

An Evaluation of Changes in the Yellow Perch
(*Perca flavescens*) Population of Grafton Lake, Kejimikujik
National Park After Dam Removal

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SUMMARY

During the period between July 1993 and September 1996, the Centre for Wildlife and Conservation Biology of Acadia University, in partnership with a number of other agencies, carried out studies to determine the physical, chemical and biological changes occurring in Grafton Lake, Kejimikujik National Park as a result of removal of the dam. As part of this study, a number of surveys were conducted to assess the changes occurring in the dominant fish populations of the lake. However, the data from these surveys was never fully analyzed with respect to evaluating what, if any, changes had occurred in the fish populations. To partially remedy this deficiency, as well as provide a database spanning a longer time period, a survey of the yellow perch (*Perca flavescens*) population was carried out in 2000 and the results of all surveys subjected to a comparative analysis.

In order to ensure comparability of the results, the analysis was limited to fish collected by minnow traps during the months of May and June at transects located at Emily's Bay and Grafton Brook. The results indicate that significant change has occurred in the yellow perch population since removal of the dam. These changes include an increase in the age of the dominant age class, an increase in mean fork length and weight of the population, an increase in the rate of growth and a decrease in survival rates.

Many of these changes may be the result of increased predation on the yellow perch population as a consequence of removing the dam. Removal of the dam is likely to have allowed more predatory fish to enter Grafton Lake. In addition, the lowering of water level that accompanied removal of the dam temporarily eliminated a significant portion of the littoral zone macrophyte community, which serves as an important area of cover for small fish, thus making them more susceptible to predation.

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1. Introduction

In 1938 the Federal Department of Fisheries constructed a dam on Grafton Brook in order to meet the water requirements for a salmon hatchery. The dam resulted in enlargement of the surface area of Grafton Lake from ca. 200 to 270 km². The hatchery ceased operation in 1972 and in the early 1990s the Park Management team of Kejimikujik National Park decided to remove the dam allowing the system to revert to its original physical characteristics. This presented a unique opportunity to study and document the successional changes occurring in the terrestrial and aquatic communities within and around the lake resulting from removal of the dam. During the period July 1993 - September 1996 the Centre for Wildlife and Conservation Biology of Acadia University, together with a number of other agencies, carried out a multidisciplinary study to obtain data on the physical, chemical and biological characteristics of the lake prior to and after removal of the dam. Results of the study indicated significant changes in the lake's biology as a result of the decreased water depth and surface area, and it was concluded that changes will likely continue to occur for various lengths of time depending on the particular processes of interest (Brylinsky and others 1995; 1997).

Although the fish populations present in Grafton Lake formed a major portion of the monitoring effort of these studies, the data obtained was never adequately analyzed as a result of funding cuts to the Federal Department responsible for this portion of the project. This was unfortunate as it is likely that the fish community of the lake would experience major changes since the dam acted as a barrier to fish passage both into and out of the lake (Drysdale 1994).

In order to correct this shortcoming, and to provide a somewhat longer-term database for evaluation of changes that may have resulted from removal of the Grafton Lake dam, an additional fish survey was carried during 2000. The species chosen for analysis was yellow perch (*Perca flavescens*), largely because the database for this species is the most comprehensive for the years in which monitoring occurred. The objective was to carry out a comparative analysis of the population characteristics of this species to determine the extent to which this population has changed over the four-year period since complete removal of the dam.

2. Previous Ichthyology Studies at Grafton Lake

Kerekes (1975) carried out a preliminary survey of the fish populations present in Grafton Lake. Eight species of fish were reported. These included white perch (*Morone americana*), yellow perch (*Perca flavescens*), brown bullhead (*Ictalurus natalis*), white sucker (*Catostomus commersoni*), brook trout (*Salvelinus fontinalis*), golden shiner

(*Notemigonus cryoleucas*), ninespine stickleback (*Pungitius pungitius*) and banded killifish (*Fundulus diaphanous*). Later studies (summarized by Brylinsky and others 1995; 1997) revealed the presence of American eel (*Anguilla rostrata*) and creek chub (*Semotilus atromaculatus*).

The only comprehensive surveys of the fish populations in Grafton Lake were those carried out as part of the Grafton Lake Ecological Restoration Monitoring Project. Studies were initiated at the beginning of the project in 1993 and continued until the project ended in 1996. The populations studied most intensively during this period included white and yellow perch. These were the most abundant fish species in the lake and the only species collected in numbers great enough to allow detailed analyses of population characteristics. The initial study in 1993 was carried out by W. White, then of the Federal Department of Fisheries and Oceans, and is somewhat restricted with respect to the amount of data collected and the analyses carried out. This was largely due to delays in initiating the project that resulted in sample sizes too small for adequate analyses. The 1994 study, which is the most comprehensive, was carried out as part of an Honours Thesis (Olsen 1996) under the supervision of M. Dadswell of Acadia University. Summer research assistants working on the Grafton Lake project carried out the 1995 and 1996 fish surveys.

3. Methods

In order to ensure comparable data, similar methodologies were employed during all surveys. Yellow perch were collected using minnow traps baited with dog food. The traps were set for a period of 20-24 hrs beginning in the afternoon and ending the following day at about the same time. The traps were set along a number of transects located at Emily's Bay, Grafton Brook, Minard Brook and Sweeny Brook. Not all of these sites, however, were sampled during all years (see below).

After recovery of the minnow traps, the fish collected were transported to a field station, measured for fork length to the nearest mm and weighed to the nearest 0.1 gm. Scale samples for age determination were collected from an area just below the dorsal fin. In those instances when the number of fish collected was large (>200) the collection was randomly sub-sampled.

Scales were aged by mounting at least four scales from each fish between two glass slides and reading the ages with a compound microscope under 40X magnification.

Data analysis was carried out using SYSTAT. For probabilities used in analysis of variance (ANOVA) hypothesis tests, a Bonferroni adjustment was used to reduce the chance of erroneous significance when calculating multiple probabilities. A significance level of 95% ($p = 0.05$) was used.

4. Database Used for Analyses

The database for the yellow perch population consists of the time and location of each collection, fork length, wet weight and age. The complete database is contained in Appendix I. Table 1 is a summary of the number of fish collected and the number of fish processed for fork length, weight and age during each survey year.

Table 1. Summary of amount of data collected during each survey year.

Year	Number Collected	Number Measured for Fork Length	Number Weighed	Number Aged
1993	361	34	2	34
1994	1378	474	282	134
1995	732	192	151	79
1994	542	227	227	133
2000	560	220	220	115
Totals	3573	1147	882	495

All of the data listed in Table 1, except that collected in 1993, was used in the catch per unit effort analysis. The 1993 data could not be included because of incomplete records of the number of traps set. The 1993 data was also excluded from the comparative analyses of population characteristics. Although an adequate number of fish were collected in 1993, only 34 were measured and aged, and only two were weighed. In addition, most of the data for 1993 were for fish collected during August and September, whereas most collections in other years were made during May and June. Since the majority of fish collected were young fish likely to increase significantly in size during a single growing season, comparisons of lengths and weights between years was considered to be invalid unless fish were sampled at about the same time each year. Therefore, only data on length, weight and age obtained from fish captured during May and June were included in the analysis. Unfortunately, restricting the database to samples collected during May and June also reduced the 1994 data available for analysis of length-age relationships since all but five of the fish aged during 1994 were collected during the months of July and August.

There was also considerable variation in the locations where fish were collected. The most comprehensive survey was carried out in 1994 and fish were collected from five different sites. However, during all other surveys fish collections were made at only two sites, Emily's Bay and Grafton Brook. In order to reduce the number of factors that may account for between year variability, only fish collections made at these two sites were included in the analysis. In most cases, an ANOVA indicated little difference, either within or between years, in the characteristics of yellow perch collected at either of these sites (with the exception of catch per unit effort) and the data from both sites was combined for between year comparisons of population characteristics.

Table 2 summarizes the number of samples used for analyses once the database was limited to fish collected during the months of May and June at either the Emily's Bay or Grafton Brook site.

Table 2. Summary of the amount of data used in the comparative analysis of population characteristics.

Year	Number Collected	Number Measured for Fork Length	Number Weighed	Number Aged
1994	342	342	175	5
1995	130	130	90	64
1994	140	140	140	82
2000	220	219	219	115
Totals	3573	1151	882	499

5. Results

5.1. Catch per Unit Effort

Information on the number of minnow traps set and the number of fish captured in each trap allowed for a relatively simple analysis, based on catch per unit effort (CPUE), that provides some indication of the variation in numbers of fish present each year. Table 3 summarizes the data available for this analysis and Figure 1 shows the yearly variation in CPUE at each site.

Table 3. Number of fish caught and catch per trap for each sampling day.

Site	Year	Date	Number of Fish	Number of Traps	Catch per Trap
Grafton Brook	1994	20 May	177	14	12.6
"	"	23 June	207	13	15.9
Emily's Bay	"	26 May	118	9	13.1
"	"	23 June	71	9	7.9
Grafton Brook	1995	17 May	56	8	7.0
"	"	25 May	122	8	15.3
"	"	12 June	39	5	7.8
"	"	26 June	67	9	7.4
Emily's Bay	"	17 May	98	8	12.3
"	"	24 May	170	6	28.3
"	"	12 June	10	7	1.4
"	"	29 June	10	9	1.1
Grafton Brook	1996	20 May	23	11	2.1
"	"	3 June	43	12	3.6
"	"	19 June	52	7	7.4
Emily's Bay	"	20 May	256	12	21.3
"	"	6 June	33	11	3.0
"	"	17 June	12	12	1.0
Grafton Brook	2000	12 May	44	5	8.8
"	"	26 May	19	5	3.8
"	"	9 June	12	5	2.4
Emily's Bay	"	12 May	57	5	11.4
"	"	26 May	60	5	12.0
"	"	9 June	28	5	5.6

The results for Grafton Brook suggest that CPUE has decreased at this site beginning at about the time of removal of the dam and continuing until 2000. The results for Emily's Bay show much more variation compared to Grafton Brook, but CPUE at this site also appears to have decreased following removal of the dam.

