LAKE ONTARIO FISH COMMUNITIES AND FISHERIES:

2005 ANNUAL REPORT OF THE LAKE ONTARIO MANAGEMENT UNIT

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Lake Ontario Fish Communities and Fisheries: 2005 Annual Report of the Lake Ontario Management Unit

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Foreword

The Lake Ontario Management Unit (LOMU) is one of three Great Lakes Branch units. It is dedicated to working towards MNR's vision and mission of achieving sustainable development and ecosystem sustainability for Lake Ontario and St Lawrence River aquatic ecosystems. In addition, LOMU works to ensure the strategic directions and intent of Ontario's biodiversity strategy are met in Lake Ontario and the St. Lawrence River ecosystems.

The LOMU works to achieve ecological sustainability on Lake Ontario, the St. Lawrence River and the Niagara River by implementing annual aquatic ecosystem and fisheries assessment, enforcement and management activities through a variety of delivery mechanisms. Every year, partnerships and inter-agency collaboration are necessary to ensure effective and efficient implementation.

In 2005, the LOMU coordinated and delivered upon several projects supporting the Canada-Ontario Agreement (COA) Respecting the Great Lakes Basin Ecosystem (COA). These projects focused on the Lake Ontario Lakewide Management Plan (LaMP) and the 'Areas of Concern' identified in the Great Lakes Water Quality Agreement. COA provided dedicated funding to support Ontario's efforts to protect biodiversity, restore fish and wildlife beneficial uses, and gain new understanding and knowledge about the ecological health in the Great Lakes ecosystem. The scale and diversity of challenges facing the Great Lakes' environment requires a commitment to a delivery model based on collaboration, stewardship and partnership. A total of 38 COA projects in Lake Ontario and the St. Lawrence River were coordinated by the LOMU during 2005.

The Province of Ontario and New York State share the responsibility of managing the fish communities and fisheries. The Ministry of Natural Resources works collaboratively with numerous agencies both in Canada and the US to ensure the fish communities, fisheries and aquatic ecosystems of Lake Ontario and the St. Lawrence River are managed on sustainable basis. International cooperation is essential to the health of the Lake Ontario, Niagara and St. Lawrence River ecosystems and to the sustainable management of their fisheries. LOMU staff work closely with numerous Canadian and US agencies within the international committee structures of the Great Lakes Fishery Commission and International Joint Commission.

Preventing invasions of non-native species, controlling the spread of fish disease and restoring native species within these waterbodies are all matters of concern and priority for both New York and Ontario. Bi-national cooperation in fishery management for Lake Ontario is formalized within the Great Lakes Fishery Commission (GLFC) Lake Ontario Committee (LOC). In 2005, both NYSDEC and OMNR committee members of the Lake Ontario Committee of the GLFC participated with Canadian federal agencies, provincial governments and various US federal agencies to develop and implement a plan to research and protect American eels. This work is reaching a wide international audience and will continue through 2006 with the implementation of new research and management initiatives in both countries.

As an official member of the Lake Ontario Lakewide Management Plan (LaMP), a body formed under the auspices of the Great Lakes Water Quality Agreement, the LOMU is an active participant in the planning and implementation of annual work plans, contributing to annual updates on progress and in revising indicator and status reports. In addition, the LOMU played a significant role in the revision of the 2006 Status Report and the reclassification of the fish population beneficial use from "not impaired" to "impaired". In addition, there are five Areas of Concern (AOC) on the Canadian shores of Lake Ontario and SLR, and LOMU staff participated actively in developing and implementing Remedial Action Plans for Cornwall, Bay of Quinte and Hamilton Harbour.

This Annual Report provides a synopsis of the activities of LOMU supported by base and COA funding envelopes, and reports results on 2005 assessment and management projects. The LOMU recognizes its many partners and sources of funding for special projects including OMNR Research, the Great Lakes Fishery Commission, Department of Fisheries and Oceans, the International Joint Commission, the Canada Ontario Agreement and several Canadian and US universities.

We are pleased to share the important information about the activities and findings of the Lake Ontario Management Unit from 2005.

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1. Status of Major Species

The following is an overview of the status of major species in Ontario waters of Lake Ontario for 2004. The overview draws largely upon information presented in the chapters and sections that follow in this report.

1.1. Chinook Salmon

Chinook salmon abundance in Lake Ontario was relatively stable from 1988-2005, despite stocking reductions in 1993 (see Section 8.1), as indicated by catch rates in the boat angling fishery (see Section 3.1). Natural reproduction (see Section 2.5) and density dependent survival of young Chinook salmon may have contributed to the stability of these catch rates. Growth and condition of large Chinook salmon have declined to the lowest levels ever observed in Lake Ontario and the Credit River (see Section 2.9). The adequacy of the prey fish community to support this top predator is in question (see Section 1.11).

1.2. Rainbow Trout

Counts of wild rainbow trout at the Ganaraska River fishway remained stable and low in 2005 (see Section 2.1). These counts may indicate that wild adult returns in other Ontario tributaries are also low. The long-term trend in rainbow trout harvest rate in the Lake Ontario boat fishery (see Section 3.1) is similar to the count trend at the Ganaraska fishway; both show a decline in rainbow trout abundance in the mid 1990s. These rainbow trout declines paralleled Atlantic salmon and coho salmon trends in Lake Ontario. Condition of rainbow trout in the Ganaraska River in 2005 remained similar to the long term average (see Section 2.1).

1.3. Lake Trout

A further decline in abundance of mature lake trout occurred in 2005 after several years of stable low population levels. The decline was accompanied by unusual shifts in size-at maturity and average size of mature fish. There was no observable shift in body condition of mature fish. Early survival of stocked fish remains low but stable (see Section 2.3).

1.4 Lake Whitefish

The abundance of lake whitefish age-1 and older is very low relative to that of the 1990s (see Section 2.3). The preponderance of old fish, comprised of many year-classes produced in the late-1980s and early 1990s, caught in assessment (see Section 2.3) and commercial gear (see Section 4.2) suggests that mortality of adult fish was not excessive but rather that recent recruitment levels after the mid 1990s were low. A strong year-class was produced in 2003 (see Section 2.4). Fish from this year-class did not recruit to assessment gillnets in 2004 but did make a relatively strong contribution in 2005—one year later than expected. Growth of young fish is very slow. Catches of age-0 fish in assessment bottom trawls suggested that a poor year-class was produced in 2004 and another relatively strong year-class was produced in 2005 (see Section 2.4). Lake whitefish condition improved after the mid to late 1990s but not to levels observed in the early 1990s. The commercial lake whitefish fishery has declined significantly in recent years (see Section 4.1).

1.5 American Eel

The number of eel migrating upstream at the ladder, located at the R.H. Saunders Hydroelectric Dam on the St. Lawrence River, increased somewhat over recent years and the average size of migrants declined (see Section 2.2). While these developments are encouraging, the abundance of eel entering the upper St. Lawrence River and Lake Ontario is still less than 2% of migrations observed in the early 1980s. Even with the closure of the commercial and sport fisheries in 2004, the abundance of large eel in the Lake Ontario/upper St. Lawrence River ecosystem is expected to remain low for the next decade as a result of the low rate of upstream migration. Ontario is continuing to work with management agencies in other jurisdictions, and other stakeholders, including Ontario Power Generation, to encourage the safe passage of eels around hydro dams (see Section 8.3). Sustainable management practices throughout the range of this panmictic species (Labrador to the Caribbean) will be required to restore eel abundance.

