Fish Population Studies of the Avon Estuary, Pesaquid Lake and Lower Avon River, 2003.

Report

Prepared for

Nova Scotia Department of Transportation and Public Works.

Prepared by

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Executive summary

Since original construction of the Windsor Causeway across the Avon Estuary in 1970-1, a salt marsh-mudflat system has accumulated on its seaward side. The mudflat continues to grow down the estuary, but near the causeway has stabilized, and portions of the mudflat appear to have become important feeding grounds for migratory birds and fish. Expansion of the Windsor Causeway to accommodate twinning of Highway 101 may involve construction affecting a significant portion this mudflat, with important short-term ecological consequences. Present knowledge is insufficient to assess the degree of impact of the expansion on biophysical processes and biological resources in the estuary.

In the summer of 2003, the Acadia Centre for Estuarine Research conducted research on the fish populations above and below the Windsor Causeway. Additional studies were made together with Dr. Danika van Proosdij (Saint Mary's University, NS), on salt marsh growth, and invertebrate populations of the marsh-mudflat complex that has developed on the seaward side of the Causeway, and the first investigation of a second intertidal mudflat (the Newport Bar), that has formed on the seaward side of the St. Croix outflow channel.

The present study focused on the following aspects:

a) Occurrence of diadromous fish in the Avon Estuary, Pesaquid Lake and the lower Avon River;
b) Occurrence of larval fish in Pesaquid Lake and the lower Avon River;
c) Fish utilization of the channels and mudflats on the seaward side of the Windsor Causeway;
d) Physicochemical conditions in Pesaquid Lake and the lower Avon River, and flow conditions at the Causeway gates.

1. A total of 763 fish were captured in the West and Causeway Channels on the seaward side of the Causeway, using gill nets, a fyke net, and eel pots, between 22 May and 30 July 2003. These represented six species: alewife (*Alosa*

pseudoharengus), blueback herring (*Alosa aestivalis*), striped bass (*Morone saxatilis*), white perch (*Morone americana*), tomcod (*Microgadus tomcod*) and American eel (*Anguilla rostrata*).

2. The gaspereau run, which consisted of both alewife and blueback herring, lasted from before 22 May, when the nets were first set, until the first week of July. The first part of the run consisted mostly of alewives, whereas blueback herring were more common than alewives during June. The age of migrant fish was three to seven years for alewives, and three to six years for blueback herring.
3. Striped bass were only captured on the seaward side of the Causeway. They ranged from two to five years of age, and were not engaged in a spawning run. Stomach contents indicated that they feed on epibenthic animals, especially the shrimps *Crangon septemspinosa* and *Neomysis americana*.
4. Gill net and seine collections above the Causeway in Pesaquid Lake and the lower Avon River were carried out from late May to early October. More than 2,000 fish were taken in total, representing 11 species. The only anadromous species caught above the Causeway were alewife, blueback herring, and white perch. No salmonids (salmon or trout) or smelt were captured by any technique.
5. Young of the year gaspereau were captured by seine in Pesaquid Lake until early October, but numbers declined sharply in September when fish either moved away from shore or out to sea.
6. Length—weight relationships and seasonal changes in body length of the most abundant species – banded killifish, alewife and blueback herring – suggest that growth conditions in the Lake and its tributaries are good.
7. Physico-chemical studies in the lower Avon River and Pesaquid Lake provided no information of eutrophication – nutrient enrichment that results in a decrease in water quality – in spite of land use (agriculture, golf course maintenance, residential development) in the watershed of the Lake. Although nitrogen and phosphorous levels in Pesaquid Lake were higher than in the main river inflows, these were not sufficient to trigger excessive plant growth. Plankton studies, however, indicated that the Lake is quite productive.

8. Measurements of flow through the Causeway gates when opened to facilitate fish passage, indicated that peak velocities in excess of 7 metres/second were reached in the middle of the gate opening. Such velocities exceed the swimming capacity of gaspereau, but their upstream migration was successful in part because there were lower velocities for a period of many minutes following gate opening, and possibly because velocities near the side of the canal were significantly lower than in the centre. It is suggested that a study of when migrating gaspereau approach the gates on the rising tide would enable development of an optimal plan for gate operation that would facilitate upstream movement.
9. A preliminary survey of the Newport Bar, a mudflat that is separated from the Windsor Causeway marsh—mudflat by a channel of the St. Croix Estuary, indicated that it has a well developed benthic fauna that is dominated by *Corophium volutator*. Abundance of *Corophium* on this bar approaches the higher values associated with other productive mudflats in Minas Basin that are frequented by migratory shorebirds. Observations indicated that this bar has become the principal feeding area for semipalmated sandpipers in the upper Avon Estuary. However, patches of salt marsh (*Spartina alterniflora*) have become established on the bar, and, unless removed by ice or other forces, it is expected that the patches will coalesce and the bar undergo succession to a salt marsh in the same way as the area adjacent to the Causeway.

Acknowledgements

This study was a collaborative effort involving a number of people in addition to the ACER and Saint Mary's personnel listed in section 1.4.

We are particularly indebted to Hank Kolstee and Ken Carroll of the Nova Scotia Department of Agriculture and Marketing for their continuing encouragement, provision of facilities and information, and logistical support. Access to storage facilities at the Causeway, and to the Causeway Canal were particularly helpful. Ken Carroll also provided access to the tides database being maintained at the Causeway control gates.

Richard Armstrong of Falmouth N.S. provided a great deal of useful advice and information about fish and fisheries of the Avon River system over the past few years, including the notes from Duncanson's book recorded in Appendix 1. Lisa Isaacman provided a summary of her research on historical accounts of the Avon fish populations which will form part of her M.Sc. thesis.

Dr. Kee Muschenheim (Applied Research and ACER) provided and piloted the Hovertour 700 air-cushion vehicle. Without this, we would have been unable safely to survey the Newport Bar.

Dr. Trefor Reynoldson (National Water Research Institute and ACER) assisted with stream characterization work at the Powerhouse station.

Dr. Robert Pett (NS Department of Transportation and Public Works) provided advice and valuable editorial comments on this report.

To all these people we are most grateful.

Fish surveys were conducted under the auspices of Experimental License 2003—108 to G.R. Daborn.

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1.0 Introduction

Twinning of Highway 101 may require fundamental changes to the width and alignment of the highway as it crosses the Avon Estuary at Windsor, NS. Current plans being considered by the Nova Scotia Department of Transportation and Public Works involve six lanes running on the existing causeway, requiring an extended ‘footprint’ that will lie over part of the marsh—mudflat complex that has evolved during the three decades since the causeway was constructed. Research in 2002 by Saint Mary’s University personnel indicated that a design involving a total of six lanes would cover up to 6% of the area of salt marsh and mudflat adjacent to the existing Causeway (Van Proosdij *et al.* 2004). More recent designs, having a six lane option with a narrow median, will reduce the estimated additional footprint by approximately one half or more (Pett, R. 2004, personal communication). High numbers of invertebrates (particularly shrimps and worms) occurring on the mudflat areas on the seaward side, appear to explain the increasing use of the area as a feeding ground during the last decade by migratory birds. Such new construction would therefore impact upon features (marshes and mudflats) that are considered of high ecological significance, and it is clearly necessary that the effects of such construction be evaluated before work is undertaken.

During the summer of 2002, an extensive study of the marsh—mudflat complex adjacent to the Causeway was conducted by personnel from the Acadia Centre for Estuarine Research (ACER) and Saint Mary’s University (Daborn *et al.* 2003a,b). Building on research carried out by Saint Mary’s University in 2001 (Townsend 2002), field and laboratory analytical work in 2002 established the following:

a) a comprehensive, geo-referenced array of 47 sample stations designed for long term monitoring of changes in the elevation, flora and productivity of the marsh and mudflat;
b) an extensive survey of plant biomass, and preliminary estimates of annual production of the dominant marsh cordgrass, *Spartina alterniflora;*
c) an extensive survey of benthic invertebrates;

d) preliminary data on ambient conditions (temperature, salinity, suspended sediments) in water flooding the marsh and mudflat;
e) patterns of accretion and erosion on the mudflat during the ice-free season;
f) preliminary data on water quality conditions in Pesaquid Lake and the lower reaches of the Avon River.

Principal conclusions were that:

1. Expansion of the salt marsh continues to cover and stabilize the mudflat;
2. Where *S. alterniflora* has become established, benthic organisms are in very low abundance;
3. Benthic invertebrates, particularly *Corophium volutator* and several species of polychaete worms, are very abundant in many unvegetated parts of the mudflat, although densities vary greatly. Stocks of these species, which are important food organisms for fish and birds, disappear as *Spartina* becomes established.
4. Despite the abundance of food organisms, there appears to be little utilization by migratory shorebirds of the unvegetated areas very close to the causeway; observations of flock movements indicated greater utilization of the more seaward, unvegetated parts of the marsh—mudflat system, and of another intertidal mudflat (the Newport Bar), where it is assumed that food resources such as *Corophium* may be greater. Because of safety considerations, these areas could not be examined in 2002.

The 2002 work by ACER and St. Mary's University determined that the saltmarsh—mudflat system on the seaward side of the existing causeway is highly productive. Plant biomass estimates obtained in the fall of 2002 exceeded all previous values for saltmarsh in the Bay of Fundy, and invertebrate populations in muddy, unvegetated zones near the Causeway were found to be comparable with other highly productive mudflats in Minas Basin. Because of this richness, and observations of fish-eating birds (e.g. cormorants, eagles and herons) feeding in the channel, it would also be expected that several estuarine and *diadromous*[1] fish would make use of the mudflats (Daborn *et al*. 2003a,b). Attempts

[1] *Diadromous*: species that migrate between seawater and freshwater.

in 2002 to capture fish entering and leaving the Causeway channel were unsuccessful. For this reason, the focus of research during 2003 was on the occurrence, location, timing and population characteristics of migratory species of fish utilising the channels seaward of the Causeway, or in Pesaquid Lake.

Field work and laboratory studies conducted during the summer and fall of 2003 were aimed at the following questions:

1) Which species of diadromous and resident fish occur in the channels on the seaward side of the Windsor Causeway?
2) Which species of diadromous and resident fish are present in Pesaquid Lake and the lower reaches of the Avon River?
3) At what times do adults or young-of-the-year fish occupy Pesaquid Lake, or attempt to pass through the Windsor Causeway?
4) What conditions of Pesaquid Lake affect its importance as habitat for diadromous or resident species of fish?
5) What physical conditions near the Causeway Control Structure affect fish passage?
6) How productive is the salt marsh on the seaward side of the Causeway?
7) How productive are the mudflats on the seaward side of the causeway, especially where shorebirds and demersal fish are seen to feed?

Availability of an air-cushion vehicle (ACV) owned by Dr. Kee Muschenheim also enabled a preliminary visit to the Newport Bar, a mudflat that has developed since construction of the Windsor Causeway in 1970. This bar is currently separated from the Windsor Marsh-Mudflat adjacent to the Causeway, by the outflow channel of the St. Croix Estuary. Although it has remained a mudflat, and its outline has changed frequently in the last three decades (cf. Ch. 6), several patches of *Spartina alterniflora* have become established on its surface, indicating the probability that this may succeed into a new marsh in time.

1.1 Organization

The project was a collaborative effort of the ACER and the Department of Geography, Saint Mary's University. It was divided into five subprojects:

1. Collections of fish from the channels on the seaward side of the Causeway.
2. Collections of larval and juvenile fish in Pesaquid Lake, and in lower reaches of the Avon River.
3. Investigation of physical conditions in Pesaquid Lake, including measurements of current velocity at the Causeway control gates.
4. Further studies of elevation and production of the marsh—mudflat system adjacent to the Causeway. This is a continuing study by the Department of Geography, St. Mary's University. A report will be submitted separately.
5. A preliminary study of Newport Bar, the mudflat on the seaward side of the St. Croix outflow channel, conducted by the ACER team.

Principal funding was provided by a grant from the Nova Scotia Department of Transportation and Public Works. Additional resources were obtained from NSERC Grant No. 238447-02 to Dr. Danika van Proosdij (Department of Geography, Saint Mary's University) and from the Acadia Centre for Estuarine Research.

1.2 Personnel.

The project was jointly led by Dr. Graham R. Daborn (ACER), Dr. Michael Brylinsky (ACER) and Dr. Danika van Proosdij (Saint Mary's University).

Field and laboratory work was carried out by:
Angela Bond (ACER), Christopher Green (ACER), Dr. Kee Muschenheim (ACER), Erinn O'Toole (SMU), Dr. Trefor Reynoldson (ACER) and Sierra Wehrell (ACER). Additional field assistance was provided by Stefan Peterson and Keir Daborn (ACER).

2.0 Fish of the Avon Estuary[2].

2.1 Introduction.

More than 50 species of fish occur in the Minas Basin and its associated estuaries (Dadswell *et al.* 1984). Some of these species are resident in the system year-round, whereas many others migrate from the sea to spend part of their time in tidal estuaries, or to move upstream to freshwater spawning grounds. Fish that move between salt and fresh water during their life cycle are referred to as *diadromous*. Species that spawn in fresh water and go to see as juveniles or adults, are referred to as *anadromous* species, and include a variety of familiar and important forms (Table 2.1). One species, the American eel (*Anguilla rostrata*), spawns in the ocean, and migrates into freshwater as an elver to spend most of its life in rivers, lakes and estuaries; such a species is termed *catadromous.*

Estuaries play several extremely important roles in the lives of migratory fish. They may simply act as a pathway between spawning and feeding grounds, provide spawning areas, or function as feeding grounds for adults and/or larval stages. Because of their biological richness, and the abundance of life found within them, estuaries attract a variety of predators (e.g. birds), which feed especially on larval and juvenile fish moving out of the rivers, or foraging in tidal channels or over mudflats. Marshes often provide an important refuge for larval fish against predation.

We have been unable to find records of systematic surveys of fish in the Avon Estuary. Nonetheless, records from commercial (C) and recreational (R) fisheries, and accounts in local newspapers, provide a list of species that have been recorded or are reasonably expected to be present in the tidal or estuarine portions of the Avon system. A few of the more important of these are listed in Table 2.1. It is important to note that for some species, there is considerable doubt that a spawning stock ever lived in the Avon River

[2] For convenience, we use the term Avon **Estuary** to refer to the tidal river seaward of the Windsor Causeway. Prior to construction of the Causeway in 1970, the estuary would have extended 14 – 16 km upstream, above Windsor Forks and Upper Falmouth. Since construction, however, tidal movements and salt intrusion (features that define an estuary) have been mostly eliminated from the region upstream of the Causeway, which is now a primarily freshwater impoundment known as Pesaquid Lake. The Avon **River** therefore refers to the freshwater occurring upstream of the original head of tide, which was never tidal, and which is not now directly affected by the impoundment created by the Causeway.

system (R. Bradford – personal communication). This applies especially to American shad and Atlantic sturgeon; shad caught in the drift net fishery in the Avon Estuary were thought by E.E. Prince to be spawning in the Kennetcook, not the Avon (*Ibid.*).

Table 2.1. Known or Potential Fish Species of the Avon Estuary.

Common Name	**Species Name**	**Resident**	**Migratory**	**Commercial (C) or Recreational (R)**	**Recorded in 2003**
American eel	*Anguilla rostrata*		x	C+R	Y
Atlantic salmon	*Salmo salar*		x	C+R	N
Brook trout	*Salvelinus fontinalis*	x	x?	R	N
Alewife	*Alosa pseudoharengus*		x	C+R	Y
Blueback herring	*Alosa aestivalis*		x	C+R	Y
American shad[3]	*Alosa sapidissima*		x	C	N
Rainbow smelt	*Osmerus mordax*		x	R	N
Striped Bass	*Morone saxatilis*		x	R	Y
White perch	*Morone americana*	x	x?	R	Y
Atlantic sturgeon[4]	*Acipenser oxyrhynchus*	x		-	N
Dogfish	*Squalus acanthias*		x	-	N
Smooth flounder	*Liposetta putnami*	x		C	N
Winter flounder	*Pseudopleuronectes americana*	x		C	N
Atlantic silversides	*Menidia menidia*	x		-	N
Tomcod	*Microgadus tomcod*	x		-	Y
Killifish	*Fundulus heteroclitus*	x		-	Y
3-spine stickleback	*Gasterosteus aculeatus*	x		-	Y
9-spine stickleback	*Pungitius pungitius*	x	x	-	Y

Anecdotal records and newspaper articles, collected by Darrel Brown of Wildlife Habitat Advocates (Windsor, NS) establish that recreational fisheries existed in the past for American eel, striped bass, sea-run trout (usually a migratory form of the brook trout), speckled (i.e. brook) trout, Atlantic salmon, sturgeon, gaspereau (*Alosa* spp.), and rainbow smelt. In addition, Mr. Brown has found that fisheries regulations for c. 1800 indicate that catches of salmon and gaspereau[5] were of great value to the local area[6].

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[3] No evidence has yet been found to indicate this species as spawning in the Avon River.
[4] No evidence has yet been found to indicate this species as spawning in the Avon River.
[5] 'gaspereau' is a common name for two closely related species: the alewife (*Alosa pseudoharengus*) and the blueback herring (*Alosa aestivalis*).
[6] Letter to Dr. Michael Brylinsky, 14 October 2003.

One of the purposes of studies during the summer of 2003 was to document the presence, seasonality, and population characteristics of fish occurring near the Windsor Causeway, in Pesaquid Lake, and the lower reaches of the Avon River.

2.2. Methods

2.2.1. Gill Net Surveys

Gill net surveys were carried out between 22 May and 29 July 2003, using an experimental gill net array having four 8 m long by 2 m wide panels. The stretched mesh sizes of the panels were 2.5, 5.0, 6.5 and 8.0 cm. Surveys were conducted at three sites: one in the West Channel (WC) below the tide control gates, one in the Causeway Channel (CC) adjacent to the seaward side of the causeway, and one on the river side of the causeway in the outflow of Pesaquid Lake (the Canal Site, HS cf. Figure 2.1). The seaward surveys were typically carried out just prior to high tide and consisted of ten minute drifts. One end of the net was walked along the shoreline while the other end was tethered to a Zodiac which kept it perpendicular to the shoreline during the drift. The extended net covered approximately 2/3 of the width of the West Channel, and the whole width of the Causeway Channel at high tide. At the end of each drift, the net was retrieved at both the shoreward and Zodiac ends. Fish were carefully removed, identified to species, weighed (to the nearest g), measured for total and fork length (to the nearest mm), and then usually released. Identification was according to Scott and Crossman 1973 and Scott and Scott 1988). Within Pesaquid Lake, the gill net survey was conducted by suspending the gill net at a fixed location within the water column, typically for 35-60 minutes. The first set on 22 May was left overnight, because it was not thought that the spawning migration for gaspereau had yet begun.

In most cases, all of the striped bass collected were released after being measured for length and weight, but on two occasions they were retained for analysis of age and stomach contents. Gaspereau, which do not survive gill net capture very well, were often retained for laboratory analysis of age, weight, length, sex and species. Peritoneum color was used to distinguish alewives (*Alosa pseudoharengus*) from blueback herring (*Alosa aestivalis*).

2.2.2 Other collections.

Absence of smaller fish such as tomcod and silverside which were expected to be present in the vicinity of the marsh could be explained by the relatively large mesh size of the gill net. Attempts to collect smaller fish on the seaward side of the causeway were unsuccessful. The soft mud and steep banks along the shorelines made the use of a beach seine unworkable. On numerous occasions attempts were made to suspend various types of fine meshed fish traps across the channel that runs parallel to the highway, but the high current velocities, together with the high suspended sediment load, prevented these from working properly. For this reason, a fyke net was set on four occasions in the Causeway Channel during the ebb tide (Fig. 2.2). This net had wings and cod ends with 2.5 cm mesh.

Figure 2.1. Locations of gill net collections near the Windsor Causeway, 2003.

Figure 2.2 Fyke net set in the Causeway Channel, June 2003

2.2.3 Age and Spawning History Determinations

Specimens of striped bass and gaspereau were aged using scale analysis as described by Marcy (1969). The scales were cleaned with water, mounted between two glass microscope slides and read from an image of the scale projected onto white Bristol board, using a projecting microscope. In the case of alewives, previous spawning history was also determined from the scales using the method described by Judy (1961). Each scale was read independently by two different readers. Results shown represent those in which the two readings were the same.

2.3 Results

A total of 763 fish were taken in gill nets during the summer (Table 2.2). Full results are provided in Appendix 1. Most of these (629) were gaspereau adults taken during their upstream migration during May and early June. On the first, overnight, set in the headpond on 22 May, it was evident that the fish had already begun to move above the Causeway, but we have no information on how long before that date the migration actually began.

2.3.1. Gaspereau.

The common name ‘gaspereau’ refers to two similar and related species: the blueback herring, *Alosa aestivalis*, and the alewife, *Alosa pseudoharengus*. External differences between the two species are subtle, and definitive identification requires sacrifice of each specimen. Viable animals were usually set free (> 100 in total), but many gaspereau are in poor condition after only short periods of time in a net. Examination of 370 retained fish indicated that 241 were alewives, and 129 blueback herring. The early part of the run was dominated by alewives, but as the numbers of fish caught declined during June, more of the fish were blueback herring (Table 2.3). Overall sex ratios were 1.13 females per male for the alewife, and 0.70 females per male for bluebacks.

In general, alewives were larger and heavier than the bluebacks: most alewife adults were 250-330 mm in Total length (213-284 mm FL), and between 100 and 350 g, whereas blueback herring ranged between 225-280 mm in Total length (199-260 FL) and 100-200 g in weight (Figures 2.3, 2.4). Table 2.4 lists statistics of the adult run.

Table 2.2 Summary of gill net collections near the Windsor Causeway, 2003.

Date	Location	Time (min)	Gaspereau	Striped Bass	White Perch	White Sucker	Tomcod	Yellow Perch	Eel	CPUE*
22-May-03	West Channel	18	88	0	0	0	0	0	0	4.89
27-May-03	West Channel	12	34	0	0	0	0	0	0	2.83
03-Jun-03	West Channel	10	23	0	0	0	0	0	0	2.30
10-Jun-03	West Channel	22	18	0	0	0	0	0	0	0.82
17-Jun-03	West Channel	20	9	2	0	0	0	0	0	0.55
25-Jun-03	West Channel	10	13	0	0	0	0	0	0	1.30
02-Jul-03	West Channel	10	1	0	0	0	0	0	0	0.10

Date	Location	Time (min)	Gaspereau	Striped Bass	White Perch	White Sucker	Tomcod	Yellow Perch	Eel	CPUE*
08-Jul-03	West Channel	10	0	2	0	0	0	0	0	0.20
15-Jul-03	West Channel	10	0	0	0	0	0	0	0	0.00
22-Jul-03	West Channel	10	0	5	0	0	0	0	0	0.50
29-Jul-03	West Channel	10	0	0	0	0	0	0	0	0.00
27-May-03	Causeway Channel	10	11	0	0	0	1	0	0	1.20
10-Jun-03	Causeway Channel	10	16	2	0	0	1	0	0	1.90
17-Jun-03	Causeway Channel	10	4	2	0	0	0	0	0	0.60
25-Jun-03	Causeway Channel	10	4	27	0	0	0	0	0	3.10
02-Jul-03	Causeway Channel	10	0	26	3	0	0	0	0	2.90
08-Jul-03	Causeway Channel	10	1	9	0	0	0	0	0	1.00
15-Jul-03	Causeway Channel	10	0	8	1	0	0	0	0	0.90
22-Jul-03	Causeway Channel	10	0	21	1	0	0	0	0	2.20
29-Jul-03	Causeway Channel	5	0	3	0	0	1	0	0	0.80
22-May-03	Canal Site	920	102	0	3	4	0	0	1	0.12
27-May-03	Canal Site	290	249	0	0	1	0	1	0	0.87
03-Jun-03	Canal Site	60	25	0	0	0	0	0	0	0.42
10-Jun-03	Canal Site	43	8	0	0	1	0	1	0	0.23
17-Jun-03	Canal Site	63	0	0	0	1	0	0	0	0.02
24-Jun-03	Canal Site	44	13	0	0	0	0	0	0	0.30
02-Jul-03	Canal Site	56	10	0	0	0	0	0	0	0.18
08-Jul-03	Canal Site	35	0	0	0	1	0	0	0	0.03
16-Jul-03	Canal Site	47	0	0	0	0	0	0	0	0.00
22-Jul-03	Canal Site	55	0	0	0	5	0	0	0	0.09
27-Jul-03	Canal Site	44	0	0	0	0	0	0	0	0.00
	TOTALS		**629**	**107**	**8**	**13**	**3**	**2**	**1**	

* Catch per Unit Effort (individuals per minute).

Table 2.3. Species ratios and sex of gaspereau in gill net collections, 2003.

Date	Alewife Tot	Alewife ♂	Alewife ♀	BBH Tot	BBH ♂	BBH ♀	Species Ratio A/BBH*
22-May	85	32	53	3	2	1	28.33
28-May	103	54	49	69	42	27	1.49
05-Jun	20	9	11	9	6	3	2.22
11-Jun	14	4	10	23	12	11	0.61
19-Jun	3	2	1	6	2	4	0.50
25-Jun	12	8	4	16	10	6	0.75
03-Jul	4	4	0	3	2	1	1.33
Totals	**241**	**113**	**128**	**129**	**76**	**53**	

* Ratio of alewives (A) to blueback herring (BBH)

Table 2.4. Population statistics of alewife and blueback herring during 2003 spawning run.

Statistic	**♂ Alewife**	**♀ Alewife**	**♂ Blueback H.**	**♀ Blueback H.**
Mean FL (mm)	245.1	253.4	219.9	230.1
± S.D.	14.5	12.4	11.2	10.6
Minimum FL (mm)	213	239	199	211
Maximum FL (mm)	289	284	254	260
Mean Wt. (g)	196.1	243.4	126.5	161.2
± S.D.	41.8	37.8	20.9	28.6

Figure 2.3. Length-weight relationship of adult alewives, 2003.

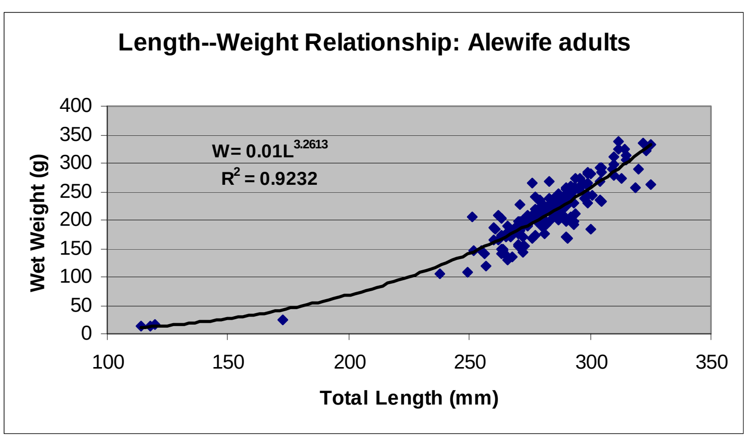
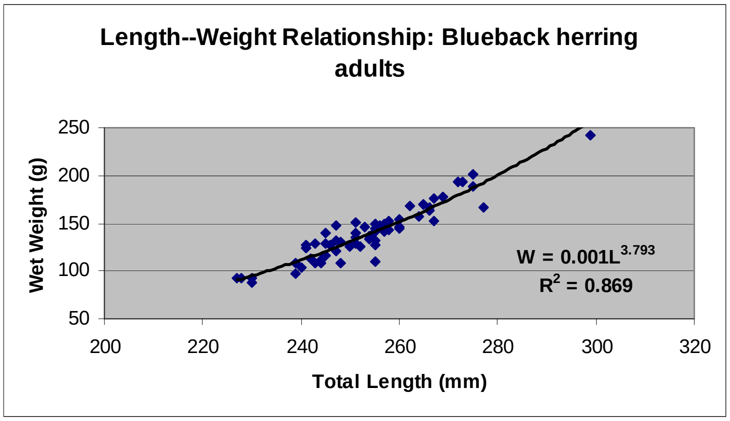


Figure 2.4. Length-weight relationship of blueback herring, 2003.



Examination of readable scales from 228 adults (169 alewife and 59 blueback herring) indicated that the majority of migrating fish were 4 or 5 years of age (Figures 2.5, 2.6). The oldest fish were 7-yr old alewives, and the youngest were 3 years of age. None of the 3-yr olds carried spawning marks; however a small number of 4-yr olds (5 alewife and 1 blueback) possessed a prior spawning mark, seven 5-yr old alewives had two spawning marks, and two 6-yr old alewives had three marks, indicating that a small fraction of the gaspereau stock may spawn at 3 years of age. Several 5-yr olds had no prior marks. Age at first spawning for alewives and blueback herring is shown in Figures 2.9 and 2.10 respectively. Length at age plots for alewives and blueback herring are shown in Figures 2. 7 and 2.8, respectively.

Figure 2.5 Age distribution of adult alewives, 2003

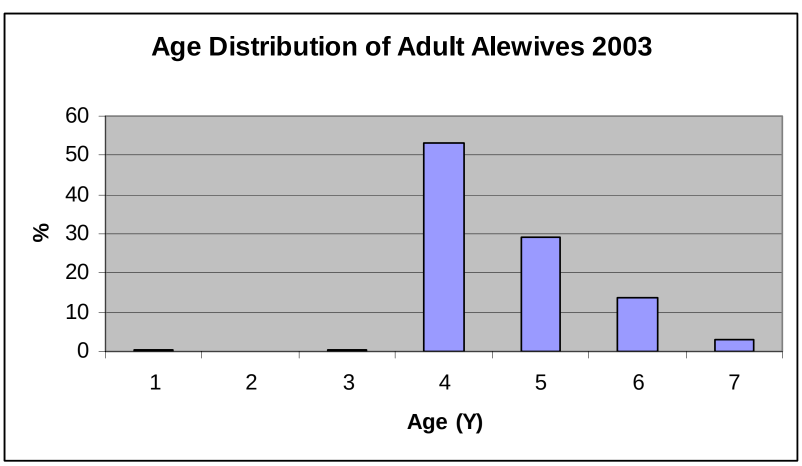


Figure 2.6 Age distribution of adult blueback herring, 2003

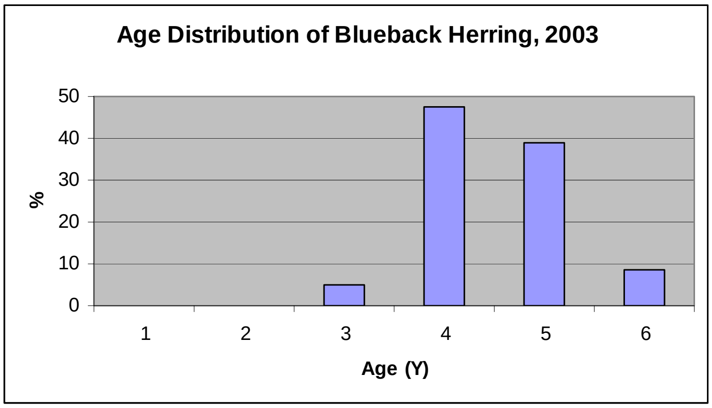


Figure 2.7 Length at age of adult alewife, 2003

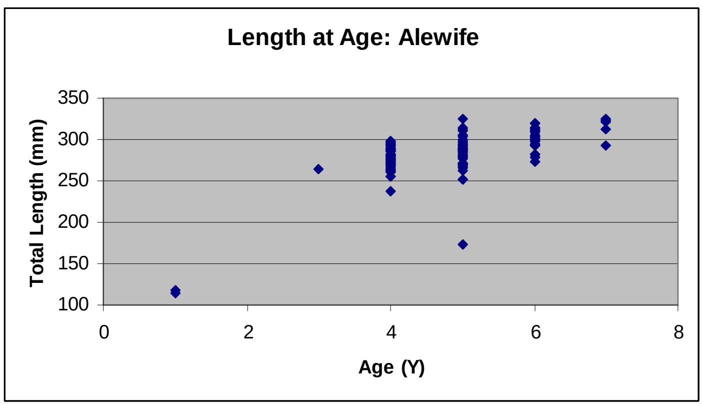


Figure 2.8 Length at age of adult blueback herring, 2003

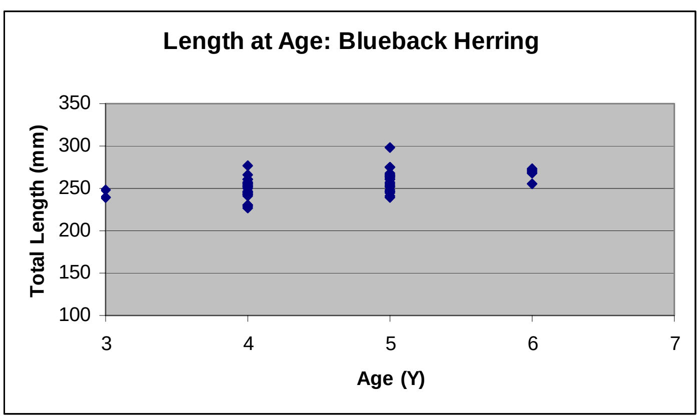


Figure 2.9. Age at first spawning of alewife.

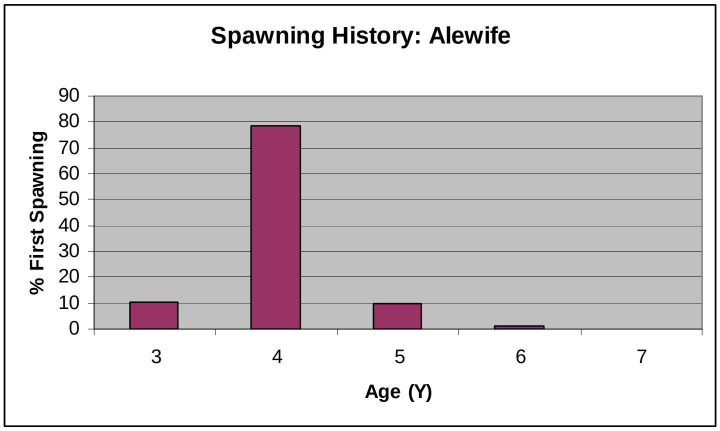
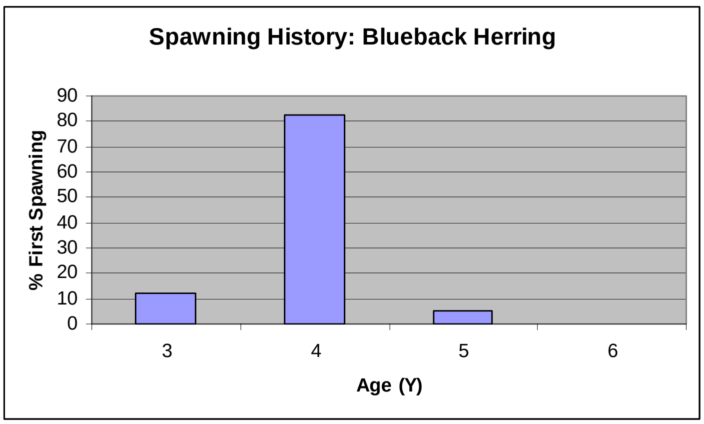


Figure 2.10. Age at first spawning of blueback herring.



2.3.2 Striped bass

A total of 107 striped bass were caught in gill nets, all of them on the seaward side of the Causeway. All but 10 fish were taken in the Causeway Channel, possibly because it is narrower and more shallow, and the net provides more complete coverage of the water column. The bass may, however, move preferentially into this channel at high tide, which was when collecting took place.

Sizes ranged from 230 mm total length (220 mm fork length) to 480 mm TL (455 mm FL) (Figure 2.11). Analysis of scales from 26 specimens indicated a range of 2-5 years in age[7] (Figure 2.12). Three small striped bass were caught in a fyke net (cf. Figure 2.2) set in the Causeway Channel on 29 July. No striped bass were captured in the headpond sets above the Causeway.

Only 2 of 5 striped bass whose stomach contents have been examined contained food. The principal prey were the shrimps *Crangon septemspinosa* and *Neomysis americana*; no fish were present in either of the stomachs.