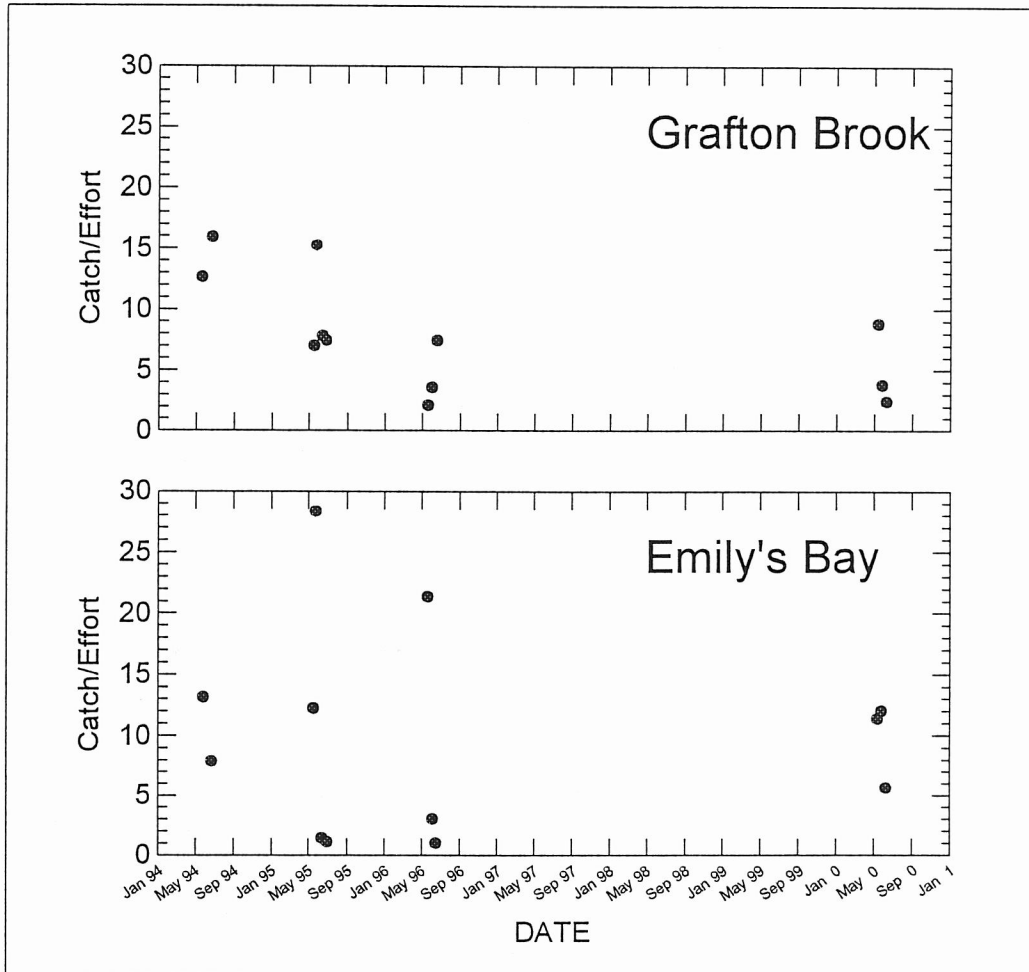


Figure 1. Catch per unit effort for each year at Emily's Bay and Grafton Brook.

5.2 Length-frequency relationships

Figure 2 shows the changes in the length-frequency distribution for each of the four years for which data is available. It appears that considerable change has occurred.* During 1994, smaller fish dominated the samples. In 1995, slightly larger fish dominated the samples, which may simply be the result of the increase in size of a strong year class represented by the smaller fish in 1994. During 1996, a still larger size class dominated

* It should be noted that the length-frequency distributions presented here are based on the size of fish that are caught by minnow traps, which most likely select against the smaller and larger size classes. As a result, they probably do not represent the true size distribution of the population. However, the between year comparisons should reflect any changes in length-frequency relationships that have occurred.

the population, which may again reflect a further increase in size of the same year class. The length-frequency distribution in 2000 suggests a more even distribution of size classes.

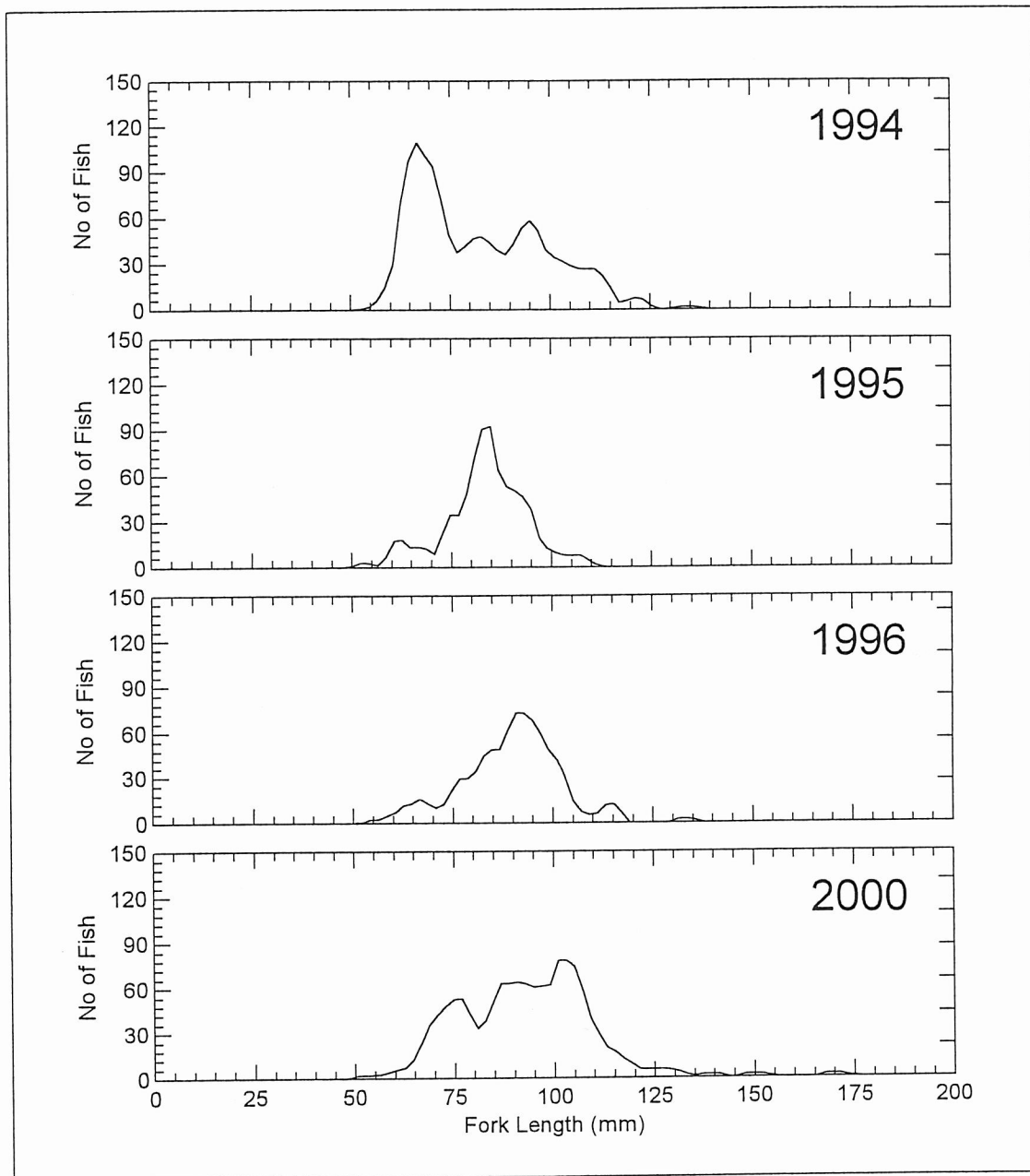


Figure 2. Length-frequency distribution for yellow perch collected during May and June of each year.

5.3 Length-weight relationships

Analysis of length-weight relationships was carried out using linear regression analysis on logarithmic transformed weights and lengths (Figure 3). The regression coefficients for the slopes are less than three for all years which is considered indicative of a poorly

growing population. An ANOVA indicated that the slope for 2000 differs significantly from all other years and that there is no significant difference in the slopes for the remaining years. The regression slope for 2000 is higher than in other years, indicating that the increase in weight per unit length has increased, which suggests that growing conditions have improved since removal of the dam.

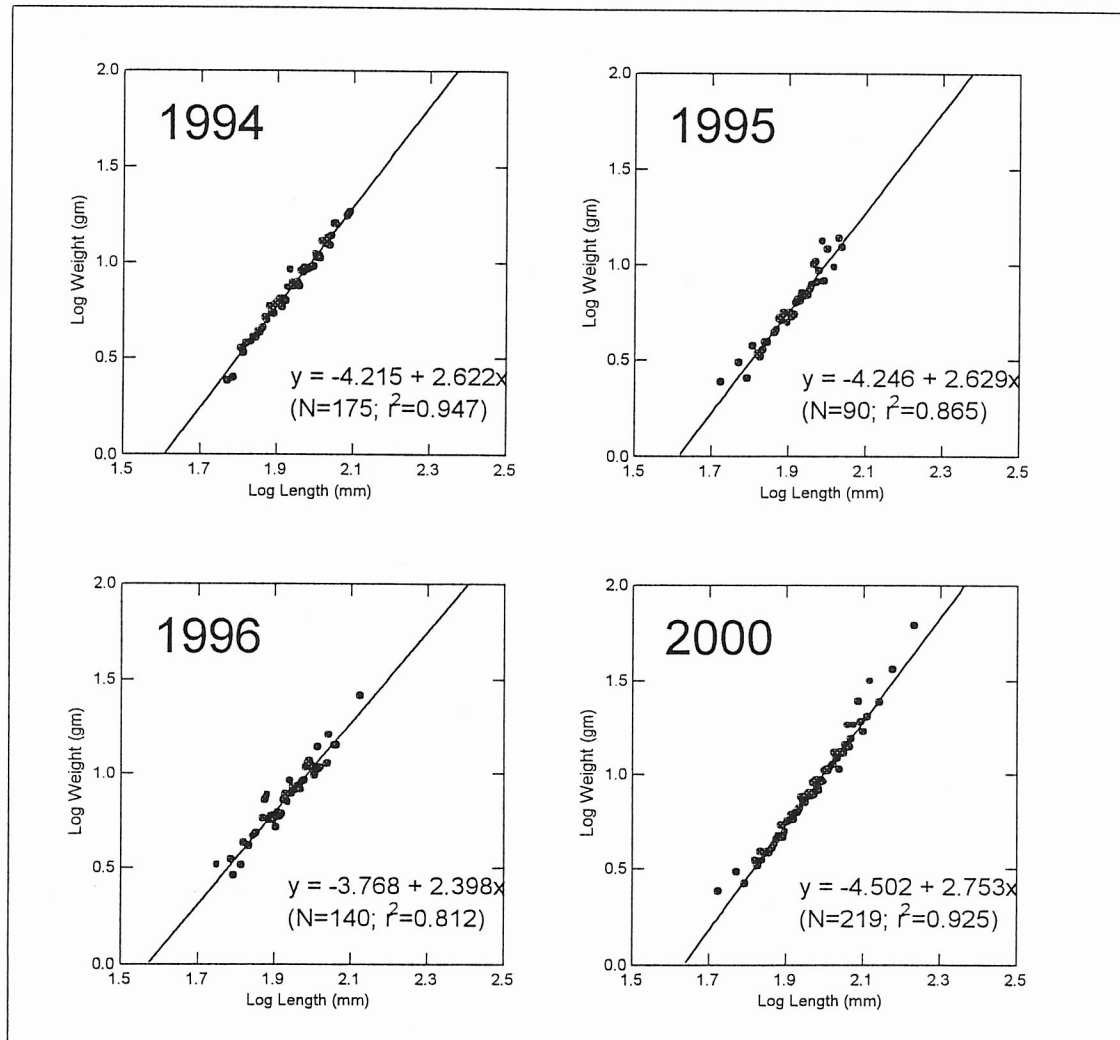


Figure 3. Length-weight relationships for each year.