1.6 Smallmouth Bass

The eastern Lake Ontario smallmouth bass population remains at low levels of abundance (see Section 2.3). Prior to the mid-1990s, the influence of summer water temperature on year-class strength was the major factor driving smallmouth bass abundance in eastern Lake Ontario. Since the mid-1990s, continued low abundance is not consistent with trends in summer water temperatures—other factors must be exerting greater influence. In the Bay of Quinte, smallmouth bass abundance is low relative to other species (see Sections 2.3 and 2.7). In the St. Lawrence River, smallmouth abundance increased significantly in the Thousands Island area gillnets (see Section 2.8).

1.7 Largemouth Bass

Largemouth bass catches in the Bay of Quinte declined in 2005 in both nearshore trapnets and the angling fishery. Still, having increased recent years, their abundance now rivals that of walleye in littoral zone areas during summer (see Sections 2.7). A recreational fishery (see Section 3.2), including increased tournament angling, targeting largemouth bass has increased in prominence over the last several years.

1.8 Panfish

Panfish, particularly pumpkinseed, bluegill and black crappie, increased dramatically during the late-1990s in the Bay of Quinte (see Section 2.3). Most recently however, their abundance has declined (see Section 2.7).

1.9 Yellow Perch

Yellow perch abundance in eastern Lake Ontario remains low. In the Bay of Quinte, abundance is relatively high but declining (see Sections 2.3 and 2.7). Age-0 catches in Bay of Quinte bottom trawls were high indicating a strong 2005 year-class (see Section 2.4). The commercial harvest of yellow perch has declined from 1999-2002 but has been relatively stable from 2002-2005 (see Section 4.1). In the St. Lawrence River, yellow perch are still dominant in the fish community; however, the 2005 catch in Thousand Island area gillnets were at an all time low (see Section 2.8). Yellow perch commercial harvest in the St. Lawrence River has declined since 1999.

1.10 Walleye

While abundance remains considerably lower than during the late 1980s and early 1990s, the walleye population has now been relatively stable since 2001. Recruitment indices (see Section 2.3, 2.4 and 2.7) indicate that a strong year-class was produced in 2003, a moderate year-class was produced in 2004 and a relatively weak year-class was produced in 2005. Based on these recent recruitment levels, and assuming no drastic change in the mortality of older fish, the population of age-3 and older fish will likely continue to hover around 400,000 fish until at least 2008.

Age-2 and age-4 walleye represented the bulk of the Bay of Quinte recreational fishery in 2005 (see Section 3.2). Removal of the restricted slot-size regulation prior to the open-water walleye angling season, allowed the harvest of these age-4 fish that otherwise would have been of a “protected” size in 2005. The outlook for the 2006 recreational fishery is for age-3 (2003 year-class) fish to dominate the catch and harvest.

1.11 Prey Fish

The mid-summer abundance of yearling-and-older alewife remains low for the third consecutive year. The abundance of yearling-and-older rainbow smelt has increased in 2005 after two poor years, but remains below levels observed in the late 1990s (see Section 2.6). Abundance of threespine sticklebacks was not assessed in 2005 due to changes in survey methodology.

1.12 Invasive Species

High densities of round goby occur in western Lake Ontario between the Niagara River and Hamilton, and in eastern Lake Ontario west of Brighton, including the Bay of Quinte. Limited anecdotal information suggests that goby are less common in the Toronto area, and no sightings have been reported from central Lake Ontario (Oshawa to Brighton). Round goby have colonized the deeper areas east of the Bay of Quinte and have been observed at depths greater than 20m. They were captured in modest densities in Prince Edward Bay near Long Point and were found in the diets of piscivores in Wellington Bay and Athol Bay in Lake Ontario (see section 9.2).

2. Index Fishing Projects

2.1 Ganaraska Fishway Rainbow Trout Assessment

The fishway on the Ganaraska River at Port Hope has been in operation since 1974. Rainbow trout are counted and sampled for length, weight and age during the spring spawning run (Fig. 2.1.1). The spring run has been stable since 1998, and was estimated at 5,055 rainbow trout in 2005 (Table 2.1.1).
The body condition of rainbow trout in Lake Ontario was determined as the estimated weight of a 635 mm (25 in) fish at the Ganaraska River. In 2005, this weight was 2,984 g and 3,110 g for males and females, respectively. These weights are similar to the long term average for the study (Table 2.1.2).

The repeat spawner rate is an estimate of survival of mature Ganaraska rainbow trout (Table 2.1.3). The repeat spawner rate of Ganaraska rainbow trout was much lower in the 1970s as a result of increasing abundance (Fig. 2.1.1). Over the last 20 years, survival of mature rainbow trout has been stable (Fig. 2.1.2).

In 2005, lamprey marks on rainbow trout in the Ganaraska River were again more than three times higher than the average for 1990-2003 (Table 2.1.4). The marking rates in 2004 and 2005 were similar to levels in the 1970s (Fig. 2.1.3). A high incidence of B1 marks in 2004 and 2005 indicates very recent attacks (Table 2.1.5). It is unclear if this increase in lamprey marking is a local event or more widespread throughout Lake Ontario.

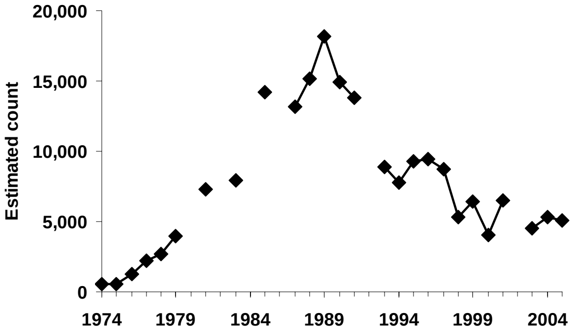

FIG. 2.1.1. Estimated upstream counts of rainbow trout at the Ganaraska River fishway, Port Hope, Ontario, during April and May, 1974-2005.

TABLE 2.1.1. Observed and estimated upstream counts of rainbow trout at the Ganaraska River fishway at Port Hope, Ontario, during April and May, 1974-2005.

	Upstream count	
Year	Observed	Estimated
1974	527	527
1975	591	591
1976	1,281	1,281
1977	2,237	2,237
1978	2,724	2,724
1979	4,004	4,004
1980		
1981	7,306	7,306
1982		
1983	7,907	7,907
1984		
1985	14,188	14,188
1986		
1987	10,603	13,144
1988	10,983	15,154
1989	13,121	18,169
1990	10,184	14,888
1991	9,366	13,804
1992		
1993	7,233	8,860
1994	6,249	7,749
1995	7,859	9,262
1996	8,084	9,454
1997	7,696	8,768
1998	3,808	5,288
1999	5,706	6,442
2000	3,382	4,050
2001	5,365	6,527
2002		
2003	3,897	4,494
2004	4,452	5,308
2005	4,417	5,055

TABLE 2.1.2. Estimated weight of a 635 mm (25 in) rainbow trout at the Ganaraska River fishway at Port Hope, Ontario, during April, 1974-2005.