Figure 2.11 Length-weight relationship of striped bass, 2003

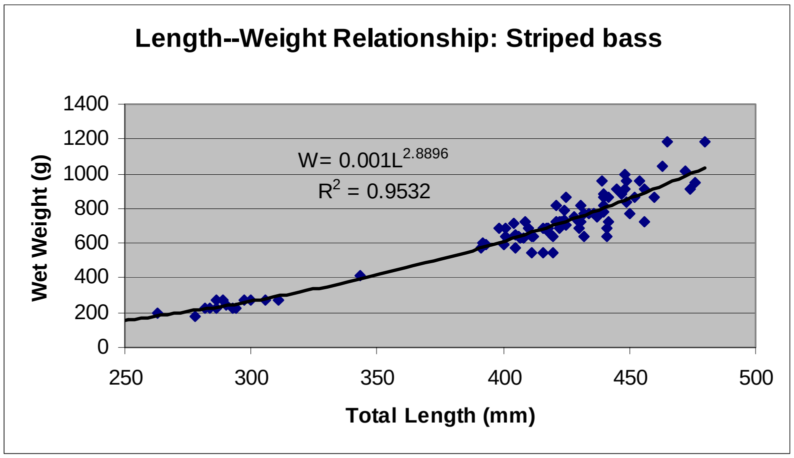


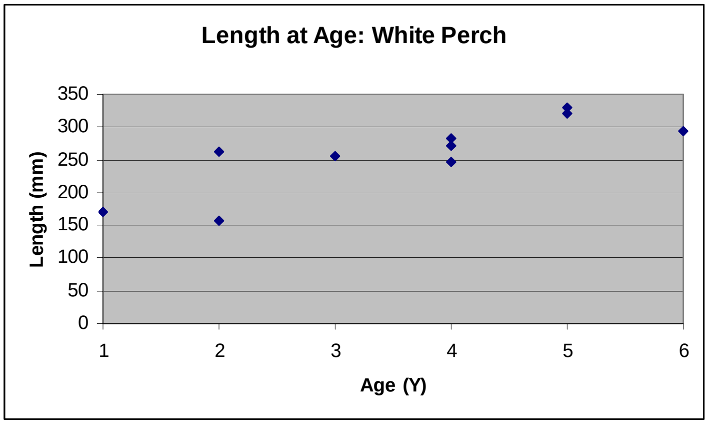
Figure 2.12 Length at age of striped bass, 2003

[7] One 2-year old specimen was a mortality from a fyke net set in the Causeway Channel on 29 July 2003.

2.3.3 Other species

Gill net collections also recovered eight white perch, 13 white suckers, three tomcod, two yellow perch, and one eel. The tomcod and five white perch were taken on the seaward side of the Causeway (in the Causeway Channel), while the remainder were caught in the headpond set. White perch were one of only three species caught on both sides of the Causeway. This is a species that is facultatively anadromous: i.e. it spawns in fresh water, but can exist both as a migratory species, moving into salt water for feeding, or as a strictly freshwater species. The oldest white perch captured was 6 years of age (Figure 2.13); spawning marks indicate that breeding begins at age 4 or 5, rather than 3 as in lake habitats (Scott and Scott 1988). Body length of the largest fish (329 mm) approaches the maximum recorded in Nova Scotia, but at 444.1 g, the weight is well below other records. Length-weight relationships for the white perch and white sucker are shown in Figures 2.14 and 2.15, respectively. (The white sucker data include numerous juveniles taken by seine net in Pesaquid Lake).

Figure 2.13 Length at age of white perch, 2003



Eel pots were set on both the seaward side of the Causeway and in the headpond during May and June, baited with pet food and gaspereau. One pot was lost from the seaward location following high flows through the control gates in late May. In total only 13 eels were captured, ranging in length from 33 – 56 cm. All were released. In spite of the low number of captures, damage to gaspereau caught in the headpond gill net indicated that eels are common in that area.

Figure 2.14 Length-weight relationship of white perch, 2003.

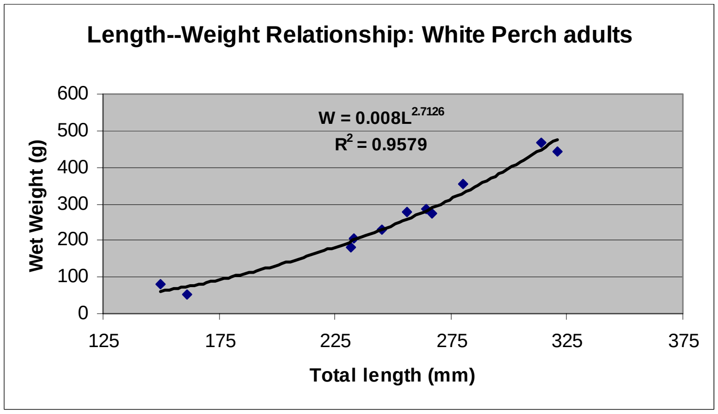
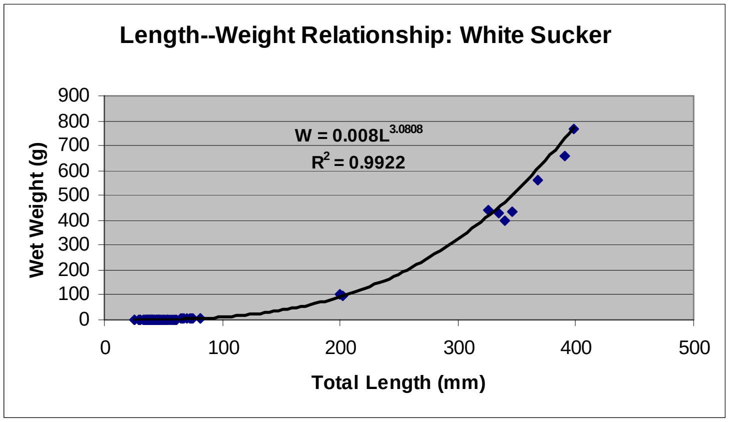
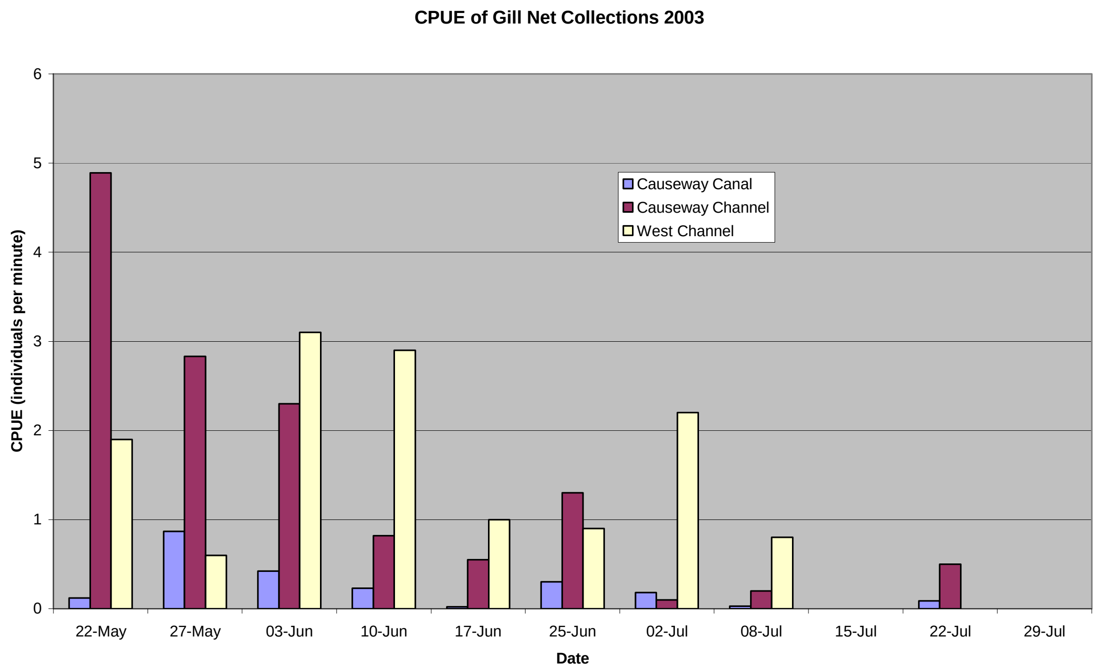


Figure 2.15 Length-weight relationship of white sucker, 2003.



In general, fish appear to be much more abundant on the seaward side of the Causeway, where gill net catches were higher, especially in the shallow channel adjacent to the Causeway (Figure 2.16). However, this is partly a function of the depth of water at the other two locations, and the technique of drifting on the seaward side, which may have increased the volume of water encountered during the set.

Figure 2.16. Relative abundance of fish caught by gill net near the Windsor Causeway 2003.



2.4 Discussion

Collections on the seaward side of the Causeway showed that fish are common in late May and early June in the channel leading from the Causeway gates (the West Channel), especially during the run of gaspereau. According to some local residents, the upstream run was much larger this year (2003) than it had been in several years. It is probable that this is related to the long period of drawdown in Pesaquid Lake, and deliberate gate management beyond that needed for maintenance. In previous years, drawdown for maintenance at the gates was scheduled to coincide with the spring gaspereau run, but in 2003 this was prolonged through most of May, and gate openings were selected to provide more favourable conditions for fish passage.

The gaspereau run consists of two species, the alewife and blueback herring, with the alewife being the most numerous, and larger in body size. Research on gaspereau stocks in other Nova Scotia rivers indicates that mixed gaspereau runs are common, although in most cases one species is more abundant than the other: in the Annapolis River, blueback herring are the more common, whereas in the Gaspereau River, it is the alewife (Gibson and Daborn 1993; Gibson 2000). Age, size and spawning history of adult alewives in the Avon system are similar to those in the Gaspereau River, and of blueback herring to those in the Annapolis system.

By mid-June, only a few striped bass were captured in the West Channel. The West Channel does not appear to be a particularly productive area, merely a means of access for fish moving further upstream, as in the case of gaspereau on their spawning migration. Observations of bank slumping and the accumulation of soft sediments on the bottom of the channel indicate that it is highly unstable, providing little habitat for benthic organisms. Examination of the stomachs of striped bass showed that most were empty, and those that contained food had exclusively prey that is *epibenthic*: i.e. organisms such as shrimp (*Crangon*, *Neomysis*) that move just above the sediment surface. Although the water may be rich in sediment, plankton and organic matter, it does not provide a suitable habitat for bottom-feeding fish (such as flounder or sturgeon) that might otherwise be expected to occur there.

The Causeway Channel also yielded mostly striped bass and gaspereau, and a few white perch. All the striped bass were immature, and none were captured upstream of the Causeway, which should have happened if they were moving in to spawn. Striped bass are opportunistic feeders, and the absence of fish or benthic organisms (such as *Corophium* or polychaetes) in the stomachs suggests that the substrate in the channels on the seaward side of the Causeway does not provide the food needed by this species. In this location they appear to be taking animals that move just above the sediment surface.

A surprisingly small total number of species (7) was captured on the seaward side of the Causeway in spite of the use of three different techniques[8]. This is consistent with results from 2002 (Daborn *et al.* 2003). Few of the expected 'forage' fish, such as tomcod, silversides or sticklebacks, were recovered, and the few striped bass stomach contents

[8] i.e. gill net, fyke net and eel trap.

examined showed no evidence that they had been feeding on small fish. However, the regular presence of cormorants, herons, and even bald eagles, suggests that small fish are available in the channels. It may be that the techniques used were simply not efficient at capturing smaller species. There can be little doubt that young of the year gaspereau are taken in late summer and fall as they migrate to sea.

The results from this part of the study do not support the expectation that fish are utilizing the benthic invertebrate fauna of the channels near to the Windsor Causeway. There is little evidence here to suggest that elimination of the Causeway Channel, as would happen with one of the proposed options for expansion of the roadway (i.e. an option with a wide median), will have significant effect upon local fish populations. Other options having a smaller footprint on the marsh will have proportionately less impact on the muddy areas adjacent to the Causeway. As indicated from studies of vegetation growth, (Daborn *et al.* 2003*)* it is probable that most of this area of muddy habitat, which is more productive of invertebrate food for fish and birds, will disappear in the next few years even if no changes are made to the present Causeway.

3.0 Fish of Pesaquid Lake and the lower Avon River

3.1 Introduction

A second objective of studies during the summer of 2003 was to inventory the fish occurring in lower reaches of the Avon River and in Pesaquid Lake, with a particular focus on the *diadromous* species. The principal migratory species known to pass through the Causeway are the American eel, alewife and blueback herring. Other important species that might also move include rainbow smelt, striped bass, white perch and sea-run trout. The status of the American shad is unclear. The species has been the subject of a drift net fishery in the Avon Estuary for decades, but we have found no records to confirm that it ever spawned in the Avon River. Apparently in the late 1800s, E.E. Prince believed that the shad caught in the Estuary[9] were spawning migrants entering the Kennetcook River (R. Bradford – personal communication), although Perley (1852) apparently listed shad among the species inhabiting the Avon River (Isaacman 2004)[10]. It has since been determined that many of the shad in the Minas Basin are in fact migrants, and include fish from most of the spawning rivers on the eastern seaboard of North America (Dadswell *et al.* 1984).

This study, which began in late May 2003, was too late to document any upstream movement of smelt; consequently, evidence for smelt runs was most likely to be obtained by surveys aimed at larval and juvenile stages. Our surveys also offered the prospect of assessing the timing of seaward movement of young-of-the-year (YOY) fish, especially gaspereau, and possibly of determining the relative status of Pesaquid Lake as a juvenile rearing habitat.

3.2 Historical records of fish in the Avon River.

In spite of the size and long history of settlement of the Avon watershed, documented information on fish stocks prior to construction of the Windsor Causeway is sparse. The

[9] i.e. seaward of the Causeway.
[10] It is conceivable that Perley (1852) used the term 'Avon River' to include both what we now call the Avon River (fresh water zone) and the salt water Estuary.

most comprehensive review of historic conditions, based on a survey of old documents and interviews with local residents, is currently being prepared by Lisa Isaacman of Dalhousie University. A summary of her report was presented at the 6th Bay of Fundy Workshop in September 2004 (Isaacman 2004).

Duncanson (1965) noted several historic events in the Avon River system, including the appearance of whales, and 19th century regulations on the promulgation of net fisheries for gaspereau in the river[11]. There have apparently been no formal attempts by any organization or government group to determine abundance and diversity of the fish fauna of the river. Informal attempts through creel censuses made by the Nova Scotia Department of Agriculture and Fisheries to determine what species exist in the river have been of limited success, as local recreational fishers appear unwilling to provide such information. Isaacman (2004) notes that although Perley (1852) reported the Avon River having an abundant salmon run in the mid-19th century, there were serious concerns about the status of the stocks in the latter half of the century, the declines being attributed to several factors, including saw mill waste, mill obstructions, and illegal fishing. A stocking programme initiated in the 1870s appeared to assist the recovery by 1898 (*Ibid.*).

In 1965, preliminary investigations were conducted by the Department of Fisheries and Oceans to determine the potential value of the Avon River as anadromous fish habitat. It was concluded that only a three to five km section of the lower river below the Falls Dam would provide suitable habitat for salmon, because of power dams, pipeline diversions, and storage dams that existed upstream (Smith 1965).

A letter from K. E. H. Smith to C.P. Ruggles in 1965 stated that, because the Avon River had already experienced so much development along its length, the chances of re-establishing any fish species to a "significant level" would be quite low. Therefore, the construction of a causeway would "add little to the loss already experienced" (Smith 1965). However, he wrote that if the cost of building a fish passage was relatively inexpensive, then one should be included to allow existing anadromous fish to pass

[11] These observations, provided through the courtesy of Mr. Richard Armstrong, are recorded in Appendix 1.

through. This suggestion was also made by the Chief of the Fish Culture Branch (Maritimes Area) in a letter to the Nova Scotia Water Authority (MacEachern 1965). Fish Culture staff had conducted a preliminary, (but apparently undocumented), examination of the fishery resources on the Avon. They found that salmon, gaspereau, shad, smelt, and sea-run trout used the lower portion of the Avon and the West Branch. It was suggested that in order to protect these migrating species, a fish pass should be created to allow fish to pass through at regular intervals (*Ibid.*).

In 1968, the Director of the Resource Development Service (DFO) stated that the West Avon River, the main tributary into the Avon River, was impounded "many years ago" for hydroelectric power. The result was thought to be the elimination of much Atlantic salmon (*Salmo salar*) habitat, and significant reductions in the number of shad (*Alosa sapidissima*), smelt (*Osmerus mordax*) and sea-run trout (*Salvelinus fontinalis*).

Even in the absence of a fishway, some migratory stocks appear to have persisted, as smelt and gaspereau have been regularly taken by non-commercial fishers. Clearly, sufficient numbers of these stocks have been able to penetrate the Causeway since construction, although all commentary seems to confirm that the numbers are much reduced from their pre-causeway condition. Unfortunately, no quantitative data are available.

Kolstee, in a recent review of the implications of removal of the Causeway makes reference to several written opinions regarding the fisheries of the Avon (Kolstee 2003):

> "When the fisheries resource was investigated prior to the causeway construction it was stated "under present conditions the Avon River systems most important fishery is for resident speckled trout." It was also reported that salmon fishing had diminished. "It is estimated that recent yearly runs would not exceed 50 salmon and grilse and in most cases would be considerably smaller." It appears the smelt fishery was eliminated with the construction of the causeway. It was reported "a limited run of smelt provides a small dip net catch most years in late April." This was mainly in the West Avon near the head of the tide. Also comments were made about shad and gaspereau. "Years ago fair runs of gaspereau were reported on the West Avon River above Benjamin's Mill. However in recent years the runs have fallen off to a level where the dip net fishery is practically nil." "There

appears to be some doubt as to whether or not any shad now utilize this system, small runs were reported in the past."

There appears to be very little information on the extent of the fisheries resource above the causeway at the present time. People have reported catching salmon, gaspereau and sea trout but there appears to be no information on numbers." (Kolstee 2003).

3.3. Methods

Surveys of young of the year fish in the fresh water portions of the system were carried out by two principal methods: beach seines and horizontal tows with an ichthyoplankton[12] net. Neither of these techniques is truly quantitative, however they can be used as a surrogate means of estimating abundance through the calculation of a 'catch per unit effort' (CPUE) index.

3.3.1 Seine collections.

Beach seine surveys were conducted at six sites above the Causeway on seven dates during between 7 August and 7 October 2003. Three of the sites were within Pesaquid Lake: at the entrance to the outflow canal above the Causeway gates (CC); at Falmouth Park (FP); and at the Boat Launch (BL) facilities just above the Windsor town bridge. Seine surveys were also carried out in two tributary streams: Allen Brook and LeBreau Creek, and occasionally at the Powerhouse (PH) on the main branch of the Avon River. Locations were chosen largely on the basis of their accessibility, and are shown in Figure 3.1. Specific sample sites are shown in Figures 3.3 to 3.8.

The seine collections were carried out using a 10 m long by 1 m deep beach seine having a stretched mesh size of 0.3 cm. At sites BL and FP, one or two circular sweeps were made along the shoreline. At site CC, located just above the causeway gates, because of the water depth, the seine was tethered to the shoreline and a circular sweep was made by extending the seine outward from the shore and then sweeping the seine back to the shore using a Zodiac. At Allen Brook, the seine was stretched across the river and held in place while one person walked downstream from an upstream position about 20 m above the

[12] Ichthyoplankton are larval fish that have limited swimming capacity, and therefore tend to drift with water currents.

seine in a manner that disturbed the shoreline and stream channel, causing fish to move downstream and into the net. In LeBreau Creek, the pool upstream of the road bridge was surveyed. Seine collections were also made periodically in the pool below the Powerhouse on the main branch of the Avon River.

The main objective of the beach seine surveys was to collect young-of-the-year (YOY) alewives, but some representative specimens of all of the fish species collected were usually retained for determination of species, length and weight.

Figure 3.1 Location of beach seine collections, 2003

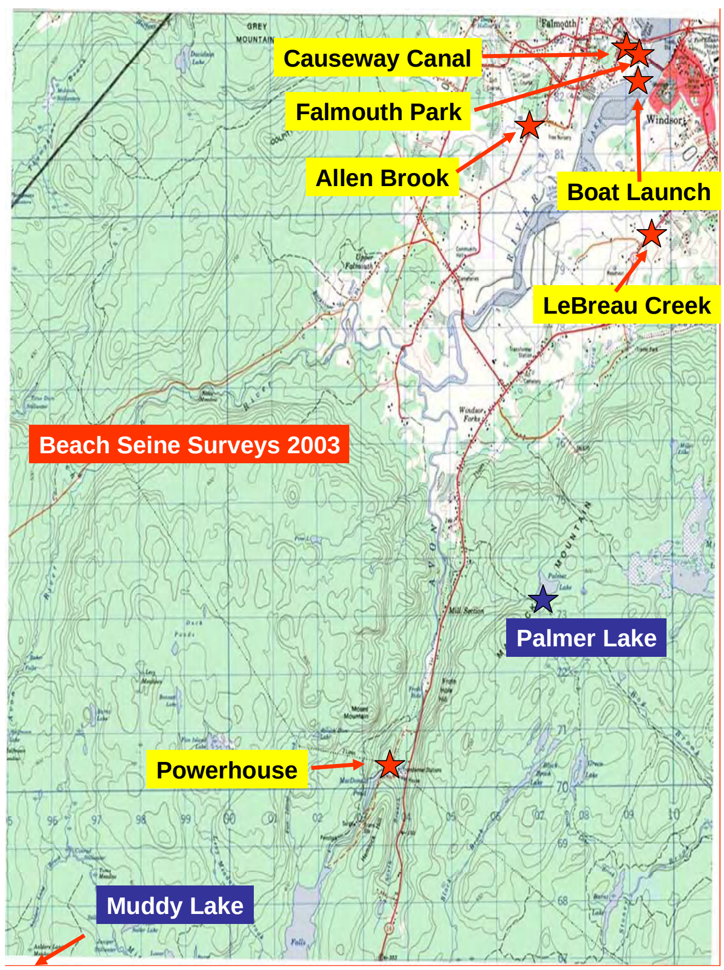


Figure 3.2 Causeway Canal seine site

Figure 3.3 Falmouth Park seine site

Figure 3.4 Boat Launch seine site

Figure 3.5 Allen Brook seine and ichthyoplankton sample site

Figure 3.6 LeBreau Creek seine and ichthyoplankton sample site

Figure 3.7 Powerhouse seine and ichthyoplankton sample site

Figure 3.8 Locations of ichthyoplankton collections, 2003

3.3.2 Larval Fish Surveys

Larval fish surveys were carried out at five locations using a rectangular 45 cm by 30 cm, ichthyoplankton net fitted with 363 µm Nitex™ mesh. The sample sites (cf. Fig. 3.8) were at Allen Brook (Fig. 3.5), LeBreau Creek (Fig. 3.6), the Powerhouse outflow (PH—Fig. 3.7), below Sangster's Bridge (Fig. 3.9), and below the bridge on the West Branch (WB) at Castle Frederick (Fig. 3.10). During high river flows at the river stations, the net was merely suspended in the water for a given period of time. The volume of water filtered was determined from water velocities measured by a Model 2031 General Oceanics™ torpedo flow meter mounted inside the net. When there was little or no flow, a standard tow was made using the ichthyoplankton net over a measured distance of 50 m. Volume sampled in this case was approximately 6.75 m^3.

Samples were preserved in ten percent formalin and processed in the laboratory using a binocular stereo microscope. Larval fish identification was carried out with reference to Jones *et al*. (1978). Principal phytoplankton and zooplankton species collected in the net were also examined and identified where possible. Additional investigations were made at two lakes in the Avon watershed, Palmer Lake and Muddy Lake, to investigate their potential as gaspereau spawning and rearing habitat.

Figure 3.9 Sangster's Bridge ichthyoplankton sample site

3.10 West Branch (Castle Frederick) ichthyoplankton sample site

3.4 Results

More than 2000 fish were taken in seine collections in Pesaquid Lake and inflowing streams during the course of the summer and fall[13]. Of these, 1316, representing 11 species, were identified[14], measured and weighed. Species recorded, their locations, and abundance are listed in Tables 3.1 and 3.2, and their overall relative abundance in Figure 3.11. Full collection details are provided in Appendix 4.

The vast majority of fish at the stations on the shore of Pesaquid Lake (Falmouth Park, and the Boat Launch sites), were juvenile gaspereau (alewife and blueback herring) and banded killifish. Only gaspereau were taken at the Causeway Canal station, located in the channel just upstream of the Causeway control gates. No juvenile gaspereau were

[13] No attempt was made to count all fish in very large catches (i.e. several hundred). From large catches, mostly of Banded killifish, collected in September and October, a random representative sample was kept, but the rest were quickly released.
[14] Except for juvenile alewife (*A. pseudoharengus*) and blueback herring (*A.* aestivalis) which were collectively recorded as 'gaspereau'.

captured in the pool below the Powerhouse, although many adult gaspereau were observed in that region during the spawning run.

Figure 3.11 Relative abundance of fish in seine collections, 2003.

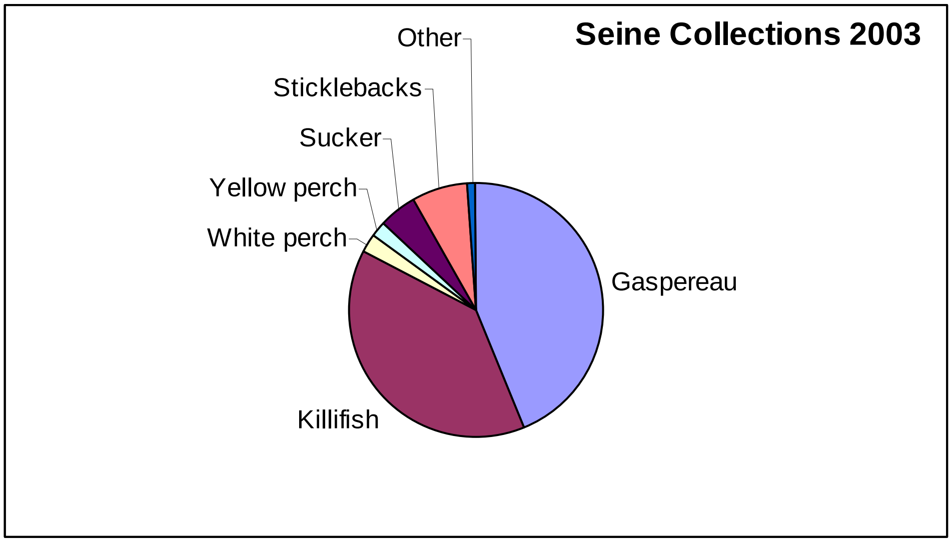


Table 3.1 Fish of Pesaquid Lake and the lower Avon River, 2003

Common	Scientific			Sites[15]			
Name	Name	CC	FP	BL	AB	LB	P
Alewife	*Alosa pseudoharengus*	x	x	x	x	x	x
Blueback herring	*Alosa aestivalis*	x	x	x	x	x	x
Yellow perch	*Perca flavescens*		x				x
White perch	*Morone americana*		x	x			x
White sucker	*Catostomus commersonii*		x	x	x	x	x
Small-mouth bass	*Micropterus dolomeui*						x
Lake chub	*Couesius plumbeus*					x	
Redbelly dace	*Chrosomus eos*				x		
Banded killifish	*Fundulus heteroclitus*		x	x	x	x	x
Threespine stickleback	*Gasterosteus aculeatus*		x	x	x	x	
Fourspine stickleback	*Apeltes quadracus*		x	x	x	x	
Ninespine stickleback	*Pungitius pungitius*		x	x		x	

[15] CC= Causeway Canal upstream of Control Gates; FP = Falmouth Park; BL= Boat Launch; AB= Allen Brook; LB= LeBreau Creek; P= Powerhouse pool.

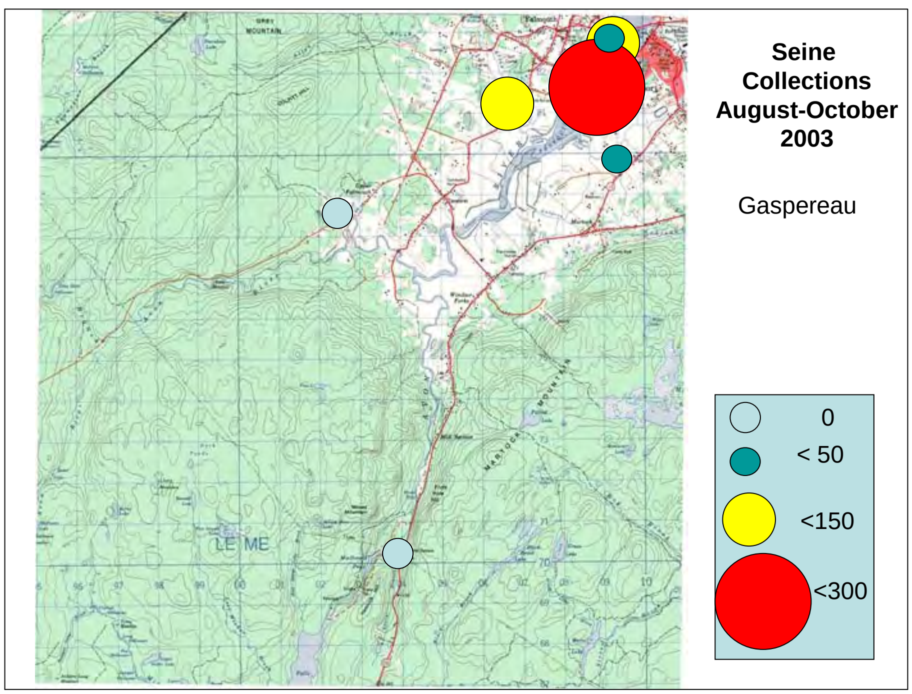
Table 3.2. Seine collections, 2003

Date	Location	Gaspereau (J)	White Sucker	Banded Killifish	Yellow Perch	White Perch	Smallmouth Bass	Lake Chub	Threespine Stickleback	Fourspine Stickleback	Ninespine Stickleback	Redbelly Dace
06-Aug-03	Boat Ramp	99	0	2	0	0	0	0	0	0	0	0
"	Causeway Canal	138	0	0	0	0	0	0	0	0	0	0
11-Aug-03	Allen Brook	56	0	0	0	0	0	0	0	0	0	0
"	Boat Ramp	141	1	45	0	29	0	0	0	0	0	0
"	Causeway Canal	3	0	0	0	0	0	0	0	0	0	0
"	Causeway Canal	3	0	0	0	0	0	0	0	0	0	0
"	Falmouth Park	35	1	4	1	5	0	0	0	0	0	0
"	LeBreau Creek	10	0	0	0	0	0	0	0	0	0	0
19-Aug-03	Allen Brook	75	4	0	0	0	0	0	1	0	0	1
"	Benjamin Bridge (W. Branch)	0	0	0	0	0	0	0	0	0	0	2
"	Davidson Road	0	1	0	0	0	0	0	0	0	0	0
"	Boat Ramp	1	1	1	0	0	0	0	0	0	0	0
"	Falmouth Park	1	10	42	0	0	0	0	0	0	0	0
"	LeBreau Creek	20	14	17	0	0	0	0	3	4	1	1
"	Powerhouse	0	1	0	13	1	1	1	0	0	0	0
"	Sangster's Bridge	1	0	0	0	0	0	0	0	0	0	0
"	South West Branch	0	0	0	1	0	0	0	0	0	0	5
09-Sep-03	Allen Brook	19	0	32	0	0	0	0	0	0	0	0
"	Boat Ramp	3	0	56	0	0	0	0	4	0	4	0
"	LeBreau Creek	3	8	18	0	0	0	0	7	0	1	0
23-Sep-03	Allen Brook	0	5	20	0	0	0	0	49	10	4	0
"	Boat Ramp	12	1	119	1	0	0	0	0	0	0	0
"	Falmouth Park	0	2	56	0	0	0	0	4	1	5	0
07-Oct-03	Allen Brook	0	2	2	0	0	0	0	3	0	1	0
"	Boat Ramp	12	0	10	0	0	0	0	0	3	1	0
"	Falmouth Park	0	0	39	0	0	0	1	0	0	0	0
"	LeBreau Creek	0	1	0	0	0	0	1	0	0	0	0
	TOTALS	**632**	**52**	**463**	**16**	**35**	**1**	**3**	**71**	**18**	**17**	**9**

3.4.1 Gaspereau collections

Juvenile gaspereau were taken in significant numbers mostly at stations in the two tributaries (Allen Brook and LeBreau Creek) and sites near the Causeway (Figure 3.12). Juvenile gaspereau tend to be schooling fish; consequently, seine collections at any given site often captured none on some days, whereas the numbers on other dates at the same site could be relatively high. The only sample site that yielded young of the year (YOY) gaspereau on all sample dates from early August to October was the Boat Ramp site on the west side of Pesaquid Lake upstream of the road bridge (cf. Figure 3.4). Catches were also relatively large at the Causeway Canal site and in Allen Brook, but only on 3 occasions each.

Figure 3.12 Relative numbers of juvenile gaspereau taken at seine collection sites, August to October 2003



The largest YOY was 65 mm in total length, and the smallest 21 mm. Mean size increased during the course of the summer from 27.3 to 54.1 mm (Figure 3.13). Average rates of growth were 0.44 mm/day, or 20 mg/day, representing a daily increase of 2-3% in weight. These growth rates were similar at each of the sample locations, and on any given date the mean length was similar at all stations at which YOY gaspereau were collected (Figure 3.14). This suggests that growing conditions are comparable in the lake and in the two major tributary streams, in spite of the apparently higher productivity of Allen Brook. The length-weight relationship for juvenile gaspereau has an exponent of 3.38, which suggests that the young of the year gaspereau were in good condition (Figure 3.15); however the growth rates, maximum and mean lengths are considerably lower than those obtained in other years in the Gaspereau River system (Gibson and Daborn 1998). Possibly growing conditions in the Avon system during 2003 were poorer than usual for gaspereau. YOY gaspereau began to leave Pesaquid Lake during the fall, and only a few specimens were captured on 7 October.