5.4 Comparison of Mean Length and Weight

The average length and weight of the yellow perch population for each year is shown in Figure 4. Although the differences are small, there is an obvious trend of increased length and weight since removal of the dam. An ANOVA indicated significant differences in length between all years except between 1994 and 1995 and between 1996 and 2000. In the case of weight, significant differences exist between 2000 and all other years.

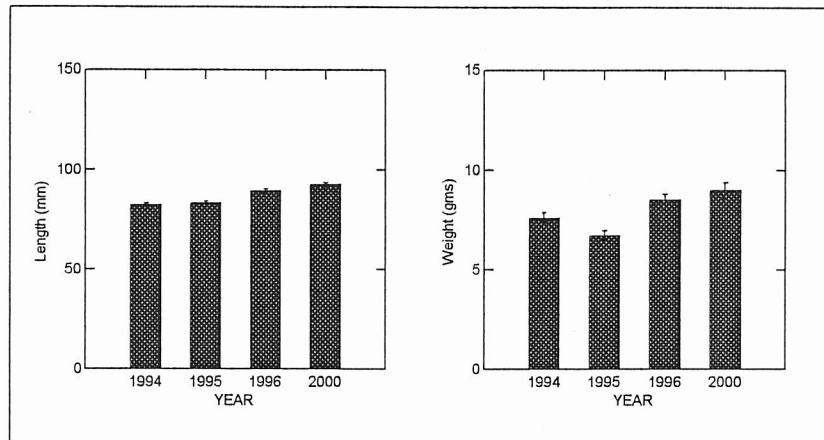


Figure 4. Mean length and weight of yellow perch for each year of the survey (error bars are one standard error of the mean).

5.5 Length-age Relationships

Figure 5 shows the relationship between fork length and age for each year (1994 is not included because of insufficient age data for fish collected during May and June). The data for 1995 and 1996 show little difference in the rate of increase in length between age groups. The results for 2000, however, show a much larger rate of increase in length with age, further indicating that the yellow perch population is in a healthier condition since removal of the dam.

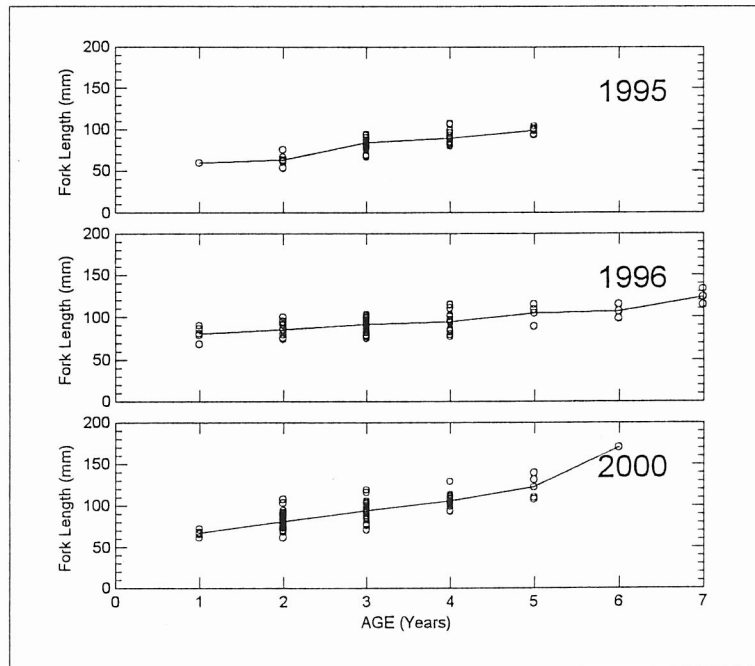


Figure 5. Fork length-age relationship for each year.

Figure 6 shows the variation in fork length and weight with age grouped by year. In almost all cases the mean fork length and weight for each age group was greatest in 2000, particularly for fish three years or greater in age which would represent those entering the population at about the time the dam was being removed.

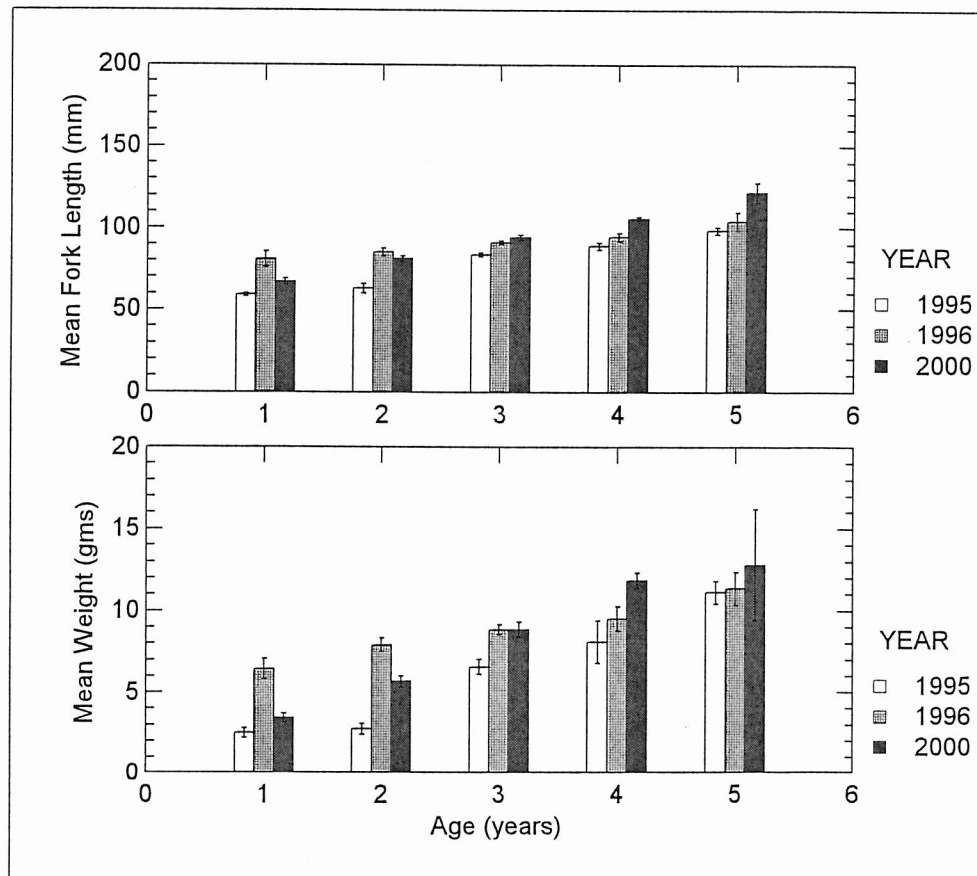


Figure 6. Variation in fork length and weight with age grouped by year.

5.6 Survival Rates

A simple analysis of survival rate can be made on the basis of the number of fish collected in each age class. Percent survival is calculated as $(N_{i+t}/N_i) \times 100$ where N_i is the number of fish of age i and N_{i+t} is the number of fish one year (or more) older. The rates were calculated only for the three to five year age interval since it was assumed that only these ages were sampled with equal efficiency by the minnow traps. All of the data available was used in the analysis, i.e., it was not limited to fish collected only during the months of May and June. Figure 7 shows the frequency distribution (as percentages to aid comparison) of each age class for each year.

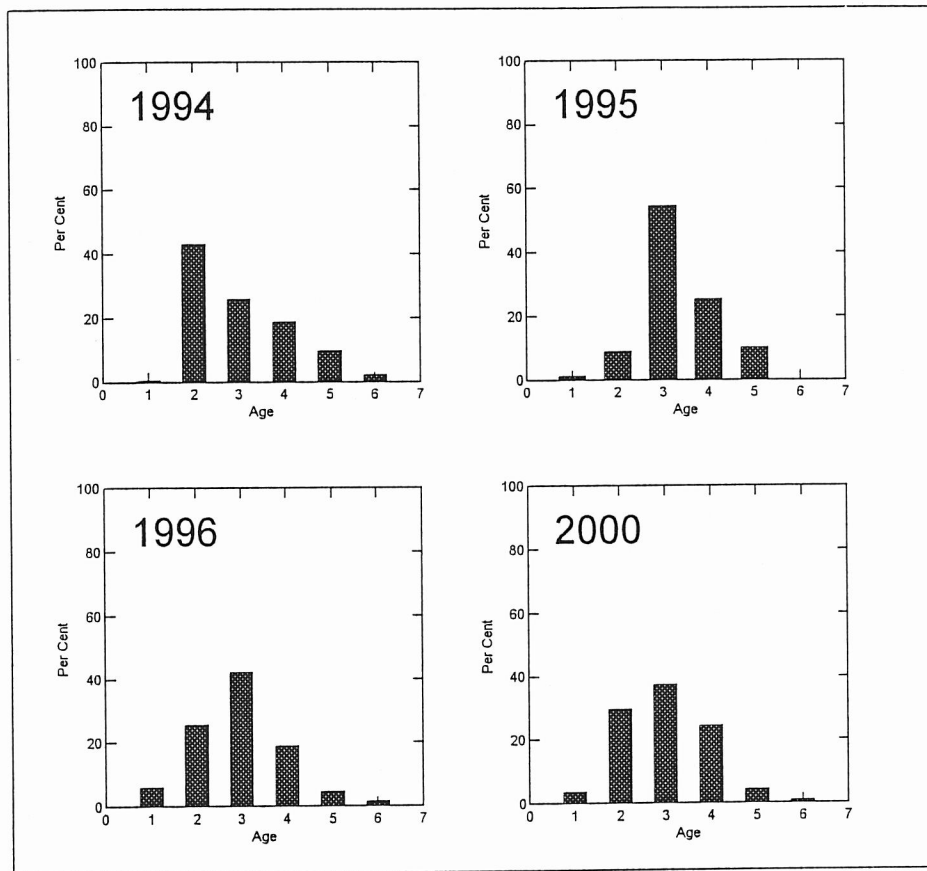


Figure 7. Frequency distribution of age classes collected by minnow traps.