	Male		Female	
Year	N	Weight (g)	N	Weight (g)
1974	173	3,066	231	3,210
1975	183	2,968	279	3,067
1976	411	3,169	588	3,324
1977	635	2,975	979	3,164
1978	255	3,181	512	3,340
1979	344	3,219	626	3,335
1981	252	3,174	468	3,359
1983	308	2,878	132	3,033
1985	410	3,170	154	3,205
1987	66	2,642	74	3,046
1990	259	2,868	197	3,071
1991	126	2,850	289	3,086
1992	138	2,997	165	3,113
1993	84	2,952	166	3,135
1994	109	3,246	178	3,356
1995	147	2,987	155	3,061
1997	140	3,144	127	3,270
1998	96	3,034	222	3,195
1999	173	3,062	290	3,226
2000	121	3,120	226	3,242
2001	295	2,919	290	3,041
2003	92	3,034	144	3,152
2004	139	3,037	242	3,193
2005	142	2,984	173	3,110
Average		3,028		3,181

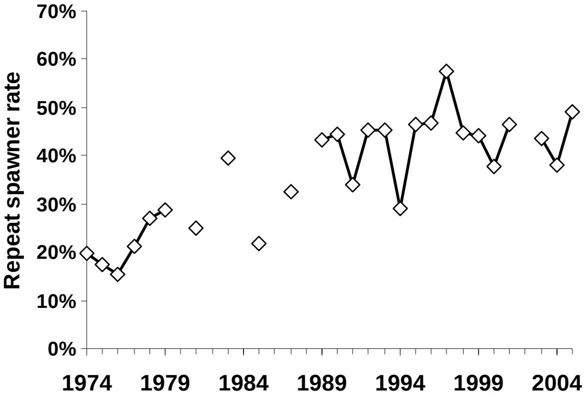

FIG. 2.1.2. The repeat spawner rate for rainbow trout (sexes combined) in April at the Ganaraska River fishway, in Port Hope, Ontario, 1974-2005.

TABLE 2.1.3. The repeat spawner rate of rainbow trout in April, 1974-2005, at the Ganaraska River fishway, in Port Hope, Ontario.

	Male		Female	
Year	Repeat spawner	Sample size	Repeat spawner	Sample size
1974	19.4%	36	20.0%	50
1975	16.7%	30	18.2%	55
1976	17.4%	46	13.5%	52
1977	22.9%	48	19.6%	56
1978	29.4%	34	24.3%	74
1979	31.6%	38	26.1%	69
1981	28.9%	38	20.8%	72
1983	44.1%	34	35.0%	60
1985	21.6%	37	21.7%	69
1987	22.0%	41	43.1%	58
1989	25.0%	8	61.5%	13
1990	37.9%	58	51.0%	49
1991	37.5%	32	30.7%	75
1992	40.0%	45	50.8%	59
1993	33.3%	39	57.1%	63
1994	22.0%	41	35.9%	64
1995	47.3%	55	45.5%	44
1996	50.0%	36	43.8%	64
1997	57.1%	49	58.1%	43
1998	40.0%	25	49.3%	75
1999	40.5%	37	47.6%	42
2000	26.7%	30	48.6%	70
2001	45.8%	48	47.1%	51
2003	33.3%	42	53.7%	54
2004	24.2%	33	51.9%	77
2005	55.8%	43	42.1%	57

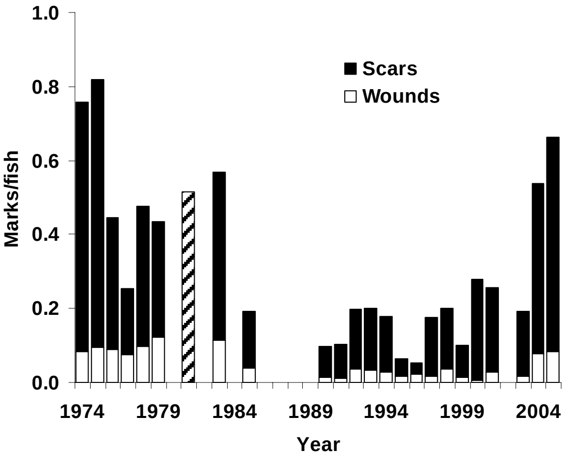

FIG. 2.1.3. Lamprey mark trends on rainbow trout in April, 1974-2005, at the Ganaraska River fishway in Port Hope, Ontario. Since 1990, A1 and A2 marks[1] were called wounds and the remainder of marks were called scars to fit with historical classification. Scars and wounds were combined in 1981.

TABLE 2.1.4. Lamprey marks on rainbow trout in April, 1974-2005, at the Ganaraska River fishway, in Port Hope, Ontario. Since 1990, A1 and A2 marks[1] were called wounds and the remainder of marks were called scars to fit with historical classification.

Year	Wounds/fish	Scars/fish	Marks/fish	% with wounds	% with scars	% with marks	N
1974	0.083	0.676	0.759	7.0	33.2	36.8	527
1975	0.095	0.725	0.820	8.0	37.2	40.2	599
1976	0.090	0.355	0.445	6.6	23.3	28.1	1280
1977	0.076	0.178	0.254	6.4	13.5	18.2	2242
1978	0.097	0.380	0.476	8.1	28.4	33.7	2722
1979	0.122	0.312	0.434	10.3	22.8	29.8	3926
1981			0.516			36.2	5489
1983	0.113	0.456	0.569	9.7	33.4	38.8	833
1985	0.040	0.154	0.193	3.7	11.5	14.5	1256
1990	0.015	0.083	0.098	1.5	6.6	8.1	470
1991	0.012	0.091	0.103	1.2	7.4	8.4	419
1992	0.035	0.162	0.197	2.9	14.3	16.5	315
1993	0.034	0.165	0.199	3.1	15.3	17.2	261
1994	0.027	0.153	0.179	2.7	13.6	15.3	301
1995	0.017	0.046	0.063	1.7	4.3	5.9	303
1996	0.023	0.030	0.053	2.3	3.0	5.3	397
1997	0.017	0.158	0.175	1.7	12.7	13.7	291
1998	0.035	0.165	0.200	3.2	13.2	15.3	340
1999	0.015	0.086	0.101	1.5	7.5	8.6	477
2000	0.005	0.272	0.278	0.5	23.2	23.5	371
2001	0.028	0.229	0.257	2.5	17.8	18.8	608
2003	0.017	0.176	0.193	1.7	14.3	15.1	238
2004	0.079	0.459	0.538	6.9	33.7	37.5	392
2005	0.084	0.579	0.664	6.9	39.6	41.4	321

TABLE 2.1.5. Classification of lamprey marks[1] on rainbow trout in April, 1974-2005, at the Ganaraska River fishway, in Port Hope, Ontario.