Figure 3.13 Combined mean length of juvenile gaspereau at all seine sample sites, August-October 2003

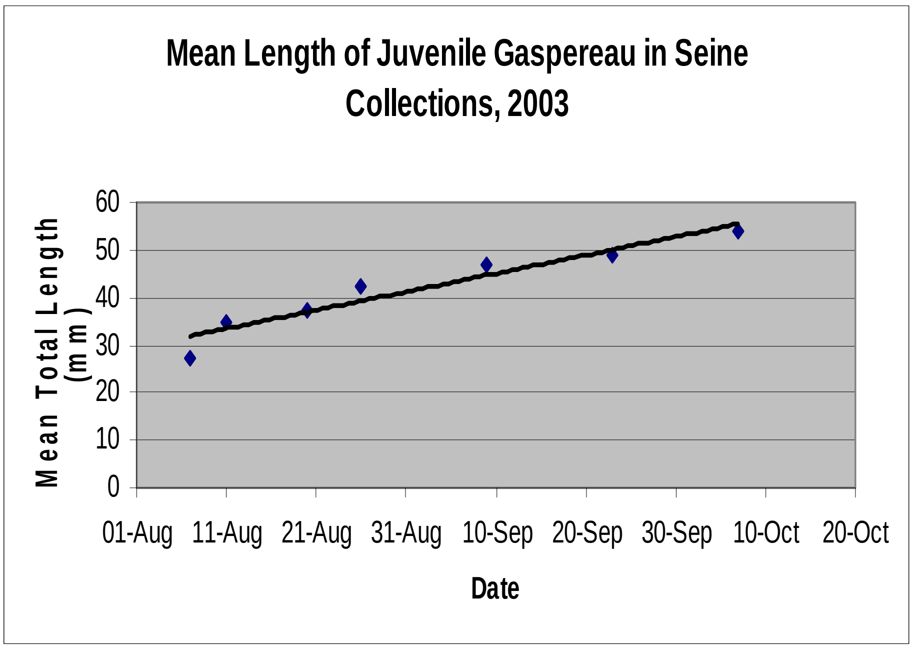
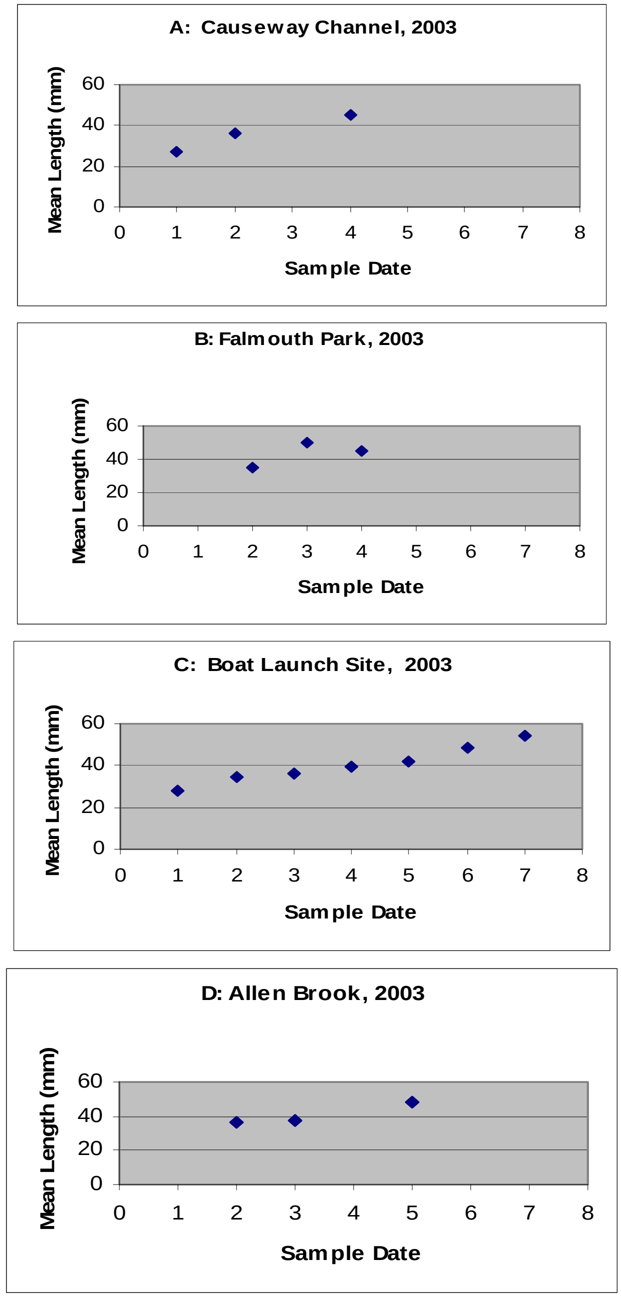
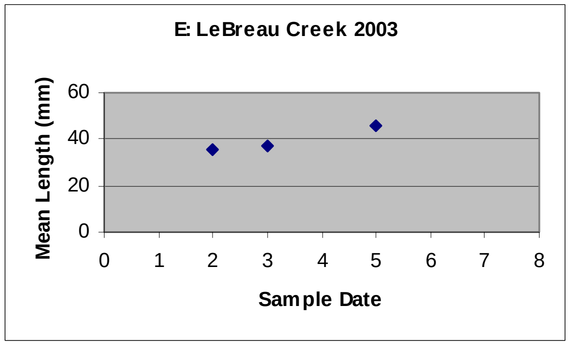


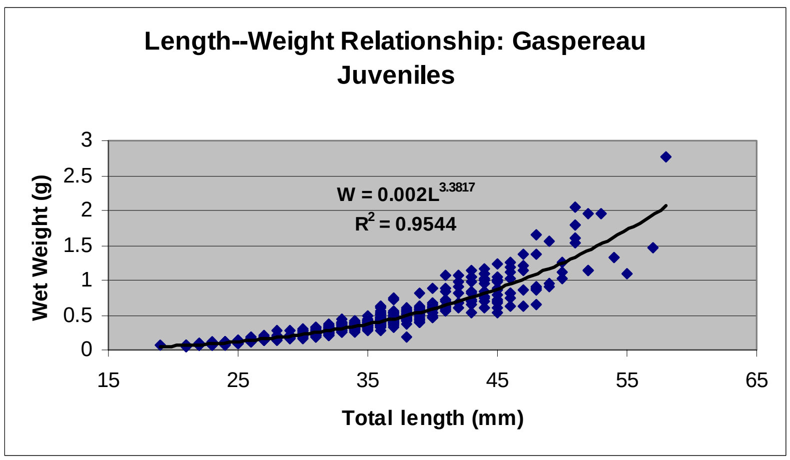
Figure 3.14 Mean length of juvenile gaspereau at individual seine sample sites, August – October 2003.





[Sample dates: 1 = 7 August; 2 = 11 August; 3 = 20 August; 4 = 26 August; 5 = 9 September; 10 = 23 September; 11 = 7 October 2003].

Figure 3.15 Length-weight relationship of gaspereau juveniles, 2003.



Additional sites were investigated during the course of the summer, at Benjamin Bridge, Sangster's Bridge, and localities in the Southwest Branch of the Avon. Muddy Lake and Palmer Lake, which drain into the Southwest Branch of the Avon River and Pesaquid Lake, respectively, were visited to determine if they served as spawning areas for gaspereau. Muddy Lake proved to be a very shallow, largely bog dominated lake; it was not possible to access it by boat and the substrate was too soft to carry out beach seines. At Palmer Lake, two ichthyoplankton tows were made but contained no larval alewives, and two beach seines failed to collect any YOY alewives. A survey of the outflow stream leading from Palmer Lake to the Avon River indicated the presence of a number of waterfalls, some greater than two meters in height, that would most likely be a barrier to spawning alewives attempting to reach the lake.

3.4.2 Banded killifish collections.

The banded killifish was captured at least once at all stations except for the Causeway Canal. They were most common at Falmouth Park and the Boat Launch sites, and much less common at Allen Brook, LeBreau Creek and the Powerhouse (Figure 3.16). This is a predominantly estuarine species that has an extremely wide tolerance of changes in salinity, temperature and oxygen; it is commonly found in relatively turbid water, perhaps as a means of avoiding predators. The smallest specimen captured was 22 mm, and the largest 95 mm in total length. Because these are resident fish, the population is multi-aged during the growing season; hence seasonal growth rates are obscured (Figure 3.17).

Figure 3.16 Relative numbers of banded killifish taken at seine collection sites, August to October 2003

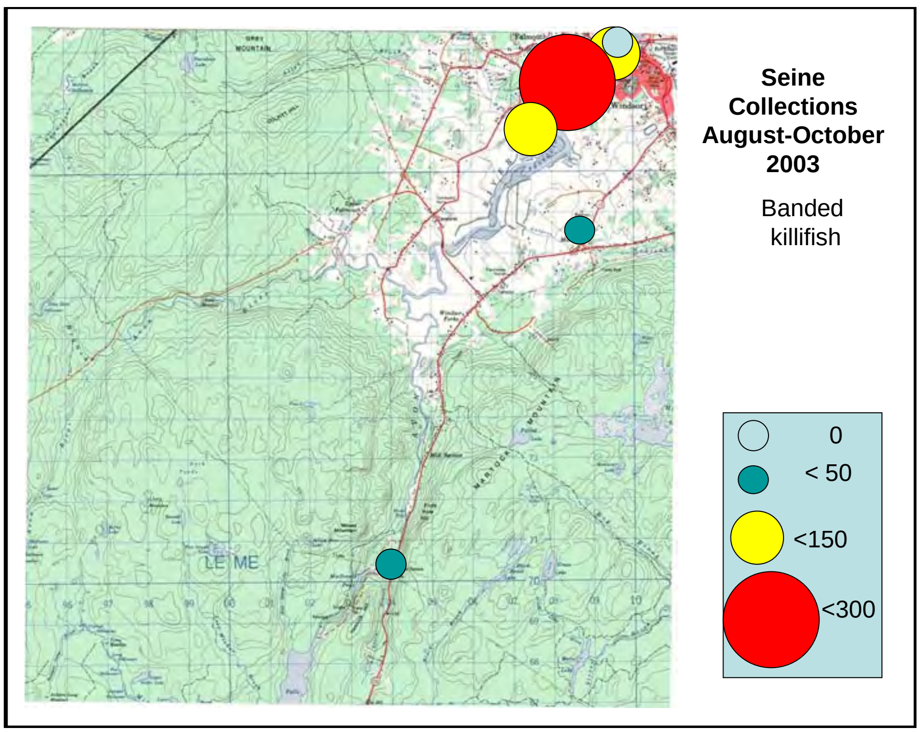


Figure 3.17 Combined mean lengths of banded killifish from all sites, 2003

(Sample dates as for Figure 3.14)

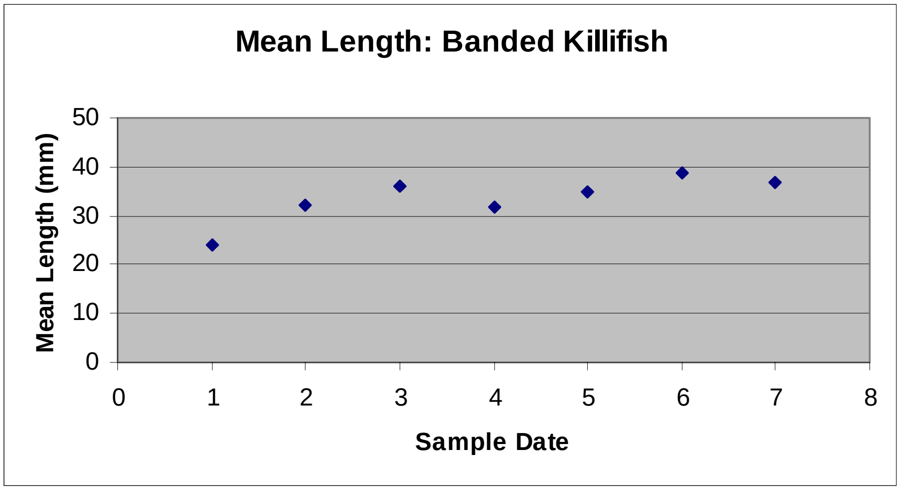
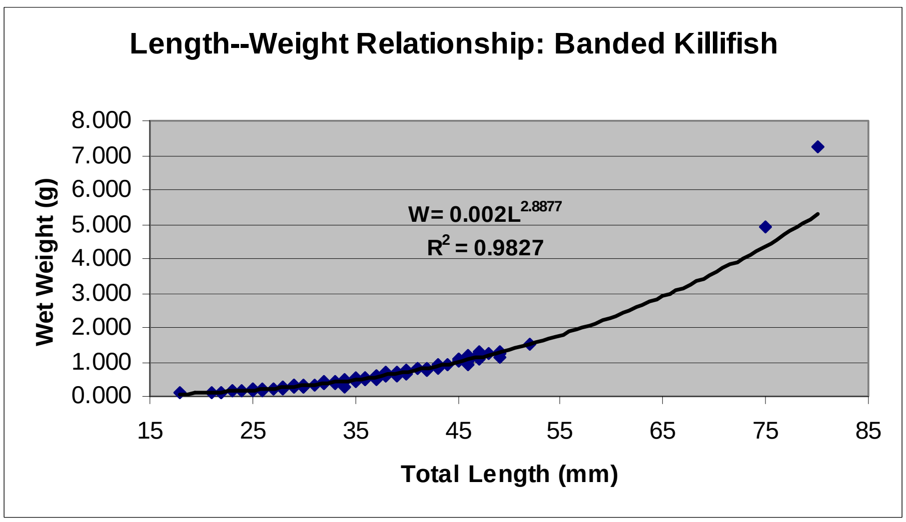


Figure 3.18. Length-weight relationship of banded killifish



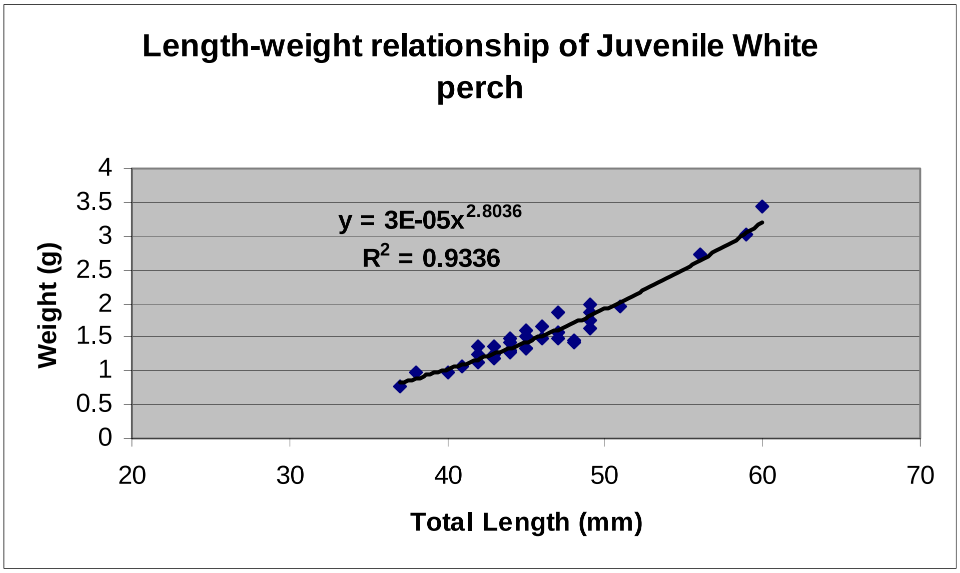
3.4.3 White perch[16] and yellow perch collections.

The white perch, *Morone americana*, is a facultatively anadromous species, meaning that it can persist indefinitely in fresh water or migrate regularly between fresh and salt water. Specimens were captured on both sides of the Causeway, indicating that this population may be migratory. However, only 43 individuals were captured in total; most of these

[16] Despite its common name, it is a closer relative of the striped bass (*M. saxatilis*), and is in the bass family (Percichthyidae) than of the yellow perch (*Perca flavescens*), which is in the perch family (Percidae).

(34) were YOY caught by seining in the lower part of Pesaquid Lake. The length-weight relationship of these juveniles is shown in Figure 3.19.

Figure 3.19. Length-weight relationship of juvenile white perch



Yellow perch are essentially inhabitants of freshwater lakes and slow-moving rivers. Although there are records from brackish waters and even saline lakes of western Canada, the species is not known to move into estuarine waters in the east. Only 40 animals were caught in total; of these, 22 were taken by gill net set for five minutes beneath Sangster's Bridge on 28 May. Ages of these fish ranged from 2-5 years (Figure 3.20), and at this time it appeared that many were spawning. Mean fork length of these fish was 197.9 ± 41.0 S.D. mm. (max. FL 267 mm). All but one of the remaining fish were taken in seines at the seaward end of Pesaquid Lake (Falmouth Park and the Boat Launch), and were young of the year ranging from 54 to 77 mm in length. One specimen only was taken at the Powerhouse site. Length-weight relationship for the yellow perch is shown in Figure 3.21.

Figure 3.20 Length at age of yellow perch, 2003.

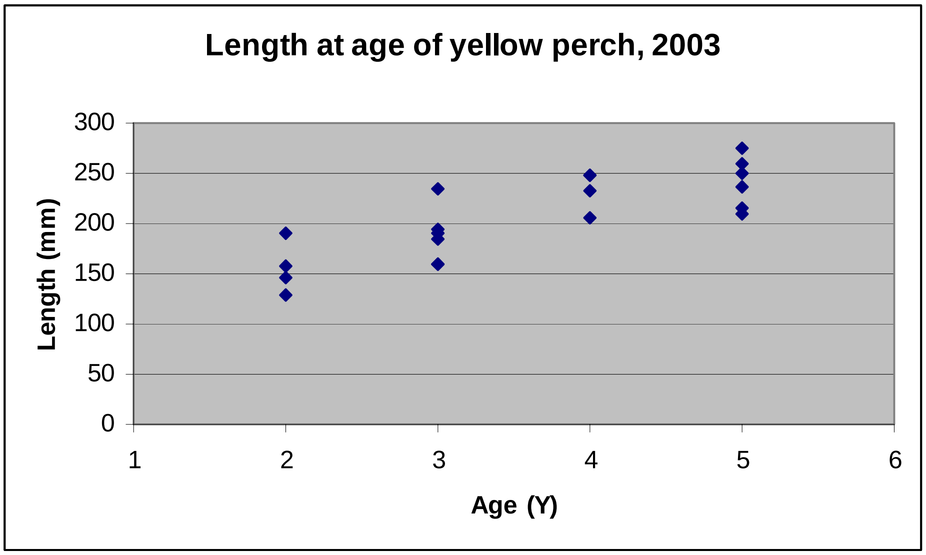
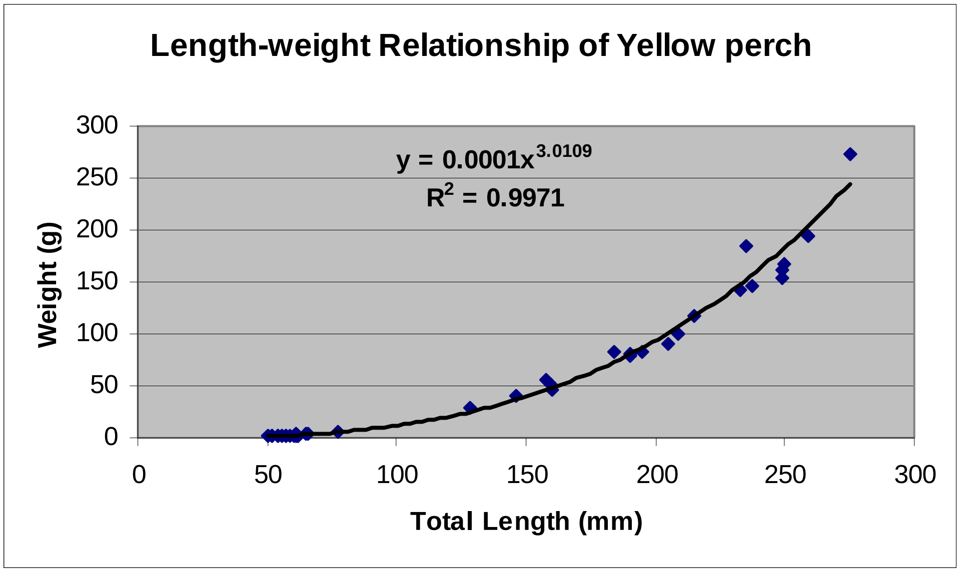


Figure 3.21. Length-weight relationship of yellow perch



3.4.4 Other species.

Of the remaining seven species taken in seine collections, smallmouth bass and lake chub were represented by solitary individuals. Three species of sticklebacks (Threespine, fourspine and ninespine) were collected mainly in Allen Brook and LeBreau Creek, and the northern redbelly dace in the West Branch of the Avon. White suckers were widespread in both tributaries and Pesaquid Lake itself. Length—weight relationships of these species are shown in Figures 3.22 to 3.26.

Figure 3.22 Length-weight relationship of juvenile white sucker.

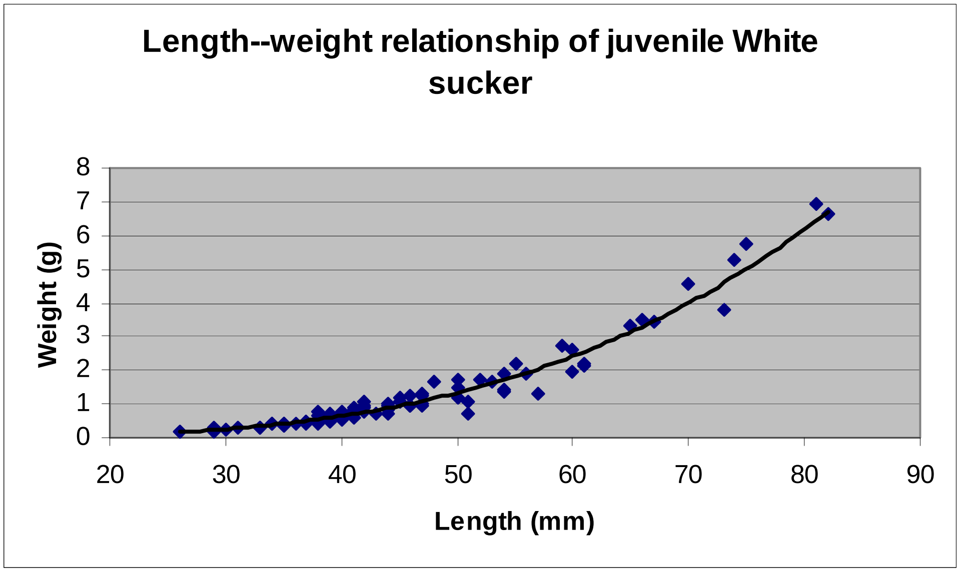


Figure 3.23. Length-weight relationship of threespine stickleback

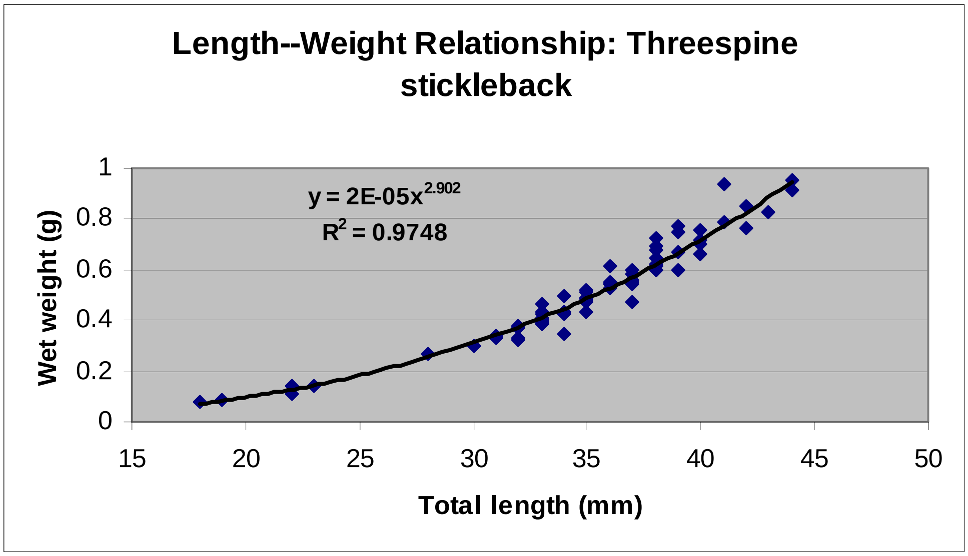


Figure 3.24 Length-weight relationship of fourspine stickleback

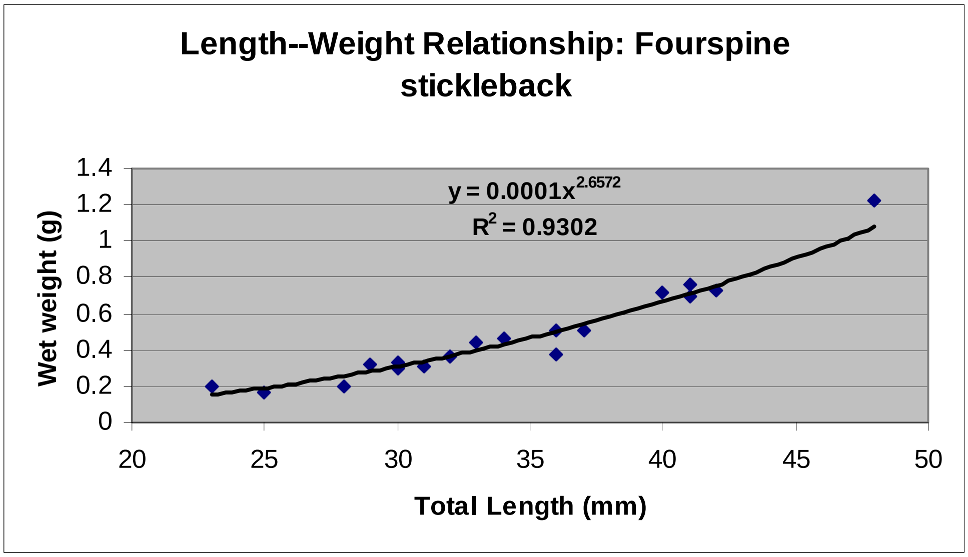


Figure 3.25 Length-weight relationship of ninespine stickleback

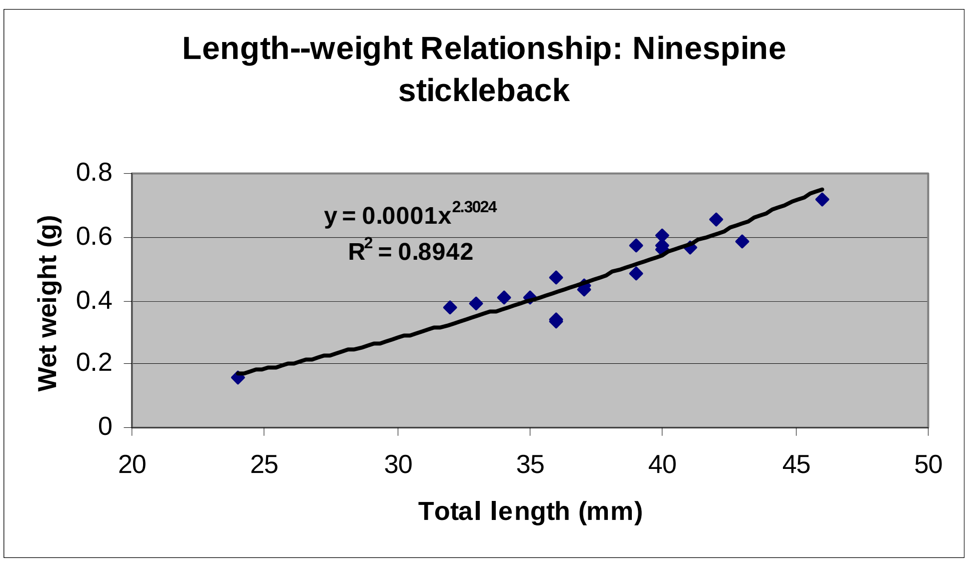
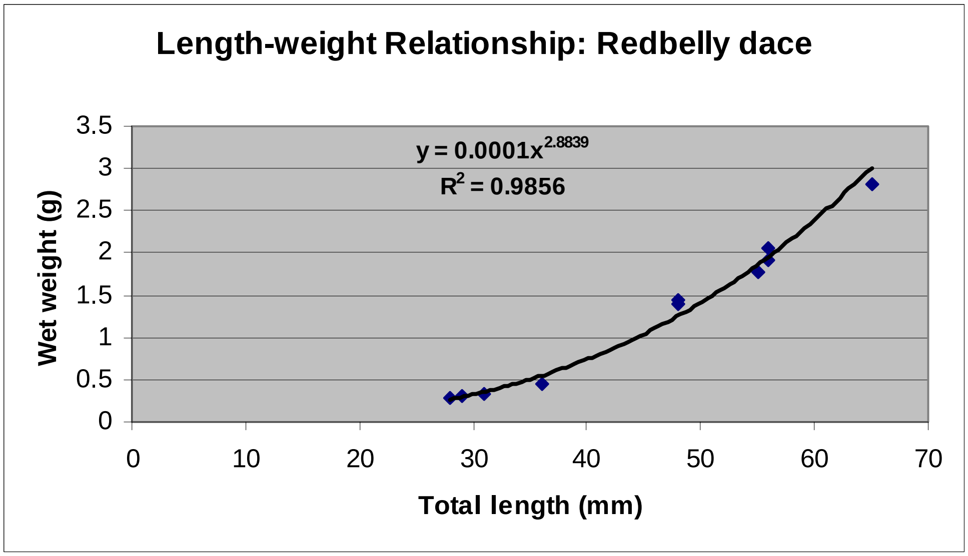


Figure 3.26. Length-weight relationship of redbelly dace



3.4.5 Ichthyoplankton collections.

Ichthyoplankton tows were largely unsuccessful at capturing fish larvae in the headpond (Pesaquid Lake). Except when the water level in Pesaquid Lake was low, flows at the bridge sampling locations were too low to provide sufficient volume through the net, and to capture and retain actively swimming larvae. Results are shown in Table 3.3. Larvae were identified to family level only. The clupeids (herring family) were probably larval *Alosa* (gaspereau), and the cyprinodontids the killifish *Fundulus* sp. One yellow perch (*Perca flavescens*-Percidae) was captured at Sangster's Bridge together with a white perch (*Morone americana*-Percichthyidae). More intensive sampling is needed to establish the distribution and timing patterns of fish larvae in the lower Avon system, and to determine production.

Table 3.3. Larval fish captured in ichthyoplankton tows, 2003.

Date	Site	Clupeidae	Percidae/ Percichthyidae	Gasterosteidae	Cyprinodontidae	Other
15-May	Allen Brook	0	0	0	0	0
	Sangster's Bridge	0	0	0	0	0
	West Branch	0	0	0	0	0
	Powerhouse	0	0	0	0	0
	LeBreau Creek	0	0	0	0	0

Date	Site	Clupeidae	Percidae/ Percichthyidae	Gasterosteidae	Cyprinodontidae	Other
21-May	Allen Brook	0	0	0	0	0
	Sangster's Bridge	0	0	0	0	0
	West Branch	2	0	0	0	0
	Powerhouse	0	0	0	0	0
	LeBreau Creek	0	0	0	0	0
27-May	Allen Brook	0	0	0	4	0
	Sangster's Bridge	0	0	0	0	0
	West Branch	0	0	0	0	0
	Powerhouse	0	0	0	0	0
	LeBreau Creek	0	0	0	0	0
3&4-Jun	Allen Brook	0	0	1	0	0
	Sangster's Bridge	2	2	0	0	0
	West Branch	0	0	0	0	0
	Powerhouse	0	0	0	0	0
	LeBreau Creek	0	0	0	0	0
10-Jun	Allen Brook	0	0	0	0	0
	Sangster's Bridge	0	0	0	0	0
	West Branch	3	0	0	0	0
	Powerhouse	0	0	0	0	0
	LeBreau Creek	0	0	0	0	0
17&18-Jun	Allen Brook	0	0	0	3	0
	Sangster's Bridge	0	0	0	0	0
	West Branch	0	0	0	0	0
	Powerhouse	0	0	0	0	0
	LeBreau Creek	0	0	0	0	0
23&24-Jun	Allen Brook	0	0	0	0	0
	Sangster's Bridge	0	0	0	0	0
	West Branch	0	0	0	0	0
	Powerhouse	0	0	0	0	0
	LeBreau Creek	0	0	0	0	0
2-Jul	Allen Brook	0	0	0	0	0
	Sangster's Bridge	0	0	0	0	0
	West Branch	0	0	0	0	0
	Powerhouse	0	0	0	0	0
	LeBreau Creek	0	0	0	0	0
8-Jul	Allen Brook	0	0	0	0	0
	Sangster's Bridge	4	0	0	0	0
	West Branch	0	0	0	0	0
	Powerhouse	0	0	0	0	0
	LeBreau Creek	0	0	0	0	0

Date	Site	Clupeidae	Percidae/ Percichthyidae	Gasterosteidae	Cyprinodontidae	Other
16&17-Jul	Allen Brook	0	0	0	0	0
	Sangster's Bridge	0	0	0	0	0
	West Branch	0	0	0	0	0
	Powerhouse	0	0	0	0	0
	LeBreau Creek	0	0	0	0	0
22-Jul	Allen Brook	0	0	0	0	0
	Sangster's Bridge	0	0	0	0	0
	West Branch	0	0	0	0	0
	Powerhouse	0	0	0	0	0
	LeBreau Creek	0	0	0	0	0
29-Jul	Allen Brook	0	0	0	0	0
	Sangster's Bridge	0	0	0	0	0
	West Branch	0	0	0	0	0
	Powerhouse	0	0	0	0	0
	LeBreau Creek	0	0	0	0	0
5&6-Aug	Allen Brook	0	0	0	0	0
	Sangster's Bridge	0	0	0	0	0
	West Branch	0	0	0	0	0
	Powerhouse	0	0	0	0	0
	LeBreau Creek	0	0	0	0	0
12-Aug	Allen Brook	0	0	0	0	0
	Sangster's Bridge	0	0	0	0	0
	West Branch	0	0	0	0	0
	Powerhouse	0	0	0	0	0
	LeBreau Creek	0	0	0	0	0
18-Aug	Allen Brook	2	0	0	0	0
	Sangster's Bridge	0	0	0	0	0
	West Branch	0	0	0	0	0
	Powerhouse	0	0	0	0	0
	LeBreau Creek	0	0	0	0	0
26-Aug	Allen Brook	0	0	0	0	0
	Sangster's Bridge	0	0	0	0	0
	West Branch	0	0	0	0	0
	Powerhouse	0	0	0	0	0
	LeBreau Creek	0	0	0	0	0

Other species captured in the plankton nets included phytoplankton[17] and zooplankton[18] that are typical of relatively productive, but also relatively clean water. Phytoplankton were particularly abundant in Allen Brook and at the Sangster's Bridge station. During late June and through July, *Volvox* was especially numerous, together with a number of filamentous algae, including *Spirogyra* and *Batrarchospermum*.

The zooplankton at Sangster's Bridge and the two tributary stations (Allen Brook and LeBreau Creek) was dominated by small crustaceans, particularly the cladoceran *Daphnia catawba,* and the copepod *Diaptomus* sp.[19]. At the Powerhouse station, water draining from the headpond above contained large numbers of the cladocerans *Daphnia catawba* and *Daphnia pulex,* and the copepods *Diaptomus* sp. and *Epischura nordenskioldii.* Occasionally the lake-dwelling predatory cladoceran, *Leptodora kindtii* was taken below the Powerhouse, indicating that the plankton at that site was dominated by organisms growing in the reservoir above.

3.5 Discussion.

Seine surveys in Pesaquid Lake and the Avon River system were aimed at determining the composition of the fish fauna that uses the headpond and lower river system, especially those that migrate from the sea.

The only anadromous species recorded above the Causeway were alewife, blueback herring, and white perch. No evidence was found for smelt or striped bass, although it is distinctly possible that these species do pass through the Causeway. Smelt spawn in early spring (April and May, with occasional extensions into June), and the fry drift downstream into estuarine waters in May and June. It is possible that sampling began too late to pick up the main downstream movement. Striped bass might move into the Avon River either to spawn or feed, however, none of the individuals caught in gill nets was in spawning condition, and none were captured above the Causeway. It is not unusual to fail

[17] Microscopic plants capable of photosynthesis.
[18] Microscopic animals (< 2 mm length) with limited swimming ability.
[19] The species keyed to *Diaptomus leptopus*, however certain features of the abdomen suggest that the identification may be incorrect.

to capture young of the year striped bass even in rivers that have spawning populations (Williams *et al.* 1984), so its absence from seine and ichthyoplankton samples cannot be taken to indicate that the species does not move through the Causeway. It may be, however, that the only striped bass remaining are those in the Estuary on feeding migrations from other river stocks such as the Shubenacadie River. No sea trout or salmon parr were obtained; again this may reflect limited sampling and relatively low abundance, rather than complete absence. However we have obtained no evidence that salmon been recorded in the Avon River for many years.

Gaspereau were abundant, representing almost half of the fish caught in 2003. Adult fish were seen and captured during the run, as far up the main branch of the Avon as the Powerhouse, and adults were caught in the mesh of the Powerhouse by-pass channel. However, almost all young of the year were taken at the stations toward the Causeway, or in Allen Brook and LeBreau Creek. Numbers declined steadily through September, presumably as the YOY moved out to sea. Absence of YOY gaspereau in samples in October was unexpected. In the Gaspereau River system, Gibson and Daborn (1998) reported YOY alewives present to mid-November. It is possible that sampling along the shoreline of Pesaquid Lake was insufficient to capture YOY gaspereau, because the fish may move further away from shore into deeper water as they become larger. In the Gaspereau system, sampling was conducted at water level control structures through which downstream-migrating gaspereau would have to pass. In retrospect, it would have been better to monitor downstream seaward movement below the Causeway gates.

Length—weight relationships and estimated growth rates suggested that growing conditions for young fish were reasonably good in the Lake and tributary streams, although maximum size reached by YOY gaspereau were lower than commonly found in the Gaspereau River system. Mean length of YOY gaspereau collected at the Boat Launch on 7 October 2003 was 54.1 mm (±8.89 S.D.); in the Gaspereau system, in 1999, YOY alewives had reached 72.4 mm by mid-August, and 83.3 mm by October (Gibson 2000). It is not possible to infer a cause for the smaller size of seaward migrants; evidence in general suggests that the Lake and its tributaries are biologically productive, providing abundant planktonic food. This was generally indicated by the abundance of planktonic organisms captured in ichthyoplankton tows.

Seining produced records of 11 species, eight of which are freshwater residents of Pesaquid Lake and the Lower Avon. A healthy population of yellow perch appears to be present in Pesaquid Lake and the lower Avon River. These fish were spawning at the end of May. In Nova Scotia, yellow perch are widely distributed in lakes, and often exhibit stunting of growth where overcrowded or in unproductive (e.g. acid-stressed) waters (Scott and Crossman 1973). The size range in Pesaquid Lake (< 267 mm) is comparable to that in the impoundments of the nearby St. Croix River system (Daborn *et al.* 2001).

In general, the surveys indicate that Pesaquid Lake and the lowermost portions of the Avon River provide productive habitat for a number of fish species. While plankton samples in the Lake showed that phytoplankton and zooplankton are abundant, they were species typically of moderately productive freshwater habitats in the area, with little indication of nutrient enrichment effects from adjacent land use. This conforms with conclusions based upon chemical analyses of the water.