Table 4 lists the associated percent survival rates. There is an obvious trend of decreased survival since removal of the dam.

Table x. Percent survival from age 3 to age 5.

YEAR	% SURVIVAL
1994	37.3
1995	18.6
1996	10.7
2000	11.6

6. Discussion

It appears there have been a number of changes in the yellow perch population of Grafton Lake since removal of the dam. These include a reduction in the size of the population at the Grafton Brook study site, a change in the age structure of the population towards a lower proportion of young fish, increases in growth rate, mean fork length and weight of fish, and a decrease in survival rate.

Many of these changes could be explained by an increase in the predation rate of the yellow perch population. This would cause a thinning of the population leading to lower numbers of fish, enhanced growth rates of those escaping predation and a change in the age structure of the population.

These results are not surprising since removal of the dam is likely to have had both direct and indirect effects leading to an increase in predation of the yellow perch population. The direct effect would largely be due to an increase in number of predatory fish that now have access to Grafton Lake as a result of removal of the dam, which acted as barrier to fish movement into and out of the lake. It is also possible that removal of the dam has allowed yellow perch to move out of the lake, and this may also have reduced the size of the population.

An indirect effect of removal of the dam that is likely to have created a temporary increase in predation rates may have resulted from changes in the littoral zone plant community, an important habitat for young fish. Prior to removal of the dam, the littoral zone plant community was well developed and contained a diversity of aquatic macrophytes. With removal of the dam and subsequent lowering of the lake's water depth by two meters, this community was largely destroyed, and with it an important habitat for young yellow perch, especially with respect to providing cover to escape predation. Although a new littoral zone macrophyte community is developing, it is far from the size and diversity of what existed before the dam was removed. As a result, if this is an important factor, it is likely that more changes in the yellow perch population will occur, at least until the littoral zone stabilizes.

7. Acknowledgements

I would like to thank Paul Olshefsky of Parks Canada for providing logistic support during the study, Fred Payne for his able help in the field and Jamie Gibson of the Acadia Centre for Estuarine Research for reviewing and commenting on the report.

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8. Appendix I

Yellow Perch Database for Surveys Carried Out at Grafton Lake Between 1993 and 2000

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
21-Jul-93	Beaver Lodge	78	10.0	2
22-Jul-93	Beaver Lodge	65		1
22-Jul-93	Beaver Lodge	75		2
22-Jul-93	Beaver Lodge	110		4
22-Jul-93	Grafton	65		2
22-Jul-93	Grafton	95	13.0	3
22-Jul-93	Minard	53		1
22-Jul-93	Minard	60		1
22-Jul-93	Minard	80		2
22-Jul-93	Sweeny	63		2
22-Jul-93	Sweeny	70		2
22-Jul-93	Sweeny	80		1
22-Jul-93	Sweeny	95		2
3-Aug-93	Emily	61		1
3-Aug-93	Emily	66		1
3-Aug-93	Emily	74		1
3-Aug-93	Emily	78		1
3-Aug-93	Minard	42		1
3-Aug-93	Minard	79		2
3-Aug-93	Mink Pt.	67		2
3-Aug-93	Mink Pt.	72		1
3-Aug-93	Sweeny	42		1
3-Aug-93	Sweeny	65		2
3-Aug-93	Sweeny	65		2
3-Aug-93	Sweeny	65		1
3-Aug-93	Sweeny	93		2
3-Sep-93	Beaver Lodge	52		1
3-Sep-93	Beaver Lodge	52		1
3-Sep-93	Beaver Lodge	53		1
3-Sep-93	Hobbit	40		1
3-Sep-93	Hobbit	42		1
3-Sep-93	Hobbit	46		1
3-Sep-93	Hobbit	94		2
3-Sep-93	Sweeny	45		1
20-May-94	Grafton	56		
20-May-94	Grafton	59		
20-May-94	Grafton	59		
20-May-94	Grafton	60		
20-May-94	Grafton	61		
20-May-94	Grafton	61		
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20-May-94	Grafton	62		
20-May-94	Grafton	63		

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Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
20-May-94	Grafton	63		
20-May-94	Grafton	64		
20-May-94	Grafton	64		
20-May-94	Grafton	64		
20-May-94	Grafton	64		
20-May-94	Grafton	64		
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20-May-94	Grafton	68		
20-May-94	Grafton	68		
20-May-94	Grafton	69		

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Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
20-May-94	Grafton	69		
20-May-94	Grafton	69		
20-May-94	Grafton	69		
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20-May-94	Grafton	72		
20-May-94	Grafton	72		
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20-May-94	Grafton	72		
20-May-94	Grafton	74		
20-May-94	Grafton	74		
20-May-94	Grafton	77		
20-May-94	Grafton	78		
20-May-94	Grafton	78		
20-May-94	Grafton	80		
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20-May-94	Grafton	87		
20-May-94	Grafton	88		
20-May-94	Grafton	88		
20-May-94	Grafton	88		
20-May-94	Grafton	88		
20-May-94	Grafton	90		
20-May-94	Grafton	91		

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Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
20-May-94	Grafton	93		
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20-May-94	Grafton	94		
20-May-94	Grafton	94		
20-May-94	Grafton	94		
20-May-94	Grafton	94		
20-May-94	Grafton	94		
20-May-94	Grafton	95		
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20-May-94	Grafton	109		
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20-May-94	Grafton	110		
20-May-94	Grafton	113		
20-May-94	Grafton	113		
20-May-94	Grafton	113		
20-May-94	Grafton	113		
20-May-94	Grafton	115		
20-May-94	Grafton	116		
20-May-94	Grafton	121		
20-May-94	Grafton	134		
26-May-94	Emily	60		
26-May-94	Emily	65		
26-May-94	Emily	67		
26-May-94	Emily	68		
26-May-94	Emily	68		
26-May-94	Emily	71		
26-May-94	Emily	73		
26-May-94	Emily	77		
26-May-94	Emily	82		
26-May-94	Emily	84		
26-May-94	Emily	85		
26-May-94	Emily	88		
26-May-94	Emily	88		
26-May-94	Emily	90		
26-May-94	Emily	91		
26-May-94	Emily	91		
26-May-94	Emily	94		
26-May-94	Emily	94		

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
26-May-94	Emily	95		
26-May-94	Emily	95		
26-May-94	Emily	97		
26-May-94	Emily	97		
26-May-94	Emily	97		
26-May-94	Emily	99		
26-May-94	Emily	100		
26-May-94	Emily	101		
26-May-94	Emily	104		
26-May-94	Emily	105		
26-May-94	Emily	113		
26-May-94	Emily	115		
20-Jun-94	Minard	66		1
20-Jun-94	Minard	75	5.0	1
20-Jun-94	Minard	88	7.7	2
20-Jun-94	Minard	94	10.5	2
20-Jun-94	Minard	110	13.3	3
23-Jun-94	Emily	66	3.4	
23-Jun-94	Emily	66	3.8	
23-Jun-94	Emily	68	4.3	
23-Jun-94	Emily	68	3.4	
23-Jun-94	Emily	69	4.1	
23-Jun-94	Emily	71	4.4	
23-Jun-94	Emily	73	4.5	
23-Jun-94	Emily	73	3.7	
23-Jun-94	Emily	80	6.3	
23-Jun-94	Emily	84	6.4	
23-Jun-94	Emily	84	6.1	
23-Jun-94	Emily	88	8.1	
23-Jun-94	Emily	92	8.1	
23-Jun-94	Emily	93	8.0	
23-Jun-94	Emily	95	9.4	
23-Jun-94	Emily	95	8.4	
23-Jun-94	Emily	95	8.6	
23-Jun-94	Emily	97	8.9	
23-Jun-94	Emily	97	12.0	
23-Jun-94	Emily	99	10.9	
23-Jun-94	Emily	103	9.6	
23-Jun-94	Emily	103	8.8	
23-Jun-94	Emily	104	13.3	
23-Jun-94	Emily	107	13.4	
23-Jun-94	Emily	108	12.4	
23-Jun-94	Emily	110	14.9	
23-Jun-94	Emily	113	15.7	
23-Jun-94	Grafton	64	3.3	
23-Jun-94	Grafton	65	3.4	
23-Jun-94	Grafton	65	3.1	

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
23-Jun-94	Grafton	66	4.0	
23-Jun-94	Grafton	66	3.3	
23-Jun-94	Grafton	68	3.4	
23-Jun-94	Grafton	69	4.0	
23-Jun-94	Grafton	69	3.9	
23-Jun-94	Grafton	69	3.9	
23-Jun-94	Grafton	70	3.8	
23-Jun-94	Grafton	70	4.5	
23-Jun-94	Grafton	70	3.8	
23-Jun-94	Grafton	70	4.3	
23-Jun-94	Grafton	70	3.9	
23-Jun-94	Grafton	71	4.4	
23-Jun-94	Grafton	71	3.9	
23-Jun-94	Grafton	71	4.9	
23-Jun-94	Grafton	71	3.9	
23-Jun-94	Grafton	71	4.5	
23-Jun-94	Grafton	72	4.4	
23-Jun-94	Grafton	72	4.9	
23-Jun-94	Grafton	72	3.9	
23-Jun-94	Grafton	72	4.0	
23-Jun-94	Grafton	73	4.1	
23-Jun-94	Grafton	73	4.6	
23-Jun-94	Grafton	74	4.9	
23-Jun-94	Grafton	74	5.4	
23-Jun-94	Grafton	74	4.9	
23-Jun-94	Grafton	77	5.2	
23-Jun-94	Grafton	77	5.3	
23-Jun-94	Grafton	77	5.7	
23-Jun-94	Grafton	78	5.4	
23-Jun-94	Grafton	79	5.8	
23-Jun-94	Grafton	79	5.2	
23-Jun-94	Grafton	80	6.1	
23-Jun-94	Grafton	80	6.1	
23-Jun-94	Grafton	81	5.3	
23-Jun-94	Grafton	81	6.0	
23-Jun-94	Grafton	83	6.0	
23-Jun-94	Grafton	84	7.2	
23-Jun-94	Grafton	85	6.1	
23-Jun-94	Grafton	87	8.5	
23-Jun-94	Grafton	90	7.2	
23-Jun-94	Grafton	90	8.6	
23-Jun-94	Grafton	91	8.9	
23-Jun-94	Grafton	92	12.7	
23-Jun-94	Grafton	92	7.6	
23-Jun-94	Grafton	92	7.9	
23-Jun-94	Grafton	92	9.6	
23-Jun-94	Grafton	93	9.9	