	Marks/fish							
Year	A1	A2	A3	A4	B1	B2	B3	B4
1990	0.000	0.015	0.009	0.009	0.000	0.002	0.017	0.051
1991	0.000	0.012	0.012	0.002	0.029	0.007	0.017	0.019
1992	0.013	0.022	0.025	0.019	0.079	0.006	0.010	0.022
1993	0.011	0.023	0.019	0.023	0.061	0.000	0.008	0.054
1994	0.007	0.020	0.010	0.007	0.076	0.010	0.010	0.043
1995	0.007	0.010	0.017	0.003	0.000	0.000	0.020	0.007
1996	0.013	0.010	0.003	0.003	0.005	0.013	0.000	0.008
1997	0.003	0.014	0.021	0.000	0.000	0.021	0.017	0.086
1998	0.012	0.024	0.012	0.041	0.012	0.003	0.015	0.079
1999	0.000	0.013	0.013	0.021	0.010	0.023	0.013	0.107
2000	0.000	0.005	0.027	0.056	0.000	0.003	0.003	0.183
2001	0.002	0.026	0.021	0.069	0.000	0.000	0.002	0.127
2003	0.000	0.013	0.021	0.029	0.000	0.008	0.004	0.105
2004	0.020	0.059	0.092	0.064	0.171	0.005	0.031	0.094
2005	0.016	0.069	0.075	0.072	0.305	0.003	0.040	0.072

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[1] King, E. L., Jr. and T. A. Edsall. 1979. Illustrated field guide for the classification of sea lamprey attack marks on great lakes lake trout.

2.2. R.H. Saunders Hydroelectric Dam Eel Ladder Monitoring

American eel spawn in the Sargasso Sea. A portion of the juvenile population migrates up the St. Lawrence River and into Lake Ontario. Eel reside in Lake Ontario and the upper St. Lawrence River (LOSLR) for several years before migrating back to the sea. Eel populations show evidence of decline in many areas of eastern Canada and particularly in LOSLR. The decline in eel abundance prompted closure of the American eel commercial and sport fisheries in LOSLR during 2004. The decline has been attributed to habitat loss and deterioration (e.g. dams), over-fishing, mortality in hydro-electric generating turbines and environmental change in the northern Atlantic Ocean.

TABLE 2.2.1. The numbers of eel observed in the trap at the top of the eel ladder located at the R.H. Saunders Hydroelectric Dam during 2005. The water temperature at the bottom of the ladder is also provided

Date	Number of eels	Water temperature (^{o}C)
01-Jun-05	0	11.75
08-Jun-05	0	14.50
15-Jun-05	1	17.50
22-Jun-05	17	17.50
29-Jun-05	115	21.00
06-Jul-05	254	22.00
13-Jul-05	246	23.00
20-Jul-05	134	23.50
27-Jul-05	270	23.75
03-Aug-05	238	24.50
10-Aug-05	92	24.50
17-Aug-05	32	24.50
24-Aug-05	4	22.50
31-Aug-05	5	23.00
07-Sep-05	4	21.25
14-Sep-05	6	21.25
21-Sep-05	2	20.00
28-Sep-05	203	18.00
05-Oct-05	289	18.50
12-Oct-05	160	14.00
19-Oct-05	43	12.00

An eel ladder was installed at the R.H. Saunders Hydroelectric Dam at Cornwall in 1974 to assist with upstream eel migration. In this section, estimates of the total number of eel ascending the ladder and an update to the eel recruitment index is provided for 2005.

Eel Ladder Operation

The eel ladder was opened on May 31 and closed on October 23 (146 days) during 2005. Weekly counts of eel migration activity were obtained by placing a net at the top of the ladder (Table 2.2.1). A sub-sample of 218 eels were collected and sampled for biological characteristics.

The average size of eel migrating up the ladder declined dramatically in 2005 (average length 414 mm, range 273-721 mm, Fig. 2.2.1). It is estimated that 14,891 American eel migrated upstream during the entire period of operation. The eel recruitment index was 227.8 eels/day, based on the 31-day peak migration period that occurred during June 30 to August 1. The eel ladder migration index increased somewhat over recent years (less than 100 eels/day from 1998 to 2004), but is still less than 2% of the indices observed in the early 1980s (Fig. 2.2.2).

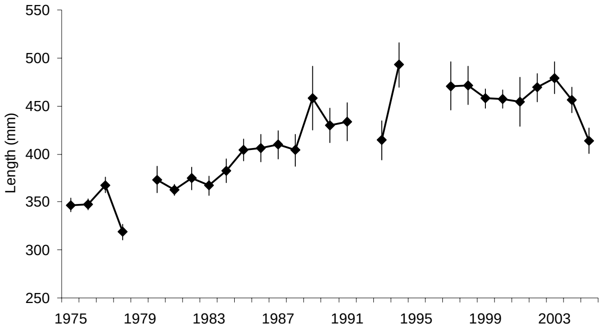
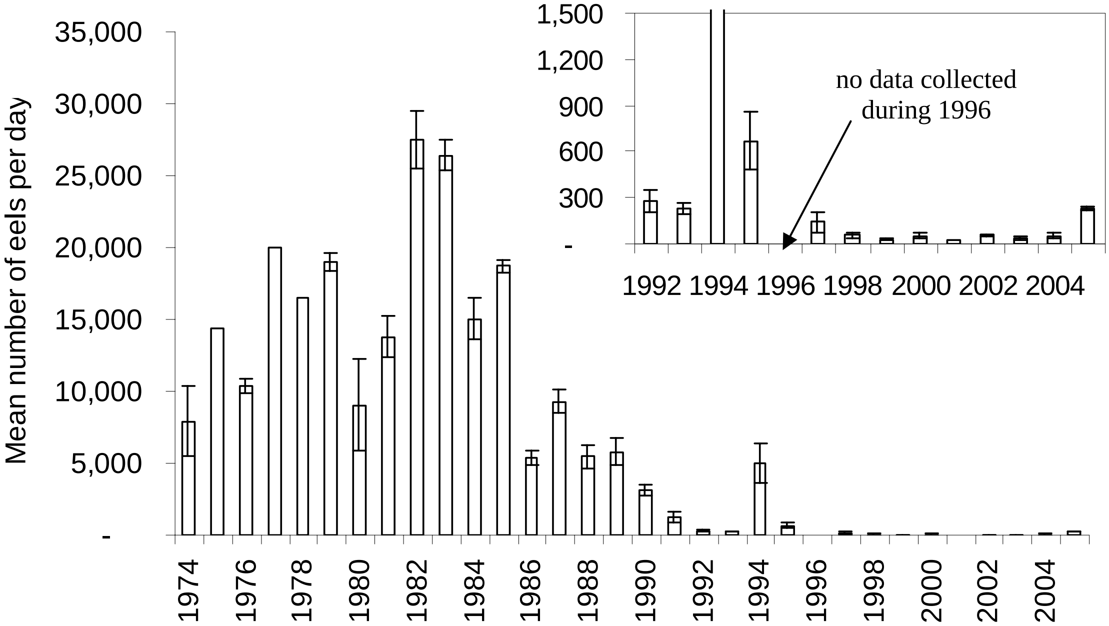


FIG. 2.2.1. Length (error bars are 95% confidence limits) of eel migrating upstream through the eel ladder located at the R.H. Saunders Hydroelectric Dam, 1975-2005.