4.0 Physicochemical Conditions of Pesaquid Lake and the Avon River

4.1 Introduction

Construction of the Windsor Causeway in 1970 created an impoundment known as Pesaquid Lake. This is, by design, a fresh water impoundment. Water levels are maintained by operation of the gates in the Causeway to serve a number of functions, particularly recreation and flood protection for the town of Windsor. Water level is periodically lowered for maintenance purposes, or for facilitating fish passage in spring.

A preliminary investigation of Pesaquid Lake in 2002 indicated that, in spite of the agricultural activity in the surrounding valley, and the proximity and growth of the Windsor area community, there was little evidence of excess nutrients or algal growth (i.e. eutrophication) such as is commonly found in impoundments (Daborn *et al*. 2003). In fact, nitrate and phosphate concentrations were very low. The survey was conducted on one day in mid-August, when it might be expected that eutrophic conditions (e.g. high algal growth in surface waters and low oxygen saturation at depth) were at their peak. The only unusual finding was that the water was stratified in places, with a layer of high conductivity (<29,500 µmhos/cm) near the bottom in the main channel just upstream from the Causeway. A modest oxygen undersaturation (60-75%) was found in this deep layer. This suggested that seawater may periodically seep through the Causeway, creating a salt wedge in the deepest waters. The high conductivity, together with the lack of mixing between this saline layer and the freshwater above it, coupled with annual drawdown of the water for maintenance purposes, was considered to be the cause of both the low oxygen concentrations and the low abundance of benthic fauna[20] living on the bottom of this otherwise productive impoundment.

Because of the limited 2002 data available, studies in 2003 were designed to provide regular sampling of important parameters at several locations in Pesaquid Lake and the lower Avon River and its tributaries. Subsequently, it was discovered that a similar program was being planned by the NS Department of Agriculture and Fisheries Quality Evaluation Division (personal communication, Dr. R. Gordon, Nova Scotia Agriculture College), and therefore the present study was scaled back to focus on water quality, physical conditions and plankton in the Lake, lower Avon and tributaries where sampling for fish was being carried out.

4.2 Methods

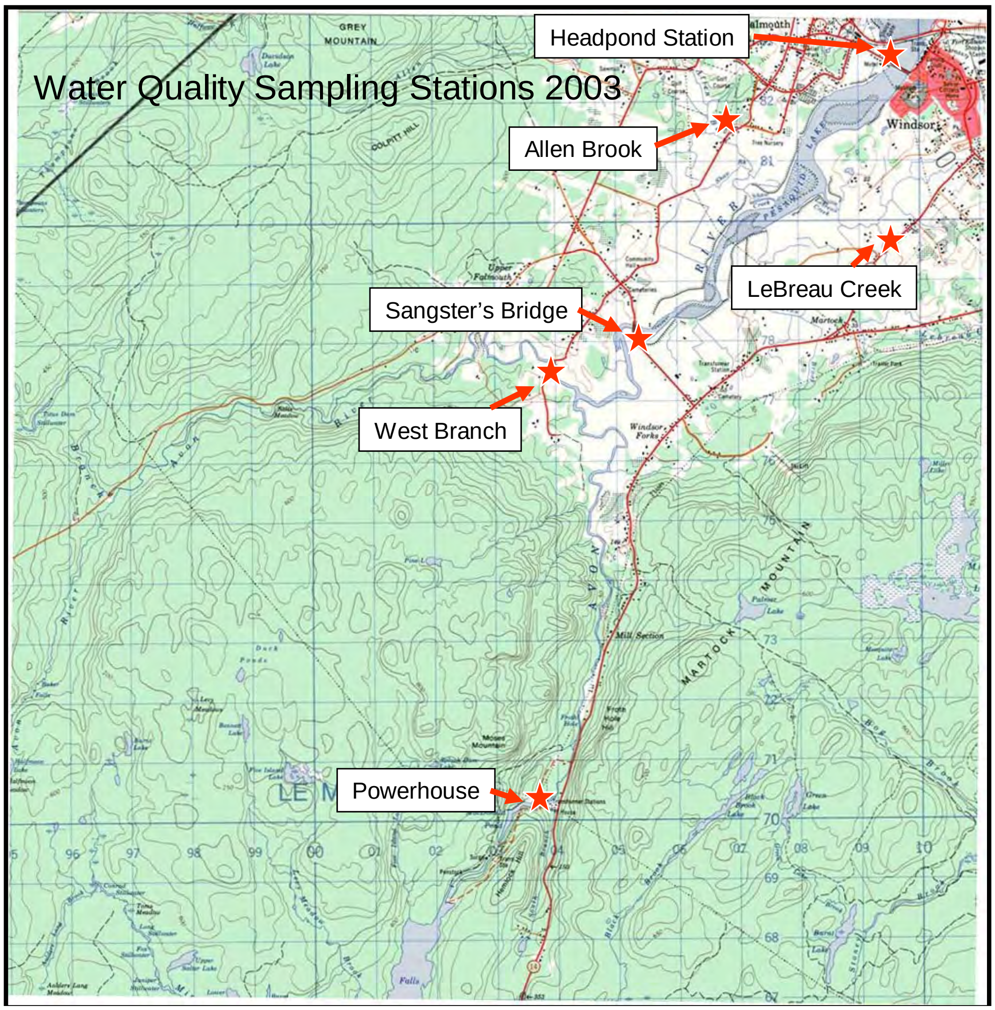
Water quality measurements were made at two river sites (the Powerhouse and the West Branch near Castle Frederick), two Pesaquid Lake sites (at Sangster's Bridge and in the main Channel upstream of the Causeway—the Headpond Station), and two tributaries (Allen Brook and LeBreau Creek). Locations are shown in Figure 4.1. At most stations, the following water quality parameters were measured weekly between 15 May and 19 August 2003: total suspended particulate matter concentration, turbidity, apparent and true color, water temperature, conductivity, alkalinity, hardness, pH, dissolved oxygen concentration and percent dissolved oxygen saturation. At all stations except the Headpond Station, measurements and water samples were taken from mid-depth at the centre of the river. At the Headpond Station, vertical profiles of water temperature, conductivity and dissolved oxygen were measured at the entrance to the water discharge channel, commencing on 10 June. Secchi Disk depth[21] was also measured at this station.

Total suspended particulate matter (TSPM) determinations were made by filtering 1 litre water samples through pre-combusted Whatman GF/C glass fibre filters and oven drying the filters at 60-70 ºC to a constant dry weight. Turbidity was measured in the laboratory

[20] Organisms living in bottom sediments of a lake, river or sea.
[21] A measure of light penetration through the water, and hence of water clarity.

using a HACH Model 2100P Turbidimeter. True and apparent color were measured using the platinum-cobalt method as described in Standard Methods for the Examination of Water and Wastewater (1985). Alkalinity was determined in the laboratory using HACH (1997) procedures. pH was measured in the laboratory using a Fisher Accumet Model 910 pH meter.

Figure 4.1. Water quality sample sites, 2003.



Water temperature and conductivity were measured in the field using a YSI Model 30 Salinity-Conductivity-Temperature meter. Dissolved oxygen concentration and percent dissolved oxygen saturation were measured in the field using a YSI Model 55 Dissolved Oxygen meter.

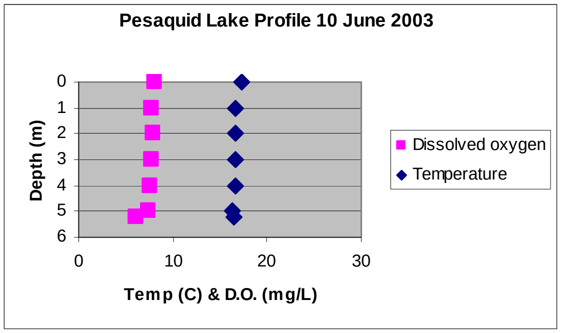
4.3 Results: Pesaquid Lake.

Summary data (as average values per site per day) for all stations are provided in Table 4.1, and complete data in Appendix 5. In the deeper water of Pesaquid Lake, conditions sometimes differed between the surface and the bottom, and therefore measurements were made at each metre from the surface.

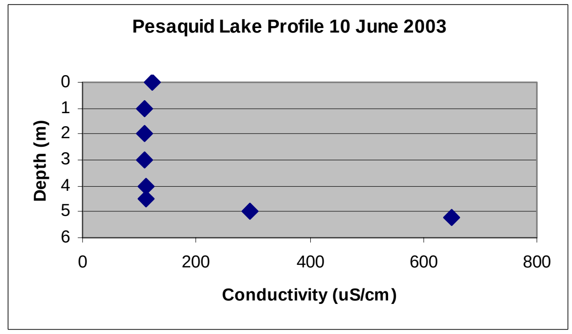
Water column profiles at the Pesaquid Lake site near the Causeway (i.e the Headpond Station) showed that for several dates in the summer (after water levels had been returned to their usual level in early June), temperature and oxygen levels were similar for the upper 4-5 m of the water column, but were often somewhat different in the lowermost 2-3 m (Figure 4.2a-n). It is apparent that from 10 June to 22 July the water column was not completely mixed. In the lower 2-3 m, temperature and oxygen levels both were lower, and conductivity was higher. Decline in oxygen concentration in cooler water indicates undersaturation: colder water can hold higher concentrations of dissolved oxygen than can warmer water, and thus the same absolute concentration of oxygen will represent a lower saturation level in cooler water.

Figure 4.2. Water column profiles, Pesaquid Lake (Headpond Stn.), 2003

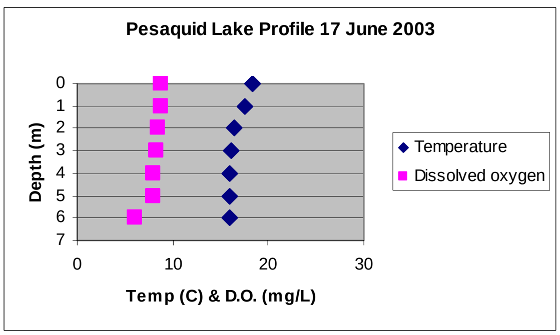
a)



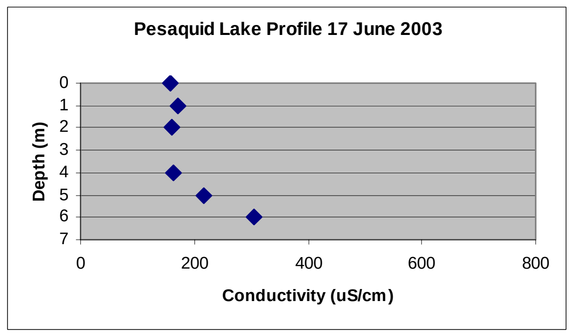
b)



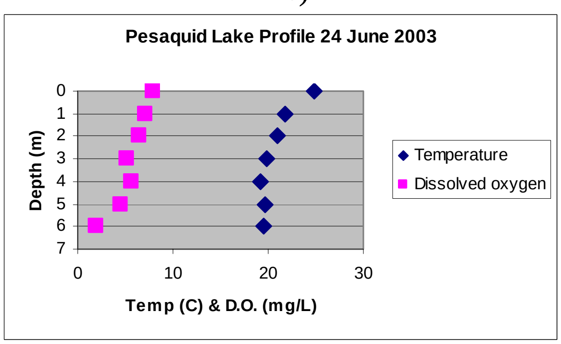
c)



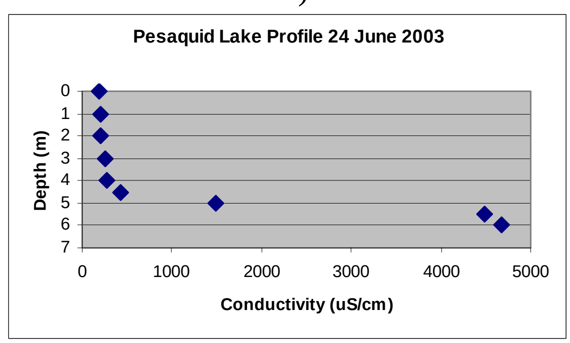
d)



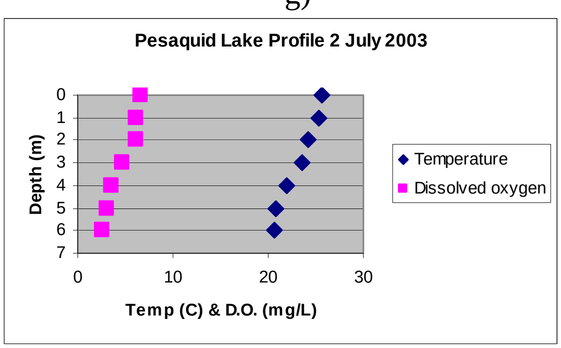
e)



f)



g)



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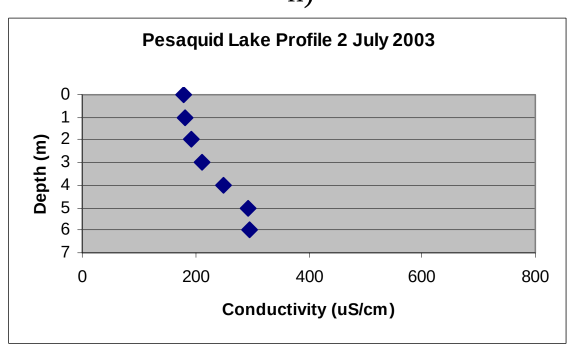

Figure 4.2 (Cont). Water column profiles, Pesaquid Lake (Headpond Stn.), 2003

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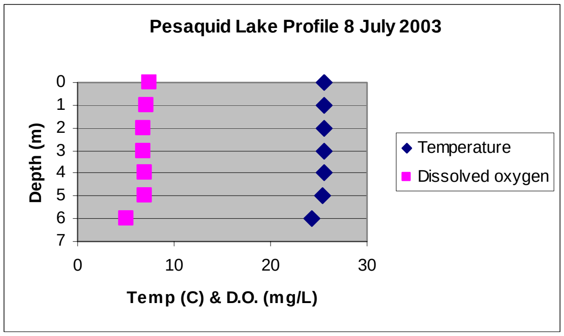

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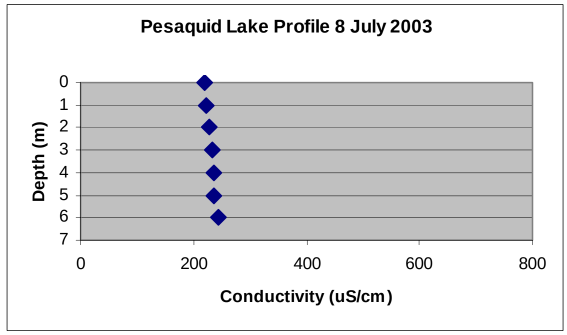

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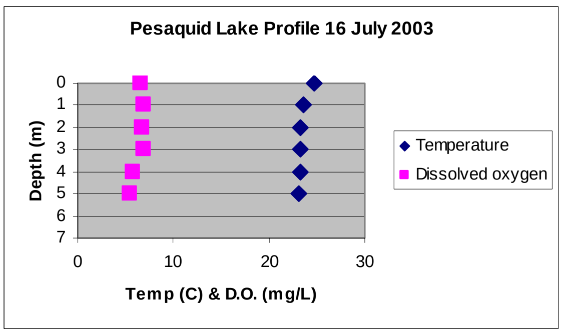

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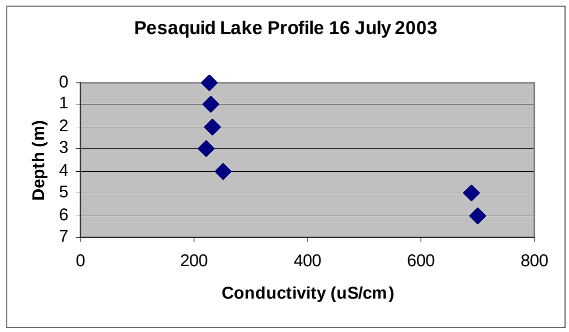

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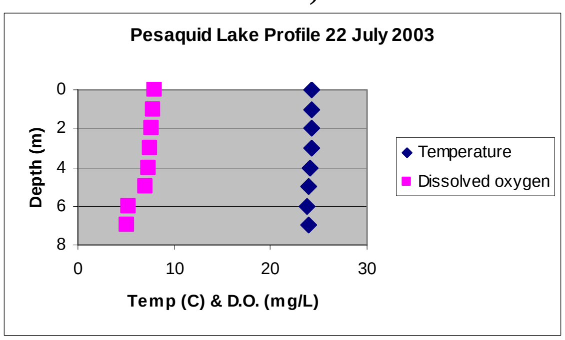

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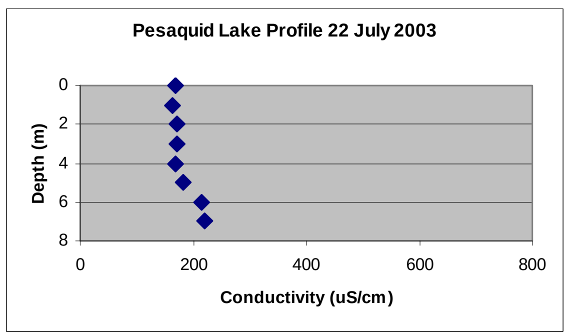

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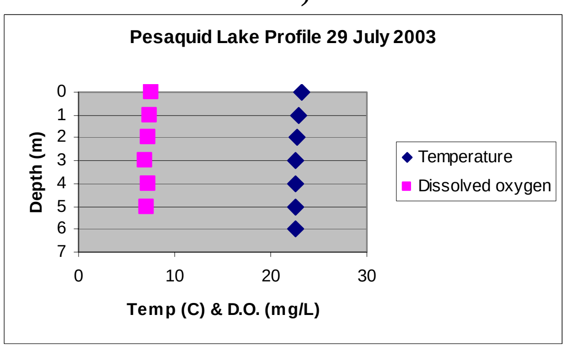

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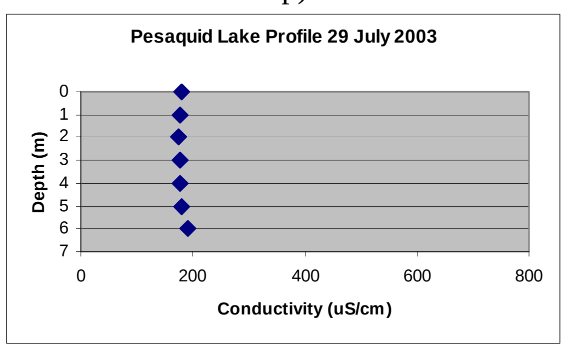

Figure 4.2 (Cont). Water column profiles, Pesaquid Lake (Headpond Stn.), 2003

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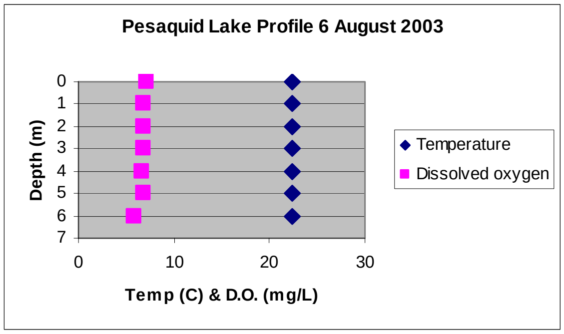

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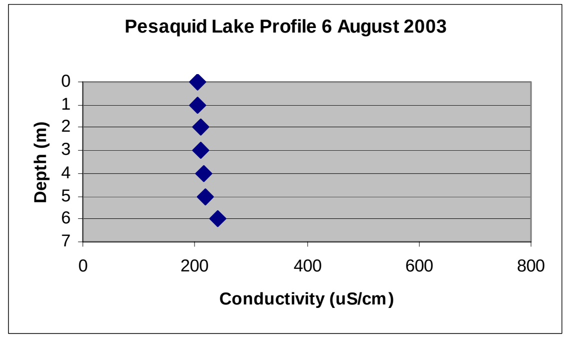

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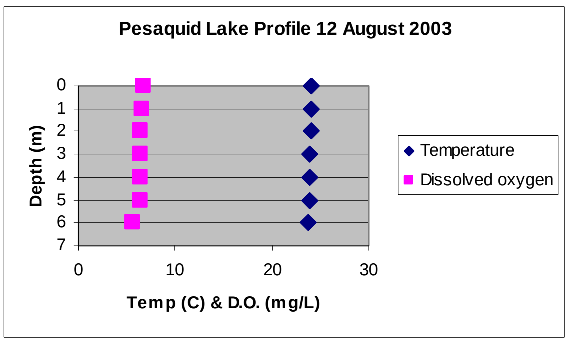

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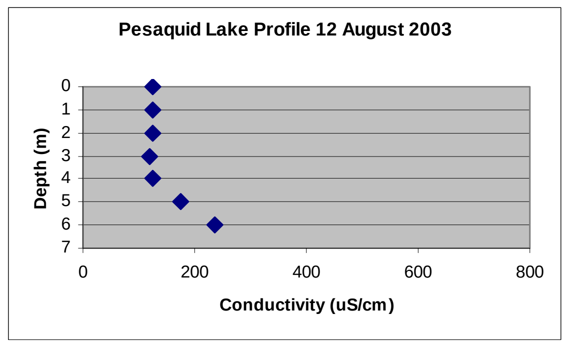

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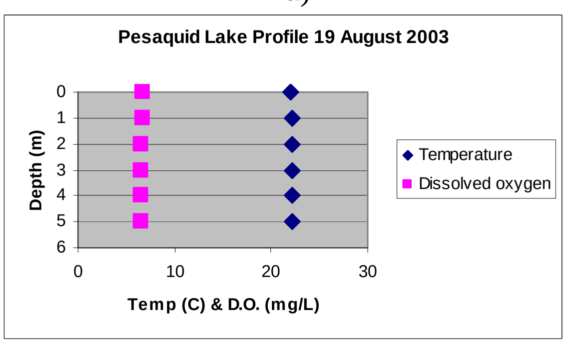

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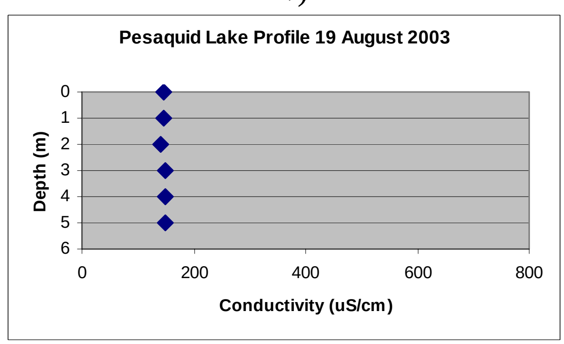


The lowest saturation level encountered was ~ 20 % (1.9 mg/L) on 24 June at a depth of 6 m (see Fig. 4.2 e)[22]. At this time, the water column was strongly stratified, with a layer of relatively saline water (< 4,800 µS/cm) occupying the lowermost 1-2 m (Figure 4.2 e,f). The high conductivity values are more than ten times the values found on other dates. They are too high to be the result of water flowing in from tributary streams, which

[22] Low saturation values do not appear in Table 4.1, which records only the surface water values; oxygen deficits were restricted to deeper waters of the lake.

commonly have higher conductivities than the Avon River or Pesaquid Lake (see below), and it therefore seems probable that this layer is derived from seepage of some salt water through the Causeway on some previous occasion. This is similar to the observations of 14 August 2002 (Daborn *et al*. 2003), except that the maximum values in 2002 were much higher.

Table 4.1. Avon River water quality data, 2003.

Date	Location	TSPM (mg/L)	Turbidity (NTU)	Apparent Colour (TCU)	True Colour (TCU)	Temperature (°C)	Conductivity (μS/cm)	Alkalinity (mg/L $CaCO_3$)	pH	Dissolved Oxygen (mg/L)	% Dissolved Oxygen
13-May-03	Headpond Site						281	15.40	6.15		
15-May-03	Headpond Site		31.5	50			443	13.40	6.40		
21-May-03	Headpond Site		120.0	70	30		603	28.40	6.20		
3-Jun-03	Headpond Site	26.11	6.6	50	50		398	21.25	6.63		
10-Jun-03	Headpond Site	5.42	4.1	70	70	16.6	131	10.60	6.39		
17-Jun-03	Headpond Site	3.83	2.5	50	50	16.5	193	10.50	5.63		
23-Jun-03	Headpond Site	20.00	2.3	50	50	22.0	173	21.30	6.21	8.3	94.2
2-Jul-03	Headpond Site	2.71	3.4	50	30		195	38.05	6.35		
8-Jul-03	Headpond Site		2.3	50	50	25.6	223	34.25	5.96		
16-Jul-03	Headpond Site	2.78	1.9	30	30		228	17.10	6.22		
22-Jul-03	Headpond Site	2.22	2.8	50	30		168	32.10	6.20		
29-Jul-03	Headpond Site	1.94	3.5	50	30	22.8	180	13.40	6.10		
6-Aug-03	Headpond Site	6.67	4.3	30	30	23.5	205	18.10	6.10	7.1	82.9
12-Aug-03	Headpond Site		2.5	70	70	23.0	125	14.20	5.10	6.8	78.6
19-Aug-03	Headpond Site	3.81	3.5	70	70		140	11.30	6.27		
15-May-03	Allen Brook		3.2	10			356	30.50	6.70		
21-May-03	Allen Brook		2.8	10	10		472	41.45	6.60		
27-May-03	Allen Brook	1.63	6.1	30	30		323	31.90	5.90		
4-Jun-03	Allen Brook	8.15	4.9	50	30	12.1	246	23.70	6.00		
10-Jun-03	Allen Brook	4.58	3.1	10	10	13.5	286	38.30	6.45		
18-Jun-03	Allen Brook	6.53	3.8	10	10	16.5	400	42.55	6.68		
23-Jun-03	Allen Brook	63.00	5.2	10	10	18.4	489	63.75	6.92	7.2	76.1
2-Jul-03	Allen Brook	0.83	4.7	30	10	20.0	588	71.70	6.92		
8-Jul-03	Allen Brook	6.14	7.4	30	10	21.7	800	97.55	6.86	7.4	83.5
16-Jul-03	Allen Brook	36.67	13.2	30	10	20.4	990	90.05	7.38		
22-Jul-03	Allen Brook	8.33	8.2	30	10	20.8	439	78.50	6.68		
29-Jul-03	Allen Brook	9.17	5.2	30	10	19.7	754	105.80	6.77		
5-Aug-03	Allen Brook	62.50	42.4	50	50	18.8	233	25.10	6.08		

Date	Location	TSPM (mg/L)	Turbidity (NTU)	Apparent Colour (TCU)	True Colour (TCU)	Temperature (ºC)	Conductivity (µS/cm)	Alkalinity (mg/L $CaCO_3$)	pH	Dissolved Oxygen (mg/L)	% Dissolved Oxygen
12-Aug-03	Allen Brook		4.0	50	30	21.0	396	47.80	6.33		
19-Aug-03	Allen Brook	4.17	5.1	30			529	62.05	6.95		
15-May-03	Sangster's Br.		1.8	70			54		5.40		
21-May-03	Sangster's Br.		1.2	70	70		72	3.70	6.50		
27-May-03	Sangster's Br.	0.83	2.0	70	80		53	3.50	6.00		
4-Jun-03	Sangster's Br.				90			9.81	2.3	90	
10-Jun-03	Sangster's Br.	4.78	2.0	90	90	13.7	41	3.65	5.83		
18-Jun-03	Sangster's Br.	3.93	1.4	90	90	16.6	51	3.65	5.21		
23-Jun-03	Sangster's Br.	90.60	3.1	90	90	21.5	81	13.35	5.88	7.1	79.8
2-Jul-03	Sangster's Br.	1.67	6.4	70	70	23.1	91	23.75	5.76		
8-Jul-03	Sangster's Br.	169.17	5.2	90	70	24.3	159	16.50	6.38	6.3	74.7
17-Jul-03	Sangster's Br.	3.89	3.6	70	50	24.7	272	20.20	6.27		
22-Jul-03	Sangster's Br.	0.00	2.8	90	90	21.1	54	18.50	5.45		
29-Jul-03	Sangster's Br.	3.67	3.8	>100	>100	23.1	145	11.80	6.15		
5-Aug-03	Sangster's Br.	23.80	20.0	90	90	18.5	55	5.95	5.58		
12-Aug-03	Sangster's Br.		1.7	> 100	> 100	21.8	50	0.00	4.88		
19-Aug-03	Sangster's Br.	0.24	3.7	>100	>100		90	8.60	5.27		
15-May-03	West Branch		6.4	70			9	5.10	6.20		
21-May-03	West Branch		3.1	50	50		113	6.40	6.30		
27-May-03	West Branch	1.37	3.6	50	50		93	5.65	6.12		
4-Jun-03	West Branch	9.63	2.1	90	90	15.3	43	2.75	5.40		
10-Jun-03	West Branch	4.17	4.1	50	50	15.6	51	4.95	6.80		
18-Jun-03	West Branch	7.96	5.1	70	70	17.8	69	6.85	5.53		
23-Jun-03	West Branch	7.78	6.4	70	70	20.8	72	17.70	6.66	7.6	84.2
2-Jul-03	West Branch	3.96	5.2	50	50	24.0	99	29.10	6.29		
8-Jul-03	West Branch	10.56	4.3	50	50	24.6	52	12.60	6.16	7.3	87.0
17-Jul-03	West Branch	0.56	2.7	50	50	23.7	48	5.80	6.15		
22-Jul-03	West Branch	1.67	3.7	50	50	23.1	56	19.50	5.55		
29-Jul-03	West Branch	1.67	3.2	50	50	23.2	78	6.90	5.26		
5-Aug-03	West Branch		6.1	50	50	21.8	132	11.20	5.89		
12-Aug-03	West Branch	3.67	2.3	70	70	23.6	45	6.45	5.17		
19-Aug-03	West Branch	4.52	6.2	90	90		68	6.25	5.56		
13-May-03	Power Station						29	1.40	4.59		
15-May-03	Power Station		1.4	50			29	1.80	5.10		
21-May-03	Power Station		1.7	50	50		40	2.40	6.30		

Date	Location	TSPM (mg/L)	Turbidity (NTU)	Apparent Colour (TCU)	True Colour (TCU)	Temperature (ºC)	Conductivity (μS/cm)	Alkalinity (mg/L $CaCO_3$)	pH	Dissolved Oxygen (mg/L)	% Dissolved Oxygen
27-May-03	Power Station	0.00	1.5	50	50		32	1.70	5.60		
4-Jun-03	Power Station	5.74	1.0	50	50	16.0	28	3.45	6.60		
10-Jun-03	Power Station	5.63	1.0	50	50	16.0	30	2.30	5.90		
18-Jun-03	Power Station	2.92	2.9	50	50	18.9	31	3.60	5.48		
23-Jun-03	Power Station	2.67	5.4	50	50	19.4	29	18.50	5.60	8.8	94.9
2-Jul-03	Power Station	0.00	2.4	50	30	23.2	30	17.45	5.50		
8-Jul-03	Power Station	4.79	1.2	50	50	24.4	30	13.90	5.56	7.7	91.4
16-Jul-03	Power Station	0.83	1.0	50	50	23.5	30	5.40	4.66		
22-Jul-03	Power Station	0.67	1.7	50	30	24.0	30	19.10	5.61		
29-Jul-03	Power Station	0.56	1.2	50	30	23.4	30	2.30	4.61		
5-Aug-03	Power Station	0.00	1.5	30	30	22.4	31	4.00	5.10		
12-Aug-03	Power Station		0.8	30	50	23.8	30	5.75	4.81		
19-Aug-03	Power Station	1.00	1.2	70	70		31	3.00	4.56		
2-Jul-03	LeBreau Creek	4.38	3.7	30	10	23.7	440	39.40	6.81		
8-Jul-03	LeBreau Creek	177.67	3.8	30	10	22.1	358	31.20	6.05	7.0	79.6
5-Aug-03	LeBreau Creek	10.33	11.1	30	30	18.9	383	31.00	6.60		
19-Aug-03	LeBreau Creek		1.4	10			398	29.05	6.76		

Other oxygen saturation values below 50% occurred at depths of 4-6 m on 2 July, but for most of the study period, the water was generally relatively high (> 70%) in oxygen saturation. The saturation level is a useful indicator of trophic enrichment: when excess nutrients enter the lake from rivers or surrounding land, enhanced growth of algae produces very high oxygen saturation (sometimes exceeding 100%) near the surface during the day, followed by depressed oxygen at night and in lower water. The 50% saturation value represents a critical level below which fish and invertebrates begin to exhibit negative effects. This really occurred on only a few occasions in early summer associated with a period of low mixing in the water column, and possibly of intrusion of salt water. As in 2002, these results do not indicate that nutrients entering Pesaquid Lake (especially from Allen Brook) present a significant problem in terms of overall water quality in the lake.

Surface waters in Pesaquid Lake are otherwise an amalgam of the inflows from the Avon River and tributaries. In general, the headpond is coloured (20-80 colour units), with moderate levels of alkalinity (10-38 mg/L), usually low turbidity, and pH from 5.1 to 6.8. As indicated below, water quality at this site is influenced especially by outflow from Allen Brook.

The station at Sangster's Bridge (referred to as the Main Branch in Figures 4.3 to 4.5) is, for most of the year, a part of Pesaquid Lake. Only when water levels are lowered (as in May 2003) does it have flows characteristic of the Avon River. Water quality, however, is strongly influenced by the Avon River inflow. Sampling at this location was from the road bridge, and water samples were taken at mid-depth of the water column. Results are shown in Figures 4.3 to 4.5. Water at Sangster's Bridge is more coloured than other tributaries (40 – 100 units), somewhat lower in conductivity (40 – 130 µS/cm) and alkalinity (3 – 30 mg/L), and usually less saturated with oxygen. pH ranged from 5.2 to 6.7.

4.4 Results: Avon River and tributaries.

The two main branches of the Avon River system, the Main Branch that descends from Zwicker Lake, and the West Branch, carry water that is relatively low in conductivity (28-270 µS/cm), alkalinity (0-24 mg/L) and pH (4.6-6.6), compared with the lake and other tributaries (Figure 4.4). Naturally, both of these fast flowing stream systems are high in oxygen, especially at the Powerhouse site (Figure 4.3). They are also relatively highly coloured (Figure 4.5), as a result of the surrounding softwood forest, although less so than the water at Sangster's Bridge. Except for rare occasions when the streams are in high flow, they carry little suspended material and have low turbidity. Nutrient samples taken by NS Department of Agriculture and Fisheries during 2003 indicate that at Sangster's Bridge, nitrate levels rarely exceeded 0.3 mg/L, although further downstream, near the Town of Windsor (and thus downstream of Allen Brook and LeBreau Creek), both nitrate and total phosphorus levels were quite elevated (Anon, 2004).

Figure 4.3. Mean values of temperature and oxygen at all sites, 2003.

(Error bars indicate one standard error of the mean).