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
23-Jun-94	Grafton	94	7.3	
23-Jun-94	Grafton	94	9.2	
23-Jun-94	Grafton	94	10.0	
23-Jun-94	Grafton	94	9.0	
23-Jun-94	Grafton	96	8.4	
23-Jun-94	Grafton	96	8.9	
23-Jun-94	Grafton	97	8.5	
23-Jun-94	Grafton	97	9.0	
23-Jun-94	Grafton	98	9.5	
23-Jun-94	Grafton	99	9.2	
23-Jun-94	Grafton	99	8.7	
23-Jun-94	Grafton	100	11.2	
23-Jun-94	Grafton	100	12.7	
23-Jun-94	Grafton	101	10.6	
23-Jun-94	Grafton	102	11.9	
23-Jun-94	Grafton	102	10.0	
23-Jun-94	Grafton	103	13.2	
23-Jun-94	Grafton	103	11.9	
23-Jun-94	Grafton	103	11.4	
23-Jun-94	Grafton	103	9.0	
23-Jun-94	Grafton	104	12.7	
23-Jun-94	Grafton	106	10.7	
23-Jun-94	Grafton	106	13.3	
23-Jun-94	Grafton	106	14.0	
23-Jun-94	Grafton	107	13.3	
23-Jun-94	Grafton	108	14.7	
23-Jun-94	Grafton	109	12.3	
23-Jun-94	Grafton	110	13.7	
23-Jun-94	Grafton	110	15.3	
23-Jun-94	Grafton	112	16.9	
23-Jun-94	Grafton	112	15.2	
23-Jun-94	Grafton	113	16.3	
23-Jun-94	Grafton	121	17.0	
23-Jun-94	Grafton	121	18.2	
23-Jun-94	Grafton	122	18.0	
23-Jun-94	Grafton	123	18.4	
26-Jun-94	Minard	59	2.4	
26-Jun-94	Minard	61	2.5	
26-Jun-94	Minard	64	3.4	
26-Jun-94	Minard	64	4.4	
26-Jun-94	Minard	64	3.1	
26-Jun-94	Minard	64	3.7	
26-Jun-94	Minard	65	3.6	
26-Jun-94	Minard	66	4.0	
26-Jun-94	Minard	66	4.0	
26-Jun-94	Minard	66	3.9	
26-Jun-94	Minard	68	4.4	

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
26-Jun-94	Minard	69	4.3	
26-Jun-94	Minard	70	4.0	
26-Jun-94	Minard	71	4.4	
26-Jun-94	Minard	71	4.3	
26-Jun-94	Minard	71	4.2	
26-Jun-94	Minard	71	4.5	
26-Jun-94	Minard	71	4.3	
26-Jun-94	Minard	71	4.3	
26-Jun-94	Minard	72	4.7	
26-Jun-94	Minard	72	3.6	
26-Jun-94	Minard	72	4.8	
26-Jun-94	Minard	73	4.8	
26-Jun-94	Minard	73	4.8	
26-Jun-94	Minard	73	5.6	
26-Jun-94	Minard	74	5.4	
26-Jun-94	Minard	75	5.0	
26-Jun-94	Minard	75	4.6	
26-Jun-94	Minard	75	6.1	
26-Jun-94	Minard	75	4.3	
26-Jun-94	Minard	76	5.9	
26-Jun-94	Minard	77	5.6	
26-Jun-94	Minard	79	6.1	
26-Jun-94	Minard	79	7.1	
26-Jun-94	Minard	79	6.3	
26-Jun-94	Minard	80	6.5	
26-Jun-94	Minard	81	7.2	
26-Jun-94	Minard	81	7.5	
26-Jun-94	Minard	82	5.8	
26-Jun-94	Minard	83	6.9	
26-Jun-94	Minard	84	5.5	
26-Jun-94	Minard	85	7.9	
26-Jun-94	Minard	85	8.5	
26-Jun-94	Minard	86	9.2	
26-Jun-94	Minard	87	7.3	
26-Jun-94	Minard	88	7.7	
26-Jun-94	Minard	88	6.7	
26-Jun-94	Minard	91	6.3	
26-Jun-94	Minard	92	9.1	
26-Jun-94	Minard	94	10.6	
26-Jun-94	Minard	95	10.8	
26-Jun-94	Minard	96	10.6	
26-Jun-94	Minard	100	9.7	
26-Jun-94	Minard	102	11.0	
26-Jun-94	Minard	102	10.7	
26-Jun-94	Minard	107	11.4	
26-Jun-94	Minard	110	12.9	
26-Jun-94	Minard	110	13.3	

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
16-Jul-94		41	0.9	
16-Jul-94		69	3.5	1
16-Jul-94		69	3.6	1
16-Jul-94		71	4.1	1
16-Jul-94		72	4.5	1
16-Jul-94		73	4.2	
16-Jul-94		75	4.7	1
16-Jul-94		76	5.4	1
16-Jul-94		76	4.8	
16-Jul-94		77	4.8	1
16-Jul-94		78	5.9	1
16-Jul-94		79	5.1	1
16-Jul-94		98	9.3	2
16-Jul-94		99	11.7	2
16-Jul-94		113	15.1	2
16-Jul-94		117	19.2	2
17-Jul-94	Grafton	64	3.4	1
17-Jul-94	Grafton	67	3.6	1
17-Jul-94	Grafton	69	4.2	1
17-Jul-94	Grafton	70	4.3	1
17-Jul-94	Grafton	70	4.3	1
17-Jul-94	Grafton	71	4.4	1
17-Jul-94	Grafton	71	4.1	1
17-Jul-94	Grafton	71	4.8	1
17-Jul-94	Grafton	72	4.6	1
17-Jul-94	Grafton	72	4.6	1
17-Jul-94	Grafton	72	5.0	1
17-Jul-94	Grafton	73	4.8	1
17-Jul-94	Grafton	73	5.0	1
17-Jul-94	Grafton	75	4.8	1
17-Jul-94	Grafton	75	5.6	1
17-Jul-94	Grafton	75	5.0	1
17-Jul-94	Grafton	75	5.1	1
17-Jul-94	Grafton	76	5.1	1
17-Jul-94	Grafton	76	5.6	1
17-Jul-94	Grafton	77	6.0	1
17-Jul-94	Grafton	77	5.7	1
17-Jul-94	Grafton	77	5.5	1
17-Jul-94	Grafton	77	4.9	1
17-Jul-94	Grafton	78	5.0	1
17-Jul-94	Grafton	78	6.6	1
17-Jul-94	Grafton	79	6.2	1
17-Jul-94	Grafton	79	6.0	1
17-Jul-94	Grafton	79	5.4	1
17-Jul-94	Grafton	79	6.1	1
17-Jul-94	Grafton	79	5.8	1
17-Jul-94	Grafton	79	6.5	1

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
17-Jul-94	Grafton	80	5.5	1
17-Jul-94	Grafton	82	6.8	2
17-Jul-94	Grafton	82	6.5	1
17-Jul-94	Grafton	85	7.4	2
17-Jul-94	Grafton	86	8.4	2
17-Jul-94	Grafton	88	8.3	1
17-Jul-94	Grafton	89	8.1	2
17-Jul-94	Grafton	89	8.5	2
17-Jul-94	Grafton	90	8.9	1
17-Jul-94	Grafton	90	8.5	2
17-Jul-94	Grafton	90	8.0	2
17-Jul-94	Grafton	91	9.1	2
17-Jul-94	Grafton	91	8.7	2
17-Jul-94	Grafton	92	8.9	2
17-Jul-94	Grafton	92	9.2	2
17-Jul-94	Grafton	93	9.0	2
17-Jul-94	Grafton	95	9.7	2
17-Jul-94	Grafton	95	9.3	2
17-Jul-94	Grafton	95	10.3	2
17-Jul-94	Grafton	97	9.7	2
17-Jul-94	Grafton	97	9.8	3
17-Jul-94	Grafton	98	9.6	2
17-Jul-94	Grafton	98	11.8	2
17-Jul-94	Grafton	99	10.7	2
17-Jul-94	Grafton	100	12.3	2
17-Jul-94	Grafton	102	11.5	2
17-Jul-94	Grafton	106	12.8	2
17-Jul-94	Grafton	107	14.7	2
17-Jul-94	Grafton	111	14.8	3
17-Jul-94	Grafton	111	14.6	3
17-Jul-94	Grafton	111	14.9	2
17-Jul-94	Grafton	111	14.2	4
17-Jul-94	Grafton	112	14.8	2
17-Jul-94	Grafton	113	17.1	3
17-Jul-94	Grafton	116	18.8	3
17-Jul-94	Grafton	118	17.7	3
17-Jul-94	Grafton	120	19.0	4
20-Jul-94	Minard	65	3.8	1
20-Jul-94	Minard	65	3.9	0
20-Jul-94	Minard	66		1
20-Jul-94	Minard	68		1
20-Jul-94	Minard	68		1
20-Jul-94	Minard	70	4.5	1
20-Jul-94	Minard	71		1
20-Jul-94	Minard	71		1
20-Jul-94	Minard	72		1
20-Jul-94	Minard	72		1