. 2.2.2. Mean number of eels ascending the eel ladder per day at the R.H. Saunders hydroelectric Dam, Cornwall, Ontario during a 31-day peak migration period, 1975-2005. Vertical bars represent the 95% confidence intervals. No counts are available for 1996.

2.3 Eastern Lake Ontario and Bay of Quinte Fish Community Index Gillnetting

Bottom set gillnets have been used at fixed index netting sites (Fig. 2.3.1) in eastern Lake Ontario (ranging in depth from 2.5-140 m) and the Bay of Quinte (ranging in depth from 5-45 m) annually beginning with the Hay Bay site in the Bay of Quinte in 1958. Gillnets are multi-paneled with mesh sizes ranging from 1½-6 inch stretched mesh. Monofilament mesh replaced multifilament in 1992. The gillnetting program is used to monitor the abundance of a variety of fish species in the eastern Lake Ontario and Bay of Quinte fish community.

Species-specific catches in the gillnetting program are shown by geographic region in Tables 2.3.1-2.3.6 for the 1992-2005 time-period. Each gillnet catch was standardized to represent the total number of fish in 100 m of each mesh size and summed across ten mesh sizes from 1½-6 inch. Twenty-seven different species were caught in 2005. Fish age distribution and other biological attribute data for walleye and lake whitefish are shown in Tables 2.3.7 and 2.3.8, respectively.

Middle Ground

The most abundant species in gillnets at the Middle Ground site were yellow perch, brown bullhead, walleye, white sucker, rock bass and gizzard shad (Table 2.3.1). Among these species, only gizzard shad was more abundant in 2005 than their long-term average while brown bullhead, walleye, white sucker and rock bass were less abundant. Alewife, a species that was moderately abundant in the early to mid-1990s, has not been caught in the past three years.

Northeast

The most abundant species in Northeastern Lake Ontario gillnets were alewife, round goby, yellow

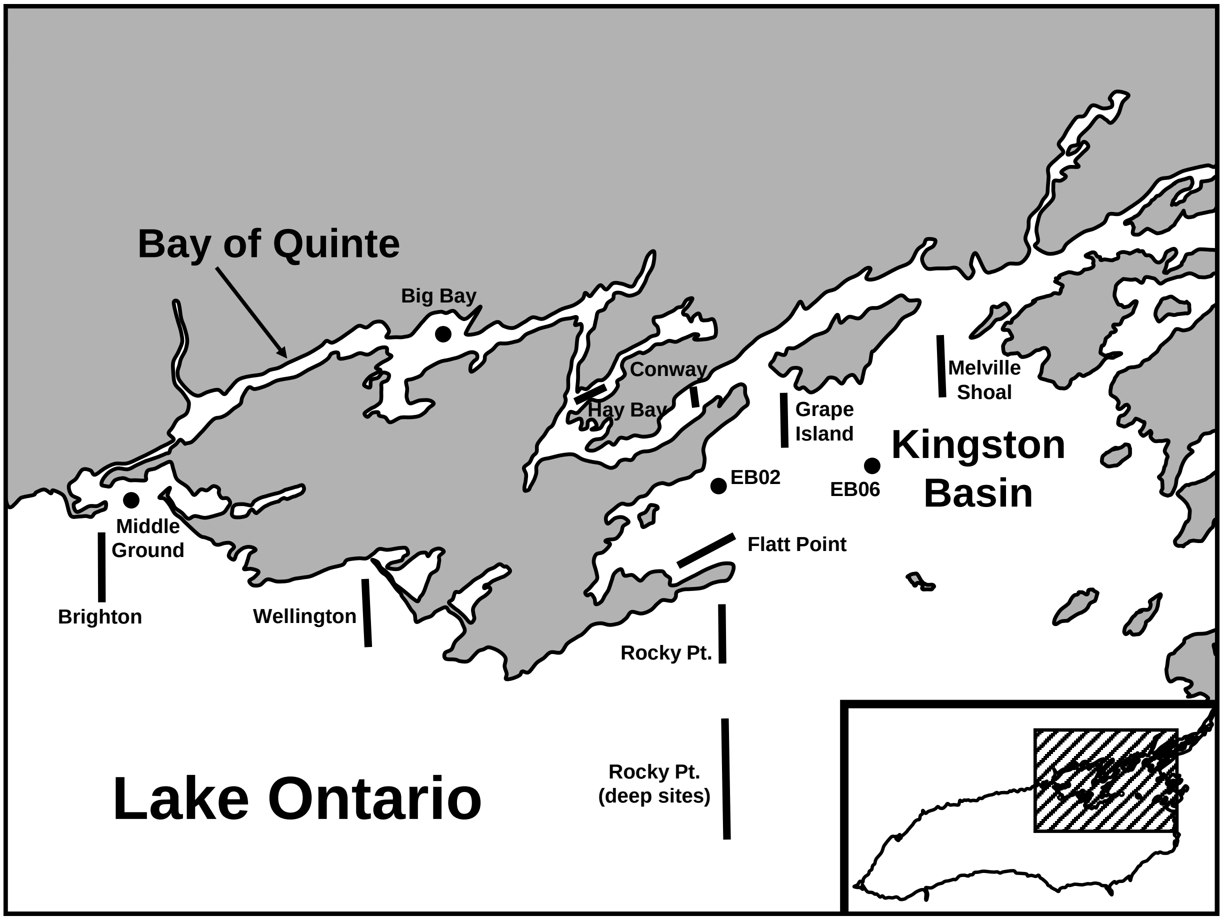


FIG. 2.3.1. Map of northeastern Lake Ontario. Shown are eastern Lake Ontario and Bay of Quinte fish community index gillnetting locations. Circles represent single depth sites; lines represent depth-stratified sampling areas.

perch and walleye (Table 2.3.2). Of these species, alewife, round goby and walleye were more abundant in 2005 than their long-term average while yellow perch was less abundant. The cold-water benthic species, lake trout, lake whitefish and round whitefish, declined markedly over the 1992-2005 time-period. Round goby, caught for the first time in 2003, were the second most abundant species in 2005.

Rocky Point (deep sites)

Only three species were caught in Rocky Point Lake Ontario deep gillnets (60-140 m depth), alewife, lake trout, and lake whitefish (Table 2.3.3). All three species were less abundant than their long-term average. Cisco (lake herring), rainbow smelt, burbot and slimy sculpin were caught in previous years at low abundance but none was caught in 2005.

Kingston Basin (nearshore sites)

The most abundant species in the Kingston Basin, Lake Ontario nearshore gillnets were alewife, yellow perch, round goby, walleye and rock bass (Table 2.3.4). Alewife abundance was higher in 2005 compared to their long-term average. Round goby, caught for the first time in 2003, increased dramatically in 2004 but declined in 2005. Lake trout and lake whitefish were caught in particularly low numbers compared to previous catches.

