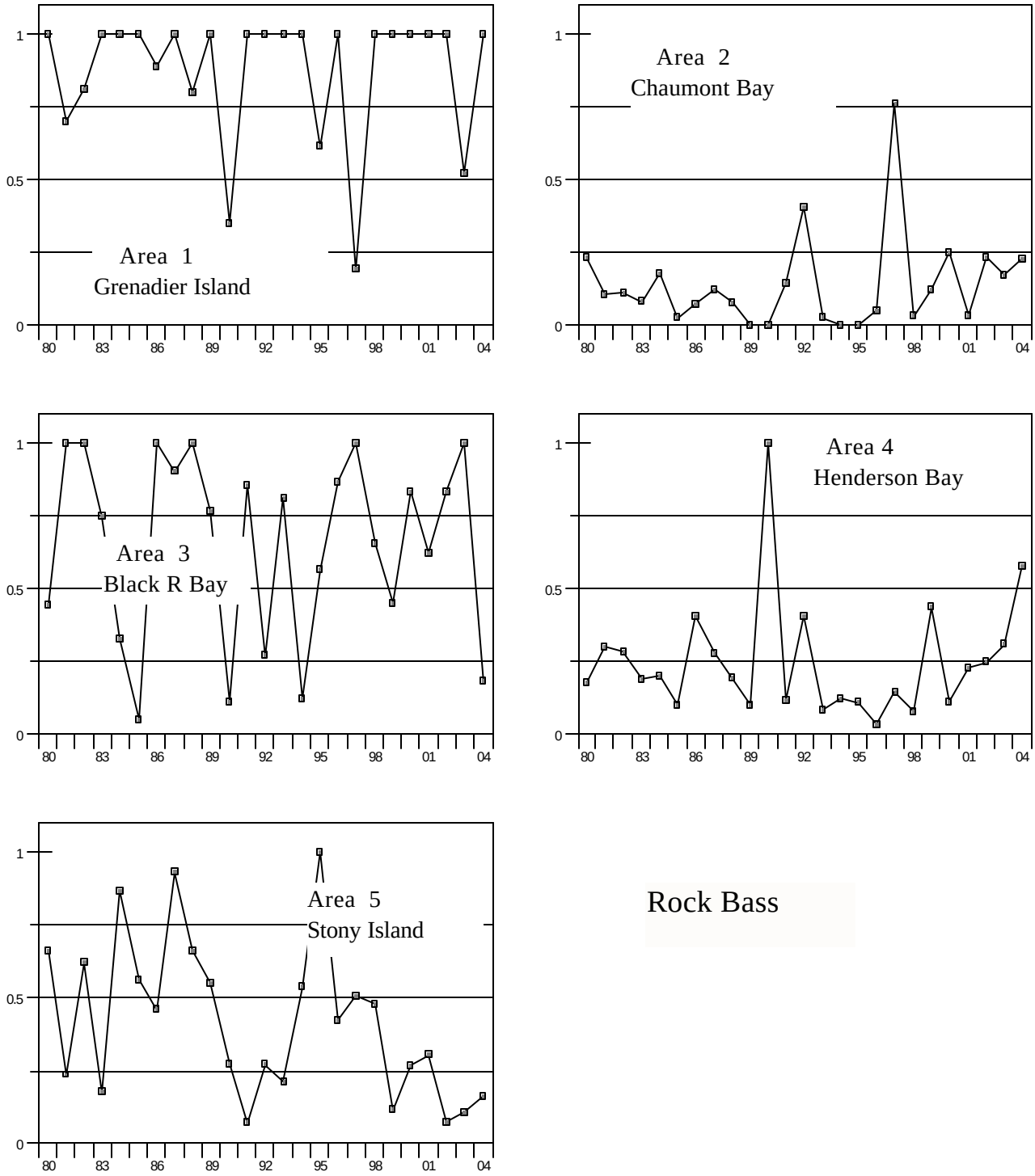

Figure A15. Relative CPUE by geographic area for rock bass collected in depth strata 1 and 2 in warm water assessment netting in New York waters of Lake Ontario's eastern basin, 1980-2004.

Relative CPUE on Y-axis, year collected on X-axis.