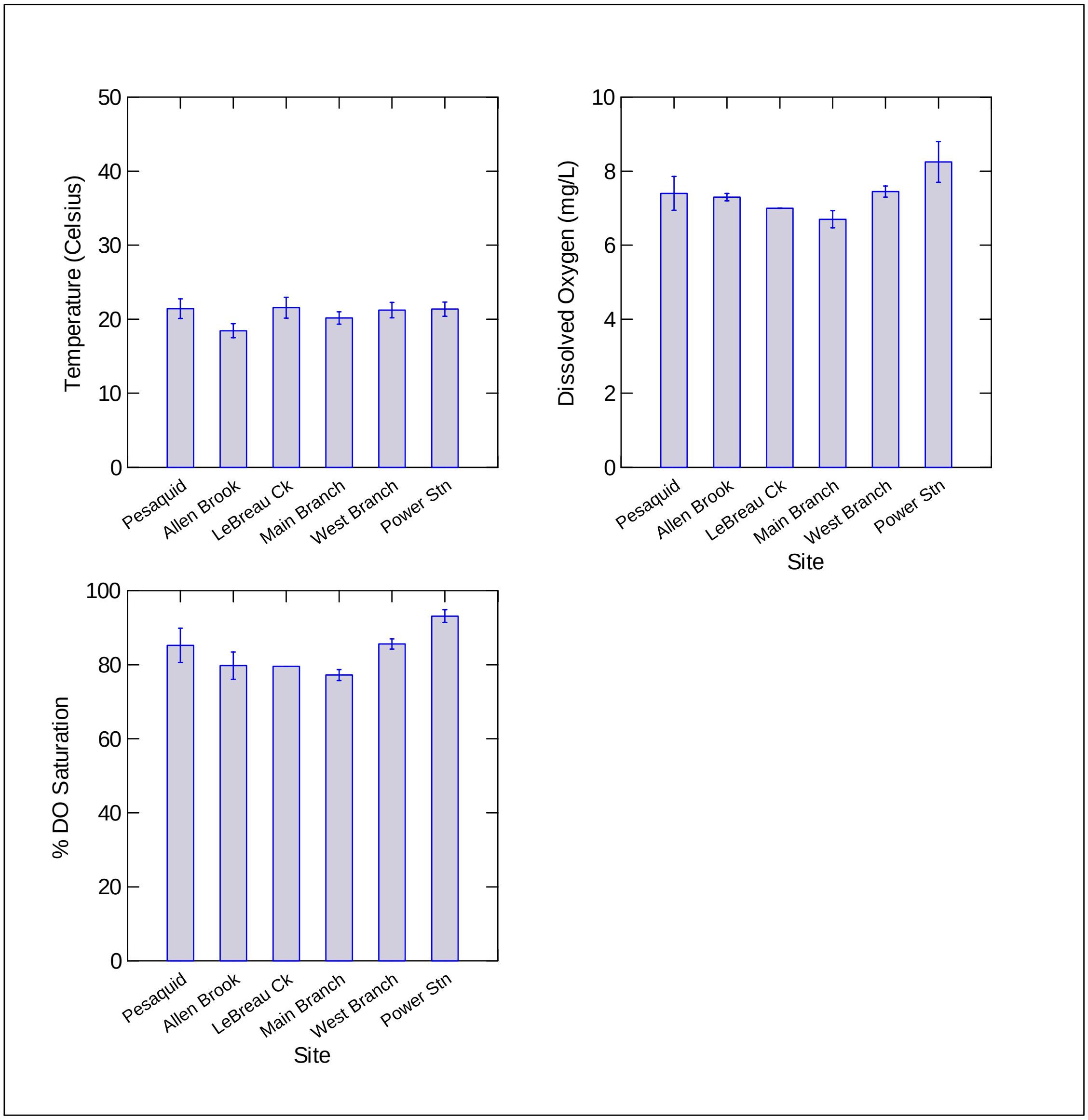


Figure 4.4. Mean values of conductivity, alkalinity and pH at all sites, 2003. (Error bars indicate one standard error of the mean).

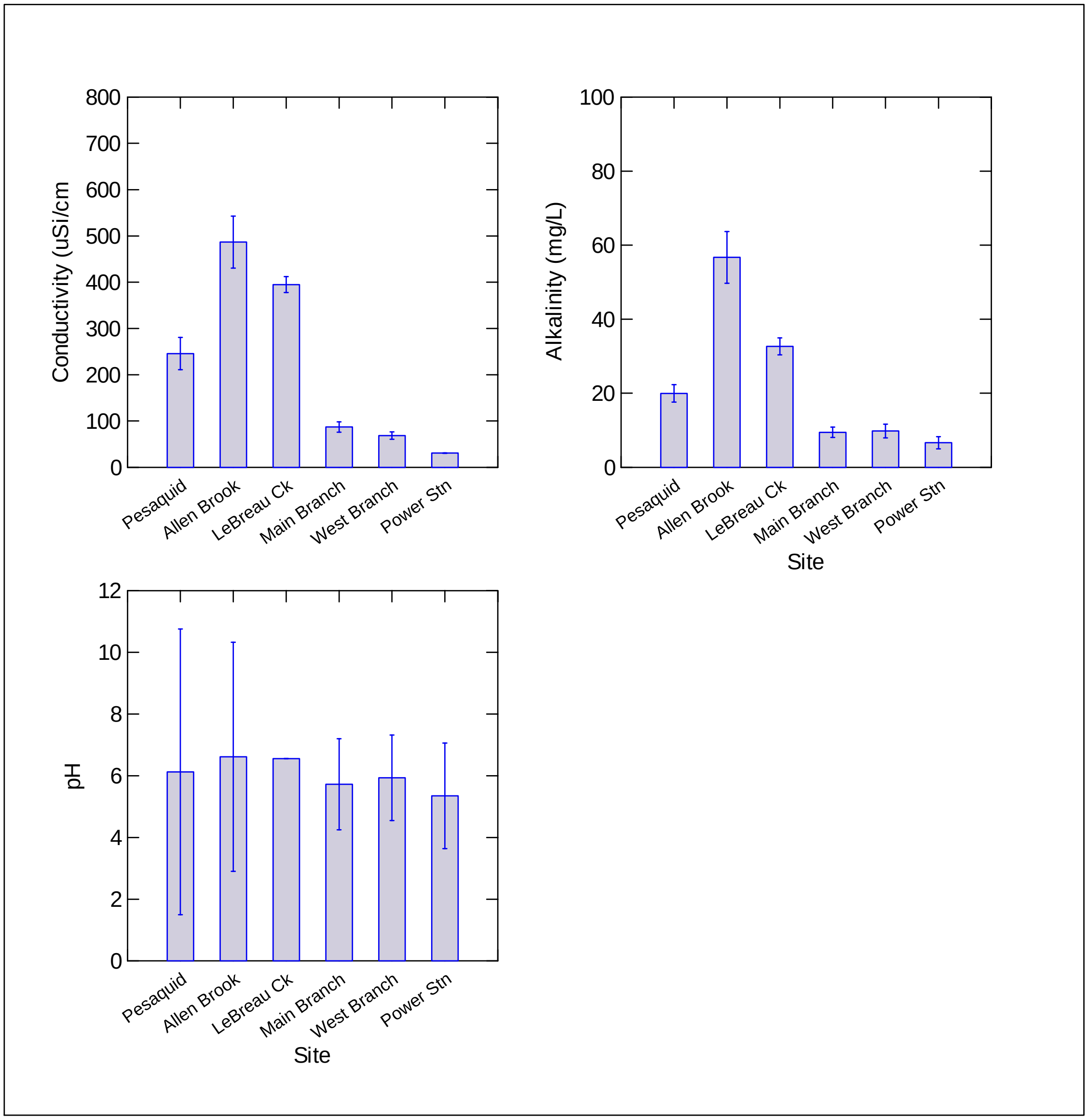
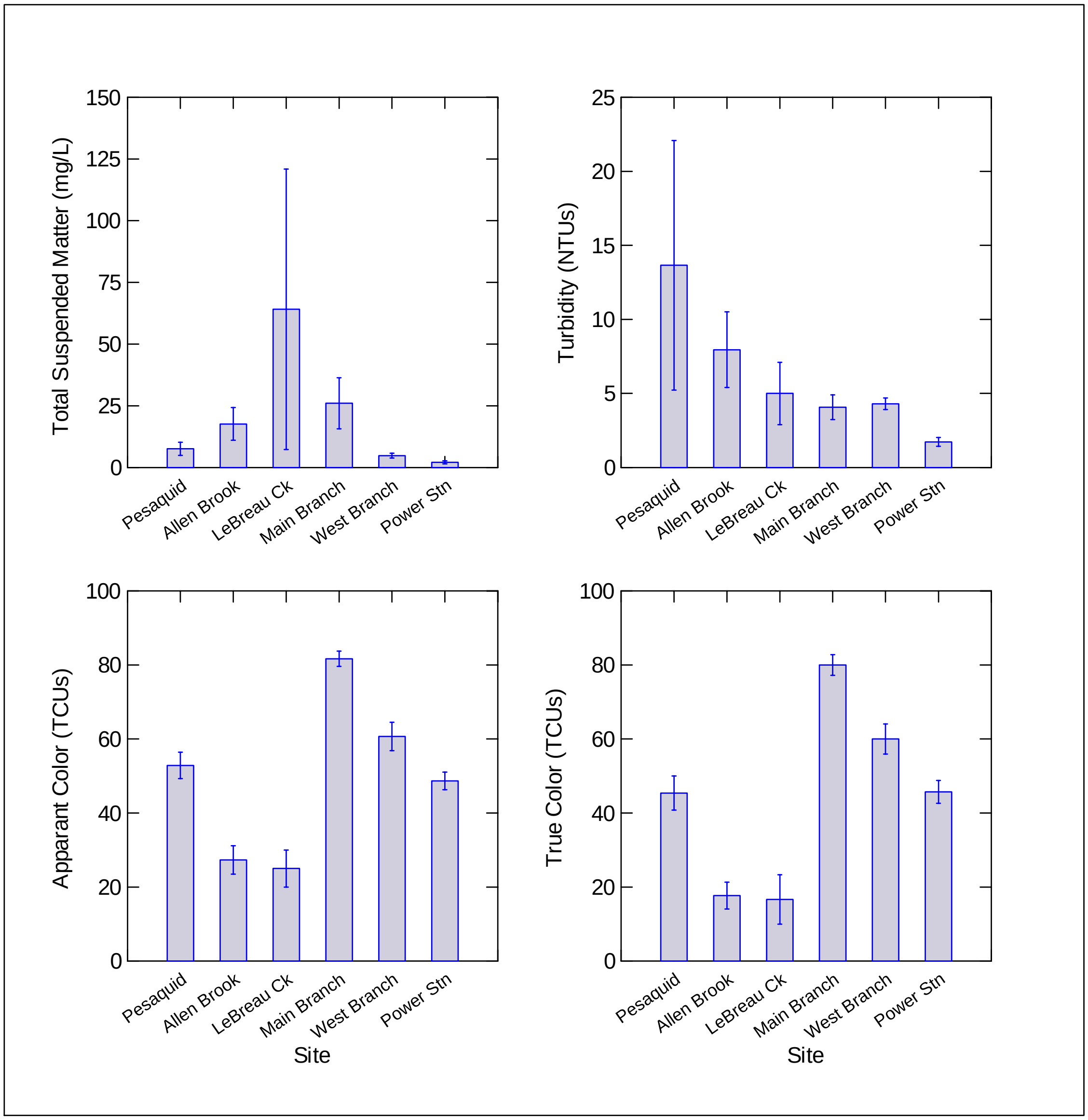


Figure 4.5. Mean values of suspended matter, turbidity and colour at all sites, 2003. (Error bars indicate one standard error of the mean).



The two tributaries entering Pesaquid Lake, Allen Brook and LeBreau Creek, exhibit very different water quality characteristics. Both drain farmland with relatively small slope, so that flows tend to be low, and they both receive much greater nutrient inputs than other sites sampled. The upper part of the Allen Brook sub-watershed is also occupied by an active golf course, and thus has higher levels of alkalinity and conductivity (Figure 4.4), presumably as a result of lime and fertilizer applications. Conductivity in this brook ranged from 233 to 754 µS/cm[23], which was 3-20 times the values usually found at the Avon River stations, and twice the usual values in Pesaquid Lake itself.

Nutrient analyses conducted by the NS Department of Agriculture and Fisheries during 2003 indicate that Allen Brook in particular has nitrate-N and inorganic phosphorus that are usually well above levels (1 and 0.01 mg/L, respectively) that could stimulate the growth of nuisance algae (Anon 2004). Allen Brook had a great deal of *Lemna minor* at the surface, and filamentous algae attached to in-stream surfaces; these are common indicators of nutrient enrichment. However, the effects appear to be localised, and were not seen in Pesaquid Lake itself.[24]

LeBreau Creek was not accessible for much of May and June because of repairs to the footings of the bridge. Consequently, sampling only began in July. In general, during July and August this site exhibited relatively high suspended particulate matter (< 178 mg/L, Table 4.1, Fig. 4.5). Conductivity was similar to Allen Brook, with a range of 358-440 µS/cm. Values of inorganic phosphorus and nitrogen were considerably lower in LeBreau Creek than in Allen Brook, in spite of the fact that both are primarily bordered by farmland (Anon 2004). This reinforces the conclusion that the higher nutrient loads in Allen Brook are associated with the golf course.

4.5 Flows at Causeway gates.

In the absence of a fishway, upstream passage of fish through the Windsor Causeway is dependent upon conditions prevailing when the Causeway gates are open. For most of the ice-free season, the headpond level is maintained at nine feet to accommodate

[23] This relatively high conductivity is still an order of magnitude lower than that of the deep water layer encountered in Pesaquid Lake on 24 June, and this layer cannot therefore be attributed to water from Allen Brook. On most other dates, the conductivity of deeper water in Pesaquid Lake is very similar to the values in Allen Brook.

[24] In fact, inorganic phosphorous levels were higher in the middle stretch of Allen Brook than they were near the mouth (Anon 2004). This could be because of dilution as more, cleaner water enters the stream at lower points, or because of uptake by plants and sediments in the brook itself.

recreational use of Pesaquid Lake, while retaining the option to lower water levels in anticipation of large outflows from the Avon River (Kolstee 2003). During May 2003, in accordance with a request from the Department of Fisheries and Oceans, the level in the headpond was lowered to a level of 0 feet for a period of three weeks (3 – 24 May) during the peak of the gaspereau migration (K. Carroll, personal communication). This afforded an opportunity to investigate the flows through the Causeway gates.

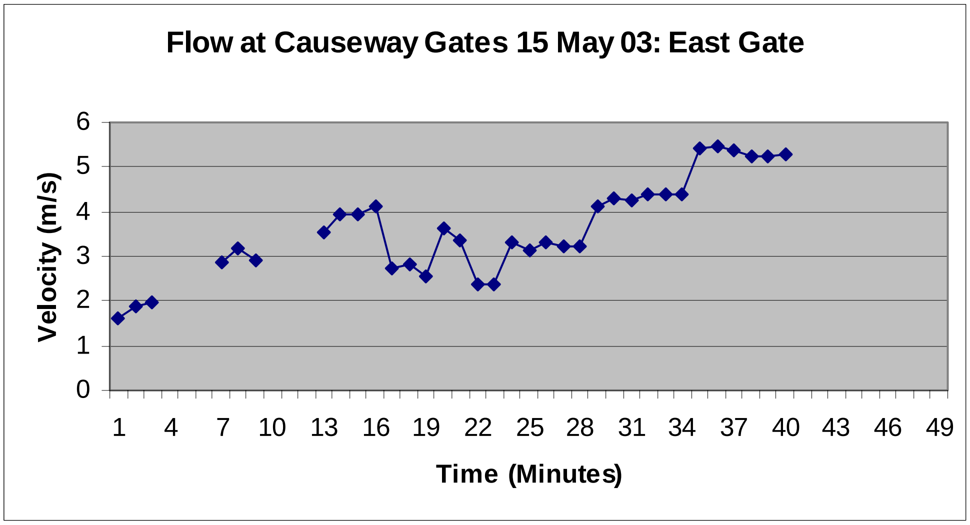
On 15 May and 3 June flow rates were measured in the intake of the Causeway gates using an Oceanics™ 330 Current meter. As far as possible, the current meter was positioned in the centre of the intake until forces on the meter and cable made it dangerous to deploy. When that happened, the meter was moved to the walls of the intake and retrieved. On 15 May, both gates were opened at the same time at the beginning of drawdown, and the instrument was deployed alternately in front of the East and West gates (Figure 4.6 a, b). On 3 June only the West gate was opened initially, but after one hour (sample 11 in Figure 4.7) the East gate was also opened. The meter was maintained in the mouth of the West gate for the duration of measurement (Figure 4.7). Current velocities were recorded at five minute intervals until measurements were no longer feasible.

Maximum velocity recorded in the centre of the intake on 15 May was 7.31 m/sec, achieved just before the gates were closed. For most of the drawdown period, velocities were 5-6 m/sec.

On 3 June, only the West gate was opened at first. Velocity rose steadily to about 6 m/sec as the tide fell on the seaward side, increasing the head (Figure 4.7). After one hour, the East gate was also opened; this had a minor influence on the velocities through the West gate[25], and subsequently velocity reached a peak at 7.3 m/sec just before the gates were closed again.

[25] It is worth noting that velocity through a channel is determined by the cross-sectional area and the head difference, not the number of channels that are open.

Figure 4.6 Current velocities through the Causeway gates, 15 May 2004.



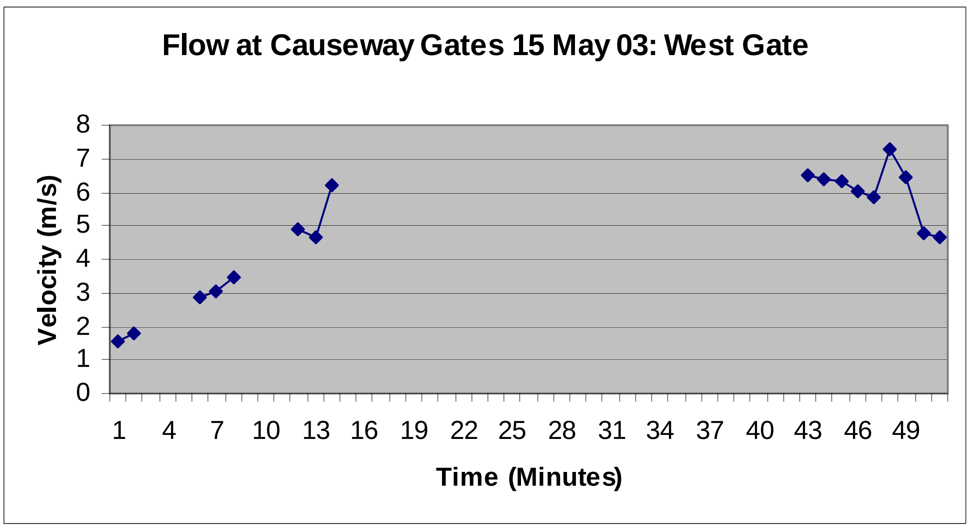
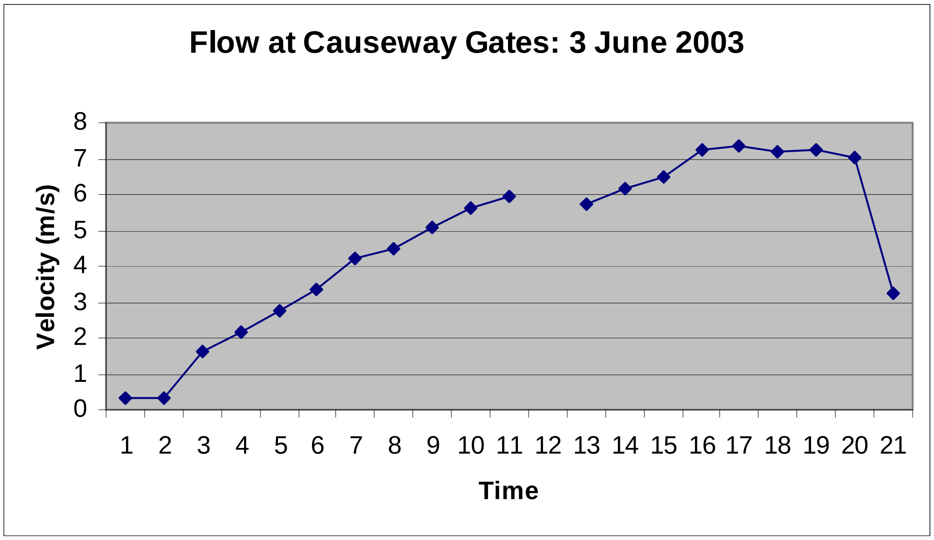


Figure 4.7 Current velocities through the Causeway gates, 3 June 2004.



These records indicate that upstream movement of fish such as gaspereau face velocities in the centre of the gates that exceed the maximum burst swimming speed of c. 5-7 times body length, or <2 m/sec for a 200 mm clupeid[26] (cf. Aleyev, 1977; Videler 1993). However, there is a period at the beginning of the drawdown during which velocities are below such limiting speeds. Gaspereau and other migratory fish tend to move into estuaries with the flood tide; they are sometimes observed in the West Channel before the gates are opened, and therefore may be well positioned to move while the velocities are low during the first half hour following opening. In addition, of course, boundary or wall effects mean that water velocities are considerably lower along the sides of the culvert.

4.6. Discussion.

Water quality data once again indicate that, although the potential exists for eutrophication of Pesaquid Lake because of surrounding land use, the main lake shows little evidence of deleterious conditions (other than the bacterial contamination derived from humans and animals -- Anon 2004). Although nitrate and phosphorus levels are higher than the main river, particularly as a result of the Allen Brook sub-watershed, they do not reach the level of impairment of the Lake that is sometimes associated with nutrient enrichment. Oxygen data derived from water column profiles also show that oxygen saturation is usually high, with the occasional exception of deeper waters in the

[26] A member of the herring family (Clupeidae), which includes the shad, alewife and blueback herring.

middle of summer. In the latter case, lack of vertical mixing associated with low flow and calm weather conditions, may lead to some depression of oxygen, although rarely below 50% saturation at which negative effects on the biology might be expected.

In the Avon River, the waters are clear and relatively well oxygenated. Dissolved materials are low (as indicated by conductivity values), and colour is variable but relatively lower than in many streams in Nova Scotia that originate from softwood-dominated slopes. Alkalinity and pH were both relatively low, especially in the main Branch of the Avon at the Powerhouse: pH was as low as 4.5, and alkalinities less than 3 mg/L were common. These values are of some interest: observations in other lakes of Nova Scotia indicate that buffering capacity (as indicated in part by alkalinity values) has declined in recent years, leaving the lakes more vulnerable to the effects of acid rain (Brylinsky – unpublished data). Low pH values are common in spring following snowmelt, but the effects usually disappear by summer; pH values less than 4.2 are considered a threat to successful spawning of salmonid fish such as trout and salmon.

Investigations of flow conditions through the Causeway gates indicate that there is only a limited time available for migrating fish to move upstream when the gates are opened, because velocities become too high across most of the gate opening after only a few minutes. These measurements were taken at a time when the lake level had been lowered, and thus when the lowest head difference was available early in the rising tide. At normal lake levels, the opportunity for upstream fish passage might be more restricted, since the velocity through open gates would be too high except near high water when the head difference small enough. Having said that, it is to be noted that not only did many alewives and blueback herring pass upstream to spawn, but local residents commented that it was the largest run seen in many years.

It is apparent that managing the gate openings for favouring upstream movement of migratory fish during May and early June would be a favourable strategy for sustaining the gaspereau stock in the system. At the present time it is not known exactly when the gaspereau enter the West Channel on the seaward side of the Causeway. Is it early in the flood, when the Channel first begins to fill, or do they arrive later when the channel is mostly full? Answers to these questions, which could readily be obtained by sampling at short intervals in the Channel during the rising tide, would enable a suitable gate opening strategy to be developed that would maximise the opportunities for upstream movement.

5.0 Newport Bar and other mudflats

5.1 Introduction

Observations during 2002 indicated that, with the growth of salt marsh over the mudflat adjacent to the Windsor Causeway, shorebird feeding activity had moved primarily to more seaward locations, especially the emerged mudflat on the opposite side of the St. Croix outflow channel. This has been termed the Newport Bar, and extends along the west side of the Avon Estuary almost to Avondale. Because of deep channels on all sides, access to the bar is very difficult. During summer 2003, however, availability of a small Hovertour™ 700 air-cushion vehicle (ACV or 'hovercraft' – Figure 5.1) permitted a preliminary survey of the mudflat.

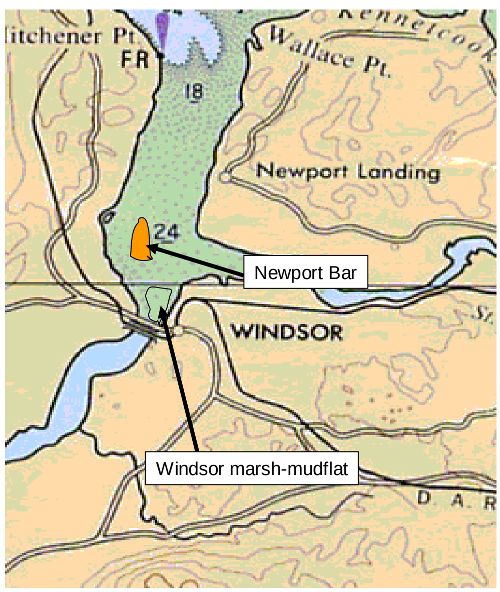
Figure 5.1 Hovertour 700 at Avondale wharf

The primary purpose of this study was to investigate the surface condition of the mudflat, to identify and enumerate the presence of salt marsh patches that have been seen from a distance, and to confirm previous observations suggesting that it is an important feeding ground for sandpipers. Samples from the Newport Bar, and from the intertidal mudflat near Avondale wharf were taken to provide an initial comparison of the invertebrates found there with the mudflat areas of the Windsor marsh—mudflat complex that formed part of the study in 2002. These observations are of interest in relation to proposals for twinning the Highway 101. In addition, we were interested in assessing the utility of the ACV for research on soft mudflats that are inaccessible because of their distance or texture.

5.2 Evolution of the Newport Bar.

An intertidal bar, which we refer to as the Newport Bar (Fig. 5.2), has been intermittently present in approximately the same location for the last five decades, and probably represents a more or less permanent feature of the Avon Estuary. Aerial photographs taken at approximately ten year intervals show that its shape has varied considerably over time, particularly following the construction of the Windsor Causeway (Figures 5.3 to 5.7). These photographs, however, provide little information on the elevation of the bar, which has undoubtedly risen since 1970.

Figure 5.2 Location of the Newport Bar.



Prior to construction of the Causeway in 1970, a large, linear sandbar existed along the axis of the Avon Estuary from the Town of Windsor towards Newport (Figure 5.3). In 1959 and 1969, the main outflow channel from the Avon River passed on the west side of the Avon Estuary, while the outflow of the St. Croix River cut back toward the eastern shore adjacent to the village of Newport Landing. This left a linear bar of unknown height and composition in the centre of the Estuary. Although difficult to discern from photographs taken at different stages of the tide, it appears that in 1959 the St. Croix and Avon River outflow channels converged to the north of Newport Landing, segregating another mid-channel bar to the north. In 1969, however, it seems that the St. Croix outflow followed the eastern shore, leaving a single mid-channel bar that extended for several kilometres on the west side, and encircling another bar on the eastern side (Figure 5.4).

Figure 5.3. Aerial photograph of the pre-Causeway Avon Estuary, 1959.

Figure 5.4. Aerial photograph of the pre-Causeway Avon Estuary, 1969.

With construction of the Causeway in 1970, rapid deposition of silt onto the existing bar adjacent to the Causeway began to form what has become known as the Windsor mudflat. In 1979 a large, ovoid deposit was present that Amos (1977) determined had been formed at rates as high as 15 cm/month (Figure 5.5). Several other intertidal bars are evident in this aerial photograph, occupying the central part of the Avon Estuary to the north of the Causeway and Windsor mudflat; the elevations and composition of these cannot be determined, and were apparently never investigated. It is probable that they were predominately coarse sands like the majority of the outer estuary bars, with a transient drape of finer material associated with lower water velocities following Causeway construction.

By 1990, however, this deposit had grown seaward to form an elongate bar along the western side of the Avon Estuary (Figure 5.6). At this time, the St. Croix outflow was principally along the eastern shore, with distributaries along the face of the Causeway, and defining the northern edges of the new Windsor mudflat.

Figure 5.5. Aerial photograph of the post-Causeway Avon Estuary, 1979.

Figure 5.6. Aerial photograph of the post-Causeway Avon Estuary, 1990.

By 1992, this elongated bar was being compressed at its northern end by the erosive effects of the St. Croix outflow (Figure 5.7), which had begun to cut across the Estuary to join the Avon outflow on the western shore.

Figure 5.7. Aerial photograph of the Windsor marsh/mudflat and Newport Bar, 1992.

Since 1992, the St. Croix outflow has once again cut across to the western shore, dividing the mudflat into two fragments. These two, the Windsor marsh—mudflat that has been under study, and the Newport Bar, are separated by a deep, steep-sided channel. Unlike the Windsor mudflat, the Newport Bar has remained largely unvegetated, although in 2003 six separate and widely-spaced clumps of *Spartina alterniflora* were noted. Each was 1-2 m^2 in extent. In June and July 2003 aerial photographs were taken of the Windsor marsh/mudflat and the Newport Bar. These are shown in Figures 5.8 and 5.9.

Figure 5.8 Aerial photograph of the Newport Bar, 27 June 2003.[27]

Figure 5.9 Aerial photograph of the Windsor marsh/mudflat, 29 July 2003.[28]

[27] Photograph provided by Dr. Robert Pett, NS Department of Transportation and Public Works.
[28] Photograph provided by Dr. Robert Pett, NS Department of Transportation and Public Works.

These photographs, taken one month apart, indicate that the channel separating the Windsor marsh/mudflat from the Newport Bar has widened as the northern tip of the Windsor mudflat has eroded away. In Figure 5.9, it appears as if a secondary deposit has been formed or remains between the Windsor and Newport mudflats. This might be apparent only because the water levels in the two photographs were different, but it does seem that in the month between the photographs, the shape of the northern part of the Windsor marsh\mudflat had changed; its orientation on 29 July was distinctly different from that on 27 June. These changes are reflective of the extremely dynamic nature of sedimentary deposits in the estuaries of the Minas Basin.

5.3 Investigations in 2003.

During September and October 2003, the Newport Bar was accessed on two occasions to investigate its extent and surface. An outline of the bar, developed from GPS readings, is shown in Figure 5.10. Area of the bar is estimated at 63.6 ha.

The western half of the Bar is a gently sloping current- and wave-washed area characterised by sand ripples and surficial deposits of black magnetites and other minerals (Figure 5.11). The eastern half of the bar is a depositional plateau, with fine sediments overlaying coarse, laminated sediments, and six scattered patches of salt marsh grasses (Figures 5.12 and 5.14). The eastern and northeastern edges of the bar are defined by a steep scarp slope approximately 4-5 m in height, presumably areas that are being eroded by strong currents associated with the St. Croix flow. Figure 5.13 shows a view of this erosional face, illustrating the laminar structure of the deposit. These laminations, which are layers 2-5 cm in thickness, probably represent either seasonal or spring-neap cycle accumulations.

Figure 5.10. Newport Bar, 2003.

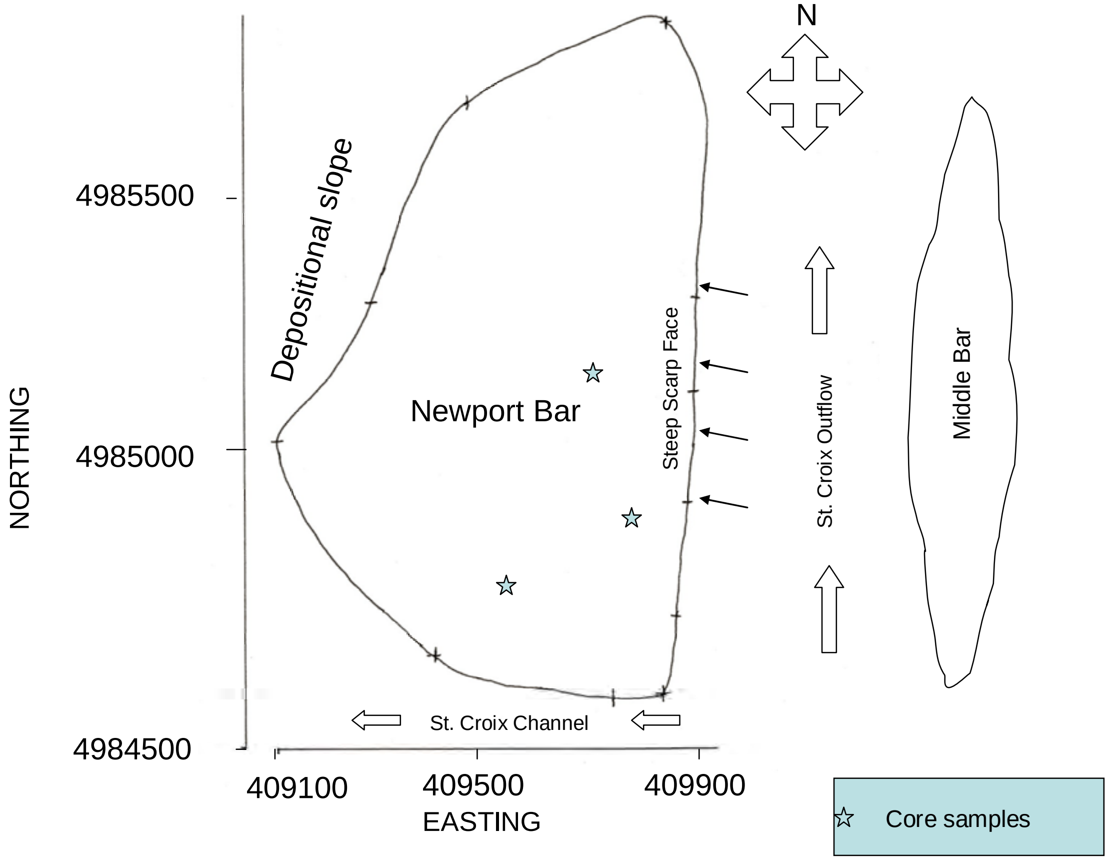


Figure 5.11. Newport Bar, west side.

Figure 5.12. Rafted salt marsh on Newport Bar.

Figure 5.13. Scarp slope on the northeast side of Newport Bar, 2003.

Figure 5.14. Scarp slope on the east side of Newport Bar, 2003.

During the field survey on 20 August 2003, large numbers of shorebirds, principally semipalmated sandpipers (*Calidris pusilla*), were feeding on the top surface of the mudflat. In spite of the noise and bright colour of the ACV, the birds were not greatly disturbed even when it approached within 20 m of them. However, all the birds took flight when one of the researchers stepped onto the mudflat from the vehicle.

Three small core samples[29] taken from the surface of the Bar indicated that invertebrates are well established and abundant on the mudflat (Table 5.1). The most common species was the amphipod *Corophium volutator*, which is the principal prey of the semipalmated sandpiper when feeding in Minas Basin. Other species included the polychaetes *Nereis* spp. (Nereidae) and *Heteromastus filiformis* (Capitellidae). Although only three samples were taken, they indicate that *Corophium* numbers on the Newport Bar were as high (an average of 17,033 /m^2, range 13,248 to 24,224 /m^2) as those found in the previously muddy areas near the Causeway (Daborn *et al.* 2003a).

[29] Area of sample was 26.42 cm^2. Estimates of animal abundance per square metre may be obtained by multiplying the number in the sample by 378.5.

Table 5.1. Invertebrate samples from Newport Bar, August 2003.

Sample No.	Nereidae	Capitellidae	Other Polychaete	*Corophium*	*Macoma*
1	5	17		35	2
2	2	8	1	64	
3	4	11		36	

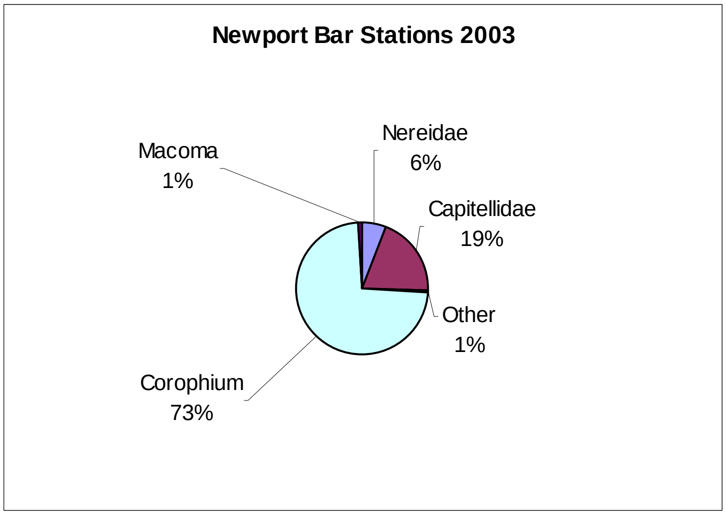
For comparison, 19 samples taken from the unvegetated parts of the Windsor Causeway during 2003 gave an average density of 18,168 *Corophium* per square metre, whereas 10 samples taken from three transects across the intertidal zone at Avondale averaged only 6,850 /m^2. Changes in size distribution of *Corophium* on the mudflats near the Causeway are shown in Appendix 5. Relative abundance of the invertebrates in samples from the Newport Bar, Avondale and the Causeway Channel are shown in Fig. 5.15.