Kingston Basin (deep sites)

The most abundant species in the Kingston Basin, Lake Ontario deep gillnets were alewife and lake trout (Table 2.3.5). Catches of all species generally declined precipitously over the 1992-2005 time-period.

Bay of Quinte

The most abundant species in Bay of Quinte gillnets were yellow perch, alewife, white perch, gizzard shad, freshwater drum and walleye (Table 2.3.6). Of these species, alewife and gizzard shad were more abundant in 2005 than their long-term average while yellow perch, white perch and walleye were less abundant. Freshwater drum were caught at about the same abundance in 2005 as their long-term average. Round goby, having increased exponentially since their arrival in the late-1990s, declined dramatically in 2005 compared to 2004.

Walleye

The age distribution of walleye (Table 2.3.7) showed a broad range of age-classes from age-1 to age-21.

TABLE 2.3.1. Species-specific catch per gillnet set at Middle Ground, 1992-2005. Shown are the average catches in 1-3 gillnet gangs set at a single depth (5 m) during each of 2-3 visits to a single site (Middle Ground). The total number of sets each year is indicated.

	Year														
Species	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Mean
Longnose gar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.1
Alewife	30.9	5.5	76.1	90.2	0.0	10.9	0.0	0.0	0.0	5.4	5.4	0.0	0.0	0.0	16.0
Gizzard shad	0.0	0.0	0.0	6.6	13.2	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	1.9
Brown trout	0.0	0.0	0.0	0.0	0.0	3.3	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Lake trout	21.9	0.0	0.0	3.3	0.0	26.3	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	3.8
Northern pike	4.4	1.1	1.6	0.0	6.6	3.3	0.0	3.3	0.0	0.0	0.0	3.3	0.0	1.6	1.8
White sucker	3.3	2.2	0.0	13.2	19.7	9.9	6.6	23.0	8.2	9.9	20.2	0.0	13.7	4.9	9.6
Common carp	0.0	1.1	0.0	0.0	6.6	0.0	19.7	6.6	0.0	3.3	0.0	4.9	3.3	0.0	3.3
Brown bullhead	4.4	2.2	1.6	32.9	0.0	0.0	52.6	13.2	3.3	13.2	3.3	14.2	1.6	10.4	10.9
White perch	1.1	2.2	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Rock bass	0.0	3.3	3.3	10.9	3.3	3.3	6.6	32.6	27.2	7.1	1.6	3.3	4.9	3.3	7.9
Pumpkinseed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.9	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Bluegill	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Smallmouth bass	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.2
Largemouth bass	0.0	0.0	0.0	0.0	0.0	0.0	6.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Yellow perch	539.8	267.5	455.0	332.7	129.4	281.6	1013.2	419.9	423.7	285.4	400.7	170.1	448.2	193.0	382.9
Walleye (Yellow pickerel)	19.0	23.0	25.7	16.4	50.3	3.3	0.0	6.6	0.0	1.6	3.3	6.6	3.3	4.9	11.7
Freshwater drum	0.0	1.1	0.0	9.9	13.2	0.0	13.2	0.0	3.3	0.0	1.6	0.0	19.7	1.6	4.5
Total catch	626	309	565	516	242	345	1118	523	467	326	436	204	496	223	457
Number of sets	6	6	4	2	2	2	1	2	4	4	4	4	4	4	

TABLE 2.3.2. Species-specific catch per gillnet set in Northeastern Lake Ontario, 1992-2005. Shown are the average catches in 1-3 gillnet gangs set at each of 5 depths (range 7.5-27.5 m) during each of 2-3 visits to each of 3 sites (Brighton, Wellington and Rocky Point). The total number of sets each year is indicated.

	Year														
Species	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Mean
Alewife	218.6	130.8	338.7	439.2	721.6	337.3	897.1	550.8	218.3	385.6	657.0	396.9	474.0	916.2	477.3
Gizzard shad	0.1	5.1	0.8	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
Coho salmon	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chinook salmon	1.5	5.5	8.3	3.3	2.6	0.9	1.4	0.6	0.0	0.4	1.4	4.1	4.8	1.5	2.6
Atlantic salmon	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brown trout	0.5	0.3	3.0	0.2	0.0	0.7	0.5	0.2	0.7	0.3	3.3	1.2	1.9	1.0	1.0
Lake trout	80.7	37.3	69.4	60.9	28.5	29.2	28.2	7.9	22.4	11.8	8.9	3.0	7.5	1.3	28.3
Lake whitefish	5.0	9.5	4.8	7.7	2.9	3.4	0.7	0.0	0.7	0.4	0.1	0.8	0.2	0.1	2.6
Cisco (Lake herring)	1.3	1.3	1.2	1.1	0.0	0.0	0.7	0.2	0.0	0.0	0.0	0.1	0.0	0.2	0.4
Round whitefish	5.9	5.2	2.0	6.8	2.4	0.9	0.5	0.2	0.0	0.0	0.5	0.1	0.1	0.0	1.8
Chub	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0
Rainbow smelt	2.5	0.9	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Northern pike	0.1	0.4	0.7	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.1
White sucker	1.8	1.1	3.8	1.1	0.2	0.4	0.0	0.2	0.2	0.1	0.2	0.0	0.5	0.3	0.7
Greater redhorse	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Lake chub	1.2	0.8	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.2
Common carp	0.4	0.4	0.7	0.0	0.7	0.2	0.2	0.0	0.2	0.0	0.0	0.1	0.2	0.2	0.2
Brown bullhead	0.0	0.1	0.0	0.0	0.0	0.2	0.5	0.2	0.9	1.2	0.7	1.9	0.8	1.1	0.5
Channel catfish	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Stonecat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	1.5	0.4	0.1	0.0	0.2	0.2
American eel	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Burbot	0.6	1.4	1.3	2.0	3.3	1.1	0.9	0.0	0.9	0.7	1.3	0.3	0.2	0.7	1.0
White perch	0.1	0.0	0.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rock bass	1.5	2.2	2.5	3.3	2.4	1.7	9.7	4.2	2.7	1.1	1.9	4.4	2.0	1.6	2.9
Pumpkinseed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Smallmouth bass	6.1	4.0	4.4	2.0	0.2	0.4	1.8	4.9	0.4	1.5	1.4	1.5	1.7	0.9	2.2
Yellow perch	100.4	224.4	97.6	135.7	75.6	76.4	49.9	47.2	63.9	27.8	14.7	40.5	23.3	34.7	72.3
Walleye (Yellow pickerel)	4.9	6.7	5.6	2.9	1.8	1.8	3.2	2.4	0.8	0.0	1.1	1.2	3.4	4.4	2.9
Round goby	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	2.5	71.3	5.4
Freshwater drum	1.1	1.9	3.0	0.4	2.6	1.6	0.5	1.5	0.4	0.2	0.2	0.4	1.0	0.1	1.1
Total catch	434	439	548	670	845	456	997	621	313	433	693	458	524	1036	605
Number of sets	90	90	40	30	30	30	29	35	36	60	60	60	60	60	

TABLE 2.3.3. Species-specific catch per gillnet set at Rocky Point Lake Ontario deep sites (range 60-140 m), 1997-2005. Shown are the average catches in 2-3 gillnet gangs set at each of 4 depths during each of 2 visits to Rocky Point. The total number of sets each year is indicated.