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
20-Jul-94	Minard	72		1
20-Jul-94	Minard	72		1
20-Jul-94	Minard	72		1
20-Jul-94	Minard	73		1
20-Jul-94	Minard	73		1
20-Jul-94	Minard	73		1
20-Jul-94	Minard	73	4.9	1
20-Jul-94	Minard	73		1
20-Jul-94	Minard	73		1
20-Jul-94	Minard	75		1
20-Jul-94	Minard	76		1
20-Jul-94	Minard	76		1
20-Jul-94	Minard	77		1
20-Jul-94	Minard	77		1
20-Jul-94	Minard	78		1
20-Jul-94	Minard	78		1
20-Jul-94	Minard	78		1
20-Jul-94	Minard	79	5.5	1
20-Jul-94	Minard	79		1
20-Jul-94	Minard	80	6.4	1
20-Jul-94	Minard	83	6.1	1
20-Jul-94	Minard	85	8.2	2
20-Jul-94	Minard	87	8.8	2
20-Jul-94	Minard	88	7.6	1
20-Jul-94	Minard	89	8.6	2
20-Jul-94	Minard	90	9.2	2
20-Jul-94	Minard	91	8.8	2
20-Jul-94	Minard	91	9.3	1
20-Jul-94	Minard	95	9.8	2
20-Jul-94	Minard	98	10.0	2
20-Jul-94	Minard	98	10.6	2
20-Jul-94	Minard	99	11.0	2
20-Jul-94	Minard	99	11.1	2
20-Jul-94	Minard	100	11.6	1
20-Jul-94	Minard	100	11.4	2
20-Jul-94	Minard	103		2
20-Jul-94	Minard	103	13.0	2
20-Jul-94	Minard	113	12.0	4
18-May-95		78		3
18-May-95	Emily	61		
18-May-95	Emily	63		
18-May-95	Emily	66		
18-May-95	Emily	79		
18-May-95	Emily	80		3
18-May-95	Emily	80		4
18-May-95	Emily	81		4
18-May-95	Emily	82		3

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
18-May-95	Emily	83		4
18-May-95	Emily	83		4
18-May-95	Emily	83		3
18-May-95	Emily	84		4
18-May-95	Emily	85		3
18-May-95	Emily	85		3
18-May-95	Emily	87		3
18-May-95	Emily	88		4
18-May-95	Emily	90		4
18-May-95	Emily	92		4
18-May-95	Emily	93		3
18-May-95	Emily	101		5
18-May-95	Emily	106		4
18-May-95	Grafton	61		2
18-May-95	Grafton	61		2
18-May-95	Grafton	74		
18-May-95	Grafton	75		2
18-May-95	Grafton	79		3
18-May-95	Grafton	81		3
18-May-95	Grafton	81		3
18-May-95	Grafton	81		
18-May-95	Grafton	83		3
18-May-95	Grafton	84		3
18-May-95	Grafton	85		4
18-May-95	Grafton	86		3
18-May-95	Grafton	87		3
18-May-95	Grafton	89		3
18-May-95	Grafton	89		3
18-May-95	Grafton	94		5
18-May-95	Grafton	98		4
25-May-95		100	12.2	5
25-May-95	Emily	64	3.7	
25-May-95	Emily	67	3.3	3
25-May-95	Emily	74	4.4	
25-May-95	Emily	75	5.6	
25-May-95	Emily	77	5.3	
25-May-95	Emily	79	3.5	
25-May-95	Emily	80	5.6	3
25-May-95	Emily	82	5.3	
25-May-95	Emily	83	6.8	
25-May-95	Emily	83	6.2	
25-May-95	Emily	84	6.6	
25-May-95	Emily	84	6.4	
25-May-95	Emily	85	5.5	4
25-May-95	Emily	85	6.8	
25-May-95	Emily	86	6.7	
25-May-95	Emily	86	7.3	

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
25-May-95	Emily	87	7.5	
25-May-95	Emily	90	7.9	3
25-May-95	Emily	90	6.6	3
25-May-95	Emily	90	8.6	3
25-May-95	Emily	93	9.1	
25-May-95	Emily	93	13.0	
25-May-95	Emily	95	8.9	
25-May-95	Emily	95	9.3	
25-May-95	Emily	109	12.4	
25-May-95	Grafton	102		
12-Jun-95		80	5.5	
12-Jun-95	Emily	53	2.4	2
12-Jun-95	Emily	62	2.7	
12-Jun-95	Emily	62	2.4	2
12-Jun-95	Emily	79	5.9	
12-Jun-95	Emily	82	6.5	4
12-Jun-95	Emily	83	5.4	4
12-Jun-95	Emily	84	6.7	
12-Jun-95	Emily	90	6.8	
12-Jun-95	Emily	91	7.7	
12-Jun-95	Emily	94	7.6	
12-Jun-95	Grafton	75	4.8	
12-Jun-95	Grafton	77	6.4	3
12-Jun-95	Grafton	77	5.2	
12-Jun-95	Grafton	80	6.4	
12-Jun-95	Grafton	82	4.3	
12-Jun-95	Grafton	85	5.9	
12-Jun-95	Grafton	85	6.7	
12-Jun-95	Grafton	85	7.5	
12-Jun-95	Grafton	86	7.3	
12-Jun-95	Grafton	87	5.9	
12-Jun-95	Grafton	89	6.8	
12-Jun-95	Grafton	89	7.1	
12-Jun-95	Grafton	91	8.0	
12-Jun-95	Grafton	93	8.7	3
12-Jun-95	Grafton	94	7.8	
12-Jun-95	Grafton	95	9.3	4
12-Jun-95	Grafton	98	8.2	
25-Jun-95	Grafton	81	5.3	
26-Jun-95	Emily	97	13.4	
26-Jun-95	Grafton	66	3.4	2
26-Jun-95	Grafton	70	3.9	
26-Jun-95	Grafton	73	4.7	
26-Jun-95	Grafton	75	4.7	3
26-Jun-95	Grafton	75	5.9	
26-Jun-95	Grafton	76	5.1	
26-Jun-95	Grafton	80	4.9	

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
26-Jun-95	Grafton	82	6.2	
26-Jun-95	Grafton	83	6.9	
26-Jun-95	Grafton	84	6.5	
26-Jun-95	Grafton	84	6.8	
26-Jun-95	Grafton	85	6.2	3
26-Jun-95	Grafton	85	7.0	
26-Jun-95	Grafton	86	7.2	3
26-Jun-95	Grafton	87	6.6	
26-Jun-95	Grafton	90	7.5	
26-Jun-95	Grafton	90	8.1	4
26-Jun-95	Grafton	90	7.0	3
26-Jun-95	Grafton	93	11.4	5
26-Jun-95	Grafton	95	10.6	
26-Jun-95	Grafton	95	8.7	
26-Jun-95	Grafton	104	9.8	5
26-Jun-95	Grafton	107	13.9	4
29-Jun-95	Emily	59	3.1	1
29-Jun-95	Emily	68	3.6	3
29-Jun-95	Emily	69	3.9	3
29-Jun-95	Emily	73	4.1	
29-Jun-95	Emily	74	4.8	
29-Jun-95	Emily	79	6.0	3
29-Jun-95	Emily	82	5.5	3
29-Jun-95	Emily	83	6.5	
29-Jun-95	Emily	87	7.9	3
29-Jun-95	Emily	92	10.1	3
29-Jun-95	Emily	94	9.0	3
26-Jul-95	Emily	75	6.8	
26-Jul-95	Emily	76	5.6	3
26-Jul-95	Emily	79	7.5	3
26-Jul-95	Emily	79	7.3	
26-Jul-95	Emily	81	6.9	
26-Jul-95	Emily	81	7.9	
26-Jul-95	Emily	81	7.3	
26-Jul-95	Emily	82	7.9	
26-Jul-95	Emily	84	7.8	
26-Jul-95	Emily	84	7.8	
26-Jul-95	Emily	85	7.3	
26-Jul-95	Emily	86	8.7	
26-Jul-95	Emily	87	9.0	
26-Jul-95	Emily	103	16.0	5
26-Jul-95	Grafton	68	3.8	3
26-Jul-95	Grafton	69	4.5	2
26-Jul-95	Grafton	69	4.0	
26-Jul-95	Grafton	76	5.1	
26-Jul-95	Grafton	76	5.0	
26-Jul-95	Grafton	76	4.2	

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
26-Jul-95	Grafton	77	5.3	
26-Jul-95	Grafton	78	5.7	
26-Jul-95	Grafton	80	6.4	3
26-Jul-95	Grafton	84	8.0	
26-Jul-95	Grafton	85	7.5	
26-Jul-95	Grafton	85	7.6	
26-Jul-95	Grafton	88	8.4	4
26-Jul-95	Grafton	90	8.6	
26-Jul-95	Grafton	99	12.9	
27-Jul-95	Emily	88	8.9	3
1-Aug-95		74	4.9	3
22-Aug-95	Emily	76	5.9	
22-Aug-95	Emily	82	7.4	
22-Aug-95	Emily	82	6.8	
22-Aug-95	Emily	84	7.2	
22-Aug-95	Emily	84	7.8	
22-Aug-95	Emily	85	7.5	
22-Aug-95	Emily	85	8.1	
22-Aug-95	Emily	87	9.0	
22-Aug-95	Emily	99	10.6	
22-Aug-95	Grafton	70	4.2	
22-Aug-95	Grafton	72	4.6	
22-Aug-95	Grafton	76	5.3	
22-Aug-95	Grafton	78	6.3	
22-Aug-95	Grafton	81	6.7	
22-Aug-95	Grafton	82	5.5	
22-Aug-95	Grafton	82	6.4	
22-Aug-95	Grafton	83	6.7	3
22-Aug-95	Grafton	85	8.3	3
22-Aug-95	Grafton	87	7.5	
22-Aug-95	Grafton	89	8.2	
22-Aug-95	Grafton	90	9.7	
22-Aug-95	Grafton	90	9.0	
22-Aug-95	Grafton	90	9.9	
22-Aug-95	Grafton	90	8.8	
22-Aug-95	Grafton	92	9.5	4
22-Aug-95	Grafton	92		
22-Aug-95	Grafton	94	7.4	
22-Aug-95	Grafton	94	9.7	4
22-Aug-95	Grafton	96	9.5	
22-Aug-95	Grafton	110	14.0	5
26-Sep-95	Grafton	109	10.5	5
20-May-96	Emily	61	4.0	
20-May-96	Emily	65	3.1	
20-May-96	Emily	65	2.9	
20-May-96	Emily	68	3.5	
20-May-96	Emily	68	3.9	