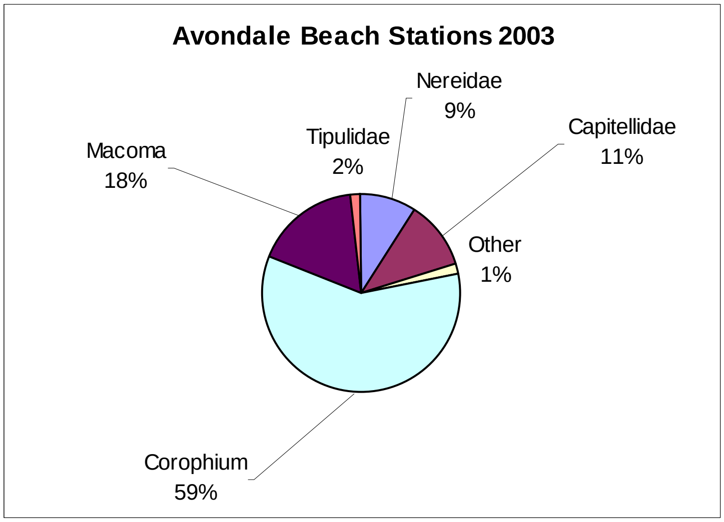
5.4 Discussion.

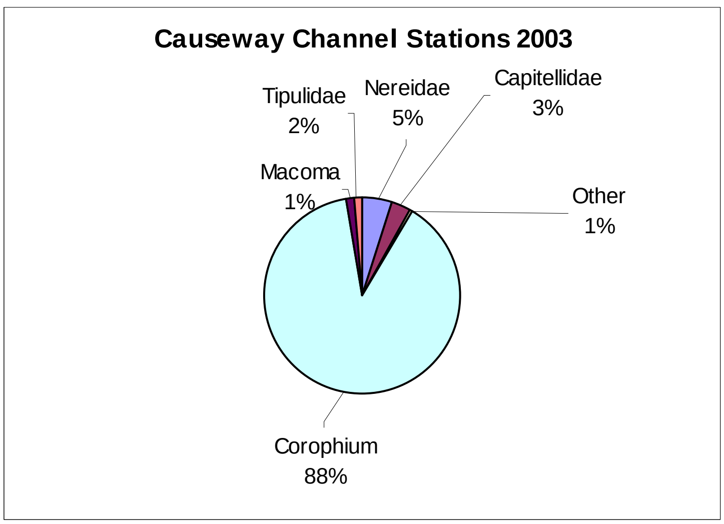
This preliminary survey indicates that the deposit being termed the Newport Bar represents the latest region of the Avon Estuary that is suitable feeding habitat for visiting shorebirds. It is likely that it is important also for foraging fish, especially those that feed on benthic or epibenthic organisms. Although there are no direct data to confirm this, it is probable that the Newport Bar has accreted significantly as a result of the Windsor Causeway, just as did the mudflat known as the Windsor mudflat adjacent to the Causeway. However, unlike the latter habitat, there was little evidence of the establishment of salt marsh until the last three years.

Observations in 2002 of shorebird foraging on this distant mudflat suggested that it might harbour the kind and abundance of food organisms that used to inhabit the stabilised, but unvegetated, portions of the Windsor mudflat. The observations in 2003 confirmed this assumption: *Corophium volutator* was both the dominant organism, and the most abundant, occurring in densities that rival other feeding areas in Minas Basin.

Figure 5.15 Relative abundance of invertebrates on three mudflats in the Avon Estuary







It is not surprising that shorebirds are now feeding mostly on this mudflat, since the rapid growth of *Spartina alterniflora* has eliminated invertebrates from much of the mudflat that used to exist adjacent to the Causeway.

It now appears that the Newport Bar has stabilised to the extent that rafted pieces of *Spartina alterniflora* have established, and will probably spread rapidly over the next few years. During the 2003 survey, six patches were noted. Since that time, further patches have appeared, and during the summer of 2004 it became evident that many parts of the Newport Bar had established marsh grass. It is to be expected that these patches will coalesce, and, provided heavy winter ice conditions do not disrupt these colonists, will rapidly extend over the surface. This is a natural process of succession. The implications are, however, since new marsh seems to exclude the invertebrates that form the base of the estuary food chain (Daborn *et. al.* 2003a), that the Newport Bar will eventually become a poor foraging area for migratory species.

6.0 Summary and Implications

Studies in 2003 were aimed at providing answers to questions about the utilization of the Avon River and Estuary by fish, and the physical conditions that pertain to their rearing habitat, or their movements through the Causeway. These questions are listed on Page 3 of this report. Part of the study related to productivity and sedimentology of the Windsor marsh—mudflat complex adjacent to the Causeway has been reported separately (van Proosdij *In prep*).

The principal purpose of field studies by ACER personnel near the Windsor Causeway and in the lower Avon River during 2003 was to investigate the conditions affecting fish utilizing the lower Avon River system for spawning, rearing or feeding. Surprisingly little is known about fish movements and success since the Causeway was constructed in 1970-1971, partly because there has been no systematic survey of fish populations in the last three decades, and because commercial fishing operations that used to be carried out in the Avon River and Estuary have largely ceased. The need to expand the highway crossing of the Avon at Windsor has provided the incentive both for examination of present conditions in the vicinity of the Causeway, which has been conducted by personnel from the Acadia Centre for Estuarine Research, Acadia University, and St. Mary's University (Daborn *et al.* 2003a, b), and for a review of historic information of the fisheries in the Avon system. A forthcoming thesis by Lisa Isaacman from Dalhousie University promises to provide the first thorough review of information pertaining to fish and fisheries in the Avon over the last two centuries (cf. Isaacman 2004).

6.1 Diadromous[30] and resident fish of the Avon Estuary.

Collections of fish utilizing the channels on the seaward side of the Windsor Causeway were made using three techniques: drifting with an experimental gill net, eel pots, and a fyke net. In total, 763 fish were captured. Of more than 20 species of marine or

[30] *Diadromous* fish are those that move between freshwater and marine habitats during their life cycle. *Anadromous* fish spawn in fresh waters, and move to sea to feed and grow; *catadromous* fish (e.g. the American eel) spawn at sea, but move into fresh water habitats to grow.

diadromous fish that might be expected to be present in the Estuary, only six species were caught in 2003: alewife, blueback herring, striped bass, white perch, tomcod, and American eel. White perch and tomcod were represented by four and three specimens respectively, and were only captured in the small channel adjacent to the Causeway. Of the other species, only three – the alewife, blueback herring and eel – were captured on both sides of the Causeway, confirming that they are able to pass through the Causeway on their migration.

The gaspereau run, which consisted of both alewife and blueback herring, lasted from some time before May 22, when the nets were first set, until the first week of July. The first part of the run consisted mostly of alewives, whereas blueback herring were more common than alewives during June. The age of migrant fish was three to seven years for alewives, and three to six years for blueback herring.

Striped bass were only caught on the seaward side of the Causeway. Most of these (97) were taken in the channel next to the Causeway, and only 10 in the deeper West Channel, through which all fish would have moved to enter the Causeway Channel. It is probable that this is a reflection of the more complete sampling provided by gill nets in the shallow Causeway Channel. Age ranged from two to five years; none of the fish was ready to spawn, which suggests that their movement up the Estuary to the Causeway represents a feeding, not a spawning, migration. Examination of stomach contents indicates that they fed primarily on mobile, epibenthic[31] animals, primarily the shrimps *Crangon septemspinosa* and *Neomysis americana.*

None of several expected estuarine or marine species (Atlantic silverside, smooth flounder, sticklebacks) was captured near the Causeway.

[31] *Epibenthic* animals live and move at the sediment surface, and are not buried in the sediment as are *benthic* animals.

6.2 Diadromous and resident fish of Pesaquid Lake and the lower Avon River.

Collections of fish above the Causeway were made with gill nets, beach seines, and ichthyoplankton tows. More than 2,000 fish were taken in total, representing 11 species. The only anadromous species caught above the Causeway were alewife, blueback herring, and white perch[32]. The gaspereau traveled at least as far upstream as the Powerhouse, and some appeared to have spawned in the main branch of the Avon River just below that location. Young of the year were captured in beach seines at sites in Pesaquid Lake from the first week of August through the first week of October, but numbers declined sharply after the middle of August. The decline in numbers in late August and September is partly a result of their seaward migration, but also the lower probability of capture in a beach seine as they grow and move away from shore. Length-weight relationships and growth rates suggest that the lower Avon system, including Pesaquid Lake, provides fair to good rearing habitat for gaspereau.

No striped bass or smelt were captured above the Causeway, even as young of the year. This does not mean that these species are not present in the Avon River, merely that sampling may have been inadequate to detect a relatively uncommon species. Comments from local residents, however, suggest that both species have declined significantly in the last 30 years. No evidence was obtained for any salmonid species (e.g. brook trout, brown trout, smelt or salmon) in this study.

The most numerous fish in seine collections was the banded killifish, which is a common resident of coastal freshwater and estuarine habitats in Nova Scotia. Other resident species in the lake included three species of sticklebacks, and yellow perch. Length-weight relationships and growth rates determined from repeated collections over the

[32] The white perch is a *facultatively* anadromous fish, meaning that it may migrate between freshwater habitat and saline waters, or remain permanently in fresh water. Only one white perch was collected on the seaward side of the Causeway, and it is possible that this specimen accidentally passed through the control gates.

summer suggest that the Lake provides good rearing conditions for these relatively tolerant species.

Ichthyoplankton tows produced only 21 fish larvae, representing four or five species[33]. The low number probably reflects the low volumes of water sampled at most stations, rather than a low abundance of larvae in the system.

6.3 **Physical and chemical conditions in the lower Avon River, Pesaquid Lake, and the Causeway Canal**.

Water quality data once again indicate that, although the potential exists for eutrophication of Pesaquid Lake because of surrounding land use, the main lake shows little evidence of deleterious conditions (other than the bacterial contamination derived from humans and animals -- Anon 2004). Although nitrate and phosphorus levels are higher than the main river, particularly as a result of the Allen Brook sub-watershed, they do not reach the level of impairment of the Lake that is sometimes associated with nutrient enrichment. pH levels in the River stations were as low as 4.6, which is still above the threshold value for successful reproduction of salmonids. Most measurements were in the range 5.0 to 6.6. Alkalinity is low throughout the system, indicating that the Avon River has poor buffering capacity.

Examination of water flows through the Causeway control gates produced peak flow values that were higher than 7 m/sec, well above the maximum swimming speed of herring-type fish, which include the alewife and blueback herring. However, the time sequence of flows indicates that there is a period of up to half an hour after the gates have been opened in which velocities in the centre of the gate are low enough to allow gaspereau to pass upstream. In addition, there may be suitable passage conditions for a longer time period near the sluice walls. The fact that gaspereau have continued to move upstream since the Causeway was built, indicate that they have found such conditions sufficient. It is interesting that local people commented on the relatively large number of

[33] Larvae were only identified to family level.

gaspereau in the river in 2003, when the gates were operated to maximise the opportunities for fish passage. A study of the timing of arrival of fish in the West Channel, relative to the tidal cycle, could provide the basis for developing an optimum management plan for gate operations that would favour upstream migration.

6.4 Newport Bar and other intertidal areas.

A first study has been made of the Newport Bar, which has appeared in recent years to be an important feeding ground for migratory shorebirds. This large bar (~64 ha) is presently separated from the Windsor marsh-mudflat by a deep channel that is part of the outflow of the St. Croix River. It is predominantly a mudflat, with a relatively well-developed benthic community, including the amphipod *Corophium volutator*. *Corophium* densities are similar to some of the higher values found in mudflats frequented by shorebirds elsewhere in Minas Basin, and similar to those in muddy areas near Avondale and the Windsor Causeway. As salt marsh has steadily expanded over the Windsor mudflat, the Newport Bar has become the major feeding area. However, several patches of *Spartina alterniflora* have become established on the Newport Bar[34], and it seems probable that it will progress into a marsh over the next years.

The results from the studies in 2003 indicate that the Avon Estuary system continues to change with time. Although fish diversity appears to be low compared with other parts of the Minas Basin (only six species being captured near the Causeway), it is not clear whether the apparent absence of the other species recorded in the Estuary during the 19th and 20th centuries is a result of limited sampling in a highly modified portion of the system, or whether they are truly absent from the Estuary. Some migratory species still persist, apparently able to negotiate the Causeway. More information on their movements during the rising tide could provide the basis for more effective management of the water levels in Pesaquid Lake and gate opening protocols that would favour upstream movement of migrants. Conditions in Pesaquid Lake itself indicate that it

[34] Since the observation of six patches of *Spartina* in 2003, the number of patches had more than doubled by late summer 2004.

provides suitable rearing habitat for anadromous and resident species, without the negative effects of nutrient enrichment that might have come from the extensive agricultural activity in the former floodplain, or failures in residential wastewater management. Finally, while the succession of mudflat into salt marsh observed on the Windsor causeway marsh—mudflat complex over the last decade has seen the elimination of one feeding ground previously used by migratory shorebirds (and possibly by fish), other mudflats in the Avon Estuary, particularly the Newport Bar, continue to provide attractive and productive feeding grounds. However, the establishment of salt marsh on the Newport Bar may indicate the beginning of the end for that role if the grass expands as effectively as it has near the Causeway.

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Appendix 1

Observations of Fishery-related Events in the Avon River system from: Duncanson, J.V. 1965. <u>Falmouth: A New England Township in Nova Scotia.</u>[35]

1786. "A whale appeared in the Avon River. When the tide went out, the whale was found in the area of the Falmouth Great Dyke. It was thirty feet long, and yielded a great quantity of oil."

1823. "The Mill Dam on the south branch of the river was ordered to be moved since it caused injury to the fishery."

1834. "Mondays and Tuesdays in every week during the run of fish in rivers were declared days for fishing with square or scoop nets. On these days seines were prohibited in the rivers. Gaspereau or alewife (*sic*) fishery areas on the south and west branches of the river: 1. near the falls of the river; 2. Creek at Redden's to the falls; 3. Fording place to the upper end of the Big Island in the West Branch."

1933. A large school of Black Fish (*sic*) became stranded on the mudflats in the upper section of the river. The authorities took immediate action to have the fish (*sic*) buried. The last occurrence was in the 1880s."

[35] (Provided courtesy of Mr. Richard Armstrong, Falmouth, NS).

Appendix 2.
Gill Net Collections in Avon Estuary 2003: Alewife & Blueback herring.

Date	Location	Technique	Species	Weight (grams)	Fork Length (mm)	Total Length (mm)	Sex
23-May	West Channel	Gill net	Alewife	234.4	239	279	F
23-May	West Channel	Gill net	Alewife	221.1	250	283	M
23-May	West Channel	Gill net	Blueback	153.1	224	258	M
23-May	West Channel	Gill net	Alewife	237.5	247	283	M
23-May	West Channel	Gill net	Alewife	240	256	292	F
23-May	West Channel	Gill net	Alewife	249.2	260	291	F
23-May	West Channel	Gill net	Alewife	232.8	239	279	F
23-May	West Channel	Gill net	Alewife	220.3	247	283	M
23-May	West Channel	Gill net	Alewife	215.5	248	282	F
23-May	West Channel	Gill net	Alewife	238.9	250	287	F
23-May	West Channel	Gill net	Alewife	191.5	244	274	M
23-May	West Channel	Gill net	Alewife	217.5	247	283	F
23-May	West Channel	Gill net	Alewife	311.3	276	310	M
23-May	West Channel	Gill net	Alewife	231	251	287	F
23-May	West Channel	Gill net	Alewife	277.8	270	310	M
23-May	West Channel	Gill net	Alewife	186.1	229	260	F
23-May	West Channel	Gill net	Alewife	240.8	240	277	F
23-May	West Channel	Gill net	Alewife	205.6	239	275	F
23-May	West Channel	Gill net	Alewife	272.8	259	294	F
23-May	West Channel	Gill net	Alewife	242.7	252	287	F
23-May	West Channel	Gill net	Alewife	241.9	255	290	F
23-May	West Channel	Gill net	Alewife	178.2	236	266	M
23-May	West Channel	Gill net	Alewife	291.3	267	304	F
23-May	West Channel	Gill net	Alewife	216.4	244	280	F
23-May	West Channel	Gill net	Alewife	197.1	245	278	M
23-May	West Channel	Gill net	Alewife	247.9	258	292	F
23-May	West Channel	Gill net	Alewife	225.6	247	281	F
23-May	West Channel	Gill net	Alewife	208.6	237	262	F
23-May	West Channel	Gill net	Alewife	239.6	254	288	F
23-May	West Channel	Gill net	Alewife	323.8	268	314	F
23-May	West Channel	Gill net	Alewife	187.9	233	266	F
23-May	West Channel	Gill net	Alewife	207.4	241	274	M
23-May	West Channel	Gill net	Alewife	210.2	240	277	F
23-May	West Channel	Gill net	Alewife	227	255	288	F
23-May	West Channel	Gill net	Alewife	203.2	244	274	F
23-May	West Channel	Gill net	Alewife	322.3	281	323	F
23-May	West Channel	Gill net	Alewife	207	244	280	M
23-May	West Channel	Gill net	Alewife	199.9	242	272	M
23-May	West Channel	Gill net	Alewife	213.7	244	277	F
23-May	West Channel	Gill net	Alewife	218.8	248	286	M
23-May	West Channel	Gill net	Alewife	191.3	236	274	M
23-May	West Channel	Gill net	Alewife	314	279	315	M
23-May	West Channel	Gill net	Alewife	241.6	245	292	F

Date	Location	Technique	Species	Weight (grams)	Fork Length (mm)	Total Length (mm)	Sex
23-May	West Channel	Gill net	Alewife	253.3	253	290	F
23-May	West Channel	Gill net	Alewife	190.4	238	274	M
23-May	West Channel	Gill net	Alewife	336.1	281	322	F
23-May	West Channel	Gill net	Alewife	227.5	244	271	F
23-May	West Channel	Gill net	Alewife	242.1	249	287	F
23-May	West Channel	Gill net	Alewife	250.5	256	296	F
23-May	West Channel	Gill net	Alewife	218.6	243	282	M
23-May	West Channel	Gill net	Alewife	175.9	246	270	M
23-May	West Channel	Gill net	Alewife	287.9	270	309	M
23-May	West Channel	Gill net	Alewife	224.1	251	290	F
23-May	West Channel	Gill net	Alewife	281.5	260	299	F
23-May	West Channel	Gill net	Alewife	242.5	251	292	M
23-May	West Channel	Gill net	Alewife	197	235	270	F
23-May	West Channel	Gill net	Alewife	247.1	263	287	F
23-May	West Channel	Gill net	Alewife	233.1	253	290	F
23-May	West Channel	Gill net	Alewife	263.9	263	297	F
23-May	West Channel	Gill net	Alewife	283.6	271	305	F
23-May	West Channel	Gill net	Blueback	167.1	228	266	F
23-May	West Channel	Gill net	Alewife	224.4	240	284	M
23-May	West Channel	Gill net	Alewife	180.6	228	268	M
23-May	West Channel	Gill net	Alewife	180.7	238	271	F
23-May	West Channel	Gill net	Alewife	197.3	243	271	M
23-May	West Channel	Gill net	Alewife	284.3	264	299	F
23-May	West Channel	Gill net	Alewife	179.8	237	269	M
23-May	West Channel	Gill net	Alewife	170.7	233	265	M
23-May	West Channel	Gill net	Alewife	213.8	243	278	F
23-May	West Channel	Gill net	Alewife	267.3	250	283	F
23-May	West Channel	Gill net	Alewife	332.1	284	325	F
23-May	West Channel	Gill net	Alewife	187.9	235	270	M
23-May	West Channel	Gill net	Alewife	258.3	256	292	F
23-May	West Channel	Gill net	Alewife	304.1	284	315	F
23-May	West Channel	Gill net	Alewife	197.8	240	273	M
23-May	West Channel	Gill net	Alewife	200	239	275	M
23-May	West Channel	Gill net	Alewife	254.1	254	290	F
23-May	West Channel	Gill net	Alewife	217.7	248	285	M
23-May	West Channel	Gill net	Alewife	208.9	241	276	M
23-May	West Channel	Gill net	Alewife	196.2	239	275	F
23-May	West Channel	Gill net	Alewife	256	259	293	F
23-May	West Channel	Gill net	Alewife	216.9	252	287	M
23-May	West Channel	Gill net	Alewife	280.2	264	300	F
23-May	West Channel	Gill net	Blueback	146.6	222	253	M
23-May	West Channel	Gill net	Alewife	229.6	255	293	F
23-May	West Channel	Gill net	Alewife	225	244	280	M
23-May	West Channel	Gill net	Alewife	251.4	257	293	F
23-May	West Channel	Gill net	Alewife	207.8	249	285	M
28-May	Causeway gates, lake side	Gill net	Alewife	105.4	213	238	M

Date	Location	Technique	Species	Weight (grams)	Fork Length (mm)	Total Length (mm)	Sex
28-May	Causeway gates, lake side	Gill net	Blueback	128.2	215	251	M
28-May	Causeway gates, lake side	Gill net	Blueback	127.1	217	246	M
28-May	Causeway gates, lake side	Gill net	Blueback	140.7	222	255	M
28-May	Causeway gates, lake side	Gill net	Blueback	134.5	220	251	M
28-May	Causeway gates, lake side	Gill net	Blueback	139.7	217	245	M
28-May	Causeway gates, lake side	Gill net	Blueback	153.2	231	260	F
28-May	Causeway gates, lake side	Gill net	Blueback	163.1	236	266	F
28-May	Causeway gates, lake side	Gill net	Blueback	150	224	257	F
28-May	Causeway gates, lake side	Gill net	Blueback	169.1	233	265	M
28-May	Causeway gates, lake side	Gill net	Alewife	200.5	252	281	F
28-May	Causeway gates, lake side	Gill net	Alewife	147.1	223	252	M
28-May	Causeway gates, lake side	Gill net	Alewife	197.6	258	293	M
28-May	Causeway gates, lake side	Gill net	Alewife	203.1	240	275	M
28-May	Causeway gates, lake side	Gill net	Alewife	196.4	247	283	F
28-May	Causeway gates, lake side	Gill net	Alewife	226.3	250	286	F
28-May	Causeway gates, lake side	Gill net	Alewife	236.9	261	298	M
28-May	Causeway gates, lake side	Gill net	Alewife	324.1	272	312	F
28-May	Causeway gates, lake side	Gill net	Alewife	297.8	272	310	F
28-May	Causeway gates, lake side	Gill net	Alewife	257.1	258	295	M
28-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
28-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
28-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
28-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
28-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
28-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
28-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
28-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
28-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
28-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
28-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
28-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
28-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
28-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
28-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
28-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
28-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
28-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
28-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
28-May	Sangster's Bridge	Gill net	Alewife	202.8	243	276	M
28-May	Sangster's Bridge	Gill net	Alewife	178.8	237	270	M
28-May	Sangster's Bridge	Gill net	Alewife	289.2	280	320	F
28-May	Sangster's Bridge	Gill net	Alewife	192.1	247	273	F
28-May	Causeway Channel	Gill net	Alewife	218.3	244	279	F
28-May	Causeway Channel	Gill net	Alewife	290.6	266	305	F
28-May	Causeway Channel	Gill net	Alewife	236.5	252	285	F
28-May	Causeway Channel	Gill net	Alewife	235.5	248	285	F

Date	Location	Technique	Species	Weight (grams)	Fork Length (mm)	Total Length (mm)	Sex
28-May	Causeway Channel	Gill net	Alewife	218.4	253	289	M
28-May	Causeway Channel	Gill net	Alewife	171.6	232	267	M
28-May	Causeway Channel	Gill net	Alewife	217	248	283	M
28-May	Causeway Channel	Gill net	Alewife	182.1	237	267	M
28-May	Causeway Channel	Gill net	Alewife	259.2	263	299	F
28-May	Causeway Channel	Gill net	Alewife	230.2	252	287	F
28-May	Causeway Channel	Gill net	Blueback	124.7	212	241	M
29-May	West Channel	Gill net	Alewife	163.6	231	262	M
29-May	West Channel	Gill net	Alewife	173.7	236	263	F
29-May	West Channel	Gill net	Alewife	226.2	249	283	F
29-May	West Channel	Gill net	Alewife	184.2	242	261	F
29-May	West Channel	Gill net	Alewife	273	260	296	F
29-May	West Channel	Gill net	Alewife	187	239	269	M
29-May	West Channel	Gill net	Alewife	171.2	236	272	M
29-May	West Channel	Gill net	Blueback	128.5	211	243	F
29-May	West Channel	Gill net	Alewife	226.6	254	290	M
29-May	West Channel	Gill net	Alewife	256.1	257	294	F
29-May	West Channel	Gill net	Alewife	256.5	251	296	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M

Date	Location	Technique	Species	Weight (grams)	Fork Length (mm)	Total Length (mm)	Sex
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F

Date	Location	Technique	Species	Weight (grams)	Fork Length (mm)	Total Length (mm)	Sex
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	M
29-May	Causeway gates, lake side	Gill net	Alewife	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Blueback	-	-	-	F
29-May	Causeway gates, lake side	Gill net	Alewife	244.1	262	301	M
5-Jun	Causeway gates, lake side	Gill net	Alewife	210.7	257	294	M
5-Jun	Causeway gates, lake side	Gill net	Alewife	206.5	289	251	M
5-Jun	Causeway gates, lake side	Gill net	Alewife	191.9	247	282	F
5-Jun	Causeway gates, lake side	Gill net	Alewife	146.5	233	264	M
5-Jun	Causeway gates, lake side	Gill net	Alewife	167.7	240	276	F
5-Jun	Causeway gates, lake side	Gill net	Alewife	203.5	300	263	F
5-Jun	Causeway gates, lake side	Gill net	Alewife	136	243	268	M
5-Jun	Causeway gates, lake side	Gill net	Alewife	228.5	263	299	F
5-Jun	Causeway gates, lake side	Gill net	Alewife	231.3	266	305	F
5-Jun	Causeway gates, lake side	Gill net	Alewife	210	254	288	M
5-Jun	Causeway gates, lake side	Gill net	Alewife	271.8	274	313	M
5-Jun	Causeway gates, lake side	Gill net	Alewife	244.4	260	299	F
5-Jun	Causeway gates, lake side	Gill net	Alewife	n/a	n/a	n/a	F

Date	Location	Technique	Species	Weight (grams)	Fork Length (mm)	Total Length (mm)	Sex
5-Jun	West Channel	Gill net	Alewife	217.7	240	277	M
5-Jun	West Channel	Gill net	Blueback	126	218	252	M
5-Jun	West Channel	Gill net	Blueback	120.5	215	247	M
5-Jun	West Channel	Gill net	Blueback	131.4	223	255	M
5-Jun	West Channel	Gill net	Blueback	153.4	230	260	M
5-Jun	West Channel	Gill net	Alewife	337	273	312	F
5-Jun	West Channel	Gill net	Alewife	200.2	248	287	F
5-Jun	West Channel	Gill net	Alewife	257.5	253	290	F
5-Jun	West Channel	Gill net	Blueback	192.6	241	273	F
5-Jun	West Channel	Gill net	Blueback	130.5	215	248	F
5-Jun	West Channel	Gill net	Blueback	137.4	222	254	M
5-Jun	West Channel	Gill net	Alewife	263.9	262	299	F
5-Jun	West Channel	Gill net	Alewife	164.8	225	260	M
5-Jun	West Channel	Gill net	Blueback	141.9	224	257	M
5-Jun	West Channel	Gill net	Alewife	141.3	225	256	M
5-Jun	West Channel	Gill net	Blueback	148.4	223	256	F
11-Jun-03	Windsor-combo	Gill net	Alewife	12.7	103	118	M?
11-Jun-03	Windsor-combo	Gill net	Blueback	176.7	236	267	F
11-Jun-03	Windsor-combo	Gill net	Blueback	88.1	200	230	M
11-Jun-03	Windsor-combo	Gill net	Blueback	151.5	230	251	F
11-Jun-03	Windsor-combo	Gill net	Alewife	147.7	232	263	M
11-Jun-03	Windsor-combo	Gill net	Blueback	126.6	254	255	M
11-Jun-03	Windsor-combo	Gill net	Blueback	92.2	199	228	M
11-Jun-03	Windsor-combo	Gill net	Blueback	140	232	251	F
11-Jun-03	Windsor-combo	Gill net	Blueback	143.7	226	258	M
11-Jun-03	Windsor-combo	Gill net	Alewife	176.7	239	270	F
11-Jun-03	Windsor-combo	Gill net	Alewife	188.7	248	280	F
11-Jun-03	Windsor-combo	Gill net	Blueback	148.8	228	255	F
11-Jun-03	Windsor-combo	Gill net	Blueback	144.3	237	260	M
11-Jun-03	Windsor-combo	Gill net	Blueback	152.1	234	267	M
11-Jun-03	Windsor-combo	Gill net	Blueback	92.2	203	230	M
11-Jun-03	Windsor-combo	Gill net	Blueback	163.4	234	266	F
11-Jun-03	Windsor-combo	Gill net	Blueback	128.2	215	245	M
11-Jun-03	Windsor-combo	Gill net	Blueback	134.1	222	254	F
11-Jun-03	Windsor-combo	Gill net	Alewife	157.1	234	270	M
11-Jun-03	Windsor-combo	Gill net	Blueback	146.6	227	260	M
11-Jun-03	Windsor-combo	Gill net	Blueback	-	-	-	F
11-Jun-03	Windsor-combo	Gill net	Blueback	-	-	-	M
11-Jun-03	Windsor-combo	Gill net	Blueback	-	-	-	F
11-Jun-03	Windsor-combo	Gill net	Alewife	-	-	-	F
11-Jun-03	Windsor-combo	Gill net	Blueback	-	-	-	F
11-Jun-03	Windsor-combo	Gill net	Blueback	-	-	-	F
11-Jun-03	Windsor-combo	Gill net	Blueback	-	-	-	M
11-Jun-03	Windsor-combo	Gill net	Blueback	-	-	-	M
11-Jun-03	Windsor-combo	Gill net	Blueback	-	-	-	F
11-Jun-03	Causeway gates, lake side	Gill net	Alewife	173.5	243	277	F

Date	Location	Technique	Species	Weight (grams)	Fork Length (mm)	Total Length (mm)	Sex
11-Jun-03	Causeway gates, lake side	Gill net	Alewife	203.2	252	290	F
11-Jun-03	Causeway gates, lake side	Gill net	Alewife	265.5	241	276	F
11-Jun-03	Causeway gates, lake side	Gill net	Alewife	267.6	266	304	F
11-Jun-03	Causeway gates, lake side	Gill net	Alewife	205.9	256	292	F
11-Jun-03	Causeway gates, lake side	Gill net	Alewife	256	283	319	F
11-Jun-03	Causeway gates, lake side	Gill net	Alewife	155.2	235	270	M
11-Jun-03	Causeway gates, lake side	Gill net	Alewife	148.4	231	264	F
19-Jun-03	West Channel	Gill net	Alewife	243	279	173	M
19-Jun-03	West Channel	Gill net	Blueback	103.7	212	240	M
19-Jun-03	West Channel	Gill net	Blueback	157.8	230	264	F
19-Jun-03	West Channel	Gill net	Alewife	174.9	246	281	F
19-Jun-03	West Channel	Gill net	Blueback	201.6	241	275	F
19-Jun-03	Causeway Channel	Gill net	Blueback	125.2	218	250	M
19-Jun-03	Causeway Channel	Gill net	Alewife	146.1	224	255	M
19-Jun-03	Causeway Channel	Gill net	Blueback	148.2	218	247	F
19-Jun-03	Causeway Channel	Gill net	Blueback	167.5	230	262	F
25-Jun-03	Causeway gates, lake side	Gill net	Alewife	263	286	325	F
25-Jun-03	Causeway gates, lake side	Gill net	Alewife	234.9	265	304	F
25-Jun-03	Causeway gates, lake side	Gill net	Alewife	198.1	257	293	M
25-Jun-03	Causeway gates, lake side	Gill net	Alewife	170.6	253	290	M
25-Jun-03	Causeway gates, lake side	Gill net	Alewife	168.5	254	291	M
25-Jun-03	Causeway gates, lake side	Gill net	Alewife	190.9	257	293	F
25-Jun-03	Causeway gates, lake side	Gill net	Alewife	184	262	300	M
25-Jun-03	Causeway gates, lake side	Gill net	Alewife	129.4	234	266	M
25-Jun-03	Causeway gates, lake side	Gill net	Alewife	142.5	241	272	F
25-Jun-03	Causeway gates, lake side	Gill net	Alewife	154.6	241	273	M
25-Jun-03	Causeway gates, lake side	Gill net	Alewife	196.8	253	290	M
25-Jun-03	Causeway gates, lake side	Gill net	Alewife	154.7	236	272	M
25-Jun-03	Causeway gates, lake side	Gill net	Blueback	110.3	223	255	M
25-Jun-03	West Channel	Gill net	Blueback	192.8	241	272	F
25-Jun-03	West Channel	Gill net	Blueback	170.2	233	265	F
25-Jun-03	West Channel	Gill net	Blueback	188	239	275	F
25-Jun-03	West Channel	Gill net	Blueback	126.5	214	241	F
25-Jun-03	West Channel	Gill net	Blueback	144.6	225	255	M
25-Jun-03	West Channel	Gill net	Blueback	108.3	213	239	M
25-Jun-03	West Channel	Gill net	Blueback	132	224	247	M
25-Jun-03	West Channel	Gill net	Blueback	113.4	211	242	M
25-Jun-03	West Channel	Gill net	Blueback	178.3	235	269	F
25-Jun-03	West Channel	Gill net	Blueback	93.1	203	227	M
25-Jun-03	West Channel	Gill net	Blueback	115.5	214	245	M
25-Jun-03	Causeway Channel	Gill net	Blueback	166.4	245	277	M
25-Jun-03	Causeway Channel	Gill net	Blueback	108.3	216	244	M
25-Jun-03	Causeway Channel	Gill net	Blueback	112.2	213	244	M
25-Jun-03	Causeway Channel	Gill net	Blueback	242.7	260	299	F
3-Jul-03	West Channel	Gill net	Alewife	12.2	101	114	M ?
3-Jul-03	Causeway gates, lake side	Gill net	Alewife	141	235	263	M

Date	Location	Technique	Species	Weight (grams)	Fork Length (mm)	Total Length (mm)	Sex
3-Jul-03	Causeway gates, lake side	Gill net	Blueback	108.7	221	243	F
3-Jul-03	Causeway gates, lake side	Gill net	Alewife	107.8	218	249	M
3-Jul-03	Causeway gates, lake side	Gill net	Alewife	134.5	237	266	M
3-Jul-03	Causeway gates, lake side	Gill net	Alewife	119.5	238	257	F
3-Jul-03	Causeway gates, lake side	Gill net	Blueback	108.1	217	248	M
3-Jul-03	Causeway gates, lake side	Gill net	Blueback	97.9	212	239	M
30-Jul-03	Causeway Channel	Fyke Net	Alewife	15.4	104	120	Indet

Appendix 3.
Gill Net Collections in Avon Estuary 2003: Other species.