	Year									
Species	1997	1998	1999	2000	2001	2002	2003	2004	2005	Mean
Alewife	30.3	88.0	7.6	0.8	80.6	2.5	60.6	95.1	12.1	41.9
Lake trout	36.5	34.5	42.5	29.6	44.8	41.1	27.4	14.3	12.1	31.4
Lake whitefish	0.0	8.6	5.1	0.4	0.8	0.0	0.5	0.0	0.5	1.8
Cisco (Lake herring)	0.0	2.1	0.5	0.8	0.0	0.8	0.5	1.4	0.0	0.7
Rainbow smelt	3.9	3.3	3.5	0.8	0.0	1.2	0.0	0.0	0.0	1.4
Burbot	1.3	0.4	1.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3
Slimy sculpin	0.0	1.6	0.0	0.4	0.4	0.0	0.3	0.3	0.0	0.3
Total catch	72	139	60	33	127	46	89	111	25	78
Number of sets	15	16	13	16	16	16	24	24	24	

Generally speaking, during the summer index gillnetting program young walleye were found in the Bay of Quinte (e.g., age-1 to age-5 fish comprised 88% of the Bay of Quinte walleye catch) while older walleye were present in eastern Lake Ontario (e.g., age-6 and older fish comprised 94% and 90% of the catches in the Kingston Basin and the Northeast, respectively). Age-2 (2003 year-class) fish were very common while age-3 fish (2002 year-class) were relatively uncommon in all geographic areas. Age-4 fish (2001 year-class) were relatively common in the Bay of Quinte. Too few young female walleye were caught to adequately assess age-at-maturity.

Lake Whitefish

Only 35 lake whitefish were caught in the 2005 index gillnets. For the first time in many years, young fish contributed significantly to the whitefish age-class structure; age-2 fish (2003 year-class) contributed 16 of 35 fish caught (Table 2.3.8). Too few female fish were caught to adequately assess age-at-maturity. Lake whitefish condition appears to have stabilized at a level (e.g. 480 mm fish is approximately 3 lb) lower than that observed in the early 1990s but significantly higher than that in 1996 and 1997 (Fig. 2.3.2).

Lake Trout

The abundance of mature lake trout declined further in 2005 in the Kingston Basin and eastern main lake, after three years of apparently stable albeit low levels (Fig. 2.3.3). Survival of stocked fish during their first two years in the lake remains low but has stabilized after the sharp decline in the mid 1990s

TABLE 2.3.4. Species-specific catch per gillnet set in the Kingston Basin Lake Ontario (nearshore sites), 1992-2005. Shown are the average catches in 1-3 gillnet gangs set at each of 5 depths (range 7.5-27.5 m) during each of 2-3 visits to each of 3 sites (Flatt Point, Grape Island and Melville Shoal). The total number of sets each year is indicated.

	Year														
Species	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Mean
Lake sturgeon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.1	0.0	0.2	0.0	0.0	0.1
Alewife	838.4	469.6	186.0	538.4	508.6	351.9	1329.3	552.3	392.3	530.6	130.3	151.0	497.0	1195.1	547.9
Gizzard shad	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chinook salmon	0.3	1.9	0.0	0.9	0.0	0.0	0.7	0.2	0.3	0.0	0.0	0.0	0.8	0.4	0.4
Brown trout	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.2	0.0	0.0	0.1	0.1	0.1
Lake trout	66.5	82.5	97.3	76.0	57.7	24.7	15.7	3.4	3.3	6.3	3.0	3.8	2.5	2.3	31.8
Lake whitefish	20.5	42.6	34.6	27.1	15.1	8.4	15.9	1.4	4.8	10.7	6.8	2.9	6.1	1.4	14.2
Cisco (Lake herring)	6.9	3.7	7.1	2.6	0.7	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.1	1.5
Round whitefish	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coregonus sp.	0.0	0.1	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Rainbow smelt	3.5	0.5	0.5	1.7	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Northern pike	0.8	0.4	0.3	0.4	0.2	0.0	0.5	0.0	0.1	0.4	0.2	0.1	0.1	0.3	0.3
White sucker	5.6	6.0	0.5	1.8	0.0	0.9	4.8	0.3	1.5	1.1	1.0	1.8	2.2	1.3	2.1
Silver sedhorse	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Greater redhorse	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Moxostoma sp.	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Common carp	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.1
Brown bullhead	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.1	0.0	0.1	0.4	0.5	0.1	0.2
Channel catfish	1.0	0.1	0.0	0.2	0.0	1.0	0.5	0.5	0.1	0.0	0.0	0.2	0.0	0.0	0.3
Stonecat	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.4	0.8	1.4	0.9	0.7	1.1	0.5
Burbot	0.1	0.4	0.2	0.7	0.9	1.6	1.4	0.3	0.1	0.2	0.2	0.1	0.1	0.0	0.4
Threespine stickleback	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
White perch	1.9	2.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.1	0.4
Rock bass	10.9	11.2	5.4	3.7	0.7	10.6	15.5	15.6	8.1	7.7	2.4	4.6	6.1	4.4	7.6
Pumpkinseed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0
Smallmouth bass	3.7	3.9	1.3	2.9	0.0	3.2	4.2	4.5	1.1	1.2	1.8	2.0	1.6	0.4	2.3
Yellow perch	319.0	306.6	96.2	60.7	58.2	97.7	147.0	118.4	117.8	46.8	112.5	103.9	298.5	127.5	143.6
Walleye (Yellow pickerel)	38.3	33.9	18.3	38.8	6.6	21.1	26.1	34.3	13.8	11.3	8.8	9.4	11.9	10.3	20.2
Round goby	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	129.9	42.2	12.5
Freshwater drum	1.6	0.6	1.2	1.3	0.0	1.1	1.4	0.8	0.5	0.2	0.0	0.5	0.0	0.0	0.7
Total catch	1319	968	450	757	649	523	1564	734	545	618	268	286	959	1387	787.7
Number of sets	86	88	40	30	29	29	29	41	48	60	60	60	60	60	

TABLE 2.3.5. Species-specific catch per gillnet set in the Kingston Basin Lake Ontario (deep sites), 1992-2005. Shown are the average catches in 4-8 gillnet gangs set at a single depth (approx. 30 m) during each of 3 visits to each of 2 sites (EB02 and EB06). The total number of sets each year is indicated.