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
20-May-96	Emily	78	5.9	
20-May-96	Emily	81	6.2	
20-May-96	Emily	86	6.3	3
20-May-96	Emily	89	7.7	
20-May-96	Emily	90	8.9	2
20-May-96	Emily	90	7.5	
20-May-96	Emily	90	8.5	
20-May-96	Emily	90	6.8	
20-May-96	Emily	90	8.9	
20-May-96	Emily	90	7.8	
20-May-96	Emily	91	6.8	2
20-May-96	Emily	91	9.4	
20-May-96	Emily	92	6.9	3
20-May-96	Emily	92	7.0	
20-May-96	Emily	94	8.6	3
20-May-96	Emily	95	10.8	
20-May-96	Emily	95	9.7	2
20-May-96	Emily	97	11.2	3
20-May-96	Emily	98	8.6	3
20-May-96	Emily	100	10.5	
20-May-96	Emily	100	12.2	
20-May-96	Emily	100	9.0	
20-May-96	Emily	102	10.9	4
20-May-96	Emily	103	11.5	3
20-May-96	Emily	114	11.8	4
20-May-96	Emily	115	15.0	4
20-May-96	Emily	115	13.1	6
20-May-96	Grafton	77	4.4	
20-May-96	Grafton	82	5.3	
20-May-96	Grafton	82	6.5	
20-May-96	Grafton	83	6.9	
20-May-96	Grafton	83	5.0	
20-May-96	Grafton	85	7.6	
20-May-96	Grafton	86	7.2	
20-May-96	Grafton	90	9.6	3
20-May-96	Grafton	90	7.5	
20-May-96	Grafton	92	11.0	3
20-May-96	Grafton	92	9.6	
20-May-96	Grafton	95	8.3	3
20-May-96	Grafton	95	9.4	
20-May-96	Grafton	96	13.7	4
20-May-96	Grafton	97	10.6	4
20-May-96	Grafton	100	10.5	4
20-May-96	Grafton	100	10.7	
20-May-96	Grafton	101	10.1	4
20-May-96	Grafton	104	10.5	5
20-May-96	Grafton	105	11.2	

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
4-Jun-96	Emily	56	3.3	
4-Jun-96	Emily	62	2.9	
4-Jun-96	Emily	66	4.3	
4-Jun-96	Emily	75	6.5	3
4-Jun-96	Emily	82	5.5	
4-Jun-96	Emily	85	8.8	3
4-Jun-96	Emily	85	8.5	2
4-Jun-96	Emily	86	5.5	2
4-Jun-96	Emily	86	6.8	1
4-Jun-96	Emily	88	8.6	3
4-Jun-96	Emily	89	9.4	5
4-Jun-96	Emily	90	7.5	
4-Jun-96	Emily	90	7.3	
4-Jun-96	Emily	90	9.4	3
4-Jun-96	Emily	92	9.8	3
4-Jun-96	Emily	93	6.8	
4-Jun-96	Emily	93	9.8	4
4-Jun-96	Emily	94	10.0	3
4-Jun-96	Emily	94	8.3	
4-Jun-96	Emily	95	8.1	
4-Jun-96	Emily	95	8.2	2
4-Jun-96	Emily	96	8.9	3
4-Jun-96	Emily	96	13.7	
4-Jun-96	Emily	96	10.2	
4-Jun-96	Emily	97	11.2	
4-Jun-96	Emily	98	16.0	
4-Jun-96	Emily	99	11.0	3
4-Jun-96	Emily	100	9.2	3
4-Jun-96	Emily	100	11.9	
4-Jun-96	Emily	102	11.1	
4-Jun-96	Emily	102	10.1	4
4-Jun-96	Emily	103	16.5	
4-Jun-96	Emily	105	10.4	
4-Jun-96	Grafton	77	5.3	
4-Jun-96	Grafton	77	5.0	4
4-Jun-96	Grafton	79	5.5	3
4-Jun-96	Grafton	79	5.7	3
4-Jun-96	Grafton	80	4.1	4
4-Jun-96	Grafton	82	6.5	3
4-Jun-96	Grafton	83	5.0	4
4-Jun-96	Grafton	83	6.7	4
4-Jun-96	Grafton	85	7.6	4
4-Jun-96	Grafton	85	6.1	
4-Jun-96	Grafton	86	7.2	4
4-Jun-96	Grafton	89	8.1	3
4-Jun-96	Grafton	92	7.9	
4-Jun-96	Grafton	93	7.8	3

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
4-Jun-96	Grafton	93	8.6	3
4-Jun-96	Grafton	94	9.3	3
4-Jun-96	Grafton	97	9.6	
4-Jun-96	Grafton	98	11.5	6
4-Jun-96	Grafton	102	11.2	4
4-Jun-96	Grafton	114	16.8	7
4-Jun-96	Grafton	115	14.1	5
4-Jun-96	Grafton	133	26.0	7
18-Jun-96	Grafton	68	5.1	1
18-Jun-96	Grafton	74	5.5	2
18-Jun-96	Grafton	74	6.0	2
18-Jun-96	Grafton	75	7.9	2
18-Jun-96	Grafton	76	6.6	2
18-Jun-96	Grafton	76	8.9	2
18-Jun-96	Grafton	77	8.8	3
18-Jun-96	Grafton	79	5.8	1
18-Jun-96	Grafton	80	6.6	2
18-Jun-96	Grafton	82	6.0	
18-Jun-96	Grafton	83	7.2	3
18-Jun-96	Grafton	84	7.2	4
18-Jun-96	Grafton	85	8.1	4
18-Jun-96	Grafton	86	10.0	2
18-Jun-96	Grafton	87	9.1	3
18-Jun-96	Grafton	88	7.1	3
18-Jun-96	Grafton	90	9.9	3
18-Jun-96	Grafton	91	8.8	3
18-Jun-96	Grafton	95	10.2	3
18-Jun-96	Grafton	97	14.2	3
18-Jun-96	Grafton	110	16.1	4
19-Jun-96	Emily	61	3.1	
19-Jun-96	Emily	65	3.9	
19-Jun-96	Emily	70	4.7	
19-Jun-96	Emily	71	4.8	
19-Jun-96	Emily	90	8.0	1
19-Jun-96	Emily	90	7.4	
19-Jun-96	Emily	94	8.9	2
19-Jun-96	Emily	95	9.2	3
19-Jun-96	Emily	96	8.7	3
19-Jun-96	Emily	100	10.4	2
19-Jun-96	Emily	101	9.4	3
19-Jun-96	Emily	109	11.3	5
21-Jul-96	Emily	69	4.7	
21-Jul-96	Emily	70	4.4	
21-Jul-96	Emily	72	5.9	
21-Jul-96	Emily	75	5.2	
21-Jul-96	Emily	76	5.3	1
21-Jul-96	Emily	76	5.9	

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
21-Jul-96	Emily	76	5.6	1
21-Jul-96	Emily	76	5.8	2
21-Jul-96	Emily	77	4.9	2
21-Jul-96	Emily	78	6.3	
21-Jul-96	Emily	79	6.2	2
21-Jul-96	Emily	80	6.7	
21-Jul-96	Emily	94	9.2	
21-Jul-96	Emily	94	10.9	
21-Jul-96	Emily	96	10.9	4
21-Jul-96	Emily	96	10.4	
21-Jul-96	Emily	98	8.4	1
21-Jul-96	Emily	99	10.4	2
21-Jul-96	Emily	100	11.9	
21-Jul-96	Emily	104	11.8	3
21-Jul-96	Emily	105	12.0	4
21-Jul-96	Emily	106	13.6	3
21-Jul-96	Emily	110	16.6	5
21-Jul-96	Emily	117	18.3	3
21-Jul-96	Grafton	70	4.3	1
21-Jul-96	Grafton	77	5.6	2
21-Jul-96	Grafton	80	6.6	
21-Jul-96	Grafton	82	6.4	2
21-Jul-96	Grafton	84	8.4	
21-Jul-96	Grafton	85	7.4	
21-Jul-96	Grafton	85	7.4	
21-Jul-96	Grafton	85	8.2	3
21-Jul-96	Grafton	86	7.3	3
21-Jul-96	Grafton	87	7.8	4
21-Jul-96	Grafton	88	7.4	2
21-Jul-96	Grafton	88	7.9	3
21-Jul-96	Grafton	90	7.6	
21-Jul-96	Grafton	90	8.1	2
21-Jul-96	Grafton	90	10.5	
21-Jul-96	Grafton	91	9.4	3
21-Jul-96	Grafton	92	9.2	
21-Jul-96	Grafton	94	9.4	
21-Jul-96	Grafton	94	10.3	
21-Jul-96	Grafton	95	8.8	
21-Jul-96	Grafton	95	10.0	
21-Jul-96	Grafton	95	9.7	3
21-Jul-96	Grafton	95	10.5	
21-Jul-96	Grafton	96	10.8	3
21-Jul-96	Grafton	97	12.5	
21-Jul-96	Grafton	97	10.4	
21-Jul-96	Grafton	99	11.3	3
21-Jul-96	Grafton	100	13.5	
21-Jul-96	Grafton	100	11.3	4

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
21-Jul-96	Grafton	111	15.1	
21-Jul-96	Grafton	118	19.7	5
21-Jul-96	Grafton	120	23.8	4
19-Aug-96	Emily	75	5.8	2
19-Aug-96	Emily	75	5.9	2
19-Aug-96	Emily	80	7.4	2
19-Aug-96	Emily	82	7.2	2
19-Aug-96	Emily	85	8.5	2
19-Aug-96	Emily	90	10.6	
19-Aug-96	Emily	90	9.8	
19-Aug-96	Emily	95	11.3	
19-Aug-96	Emily	95	11.2	
19-Aug-96	Emily	96	11.0	3
19-Aug-96	Emily	98	11.3	3
19-Aug-96	Emily	99	12.2	3
19-Aug-96	Emily	100	10.4	
19-Aug-96	Emily	100	11.4	2
19-Aug-96	Grafton	74	5.9	2
19-Aug-96	Grafton	80	8.8	
19-Aug-96	Grafton	80	6.6	2
19-Aug-96	Grafton	83	7.9	3
19-Aug-96	Grafton	84	7.8	3
19-Aug-96	Grafton	85	8.5	3
19-Aug-96	Grafton	86	7.7	3
19-Aug-96	Grafton	89	8.5	2
19-Aug-96	Grafton	90	8.6	
19-Aug-96	Grafton	91	9.1	3
19-Aug-96	Grafton	92	9.9	2
19-Aug-96	Grafton	94	10.8	3
19-Aug-96	Grafton	95	11.6	2
19-Aug-96	Grafton	95	10.7	
19-Aug-96	Grafton	95	10.8	
19-Aug-96	Grafton	97	11.1	4
19-Aug-96	Grafton	100	12.0	3
11-May-00	Emily			2
11-May-00	Emily	68	3.8	
11-May-00	Emily	69	3.7	2
11-May-00	Emily	70	3.8	
11-May-00	Emily	70	3.7	
11-May-00	Emily	71	4.3	2
11-May-00	Emily	71	3.6	2
11-May-00	Emily	73	3.5	2
11-May-00	Emily	75	4.1	
11-May-00	Emily	75	4.5	2
11-May-00	Emily	76	4.7	3
11-May-00	Emily	77	6.4	
11-May-00	Emily	77	4.4	