Date	Location	Technique	Species	Weight (g)	Fork Length (mm)	Total Length (mm)	Sex
23-May	Causeway gates, lake side	Gill net	White Perch	284.1	264	283	-
23-May	Causeway gates, lake side	Gill net	Eel	1800 +	N/A	743	-
23-May	Causeway gates, lake side	Gill net	Eel	347.9	N/A	565	-
23-May	Causeway gates, lake side	Gill net	Sucker	96.4	190	202	-
23-May	Causeway gates, lake side	Gill net	Sucker	436.1	320	346	-
23-May	Causeway gates, lake side	Gill net	Sucker	426.4	312	335	-
23-May	Causeway gates, lake side	Gill net	Sucker	397.8	310	340	-
28-May	Causeway gates, lake side	Gill net	White Perch	54.3	161	170	M
28-May	Causeway gates, lake side	Gill net	White Perch	205.9	233	246	F
28-May	Causeway gates, lake side	Gill net	White Perch	354.6	280	295	F
28-May	Causeway gates, lake side	Gill net	White Perch	278.4	256	272	F
28-May	Sangster's Bridge	Gill net	Sucker	443.9	301	326	M
28-May	Sangster's Bridge	Gill net	Sucker	657.5	357	390	F
28-May	Sangster's Bridge	Gill net	Sucker	769.3	364	398	M
28-May	Sangster's Bridge	Gill net	Yellow Perch	273.2	267	275	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	193.3	250	259	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	160.6	241	249	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	184.9	227	235	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	167.4	241	250	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	146.8	228	237	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	141.6	220	233	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	154.7	240	249	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	118.2	208	215	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	99.3	199	209	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	91.2	196	205	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	82.2	186	195	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	83.4	175	184	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	78	181	190	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	47	153	160	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	51.6	151	159	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	40.8	140	146	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	27.9	123	128	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	80.6	181	190	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	55	151	158	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	-	-	-	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	-	-	-	Indet
28-May	Sangster's Bridge	Gill net	Yellow Perch	-	-	-	Indet
28-May	Causeway Channel	Gill net	Tomcod	58	N/A	199	M
28-May	Causeway Channel	Eel pot	Eel	-	-	360	-
28-May	Causeway Channel	Eel pot	Eel	-	-	330	-
28-May	Causeway Channel	Eel pot	Eel	-	-	560	-
28-May	Causeway Channel	Eel pot	Eel	-	-	470	-
28-May	Causeway Channel	Eel pot	Eel	-	-	420	-

Date	Location	Technique	Species	Weight (g)	Fork Length (mm)	Total Length (mm)	Sex
28-May	Causeway Channel	Eel pot	Eel	-	-	410	-
28-May	Causeway Channel	Eel pot	Eel	-	-	400	-
28-May	Causeway Channel	Eel pot	Eel	-	-	400	-
28-May	Causeway Channel	Eel pot	Eel	-	-	430	-
28-May	Causeway Channel	Eel pot	Eel	-	-	490	-
29-May	Causeway gates, lake side	Gill net	Sucker	99.9	193	200	Indet
29-May	Causeway gates, lake side	Gill net	White Perch	230.3	245	256	F
10-Jun-03	Causeway Channel	Gill net	Striped Bass	628.2	378	408	n/a
10-Jun-03	Causeway Channel	Gill net	Striped Bass	647.1	381	405	n/a
11-Jun-03	West Channel	Gill net	Tomcod	47.6		175	M
17-Jun-03	West Channel	Gill net	Striped Bass	886.8	420	440	M
17-Jun-03	West Channel	Gill net	Striped Bass	-	85	90	-
17-Jun-03	West Channel	Gill net	Striped Bass	-	360	400	-
17-Jun-03	West Channel	Gill net	Striped Bass	-	220	230	M
17-Jun-03	Causeway gates, lake side	Gill net	Sucker	-	300	320	-
25-Jun-03	Causeway Channel	Gill net	Striped Bass	599.4	363	392	M
25-Jun-03	Causeway Channel	Gill net	Striped Bass	412.9	321	343	M
25-Jun-03	Causeway Channel	Gill net	Striped Bass	572.1	376	405	M
25-Jun-03	Causeway Channel	Gill net	Striped Bass	777.2	407	440	M
25-Jun-03	Causeway Channel	Gill net	Striped Bass	719.3	389	442	M
25-Jun-03	Causeway Channel	Gill net	Striped Bass	592.8	362	393	M
25-Jun-03	Causeway Channel	Gill net	Striped Bass	629	377	407	M
25-Jun-03	Causeway Channel	Gill net	Striped Bass	747	405	437	F
25-Jun-03	Causeway Channel	Gill net	Striped Bass	949.6	446	476	M
25-Jun-03	Causeway Channel	Gill net	Striped Bass	570.8	360	391	F
25-Jun-03	Causeway Channel	Gill net	Striped Bass	727.5	371	409	M
25-Jun-03	Causeway Channel	Gill net	Striped Bass	914.2	435	474	M
25-Jun-03	Causeway Channel	Gill net	Striped Bass	787.1	396	424	Indet
25-Jun-03	Causeway Channel	Gill net	Striped Bass	716.2	383	404	Indet
25-Jun-03	Causeway Channel	Gill net	Striped Bass	641.1	376	406	Indet
25-Jun-03	Causeway Channel	Gill net	Striped Bass	194.1	244	263	Indet
25-Jun-03	Causeway Channel	Gill net	Striped Bass	591	368	-	-
25-Jun-03	Causeway Channel	Gill net	Striped Bass	545	375	-	-
25-Jun-03	Causeway Channel	Gill net	Striped Bass	682	380	-	-
25-Jun-03	Causeway Channel	Gill net	Striped Bass	727	388	-	-
25-Jun-03	Causeway Channel	Gill net	Striped Bass	682	385	-	-
25-Jun-03	Causeway Channel	Gill net	Striped Bass	591	375	-	-
25-Jun-03	Causeway Channel	Gill net	Striped Bass	864	416	-	-
25-Jun-03	Causeway Channel	Gill net	Striped Bass	727	390	-	-
25-Jun-03	Causeway Channel	Gill net	Striped Bass	773	382	-	-
25-Jun-03	Causeway Channel	Gill net	Striped Bass	864	410	-	-
25-Jun-03	Causeway Channel	Gill net	Striped Bass	682	382	-	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	773	421	45	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	1000	417	448	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	727	427	456	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	682	388	418	-

Date	Location	Technique	Species	Weight (g)	Fork Length (mm)	Total Length (mm)	Sex
2-Jul-03	Causeway Channel	Gill net	Striped Bass	636	382	401	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	545	384	411	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	727	403	431	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	545	391	420	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	636	384	441	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	682	408	441	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	682	382	410	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	636	380	411	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	636	382	412	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	727	402	430	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	682	371	398	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	591	373	400	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	727	400	430	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	727	391	423	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	818	399	431	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	682	373	401	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	636	388	420	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	636	382	432	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	682	401	430	-
2-Jul-03	Causeway Channel	Gill net	Striped Bass	909	415	445	-
2-Jul-03	Causeway Channel	Gill net	White Perch	182	232	244	-
2-Jul-03	Causeway Channel	Gill net	White Perch	-	249	263	F
3-Jul-03	Causeway Channel	Gill net	White Perch	78.9	150	156	M
3-Jul-03	Gudgeon Creek	Gill net	Sucker	559.9	350	368	Indet
3-Jul-03	Causeway Channel	Gill net	Tomcod	61.9	n/a	204	Indet
8-Jul-03	Causeway Channel	Gill net	Striped Bass	736.5	400	424	-
8-Jul-03	West Channel	Gill net	Striped Bass	1017.5	435	472	-
8-Jul-03	Causeway Channel	Gill net	Striped Bass	840.6	415	449	-
8-Jul-03	Causeway Channel	Gill net	Striped Bass	705.8	394	425	-
8-Jul-03	Causeway Channel	Gill net	Striped Bass	774	401	434	-
8-Jul-03	Causeway Channel	Gill net	Striped Bass	820.7	408	440	-
8-Jul-03	Causeway Channel	Gill net	Striped Bass	751.2	394	428	-
8-Jul-03	Causeway Channel	Gill net	Striped Bass	881.6	414	447	-
8-Jul-03	Causeway Channel	Gill net	Striped Bass	646.2	383	419	-
8-Jul-03	Causeway Channel	Gill net	Striped Bass	679.7	387	417	-
8-Jul-03	Causeway Channel	Gill net	Striped Bass	-	243	264	-
15-Jul-03	Causeway Channel	Gill net	Striped Bass	727.3	398	422	-
15-Jul-03	Causeway Channel	Gill net	Striped Bass	954.5	422	454	-
15-Jul-03	Causeway Channel	Gill net	Striped Bass	727.3	389	421	-
15-Jul-03	Causeway Channel	Gill net	Striped Bass	863.6	126	460	-
15-Jul-03	Causeway Channel	Gill net	Striped Bass	863.6	409	440	-
15-Jul-03	Causeway Channel	Gill net	Striped Bass	681.8	385	417	-
15-Jul-03	Causeway Channel	Gill net	Striped Bass	727.3	386	421	-
15-Jul-03	Causeway Channel	Gill net	White Perch	363.6	293	305	-
15-Jul-03	Causeway Channel	Gill net	Striped Bass	681.8	381	416	-
22-Jul-03	West Channel	Gill net	Striped Bass	272.7	278	297	-

Date	Location	Technique	Species	Weight (g)	Fork Length (mm)	Total Length (mm)	Sex
22-Jul-03	West Channel	Gill net	Striped Bass	772.7	402	436	-
22-Jul-03	West Channel	Gill net	Striped Bass	545.5	385	416	-
22-Jul-03	West Channel	Gill net	Striped Bass	863.6	394	425	-
22-Jul-03	West Channel	Gill net	Striped Bass	1045.5	426	463	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	863.6	408	442	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	227.3	264	282	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	272.7	277	300	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	818.2	396	421	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	227.3	265	286	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	227.3	264	284	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	272.7	265	286	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	1181.8	455	480	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	954.5	412	449	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	272.7	289	311	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	227.3	271	294	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	681.8	386	418	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	772.7	407	436	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	909.1	422	456	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	863.6	411	452	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	681.8	390	422	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	227.3	278	293	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	272.7	270	289	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	772.7	398	432	-
22-Jul-03	Causeway Channel	Gill net	White Perch	272.7	267	283	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	272.7	284	306	-
22-Jul-03	Causeway Channel	Gill net	Striped Bass	181.8	258	278	-
29-Jul-03	Causeway Channel	Gill net	Striped Bass	909.1	416	448	-
29-Jul-03	Causeway Channel	Gill net	Striped Bass	954.5	415	439	-
29-Jul-03	Causeway Channel	Gill net	Striped Bass	1181.8	429	465	-
29-Jul-03	Causeway Channel	Gill net	Tomcod	90.9	-	240	-
30-Jul-03	Causeway Channel	Fyke Net	Striped Bass	241.5	270	290	M

Appendix 4.
Seine net collections in Avon River and Pesaquid Lake, 2003.

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.264	-	32
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.152	-	27
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	1.139	-	52
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.136	-	26
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.081	-	22
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.777	-	44
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.237	-	31
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.112	-	25
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.181	-	30
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.134	-	27
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.097	-	23
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.324	-	35
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.093	-	22
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.151	-	27
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.099	-	24
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.078	-	22
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.177	-	28
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.629	-	41
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.104	-	24
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.693	-	44
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.913	-	48
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.483	-	39
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.196	-	29
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.884	-	48
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.142	-	26
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.129	-	26
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.154	-	26
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.284	-	32
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.078	-	22
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.254	-	31
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.064	-	21
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.209	-	29
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.149	-	25
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.093	-	24
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.218	-	29
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.896	-	49
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.077	-	23
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.078	-	22
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.102	-	24
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.272	-	33
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.097	-	24
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.085	-	22
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.223	-	30

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.287	-	32
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.087	-	23
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.206	-	31
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	1.315	-	54
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.145	-	27
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.127	-	26
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.211	-	30
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.237	-	32
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.138	-	26
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.193	-	31
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.162	-	26
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.171	-	28
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.503	-	39
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.254	-	31
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.176	-	29
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.101	-	23
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.158	-	27
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.146	-	27
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.144	-	25
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.179	-	26
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.127	-	25
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.156	-	27
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.317	-	32
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.269	-	32
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.113	-	24
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.173	-	27
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.082	-	22
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.131	-	25
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.069	-	22
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.071	-	22
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.169	-	27
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.237	-	31
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.24	-	31
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.089	-	22
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.065	-	21
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.087	-	23
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.077	-	19
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.107	-	23
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.108	-	24
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.068	-	21
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.098	-	23
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.071	-	22
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.08	-	23
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.074	-	21
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.09	-	23
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.093	-	22

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.083	-	23
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.11	-	24
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.132	-	26
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.114	-	25
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.052	-	21
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.073	-	21
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.091	-	23
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.159	-	28
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.086	-	22
7-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.141	-	26
7-Aug-03	Boat Ramp	Seine	Banded Killifish	0.112	-	22
7-Aug-03	Boat Ramp	Seine	Banded Killifish	0.143	-	26
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.075	-	22
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.207	-	30
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.948	45	49
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.211	-	30
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.892	42	45
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.108	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.104	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.108	-	25
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.156	-	29
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.274	-	34
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	1.114	45	50
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.215	-	31
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.128	-	26
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.178	-	29
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.172	-	30
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.117	-	25
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	1.469	53	57
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.211	-	31
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.209	-	32
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.162	-	29
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.15	-	28
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.137	-	26
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.085	-	23
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.068	-	22
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.093	-	23
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.142	-	27
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.131	24	26
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.102	22	25
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.09	22	25
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.077	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.142	25	27
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.109	-	25
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.281	-	36
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.223	-	31

Date	Location	Technique	Species	Weight (g)	Fork Length (mm)	Total Length (mm)
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.112	-	25
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.097	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.109	23	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.99	-	25
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.084	23	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.21	29	32
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.13	-	25
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.329	34	36
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.099	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.301	-	34
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.087	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.079	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.082	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.077	-	22
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.075	-	21
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.098	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.127	-	26
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.108	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.1	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.125	-	25
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.088	-	22
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.092	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.199	-	28
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.079	-	21
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.086	-	22
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.137	-	26
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.901	-	23
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.082	-	22
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.097	-	23
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.094	-	23
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.084	-	23
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.09	-	22
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.112	-	25
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.128	-	27
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.106	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.087	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.102	-	25
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.086	-	23
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.068	-	22
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.101	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.142	-	27
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.093	-	25
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.337	-	34
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.122	-	26
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.23	-	32
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.101	-	24

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.091	-	22
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.306	-	35
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.08	-	23
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.101	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.275	-	35
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.084	-	23
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.074	-	22
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.31	-	34
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.126	-	26
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.253	-	33
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.102	-	25
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.114	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.213	-	31
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.117	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.301	-	35
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.071	-	23
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.245	-	34
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.242	-	32
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.248	-	31
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.078	22	23
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.068	-	22
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.129	-	26
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.078	-	22
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.135	-	26
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.089	-	23
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.112	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.101	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.259	-	32
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.181	-	31
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.121	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.114	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.112	-	25
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.093	-	23
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.226	-	32
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.116	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.087	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.302	-	33
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.113	-	25
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.097	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.102	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.134	-	26
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.29	-	32
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.142	-	26
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.098	-	23
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.099	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.16	-	27

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.106	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.294	-	34
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.267	-	33
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.232	-	32
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.1	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.104	-	23
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.104	-	23
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.258	-	32
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.122	-	24
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.088	-	23
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.098	-	23
7-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.111	-	23
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.407	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.421	-	38
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.726	-	41
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.407	-	37
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.422	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.435	-	38
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.426	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.436	-	37
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.477	-	38
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.417	-	35
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.505	-	38
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.507	-	39
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.483	-	38
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.473	-	40
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.389	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.438	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.434	-	38
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.386	-	33
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.431	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.485	-	40
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.421	-	37
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.327	-	31
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.42	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.448	-	37
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.442	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.431	-	38
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.445	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.413	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.434	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.417	-	37
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.432	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.374	-	34
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.462	-	38
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.417	-	37

Date	Location	Technique	Species	Weight (g)	Fork Length (mm)	Total Length (mm)
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.402	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.387	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.345	-	32
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.444	-	37
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.457	-	37
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.414	-	35
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.423	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.413	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.37	-	35
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.414	-	37
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.413	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.418	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.425	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.48	-	39
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.31	-	34
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.403	-	35
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.358	-	36
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.376	-	37
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.533	-	38
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.359	-	34
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.4	-	37
11-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.374	-	33
11-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.283	-	31
11-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.404	-	36
11-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.411	-	38
11-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.463	-	38
11-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.377	-	36
11-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.279	-	29
11-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.382	-	34
11-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.435	-	37
11-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.357	-	36
11-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.441	-	37
11-Aug-03	LeBreau Brook	Seine	5-Sp. Stickleback	1.057	-	50
12-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.428	35	39
12-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.309	31	34
12-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.333	33	36
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.265	28	31
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.335	33	36
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.409	34	37
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.292	30	33
12-Aug-03	Falmouth Park	Seine	White Sucker	0.758	36	38
12-Aug-03	Falmouth Park	Seine	Banded Killifish	0.825	-	44
12-Aug-03	Falmouth Park	Seine	Yellow Perch	2.429	54	59
12-Aug-03	Falmouth Park	Seine	Banded Killifish	0.267	-	30
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.336	32	34
12-Aug-03	Falmouth Park	Seine	Banded Killifish	0.608	-	37

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.377	33	36
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.4	34	36
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.426	33	36
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.384	31	35
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.362	34	37
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.32	29	32
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.31	30	32
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.454	34	38
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.196	26	28
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.342	29	34
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.449	28	33
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.375	32	36
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.412	32	36
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.301	30	32
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.366	32	35
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.393	30	33
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.398	35	39
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.384	32	36
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.342	31	33
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.391	33	36
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.381	32	36
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.209	27	29
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.381	33	36
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.399	34	37
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.366	33	36
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.354	32	35
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.344	33	35
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.417	33	37
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.425	33	36
12-Aug-03	Falmouth Park	Seine	Gaspereau (J)	0.406	33	37
12-Aug-03	Falmouth Park	Seine	Banded Killifish	0.383	-	35
12-Aug-03	Falmouth Park	Seine	White Perch	1.231	42	46
12-Aug-03	Falmouth Park	Seine	White Perch	1.411	44	48
12-Aug-03	Falmouth Park	Seine	White Perch	1.452	48	50
12-Aug-03	Falmouth Park	Seine	White Perch	1.242	43	46
12-Aug-03	Falmouth Park	Seine	White Perch	1.33	45	48
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.448	-	38
12-Aug-03	Boat Ramp	Seine	White Perch	3.423	60	64
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.419	-	36
12-Aug-03	Boat Ramp	Seine	White Perch	1.76	49	52
12-Aug-03	Boat Ramp	Seine	White Perch	1.566	47	49
12-Aug-03	Boat Ramp	Seine	White Perch	1.471	47	49
12-Aug-03	Boat Ramp	Seine	White Perch	1.068	41	44
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.403	-	35
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.44	-	35
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.566	-	38

Date	Location	Technique	Species	Weight (g)	Fork Length (mm)	Total Length (mm)
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.424	-	33
12-Aug-03	Boat Ramp	Seine	White Perch	1.421	48	50
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.23	-	28
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.24	-	26
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.285	-	28
12-Aug-03	Boat Ramp	Seine	White Perch	0.97	40	43
12-Aug-03	Boat Ramp	Seine	White Perch	1.338	45	47
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.297	-	30
12-Aug-03	Boat Ramp	Seine	White Perch	1.947	51	53
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.483	-	35
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.208	-	25
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.361	-	33
12-Aug-03	Boat Ramp	Seine	White Perch	1.496	46	49
12-Aug-03	Boat Ramp	Seine	White Perch	1.126	42	44
12-Aug-03	Boat Ramp	Seine	White Perch	1.294	44	46
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.444	-	34
12-Aug-03	Boat Ramp	Seine	White Perch	1.566	47	50
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.43	-	33
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.452	-	35
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.692	-	39
12-Aug-03	Boat Ramp	Seine	White Perch	1.364	43	47
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.262	-	27
12-Aug-03	Boat Ramp	Seine	White Perch	1.665	46	50
12-Aug-03	Boat Ramp	Seine	White Perch	1.266	44	46
12-Aug-03	Boat Ramp	Seine	White Perch	0.766	37	38
12-Aug-03	Boat Ramp	Seine	White Perch	1.635	49	52
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.688	-	40
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.3	-	30
12-Aug-03	Boat Ramp	Seine	White Perch	1.977	49	52
12-Aug-03	Boat Ramp	Seine	White Perch	2.713	56	60
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.405	-	34
12-Aug-03	Boat Ramp	Seine	Banded Killifish	0.374	-	32
12-Aug-03	Boat Ramp	Seine	White Perch	3.023	59	62
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.535	33	37
13-Aug-03	Boat Ramp	Seine	White Sucker	0.268	-	29
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.517	34	37
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.388	33	37
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.357	-	34
13-Aug-03	Boat Ramp	Seine	White Perch	1.176	43	45
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.411	34	37
13-Aug-03	Boat Ramp	Seine	White Perch	1.869	49	51
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.626	34	36
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.342	33	36
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.535	34	39
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.829	39	43
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.414	33	36

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.55	34	39
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.555	33	36
13-Aug-03	Boat Ramp	Seine	White Perch	0.984	38	40
13-Aug-03	Boat Ramp	Seine	White Perch	1.49	44	47
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.306	29	32
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.4	33	36
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.318	29	32
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.292	28	30
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.33	30	34
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.537	-	36
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.359	31	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.396	35	39
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.36	32	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.378	32	36
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.369	31	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.431	34	38
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.478	34	37
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.316	30	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.371	29	33
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.395	33	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.451	34	38
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.352	32	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.362	32	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.346	31	35
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.478	-	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.295	30	32
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.222	-	26
13-Aug-03	Boat Ramo	Seine	White Perch	1.873	47	50
13-Aug-03	Boat Ramp	Seine	White Perch	1.589	45	47
13-Aug-03	Boat Ramp	Seine	White Perch	1.35	42	45
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.39	32	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.317	29	32
13-Aug-03	Boat Ramp	Seine	White Perch	1.514	45	48
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.374	33	36
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.379	33	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.385	33	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.435	34	37
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.511	35	38
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.323	32	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.294	31	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.551	35	38
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.538	-	36
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.369	32	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.3	30	33
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.375	29	33
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.401	33	36

Date	Location	Technique	Species	Weight (g)	Fork Length (mm)	Total Length (mm)
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.269	29	31
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.381	33	36
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.327	31	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.367	32	36
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.385	32	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.302	31	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.239	29	31
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.308	29	32
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.246	28	31
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.342	31	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.309	31	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.338	33	35
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.294	-	29
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.279	28	30
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.34	30	33
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.376	31	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.466	35	39
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.317	29	33
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.33	29	31
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.331	31	35
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.34	-	32
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.388	34	36
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.428	34	38
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.355	34	36
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.267	29	32
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.37	31	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.275	30	34
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.319	-	32
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.332	31	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.406	34	39
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.463	-	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.28	29	31
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.428	33	37
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.406	34	37
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.417	32	36
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.389	-	32
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.378	33	37
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.304	31	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.327	31	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.335	33	36
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.402	33	37
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.187	24	27
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.386	34	37
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.381	33	37
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.331	33	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.325	31	34

Date	Location	Technique	Species	Weight (g)	Fork Length (mm)	Total Length (mm)
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.324	28	32
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.352	31	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.374	32	36
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.342	31	34
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.246	-	29
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.283	30	33
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.392	33	37
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.42	32	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.463	35	37
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.365	30	33
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.352	30	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.347	31	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.305	31	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.399	33	37
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.437	35	39
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.34	31	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.315	30	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.323	31	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.352	33	36
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.36	32	36
13-Aug-03	Boat Ramo	Seine	Banded Killifish	0.416	-	32
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.262	-	29
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.277	-	29
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.443	-	35
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.324	-	30
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.426	32	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.416	34	37
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.366	32	36
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.306	31	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.313	30	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.284	28	33
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.316	29	33
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.388	30	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.335	33	37
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.367	33	38
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.251	29	32
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.359	33	36
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.373	33	37
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.323	31	35
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.147	24	28
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.244	26	31
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.145	22	26
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.425	34	38
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.279	28	30
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.247	26	30
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.29	28	32

Date	Location	Technique	Species	Weight (g)	Fork Length (mm)	Total Length (mm)
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.196	25	29
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.431	34	38
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.251	27	31
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.238	26	30
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.356	34	37
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.28	29	33
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.355	32	36
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.397	31	36
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.38	31	34
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.196	25	27
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.265	29	33
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.199	25	29
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.155	24	26
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.14	21	25
13-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.18	34	38
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.457	-	33
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.343	-	31
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.217	-	26
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.236	-	27
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.34	-	31
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.206	-	25
13-Aug-03	Boat Ramp	Seine	Banded Killifish	0.333	-	31
20-Aug-03	Powerhouse	Seine	Yellow Perch	3.245	61	66
20-Aug-03	Powerhouse	Seine	Yellow Perch	2.732	58	62
20-Aug-03	Powerhouse	Seine	White Perch	2.733	56	59
20-Aug-03	Powerhouse	Seine	Small Mouth Bass	2.781	56	57
20-Aug-03	Powerhouse	Seine	White Sucker	2.279	55	59
20-Aug-03	Powerhouse	Seine	Yellow Perch	2.051	53	56
20-Aug-03	Powerhouse	Seine	Yellow Perch	2.853	59	61
20-Aug-03	Powerhouse	Seine	Yellow Perch	2.013	52	54
20-Aug-03	Powerhouse	Seine	Yellow Perch	2.87	58	62
20-Aug-03	Powerhouse	Seine	Yellow Perch	2.011	52	54
20-Aug-03	Powerhouse	Seine	Yellow Perch	2.778	58	61
20-Aug-03	Powerhouse	Seine	Yellow Perch	3.229	61	65
20-Aug-03	Powerhouse	Seine	Yellow Perch	2.922	57	61
20-Aug-03	Powerhouse	Seine	Yellow Perch	2.392	55	57
20-Aug-03	Powerhouse	Seine	Yellow Perch	1.853	49	52
20-Aug-03	Powerhouse	Seine	Yellow Perch	1.686	47	50
20-Aug-03	Powerhouse	Seine	Lake Chubb	0.828	39	41
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.721	38	43
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.575	35	38
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.519	34	38
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.827	40	44
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.855	41	45
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.604	35	39

Date	Location	Technique	Species	Weight (g)	Fork Length (mm)	Total Length (mm)
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.557	35	39
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.561	35	39
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.62	36	40
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.415	32	36
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.697	39	43
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.368	30	34
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.551	33	37
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.52	33	36
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.458	32	36
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.573	35	39
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.401	31	34
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.592	37	40
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.525	39	43
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.67	36	40
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.51	33	36
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.724	32	37
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.617	35	39
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.336	29	33
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.431	32	35
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.605	35	39
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.618	37	41
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.403	33	36
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.6	35	39
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.363	29	34
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.455	32	36
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.533	34	37
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.392	30	34
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.596	34	38
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.523	35	38
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.699	39	43
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.476	33	36
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.382	30	34
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.641	25	40
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.463	32	36
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.512	34	38
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.498	33	37
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.54	34	37
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.44	32	36
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.583	35	39
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.395	31	34
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.577	35	39
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.584	35	39
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.685	38	42
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.482	32	36
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.37	29	32
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.819	39	42

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.605	35	40
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.452	32	36
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.701	38	41
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.502	32	36
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.637	35	39
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.589	35	39
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.407	32	35
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.392	30	34
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.51	32	36
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.526	33	37
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.406	31	35
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.798	39	45
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.556	33	38
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.614	37	41
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.313	28	32
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.344	28	32
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.528	34	37
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.412	30	34
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.386	29	33
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.496	32	37
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.372	30	33
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.379	30	34
20-Aug-03	Allen Brook	Seine	Gaspereau (J)	0.203	29	32
20-Aug-03	Allen Brook	Seine	White Sucker	0.169	27	29
20-Aug-03	Allen Brook	Seine	White Sucker	0.16	24	26
20-Aug-03	Allen Brook	Seine	White Sucker	0.259	28	30
20-Aug-03	Allen Brook	Seine	White Sucker	0.161	24	26
20-Aug-03	Allen Brook	Seine	3-Sp. Stickleback	0.139	-	22
20-Aug-03	Allen Brook	Seine	Red Bellied Dace	0.311	28	29
21-Aug-03	Falmouth Park	Seine	Gaspereau (J)	1.25	44	50
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.746	-	43
21-Aug-03	Falmouth Park	Seine	White Sucker	1.222	44	46
21-Aug-03	Falmouth Park	Seine	Banded Killifish	1.098	-	47
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.489	-	36
21-Aug-03	Falmouth Park	Seine	White Sucker	1.724	47	50
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.483	-	35
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.77	-	41
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.893	-	44
21-Aug-03	Falmouth Park	Seine	White Sucker	1.18	42	45
21-Aug-03	Falmouth Park	Seine	White Sucker	0.895	39	41
21-Aug-03	Falmouth Park	Seine	White Sucker	1.666	43	48
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.768	-	42
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.869	-	41
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.508	-	36
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.444	-	45
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.338	-	31

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.661	-	39
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.699	-	40
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.484	-	39
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.368	-	31
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.388	-	33
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.402	-	33
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.2	-	26
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.492	-	35
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.589	-	47
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.489	-	36
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.83	-	42
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.37	-	33
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.597	-	38
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.455	-	37
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.291	-	30
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.653	-	40
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.324	-	33
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.367	-	31
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.347	-	32
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.195	-	26
21-Aug-03	Falmouth Park	Seine	Banded Killifish	1.231	-	50
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.76	-	42
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.407	-	33
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.928	-	44
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.058	-	17
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.456	-	34
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.376	-	33
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.258	-	28
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.639	-	38
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.206	-	26
21-Aug-03	Falmouth Park	Seine	White Sucker	0.943	37	42
21-Aug-03	Falmouth Park	Seine	White Sucker	0.761	36	40
21-Aug-03	Falmouth Park	Seine	White Sucker	1.484	48	50
21-Aug-03	Falmouth Park	Seine	White Sucker	2.163	50	55
21-Aug-03	Falmouth Park	Seine	White Sucker	1.329	44	47
21-Aug-03	Falmouth Park	Seine	Banded Killifish	0.268	-	27
21-Aug-03	Boat Ramp	Seine	Gaspereau (J)	0.533	32	36
21-Aug-03	Boat Ramp	Seine	Banded Killifish	0.278	-	29
21-Aug-03	Boat Ramp	Seine	Banded Killifish	0.442	-	35
21-Aug-03	Boat Ramp	Seine	Banded Killifish	0.172	-	25
21-Aug-03	Boat Ramp	Seine	White Sucker	0.246	26	29
21-Aug-03	Sangster's Bridge	Seine	Gaspereau (J)	0.198	24	27
21-Aug-03	Benjamin Bridge	Seine	Red Bellied Dace	2.819	60	65
21-Aug-03	Benjamin Bridge	Seine	Red Bellied Dace	1.912	51	56
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.392	31	35
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.469	34	36

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	1.143	56	52
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.966	40	45
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.482	33	38
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.524	34	39
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.403	32	36
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.557	34	39
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.488	33	37
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.599	35	40
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.297	28	31
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.533	35	39
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.481	34	37
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.168	23	26
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.383	30	34
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.604	34	39
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.479	30	35
21-Aug-03	LeBreau Brook	Seine	White Sucker	1.076	48	51
21-Aug-03	LeBreau Brook	Seine	White Sucker	1.034	41	44
21-Aug-03	LeBreau Brook	Seine	White Sucker	2.585	56	60
21-Aug-03	LeBreau Brook	Seine	White Sucker	0.623	36	38
21-Aug-03	LeBreau Brook	Seine	White Sucker	1.287	55	57
21-Aug-03	LeBreau Brook	Seine	White Sucker	1.096	41	45
21-Aug-03	LeBreau Brook	Seine	White Sucker	0.749	38	41
21-Aug-03	LeBreau Brook	Seine	White Sucker	0.697	37	39
21-Aug-03	LeBreau Brook	Seine	White Sucker	0.676	37	40
21-Aug-03	LeBreau Brook	Seine	White Sucker	0.974	43	46
21-Aug-03	LeBreau Brook	Seine	White Sucker	0.292	29	31
21-Aug-03	LeBreau Brook	Seine	White Sucker	0.739	49	51
21-Aug-03	LeBreau Brook	Seine	White Sucker	0.39	32	34
21-Aug-03	LeBreau Brook	Seine	White Sucker	0.387	31	34
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.526	34	39
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.549	34	38
21-Aug-03	LeBreau Brook	Seine	Gaspereau (J)	0.353	30	34
21-Aug-03	LeBreau Brook	Seine	Banded Killifish	0.68	-	40
21-Aug-03	LeBreau Brook	Seine	Banded Killifish	0.465	-	34
21-Aug-03	LeBreau Brook	Seine	Banded Killifish	0.438	-	35
21-Aug-03	LeBreau Brook	Seine	Banded Killifish	0.643	-	40
21-Aug-03	LeBreau Brook	Seine	Banded Killifish	0.334	-	31
21-Aug-03	LeBreau Brook	Seine	Banded Killifish	0.482	-	37
21-Aug-03	LeBreau Brook	Seine	Banded Killifish	0.829	-	42
21-Aug-03	LeBreau Brook	Seine	Banded Killifish	0.573	-	38
21-Aug-03	LeBreau Brook	Seine	Banded Killifish	0.362	-	32
21-Aug-03	LeBreau Brook	Seine	Banded Killifish	0.716	-	40
21-Aug-03	LeBreau Brook	Seine	Banded Killifish	0.622	-	39
21-Aug-03	LeBreau Brook	Seine	Banded Killifish	0.547	-	39
21-Aug-03	LeBreau Brook	Seine	Banded Killifish	0.593	-	38
21-Aug-03	LeBreau Brook	Seine	Banded Killifish	0.564	-	38

Date	Location	Technique	Species	Weight (g)	Fork Length (mm)	Total Length (mm)
21-Aug-03	LeBreau Brook	Seine	Banded Killifish	0.554	-	39
21-Aug-03	LeBreau Brook	Seine	Banded Killifish	0.458	-	37
21-Aug-03	LeBreau Brook	Seine	Banded Killifish	0.642	-	39
21-Aug-03	LeBreau Brook	Seine	Red Bellied Dace	1.442	45	48
21-Aug-03	LeBreau Brook	Seine	9-Sp. Stickleback	0.486	-	39
21-Aug-03	LeBreau Brook	Seine	3-Sp. Stickleback	0.339	-	31
21-Aug-03	LeBreau Brook	Seine	3-Sp. Stickleback	0.265	-	28
21-Aug-03	LeBreau Brook	Seine	3-Sp. Stickleback	0.109	-	22
21-Aug-03	LeBreau Brook	Seine	4-Sp. Stickleback	0.201	-	23
21-Aug-03	LeBreau Brook	Seine	4-Sp. Stickleback	0.309	-	31
21-Aug-03	LeBreau Brook	Seine	4-Sp. Stickleback	0.196	-	28
21-Aug-03	LeBreau Brook	Seine	4-Sp. Stickleback	0.169	-	25
21-Aug-03	LeBreau Brook	Seine	Red Bellied Dace	2.051	52	56
21-Aug-03	South West Branch	Seine	Red Bellied Dace	1.771	51	55
21-Aug-03	South West Branch	Seine	Red Bellied Dace	0.324	28	31
21-Aug-03	South West Branch	Seine	Red Bellied Dace	0.443	33	36
21-Aug-03	South West Branch	Seine	Red Bellied Dace	0.291	26	28
26-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.246	29	32
26-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.727	40	45
26-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.646	43	48
26-Aug-03	Causeway Canal	Seine	Gaspereau (J)	1.099	47	55
26-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.615	42	45
26-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.624	41	46
26-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.608	40	44
26-Aug-03	Causeway Canal	Seine	Gaspereau (J)	0.623	44	47
Aug-27-03	Allen Brook	Seine	3-Sp. Stickleback	0.349	-	34
Aug-27-03	Allen Brook	Seine	4-Sp. Stickleback	0.37	-	36
Aug-27-03	Boat Ramp	Seine	Banded Killifish	3.258	-	68
Aug-27-03	Boat Ramp	Seine	Banded Killifish	0.759	-	43
Aug-27-03	Boat Ramp	Seine	Banded Killifish	0.435	-	34
Aug-27-03	Boat Ramp	Seine	Banded Killifish	1.025	-	48
Aug-27-03	Boat Ramp	Seine	White Sucker	0.953	-	46
Aug-27-03	Boat Ramp	Seine	Gaspereau (J)	0.654	-	43
Aug-27-03	Boat Ramp	Seine	Gaspereau (J)	0.489	36	39
Aug-27-03	Boat Ramp	Seine	Gaspereau (J)	0.447	35	39
Aug-27-03	Boat Ramp	Seine	Gaspereau (J)	0.861	43	47
Aug-27-03	Boat Ramp	Seine	Gaspereau (J)	0.472	37	40
Aug-27-03	Boat Ramp	Seine	Gaspereau (J)	0.596	38	42
Aug-27-03	Boat Ramp	Seine	Gaspereau (J)	0.291	29	32
Aug-27-03	Boat Ramp	Seine	Gaspereau (J)	0.309	30	34
Aug-27-03	Boat Ramp	Seine	Gaspereau (J)	0.295	29	32
Aug-27-03	Boat Ramp	Seine	Gaspereau (J)	0.438	33	39
Aug-27-03	Boat Ramp	Seine	Gaspereau (J)	0.566	37	41
Aug-27-03	Boat Ramp	Seine	Gaspereau (J)	0.392	32	36