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
11-May-00	Emily	77	4.6	2
11-May-00	Emily	79	5.1	2
11-May-00	Emily	82	5.7	2
11-May-00	Emily	84	5.5	2
11-May-00	Emily	85	6.6	3
11-May-00	Emily	86	6.0	3
11-May-00	Emily	86	6.2	
11-May-00	Emily	87	7.9	
11-May-00	Emily	88	6.9	3
11-May-00	Emily	89	6.8	3
11-May-00	Emily	90	6.6	
11-May-00	Emily	91	9.7	3
11-May-00	Emily	93	7.3	
11-May-00	Emily	93	7.8	
11-May-00	Emily	94	8.1	4
11-May-00	Emily	94	9.0	
11-May-00	Emily	94	8.3	2
11-May-00	Emily	96	6.8	3
11-May-00	Emily	98	9.1	
11-May-00	Emily	98	10.8	
11-May-00	Emily	99	9.2	3
11-May-00	Emily	99	13.6	
11-May-00	Emily	101	9.2	
11-May-00	Emily	102	9.7	3
11-May-00	Emily	103	10.4	3
11-May-00	Emily	104	10.8	
11-May-00	Emily	104	9.0	4
11-May-00	Emily	105	11.2	4
11-May-00	Emily	108	12.2	
11-May-00	Emily	109	10.7	4
11-May-00	Emily	110	13.2	
11-May-00	Emily	110	15.2	5
11-May-00	Emily	124	19.2	
11-May-00	Emily	139	24.4	5
11-May-00	Emily	150	36.4	
11-May-00	Emily	170	61.7	6
11-May-00	Grafton	53	2.4	
11-May-00	Grafton	62	2.7	1
11-May-00	Grafton	68	4.5	
11-May-00	Grafton	70	3.6	2
11-May-00	Grafton	72	3.7	
11-May-00	Grafton	73	4.0	
11-May-00	Grafton	73	4.5	2
11-May-00	Grafton	75	4.7	
11-May-00	Grafton	75	4.7	2
11-May-00	Grafton	77	4.0	3
11-May-00	Grafton	78	4.3	

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
11-May-00	Grafton	80	5.0	2
11-May-00	Grafton	84	7.2	
11-May-00	Grafton	85	5.6	
11-May-00	Grafton	86	6.9	3
11-May-00	Grafton	86	7.0	
11-May-00	Grafton	88	8.4	
11-May-00	Grafton	89	6.8	3
11-May-00	Grafton	90	6.9	
11-May-00	Grafton	91	6.9	3
11-May-00	Grafton	91	7.5	
11-May-00	Grafton	94	7.7	
11-May-00	Grafton	94	7.8	
11-May-00	Grafton	94	7.7	3
11-May-00	Grafton	95	11.0	3
11-May-00	Grafton	96	8.2	
11-May-00	Grafton	97	8.2	3
11-May-00	Grafton	99	7.7	
11-May-00	Grafton	100	10.9	3
11-May-00	Grafton	101	12.3	
11-May-00	Grafton	102	11.0	3
11-May-00	Grafton	103	8.9	
11-May-00	Grafton	103	10.0	
11-May-00	Grafton	103	12.5	
11-May-00	Grafton	104	11.6	
11-May-00	Grafton	104	12.6	3
11-May-00	Grafton	105	11.0	
11-May-00	Grafton	106	12.8	4
11-May-00	Grafton	108	13.0	5
11-May-00	Grafton	108	12.7	
11-May-00	Grafton	109	10.5	
11-May-00	Grafton	113	14.1	4
11-May-00	Grafton	117	16.0	
11-May-00	Grafton	129	20.5	4
25-May-00	Emily	68	3.6	1
25-May-00	Emily	69	3.1	
25-May-00	Emily	69	3.8	
25-May-00	Emily	70	3.9	
25-May-00	Emily	70	4.1	
25-May-00	Emily	71	4.0	3
25-May-00	Emily	74	3.8	
25-May-00	Emily	74	4.8	
25-May-00	Emily	75	4.6	2
25-May-00	Emily	75	4.6	
25-May-00	Emily	76	4.6	2
25-May-00	Emily	76	5.6	
25-May-00	Emily	78	4.9	3
25-May-00	Emily	79	4.8	2

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
25-May-00	Emily	80	4.9	
25-May-00	Emily	80	5.3	
25-May-00	Emily	83	5.8	3
25-May-00	Emily	86	5.5	2
25-May-00	Emily	87	6.8	2
25-May-00	Emily	87	6.9	
25-May-00	Emily	87	8.8	
25-May-00	Emily	88	6.9	
25-May-00	Emily	88	8.0	3
25-May-00	Emily	89	7.9	2
25-May-00	Emily	90	9.9	
25-May-00	Emily	90	7.8	2
25-May-00	Emily	91	7.8	3
25-May-00	Emily	93	11.4	
25-May-00	Emily	93	7.5	3
25-May-00	Emily	93	10.3	
25-May-00	Emily	94	7.3	3
25-May-00	Emily	94	6.3	
25-May-00	Emily	94	8.1	3
25-May-00	Emily	95	9.3	
25-May-00	Emily	96	8.9	3
25-May-00	Emily	96	8.6	3
25-May-00	Emily	96	9.8	3
25-May-00	Emily	99	8.3	
25-May-00	Emily	99	7.0	
25-May-00	Emily	99	9.8	
25-May-00	Emily	99	9.9	4
25-May-00	Emily	100	11.7	3
25-May-00	Emily	102	11.6	4
25-May-00	Emily	103	9.7	4
25-May-00	Emily	103	13.9	3
25-May-00	Emily	104	10.6	
25-May-00	Emily	104	10.8	4
25-May-00	Emily	104	12.5	4
25-May-00	Emily	105	11.0	
25-May-00	Emily	105	10.7	4
25-May-00	Emily	107	9.2	
25-May-00	Emily	107	11.6	4
25-May-00	Emily	108	12.2	
25-May-00	Emily	108	12.0	2
25-May-00	Emily	112	13.0	4
25-May-00	Emily	113	15.5	
25-May-00	Emily	115	18.6	
25-May-00	Emily	117	15.2	
25-May-00	Emily	122	24.7	5
25-May-00	Emily	131	31.7	5
25-May-00	Grafton	59	3.1	

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
25-May-00	Grafton	66	3.6	
25-May-00	Grafton	66	3.4	1
25-May-00	Grafton	72	4.0	1
25-May-00	Grafton	76	4.7	2
25-May-00	Grafton	77	8.5	
25-May-00	Grafton	77	5.4	
25-May-00	Grafton	83	5.7	
25-May-00	Grafton	84	6.3	2
25-May-00	Grafton	86	9.0	
25-May-00	Grafton	88	6.5	2
25-May-00	Grafton	88	7.6	
25-May-00	Grafton	89	6.8	
25-May-00	Grafton	91	8.1	2
25-May-00	Grafton	92	7.8	
25-May-00	Grafton	93	10.7	4
25-May-00	Grafton	95	7.8	3
25-May-00	Grafton	98	9.1	
25-May-00	Grafton	99	8.8	
25-May-00	Grafton	100	9.6	3
25-May-00	Grafton	102	10.3	4
25-May-00	Grafton	104	9.8	
25-May-00	Grafton	104	10.7	4
25-May-00	Grafton	105	12.7	
25-May-00	Grafton	107	15.2	4
25-May-00	Grafton	108	12.0	
25-May-00	Grafton	113	13.3	4
8-Jun-00	Emily	62	2.6	2
8-Jun-00	Emily	68	3.8	
8-Jun-00	Emily	73	3.6	
8-Jun-00	Emily	76	4.3	2
8-Jun-00	Emily	78	4.7	
8-Jun-00	Emily	80	6.3	
8-Jun-00	Emily	82	6.5	
8-Jun-00	Emily	84	6.0	
8-Jun-00	Emily	85	6.7	2
8-Jun-00	Emily	88	5.9	2
8-Jun-00	Emily	89	7.2	
8-Jun-00	Emily	92	7.0	2
8-Jun-00	Emily	98	10.6	
8-Jun-00	Emily	98	7.2	
8-Jun-00	Emily	100	10.6	3
8-Jun-00	Emily	102	12.5	4
8-Jun-00	Emily	102	8.0	4
8-Jun-00	Emily	102	10.8	4
8-Jun-00	Emily	103	9.5	2
8-Jun-00	Emily	103	12.6	3
8-Jun-00	Emily	104	14.1	4

Appendix I. Database for yellow perch collected by minnow traps during all surveys.

Sample Date	Sample Location	Length (mm)	Weight (gms)	Age
8-Jun-00	Emily	106	13.3	3
8-Jun-00	Emily	108	11.0	4
8-Jun-00	Emily	110	13.5	4
8-Jun-00	Emily	113	14.6	4
8-Jun-00	Emily	116	14.0	3
8-Jun-00	Emily	117	15.2	
8-Jun-00	Emily	126	17.0	
8-Jun-00	Grafton	67	3.3	
8-Jun-00	Grafton	73	4.9	2
8-Jun-00	Grafton	80	6.9	
8-Jun-00	Grafton	85	6.2	3
8-Jun-00	Grafton	86	6.0	
8-Jun-00	Grafton	92	8.2	3
8-Jun-00	Grafton	100	10.5	3
8-Jun-00	Grafton	100	9.6	
8-Jun-00	Grafton	104	10.5	4
8-Jun-00	Grafton	107	13.9	
8-Jun-00	Grafton	110	11.1	
8-Jun-00	Grafton	119	18.6	3