Date	Location	Technique	Species	Weight (g)	Fork Length (mm)	Total Length (mm)
Aug-27-03	Boat Ramp	Seine	Gaspereau (J)	0.346	31	36
Aug-27-03	Boat Ramp	Seine	Gaspereau (J)	0.7	40	45
Aug-27-03	Boat Ramp	Seine	Gaspereau (J)	0.737	40	44
Aug-27-03	Boat Ramp	Seine	Gaspereau (J)	0.578	37	41
Aug-27-03	Falmouth Park	Seine	Gaspereau (J)	0.681	41	45
Aug-27-03	Falmouth Park	Seine	Gaspereau (J)	0.54	36	40
Aug-27-03	Falmouth Park	Seine	Gaspereau (J)	1.017	45	50
Aug-27-03	Falmouth Park	Seine	Gaspereau (J)	0.539	41	45
Aug-27-03	Falmouth Park	Seine	Gaspereau (J)	0.871	43	48
Aug-27-03	Falmouth Park	Seine	Gaspereau (J)	0.67	39	42
Aug-27-03	Falmouth Park	Seine	Gaspereau (J)	0.807	41	46
Aug-27-03	Falmouth Park	Seine	Gaspereau (J)	0.527	36	40
Aug-27-03	Falmouth Park	Seine	Gaspereau (J)	0.817	43	46
Aug-27-03	Falmouth Park	Seine	White Sucker	1.416	50	54
Aug-27-03	Falmouth Park	Seine	White Sucker	0.725	41	44
Aug-27-03	Falmouth Park	Seine	White Sucker	1.346	49	54
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.381	-	33
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.151	-	26
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.508	-	36
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.26	-	30
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.527	-	39
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.174	-	26
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.37	-	35
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.152	-	25
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.276	-	32
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.066	-	20
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.162	-	26
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.115	-	23
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.139	-	26
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.103	-	24
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.233	-	30
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.328	-	34
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.34	-	33
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.215	-	28
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.195	-	28
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.345	-	34
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.406	-	34
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.205	-	30
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.19	-	27
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.164	-	27
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.121	-	22
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.201	-	28
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.38	-	33
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.119	-	24
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.277	-	34
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.388	-	36

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.405	-	35
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.191	-	26
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.31	-	33
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.134	-	24
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.242	-	28
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.062	-	20
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.115	-	25
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.214	-	29
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.248	-	31
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.105	-	23
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.143	-	26
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.337	-	32
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.268	-	31
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.174	-	26
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.104	-	23
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.099	-	23
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.728	-	44
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.314	-	32
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.158	-	25
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.224	-	28
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.142	-	25
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.261	-	31
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.514	-	37
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.114	-	24
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.148	-	25
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.355	-	33
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.123	-	24
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.246	-	29
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.114	-	23
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.192	-	28
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.371	-	33
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.229	-	29
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.205	-	29
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.197	-	26
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.261	-	30
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.21	-	29
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.249	-	30
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.093	-	23
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.62	-	40
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.247	-	31
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.129	-	25
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.083	-	21
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.203	-	28
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.144	-	26
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.319	-	32
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.117	-	21

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.105	-	22
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.262	-	29
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.211	-	27
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.249	-	30
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.805	-	44
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.235	-	29
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.135	-	25
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.106	-	22
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.14	-	24
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.272	-	30
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.203	-	29
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.078	-	17
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.125	-	22
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.324	-	31
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.088	-	21
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.335	-	33
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.167	-	26
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.111	-	22
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.242	-	30
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.395	-	35
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.278	-	31
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.181	-	27
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.071	-	20
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.084	-	21
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.162	-	26
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.073	-	22
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.194	-	28
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.174	-	27
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.106	-	23
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.192	-	27
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.156	-	26
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.056	-	20
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.824	-	43
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.191	-	26
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.167	-	26
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.325	-	31
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.15	-	26
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.207	-	27
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.134	-	25
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.345	-	34
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.108	-	23
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.12	-	24
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.064	-	19
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.11	-	24
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.23	-	28
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.285	-	31

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.26	-	31
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.204	-	30
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.238	-	28
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.097	-	22
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.141	-	25
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.097	-	22
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.297	-	31
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.164	-	25
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.128	-	23
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.09	-	22
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.293	-	32
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.28	-	29
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.191	-	28
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.322	-	33
Aug-27-03	Falmouth Park	Seine	Banded Killifish	0.254	-	30
Aug-28-03	LeBreau Brook	Seine	Red Bellied Dace	1.4	46	48
Aug-28-03	LeBreau Brook	Seine	9-Sp. Stickleback	0.332	-	36
Aug-28-03	LeBreau Brook	Seine	9-Sp. Stickleback	0.341	-	36
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.385	33	35
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.59	38	40
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.838	42	44
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.417	33	35
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.767	40	42
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.409	34	36
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.516	36	39
Aug-28-03	LeBreau Brook	Seine	White Sucker	1.188	47	50
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.711	38	41
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.559	37	40
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.963	43	46
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.442	35	37
Aug-28-03	LeBreau Brook	Seine	White Sucker	1.004	45	47
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.954	44	47
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.581	38	41
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.318	31	33
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.507	36	38
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.444	35	38
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.29	31	33
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.45	35	37
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.398	34	35
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.579	37	40
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.731	40	43
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.465	35	37
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.38	33	35
Aug-28-03	LeBreau Brook	Seine	White Sucker	0.493	37	39
Aug-28-03	Powerhouse	Seine	White Sucker	3.767	68	73
Aug-28-03	Powerhouse	Seine	White Sucker	2.113	57	61

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
Aug-28-03	Powerhouse	Seine	White Sucker	2.217	57	61
Aug-28-03	Powerhouse	Seine	White Sucker	1.941	56	60
Aug-28-03	Powerhouse	Seine	Yellow Perch	1.973	54	56
Aug-28-03	Powerhouse	Seine	Yellow Perch	2.456	57	60
Aug-28-03	Powerhouse	Seine	Yellow Perch	2.205	58	62
Aug-28-03	Powerhouse	Seine	Yellow Perch	2.412	58	62
Aug-28-03	Powerhouse	Seine	Yellow Perch	2.303	59	61
Aug-28-03	Powerhouse	Seine	Yellow Perch	1.872	54	57
Aug-28-03	Powerhouse	Seine	Yellow Perch	2.015	55	57
Aug-28-03	Powerhouse	Seine	Yellow Perch	1.396	49	52
Aug-28-03	Powerhouse	Seine	Yellow Perch	1.371	48	50
Aug-28-03	Powerhouse	Seine	Yellow Perch	1.359	49	52
Aug-28-03	Powerhouse	Seine	Yellow Perch	1.699	51	54
Aug-28-03	Powerhouse	Seine	Banded Killifish	-	-	-
Aug-28-03	Powerhouse	Seine	Banded Killifish	2.336	-	60
Aug-28-03	Powerhouse	Seine	Banded Killifish	3.474	-	70
Aug-28-03	Powerhouse	Seine	Banded Killifish	3.692	-	72
Aug-28-03	Powerhouse	Seine	Banded Killifish	2.658	-	65
Aug-28-03	Powerhouse	Seine	Banded Killifish	2.873	-	65
Aug-28-03	Powerhouse	Seine	Banded Killifish	3.113	-	65
Aug-28-03	Powerhouse	Seine	Banded Killifish	2.8	-	65
Aug-28-03	Powerhouse	Seine	Banded Killifish	3.953	-	71
Aug-28-03	Powerhouse	Seine	Banded Killifish	3.656	-	72
Aug-28-03	Powerhouse	Seine	Banded Killifish	3.289	-	72
Aug-28-03	Powerhouse	Seine	Banded Killifish	3.189	-	68
Aug-28-03	Powerhouse	Seine	Banded Killifish	3.844	-	71
Aug-28-03	Powerhouse	Seine	Banded Killifish	4.172	-	74
Sept. 9, 2003	Allen's Brook	Seine	Gaspereau	0.808	43	47
Sept. 9, 2003	Allen's Brook	Seine	Gaspereau	1.113	46	51
Sept. 9, 2003	Allen's Brook	Seine	Gaspereau	0.982	43	49
Sept. 9, 2003	Allen's Brook	Seine	Gaspereau	0.836	41	45
Sept. 9, 2003	Allen's Brook	Seine	Gaspereau	1.148	47	51
Sept. 9, 2003	Allen's Brook	Seine	Gaspereau	0.994	44	49
Sept. 9, 2003	Allen's Brook	Seine	Gaspereau	1.206	47	52
Sept. 9, 2003	Allen's Brook	Seine	Gaspereau	1.192	46	51
Sept. 9, 2003	Allen's Brook	Seine	Gaspereau	0.750	46	50
Sept. 9, 2003	Allen's Brook	Seine	Gaspereau	1.158	44	53
Sept. 9, 2003	Allen's Brook	Seine	Gaspereau	1.007	45	49
Sept. 9, 2003	Allen's Brook	Seine	Gaspereau	0.999	44	48
Sept. 9, 2003	Allen's Brook	Seine	Gaspereau	1.006	45	49
Sept. 9, 2003	Allen's Brook	Seine	Gaspereau	0.835	44	48
Sept. 9, 2003	Allen's Brook	Seine	Gaspereau	1.103	44	48
Sept. 9, 2003	Allen's Brook	Seine	Gaspereau	1.011	45	48
Sept. 9, 2003	Allen's Brook	Seine	Gaspereau	0.910	42	47
Sept. 9, 2003	Allen's Brook	Seine	Gaspereau	1.012	46	50
Sept. 9, 2003	Allen's Brook	Seine	Gaspereau	0.282	28	30

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.505	-	36
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.586	-	38
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.703	-	40
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.744	-	40
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.779	-	42
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.537	-	36
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.932	-	43
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.808	-	41
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.989	-	45
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.720	-	39
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	1.135	-	47
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.709	-	40
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.609	-	38
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.908	-	42
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.994	-	44
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.931	-	44
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.799	-	42
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.713	-	41
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.515	-	37
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	1.002	-	45
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.575	-	37
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.836	-	42
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.778	-	41
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.816	-	42
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.403	-	33
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.436	-	35
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.448	-	35
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.368	-	33
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.318	-	30
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.523	-	36
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.569	-	38
Sept. 9, 2003	Allen's Brook	Seine	Banded Killifish	0.363	-	34
Sept. 9, 2003	Boat Ramp	Seine	Gaspereau	1.137	43	47
Sept. 9, 2003	Boat Ramp	Seine	Gaspereau	0.600	36	39
Sept. 9, 2003	Boat Ramp	Seine	Gaspereau	0.619	36	39
Sept. 9, 2003	Boat Ramp	Seine	3-Sp. Stickleback	0.142	-	23
Sept. 9, 2003	Boat Ramp	Seine	3-Sp. Stickleback	0.076	-	18
Sept. 9, 2003	Boat Ramp	Seine	3-Sp. Stickleback	0.090	-	19
Sept. 9, 2003	Boat Ramp	Seine	3-Sp. Stickleback	0.392	-	33
Sept. 9, 2003	Boat Ramp	Seine	9-Sp. Stickleback	0.449	-	37
Sept. 9, 2003	Boat Ramp	Seine	9-Sp. Stickleback	0.156	-	24
Sept. 9, 2003	Boat Ramp	Seine	9-Sp. Stickleback	0.411	-	34
Sept. 9, 2003	Boat Ramp	Seine	9-Sp. Stickleback	0.392	-	33
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.247	-	28
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.495	-	36
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.101	-	21

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.138	-	22
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.346	-	36
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.151	-	22
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.138	-	22
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.882	-	43
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.185	-	26
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.405	-	34
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.395	-	33
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.097	-	19
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.435	-	32
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.569	-	37
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.556	-	38
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.826	-	44
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.711	-	38
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.775	-	42
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	1.154	-	47
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.804	-	41
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.349	-	31
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.712	-	41
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.734	-	42
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.449	-	35
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.587	-	37
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.489	-	36
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.592	-	36
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.249	-	28
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.195	-	27
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.487	-	35
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.810	-	41
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.712	-	40
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.083	-	19
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.530	-	37
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.170	-	23
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.230	-	26
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.579	-	39
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.539	-	36
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.599	-	37
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.363	-	32
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.327	-	30
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.207	-	25
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.386	-	33
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.333	-	30
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.130	-	20
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.282	-	28
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.354	-	32
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.243	-	25
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.123	-	22

Date	Location	Technique	Species	Weight (g)	Fork Length (mm)	Total Length (mm)
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.138	-	22
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.390	-	32
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.247	-	28
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.185	-	25
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.288	-	29
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.183	-	24
Sept. 9, 2003	Boat Ramp	Seine	Banded Killifish	0.126	-	22
Sept. 9, 2003	LeBreau Brook	Seine	Gaspereau	0.948	44	48
Sept. 9, 2003	LeBreau Brook	Seine	Gaspereau	0.468	37	39
Sept. 9, 2003	LeBreau Brook	Seine	Gaspereau	1.045	45	50
Sept. 9, 2003	LeBreau Brook	Seine	3-Sp. Stickleback	0.328	-	31
Sept. 9, 2003	LeBreau Brook	Seine	3-Sp. Stickleback	0.384	-	33
Sept. 9, 2003	LeBreau Brook	Seine	3-Sp. Stickleback	0.436	-	33
Sept. 9, 2003	LeBreau Brook	Seine	3-Sp. Stickleback	0.429	-	33
Sept. 9, 2003	LeBreau Brook	Seine	3-Sp. Stickleback	0.339	-	31
Sept. 9, 2003	LeBreau Brook	Seine	3-Sp. Stickleback	0.754	-	40
Sept. 9, 2003	LeBreau Brook	Seine	3-Sp. Stickleback	0.325	-	32
Sept. 9, 2003	LeBreau Brook	Seine	9-Sp. Stickleback	0.576	-	39
Sept. 9, 2003	LeBreau Brook	Seine	Sucker	1.248	45	47
Sept. 9, 2003	LeBreau Brook	Seine	Sucker	0.886	39	42
Sept. 9, 2003	LeBreau Brook	Seine	Sucker	3.498	61	66
Sept. 9, 2003	LeBreau Brook	Seine	Sucker	5.292	70	74
Sept. 9, 2003	LeBreau Brook	Seine	Sucker	0.846	38	41
Sept. 9, 2003	LeBreau Brook	Seine	Sucker	2.731	56	59
Sept. 9, 2003	LeBreau Brook	Seine	Sucker	1.686	50	53
Sept. 9, 2003	LeBreau Brook	Seine	Sucker	3.458	63	67
Sept. 9, 2003	LeBreau Brook	Seine	Banded Killifish	4.025	-	71
Sept. 9, 2003	LeBreau Brook	Seine	Banded Killifish	0.249	-	29
Sept. 9, 2003	LeBreau Brook	Seine	Banded Killifish	0.973	-	44
Sept. 9, 2003	LeBreau Brook	Seine	Banded Killifish	0.802	-	42
Sept. 9, 2003	LeBreau Brook	Seine	Banded Killifish	0.249	-	28
Sept. 9, 2003	LeBreau Brook	Seine	Banded Killifish	0.179	-	24
Sept. 9, 2003	LeBreau Brook	Seine	Banded Killifish	0.516	-	35
Sept. 9, 2003	LeBreau Brook	Seine	Banded Killifish	0.700	-	40
Sept. 9, 2003	LeBreau Brook	Seine	Banded Killifish	0.746	-	41
Sept. 9, 2003	LeBreau Brook	Seine	Banded Killifish	0.640	-	39
Sept. 9, 2003	LeBreau Brook	Seine	Banded Killifish	0.495	-	36
Sept. 9, 2003	LeBreau Brook	Seine	Banded Killifish	0.476	-	35
Sept. 9, 2003	LeBreau Brook	Seine	Banded Killifish	0.331	-	31
Sept. 9, 2003	LeBreau Brook	Seine	Banded Killifish	1.094	-	46
Sept. 9, 2003	LeBreau Brook	Seine	Banded Killifish	0.652	-	40
Sept. 9, 2003	LeBreau Brook	Seine	Banded Killifish	0.425	-	34
Sept. 9, 2003	LeBreau Brook	Seine	Banded Killifish	0.659	-	39
Sept. 9, 2003	LeBreau Brook	Seine	Banded Killifish	0.280	-	30
Sept. 23, 2003	Falmouth Park	Seine	3-Sp. Stickleback	0.541	-	37
Sept. 23, 2003	Falmouth Park	Seine	3-Sp. Stickleback	0.331	-	32

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
Sept. 23, 2003	Falmouth Park	Seine	3-Sp. Stickleback	0.374	-	32
Sept. 23, 2003	Falmouth Park	Seine	3-Sp. Stickleback	0.485	-	35
Sept. 23, 2003	Falmouth Park	Seine	4-Sp. Stickleback	0.715	-	40
Sept. 23, 2003	Falmouth Park	Seine	9-Sp. Stickleback	0.437	-	37
Sept. 23, 2003	Falmouth Park	Seine	9-Sp. Stickleback	0.574	-	40
Sept. 23, 2003	Falmouth Park	Seine	9-Sp. Stickleback	0.655	-	42
Sept. 23, 2003	Falmouth Park	Seine	9-Sp. Stickleback	0.563	-	40
Sept. 23, 2003	Falmouth Park	Seine	9-Sp. Stickleback	0.474	-	36
Sept. 23, 2003	Falmouth Park	Seine	Sucker	6.935	77	81
Sept. 23, 2003	Falmouth Park	Seine	Sucker	1.896	52	54
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	8.267	-	87
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	1.468	-	51
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.748	-	40
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.338	-	32
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.153	-	24
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.161	-	22
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.331	-	32
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.129	-	22
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.350	-	32
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	1.188	-	47
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.294	-	29
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	1.042	-	44
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.531	-	36
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.182	-	24
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.309	-	29
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.432	-	34
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	1.221	-	47
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.498	-	36
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.283	-	30
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.699	-	40
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.961	-	44
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.274	-	26
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.290	-	30
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	1.398	-	49
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.886	-	43
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.626	-	39
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.750	-	41
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.181	-	25
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.539	-	36
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.101	-	20
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.753	-	37
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	1.488	-	51
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.203	-	27
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	1.000	-	45
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.820	-	42
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.341	-	31

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	1.200	-	46
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.733	-	40
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.600	-	37
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.547	-	38
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.881	-	43
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.330	-	30
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.528	-	36
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.354	-	32
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.322	-	31
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.979	-	45
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.943	-	45
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.356	-	30
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.568	-	38
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.345	-	32
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.579	-	37
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.674	-	40
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	1.325	-	48
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.181	-	26
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.310	-	30
Sept. 23, 2003	Falmouth Park	Seine	Banded Killifish	0.156	-	23
Sept. 23, 2003	Boat Ramp	Seine	Gaspereau	1.267	46	51
Sept. 23, 2003	Boat Ramp	Seine	Gaspereau	1.375	48	52
Sept. 23, 2003	Boat Ramp	Seine	Gaspereau	1.062	41	47
Sept. 23, 2003	Boat Ramp	Seine	Gaspereau	1.532	51	58
Sept. 23, 2003	Boat Ramp	Seine	Gaspereau	1.091	44	49
Sept. 23, 2003	Boat Ramp	Seine	Gaspereau	1.607	51	57
Sept. 23, 2003	Boat Ramp	Seine	Gaspereau	0.876	41	45
Sept. 23, 2003	Boat Ramp	Seine	Gaspereau	1.050	43	48
Sept. 23, 2003	Boat Ramp	Seine	Gaspereau	0.743	37	42
Sept. 23, 2003	Boat Ramp	Seine	Gaspereau	0.883	40	44
Sept. 23, 2003	Boat Ramp	Seine	Gaspereau	0.822	39	44
Sept. 23, 2003	Boat Ramp	Seine	Gaspereau	1.030	44	48
Sept. 23, 2003	Boat Ramp	Seine	Yellow Perch	5.827	73	77
Sept. 23, 2003	Boat Ramp	Seine	Sucker	4.560	66	70
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	10.479	-	92
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	2.401	-	65
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.931	-	44
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.274	-	29
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.048	-	47
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.756	-	42
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.644	-	38
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.214	-	26
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.129	-	47
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.239	-	28
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.007	-	46
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.655	-	37

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.082	-	47
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.116	-	46
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.012	-	46
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.622	-	39
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.842	-	42
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.175	-	46
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.857	-	43
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.817	-	40
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.475	-	35
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	4.411	-	72
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.966	-	44
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.299	-	49
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.349	-	31
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.302	-	54
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.473	-	52
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.920	-	44
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.522	-	52
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.681	-	38
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.117	-	48
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.498	-	36
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.369	-	51
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.143	-	48
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.489	-	34
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.607	-	38
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.099	-	47
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.482	-	36
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.753	-	40
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.789	-	40
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.537	-	51
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.740	-	39
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.095	-	45
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.643	-	39
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.100	-	45
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.505	-	35
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.877	-	42
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.917	-	45
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.405	-	31
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.039	-	45
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.041	-	47
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.716	-	39
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.194	-	25
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.684	-	39
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.833	-	40
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.789	-	40
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.729	-	41
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.828	-	42

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.838	-	41
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.622	-	39
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.800	-	42
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.296	-	30
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.191	-	24
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.697	-	42
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.234	-	50
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.296	-	29
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.723	-	40
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.581	-	37
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.187	-	25
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.117	-	22
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish		-	tail missing
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.799	-	42
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.599	-	38
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.277	-	49
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.746	-	40
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.227	-	25
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.175	-	47
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.078	-	45
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.175	-	24
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.111	-	47
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.149	-	23
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.283	-	29
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.086	-	18
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.141	-	47
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.217	-	25
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.908	-	43
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.576	-	37
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.826	-	43
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.137	-	49
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.046	-	45
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.178	-	25
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.521	-	52
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.779	-	42
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.236	-	47
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.382	-	32
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.244	-	48
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.695	-	38
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.088	-	45
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.377	-	32
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.177	-	23
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.223	-	27
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.402	-	32
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.549	-	35
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.160	-	23

Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.415	-	32
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.698	-	40
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.633	-	38
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.583	-	37
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.779	-	42
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.266	-	29
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.182	-	46
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	1.267	-	49
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.124	-	21
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.315	-	29
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.586	-	38
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.943	-	46
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.726	-	39
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.795	-	41
Sept. 23, 2003	Boat Ramp	Seine	Banded Killifish	0.121	-	22
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.377	-	32
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.720	-	40
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.662	-	40
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.515	-	35
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.558	-	37
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.385	-	33
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.849	-	42
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.746	-	39
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.951	-	44
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.583	-	37
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.598	-	39
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.433	-	34
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.668	-	39
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.615	-	38
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.556	-	37
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.614	-	38
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.600	-	38
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.913	-	44
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.786	-	41
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.548	-	36
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.648	-	38
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.530	-	36
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.723	-	38
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.542	-	36
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.522	-	35
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.494	-	34
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.407	-	33
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.621	-	38
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.616	-	36
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.480	-	35
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.469	-	37

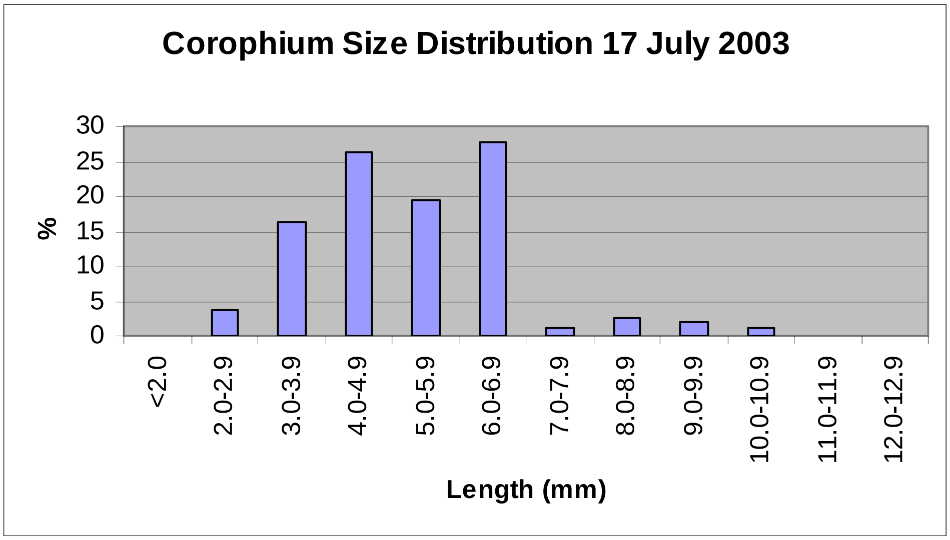
Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.552	-	37
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.690	-	38
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.939	-	41
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.547	-	36
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.388	-	33
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.770	-	39
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.404	-	33
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.492	-	35
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.436	-	35
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.595	-	37
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.826	-	43
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.463	-	33
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.674	-	38
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.547	-	36
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.698	-	40
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.422	-	34
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.597	-	38
Sept. 23, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.761	-	42
Sept. 23, 2003	Allan's Brook	Seine	4-Sp. Stickleback	0.439	-	33
Sept. 23, 2003	Allan's Brook	Seine	4-Sp. Stickleback	0.511	-	36
Sept. 23, 2003	Allan's Brook	Seine	4-Sp. Stickleback	0.765	-	41
Sept. 23, 2003	Allan's Brook	Seine	4-Sp. Stickleback	0.360	-	32
Sept. 23, 2003	Allan's Brook	Seine	4-Sp. Stickleback	0.332	-	30
Sept. 23, 2003	Allan's Brook	Seine	4-Sp. Stickleback	0.511	-	37
Sept. 23, 2003	Allan's Brook	Seine	4-Sp. Stickleback	0.468	-	34
Sept. 23, 2003	Allan's Brook	Seine	4-Sp. Stickleback	1.219	-	48
Sept. 23, 2003	Allan's Brook	Seine	4-Sp.Stickleback	0.319	-	29
Sept. 23, 2003	Allan's Brook	Seine	4-Sp. Stickleback	0.301	-	30
Sept. 23, 2003	Allan's Brook	Seine	9-Sp. Stickleback	0.564	-	41
Sept. 23, 2003	Allan's Brook	Seine	9-Sp. Stickleback	0.410	-	35
Sept. 23, 2003	Allan's Brook	Seine	9-Sp. Stickleback	0.376	-	32
Sept. 23, 2003	Allan's Brook	Seine	9-Sp. Stickleback	0.602	-	40
Sept. 23, 2003	Allan's Brook	Seine	Sucker	3.347	62	65
Sept. 23, 2003	Allan's Brook	Seine	Sucker	1.091	42	45
Sept. 23, 2003	Allan's Brook	Seine	Sucker	1.895	52	56
Sept. 23, 2003	Allan's Brook	Seine	Sucker	1.709	47	52
Sept. 23, 2003	Allan's Brook	Seine	Sucker	1.048	37	42
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	0.453	-	34
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	0.595	-	38
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	0.888	-	43
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	1.234	-	49
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	0.780	-	42
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	0.602	-	38
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	0.543	-	36
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	0.586	-	39
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	0.484	-	34

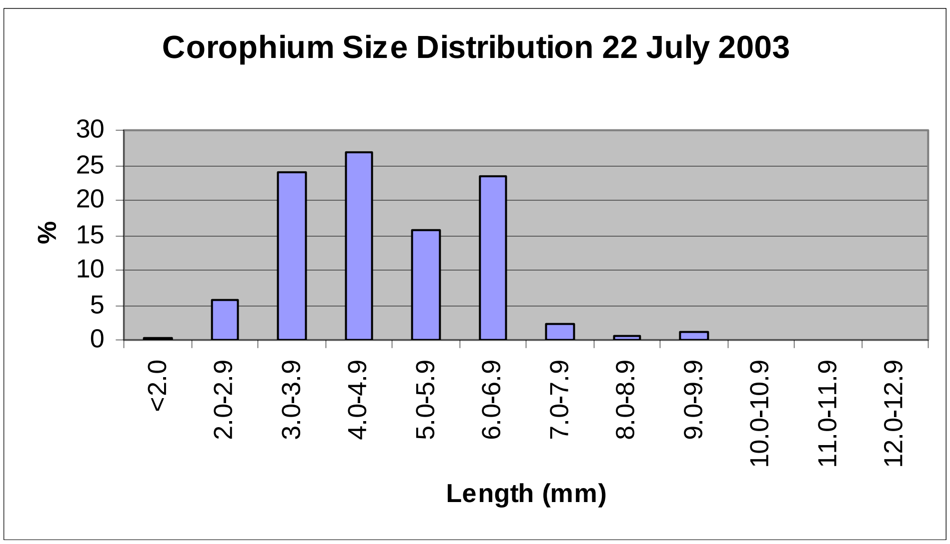
Date	Location	Technique		Weight	Fork Length	Total Length
			Species	(g)	(mm)	(mm)
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	0.906	-	44
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	0.492	-	35
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	0.665	-	40
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	1.039	-	46
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	0.757	-	40
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	0.330	-	29
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	0.475	-	35
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	1.047	-	46
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	0.510	-	35
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	0.646	-	40
Sept. 23, 2003	Allan's Brook	Seine	Banded Killifish	0.615	-	38
Oct. 7, 2003	LeBreau Brook	Seine	Sucker	0.921	40	44
Oct. 7, 2003	LeBreau Brook	Seine	Creek Chub	1.535	49	54
Oct. 7, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.469	-	35
Oct. 7, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.302	-	30
Oct. 7, 2003	Allan's Brook	Seine	3-Sp. Stickleback	0.431	-	34
Oct. 7, 2003	Allan's Brook	Seine	9-Sp. Stickleback	0.720	-	46
Oct. 7, 2003	Allan's Brook	Seine	Sucker	6.628	77	82
Oct. 7, 2003	Allan's Brook	Seine	Sucker	5.765	70	75
Oct. 7, 2003	Allan's Brook	Seine	Banded Killifish	1.016	-	45
Oct. 7, 2003	Allan's Brook	Seine	Banded Killifish	4.899	-	75
Oct. 7, 2003	Boat Launch	Seine	Gaspereau	1.957	52	58
Oct. 7, 2003	Boat Launch	Seine	Gaspereau	1.964	53	59
Oct. 7, 2003	Boat Launch	Seine	Gaspereau	1.368	47	53
Oct. 7, 2003	Boat Launch	Seine	Gaspereau	1.224	45	50
Oct. 7, 2003	Boat Launch	Seine	Gaspereau	2.035	51	58
Oct. 7, 2003	Boat Launch	Seine	Gaspereau	2.765	58	65
Oct. 7, 2003	Boat Launch	Seine	Gaspereau	1.799	51	57
Oct. 7, 2003	Boat Launch	Seine	Gaspereau	1.562	49	54
Oct. 7, 2003	Boat Launch	Seine	Gaspereau	1.647	48	54
Oct. 7, 2003	Boat Launch	Seine	Gaspereau	1.065	42	47
Oct. 7, 2003	Boat Launch	Seine	Gaspereau	1.053	43	47
Oct. 7, 2003	Boat Launch	Seine	Gaspereau	0.968	42	47
Oct. 7, 2003	Boat Launch	Seine	4-Sp. Stickleback	0.692	-	41
Oct. 7, 2003	Boat Launch	Seine	4-Sp. Stickleback	0.367	-	32
Oct. 7, 2003	Boat Launch	Seine	4-Sp. Stickleback	0.733	-	42
Oct. 7, 2003	Boat Launch	Seine	9-Sp. Stickleback	0.584	-	43
Oct. 7, 2003	Boat Launch	Seine	Banded Killifish	1.061	-	47
Oct. 7, 2003	Boat Launch	Seine	Banded Killifish	0.502	-	36
Oct. 7, 2003	Boat Launch	Seine	Banded Killifish	7.230	-	80
Oct. 7, 2003	Boat Launch	Seine	Banded Killifish	0.858	-	43
Oct. 7, 2003	Boat Launch	Seine	Banded Killifish	1.274	-	47
Oct. 7, 2003	Boat Launch	Seine	Banded Killifish	1.161	-	47
Oct. 7, 2003	Boat Launch	Seine	Banded Killifish	0.895	-	43
Oct. 7, 2003	Boat Launch	Seine	Banded Killifish	0.786	-	41
Oct. 7, 2003	Boat Launch	Seine	Banded Killifish	0.435	-	34

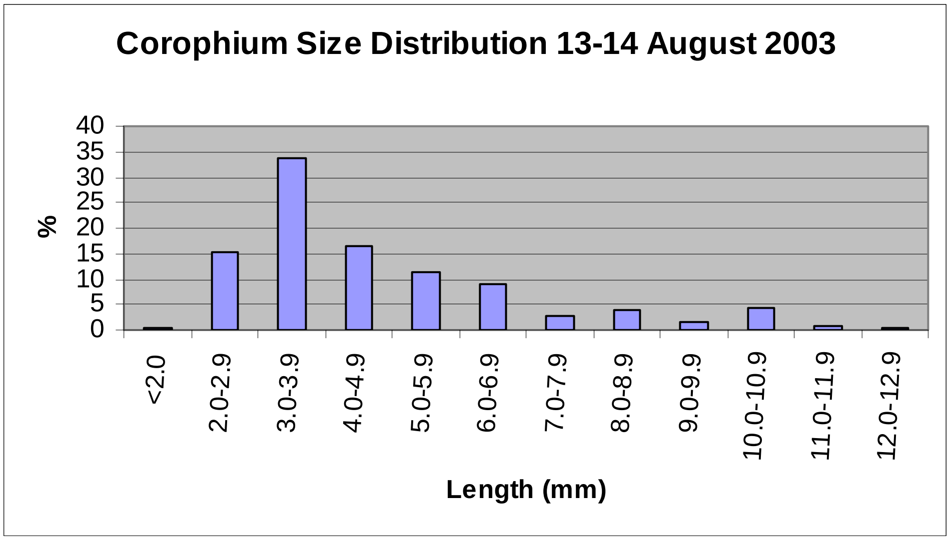
Date	Location	Technique	Species	Weight (g)	Fork Length (mm)	Total Length (mm)
Oct. 7, 2003	Boat Launch	Seine	Banded Killifish	0.787	-	41
Oct. 7, 2003	Falmouth Park	Seine	Creek Chub	1.035	41	44
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.540	-	36
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.509	-	37
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.471	-	35
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.440	-	35
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.760	-	40
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.607	-	39
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.182	-	24
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.316	-	30
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.319	-	31
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.369	-	33
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.573	-	37
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.184	-	26
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.216	-	27
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.268	-	29
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.361	-	32
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.198	-	26
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.412	-	35
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.922	-	44
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.441	-	34
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.390	-	33
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	1.103	-	46
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.295	-	30
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.833	-	42
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.877	-	43
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.505	-	36
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.120	-	22
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.274	-	29
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.249	-	28
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.387	-	33
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.470	-	35
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.443	-	33
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.482	-	36
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.259	-	34
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.293	-	30
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.225	-	28
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.252	-	28
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.365	-	33
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.285	-	30
Oct. 7, 2003	Falmouth Park	Seine	Banded Killifish	0.408	-	34

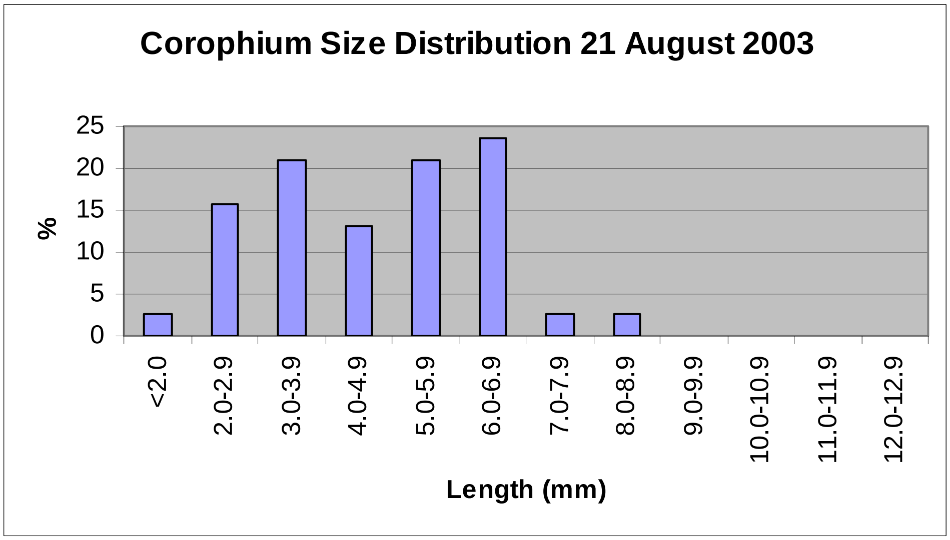
Appendix 5.

Size distributions of *Corophium volutator* on the Windsor marsh-mudflat complex, summer 2003.






Corophium Size Distribution 13-14 August 2003
%
0
5
10
15
20
25
30
35
40
<2.0
2.0-2.9
3.0-3.9
4.0-4.9
5.0-5.9
6.0-6.9
7.0-7.9
8.0-8.9
9.0-9.9
10.0-10.9
11.0-11.9
12.0-12.9
Length (mm)


Corophium Size Distribution 21 August 2003
%
0
5
10
15
20
25
<2.0
2.0-2.9
3.0-3.9
4.0-4.9
5.0-5.9
6.0-6.9
7.0-7.9
8.0-8.9
9.0-9.9
10.0-10.9
11.0-11.9
12.0-12.9
Length (mm)