	Year														
Species	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Mean
Sea lamprey	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lake sturgeon	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alewife	298.8	183.7	50.7	122.5	60.0	20.0	491.2	629.4	157.3	110.2	2.7	3.4	37.7	11.9	155.7
Chinook salmon	0.3	0.3	0.3	0.3	0.0	0.0	0.3	0.3	0.4	0.8	0.0	0.1	0.1	0.3	0.2
Brown trout	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.1	0.1
Lake trout	276.6	244.5	207.5	166.9	147.8	78.9	51.3	41.4	22.7	10.4	10.1	11.8	12.1	8.1	92.1
Lake whitefish	51.5	71.3	28.8	37.8	26.6	33.4	24.4	16.4	6.2	2.7	2.7	1.1	8.9	1.0	22.4
Cisco (Lake herring)	1.9	0.5	2.2	0.8	1.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.5
Rainbow smelt	12.9	4.4	5.5	4.9	1.6	0.3	2.7	0.0	0.0	0.0	0.0	0.0	0.1	0.1	2.3
American eel	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Burbot	0.0	0.3	0.5	0.3	0.8	1.1	0.8	0.3	1.1	0.8	0.3	0.1	0.1	0.0	0.5
Trout-perch	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
White perch	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Yellow perch	1.4	0.0	0.0	0.0	0.0	0.5	0.0	0.3	0.5	0.0	0.9	0.3	9.6	1.6	1.1
Walleye (Yellow pickerel)	0.0	0.0	0.5	0.3	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Round goby	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.0
Freshwater drum	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slimy sculpin	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total catch	645	505	296	334	238	136	571	688	188	125	17	17	69	23	275
Number of sets	24	24	24	24	24	24	24	24	36	24	24	48	48	48	

TABLE 2.3.6. Species-specific catch per gillnet set in the Bay of Quinte, 1992-2005. Shown are the average catches in 1-3 gillnet gangs set at each of 1-5 depths (range 5-40 m) during each of 2-4 visits (summer) to each of 3 sites (Big Bay, Hay Bay and Conway). The total number of sets each year is indicated.

	Year														
Species	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Mean
Sea lamprey	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lake sturgeon	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Longnose gar	0.9	5.5	0.2	3.8	0.7	1.4	0.0	5.9	0.6	1.6	1.5	0.2	1.2	1.7	1.8
Alewife	315.6	248.5	347.2	224.5	85.5	183.8	121.7	8.5	54.9	58.3	23.8	25.2	68.3	269.2	145.4
Gizzard shad	1.8	34.1	5.3	27.4	0.5	1.2	1.8	22.7	2.5	3.1	10.1	2.3	0.4	49.0	11.6
Coho salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chinook salmon	0.2	0.9	0.0	0.0	0.0	0.0	0.4	0.2	0.0	0.2	0.0	0.2	0.4	0.0	0.2
Rainbow trout	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
Atlantic salmon	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brown trout	6.6	4.7	1.3	1.6	0.0	0.8	0.2	0.2	0.0	0.4	0.2	1.4	0.4	1.0	1.3
Lake trout	22.3	8.8	7.1	4.1	15.3	9.1	5.0	0.6	5.3	2.7	8.4	7.2	7.9	10.6	8.2
Lake whitefish	8.0	6.6	2.6	0.0	6.1	2.1	7.2	2.1	1.2	1.8	0.9	2.9	0.4	2.3	3.2
Cisco (Lake herring)	1.1	4.7	1.5	1.9	10.8	21.6	23.2	0.8	4.5	2.2	0.2	0.0	0.2	0.0	5.2
Coregonus sp.	0.0	0.0	0.0	0.3	0.0	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1
Rainbow smelt	1.3	0.6	1.6	0.8	0.0	0.6	1.8	1.1	0.0	0.7	0.4	0.0	0.2	0.8	0.7
Northern pike	2.7	4.1	6.8	1.9	2.6	1.2	0.9	1.3	1.6	1.6	0.4	0.8	0.2	1.0	1.9
Mooneye	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
White sucker	33.1	30.1	30.9	36.0	26.1	29.6	20.6	23.8	22.0	25.4	27.2	14.5	19.7	7.5	24.8
Silver sedhorse	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Moxostoma sp.	0.0	0.3	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.1
Common carp	1.5	2.5	1.3	0.0	0.0	1.2	0.4	0.0	0.2	0.0	0.0	0.2	0.2	0.0	0.5
Spottail shiner	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brown bullhead	6.4	32.6	11.5	7.1	2.8	4.3	10.1	10.6	6.8	11.3	8.2	2.9	3.9	2.1	8.6
Channel catfish	0.5	3.3	1.1	0.3	0.2	0.6	0.7	0.4	0.2	0.2	0.4	0.2	0.4	0.2	0.6
Stonecat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0
Burbot	0.0	2.2	0.0	0.3	0.0	0.2	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Trout-perch	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
White perch	221.7	282.9	276.0	130.8	40.2	49.5	65.3	101.0	43.0	32.9	61.2	85.7	184.2	92.5	119.1
White bass	0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1
Rock bass	14.8	24.7	4.6	8.2	3.8	8.8	11.2	11.0	5.1	1.6	3.3	0.6	0.6	2.1	7.2
Pumpkinseed	0.0	6.6	0.0	0.5	1.9	3.1	21.3	18.3	11.7	26.7	13.7	2.1	8.3	1.0	8.2
Bluegill	0.0	0.0	0.0	0.0	0.2	0.8	2.2	1.1	1.4	10.4	5.5	0.6	0.4	2.9	1.8
Smallmouth bass	2.9	3.8	0.5	0.8	2.1	7.4	3.7	4.5	1.6	1.1	0.2	0.0	0.0	0.2	2.1
Largemouth bass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Black crappie	0.4	1.1	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.4	0.5	0.4	0.2	0.2	0.3
Yellow perch	725.1	948.1	513.0	747.0	547.5	624.8	667.1	896.6	752.5	728.8	714.5	493.2	388.7	448.9	656.9
Walleye (Yellow pickerel)	84.2	131.9	54.5	77.4	60.2	32.9	31.4	29.5	24.5	13.9	21.9	22.3	16.6	13.0	43.9
Round goby	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	43.3	120.9	3.9	12.3
Freshwater drum	16.6	17.5	15.9	17.5	21.9	19.5	12.9	13.2	15.8	31.6	15.7	11.0	21.3	16.8	17.7
Total catch	1468	1807	1283	1293	828	1006	1011	1154	956	957	923	717	845	927	1084
Number of sets	36	21	36	24	28	32	30	31	32	36	36	34	34	34	

TABLE 2.3.7. Age distribution of 203 walleye sampled from summer index gillnets, by region, 2005. Also shown are mean fork length, mean weight, mean GSI (females), and percent mature (females). GSI = gonadal somatic index calculated for females only as log10(gonad weight + 1)/log10(weight).

	Age																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Total
Bay of Quinte	5	37	1	11	5	4	0	0	0	0	0	0	0	1	0	2	1	0	0	0	0	67
Kingston Basin (nearshore)	0	3	0	2	1	8	2	2	3	6	14	4	10	12	9	4	4	6	1	1	1	93
Middle Ground	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Northeast	0	3	0	1	0	6	2	1	1	2	4	3	4	3	2	4	2	1	1	0	0	40
Total	5	46	1	14	6	18	4	3	4	8	18	7	14	16	11	10	7	7	2	1	1	203
Mean fork length (mm)	248	328	436	468	516	545	562	579	626	624	622	659	621	619	680	686	642	645	667	623	605	
Mean weight (g)	155	380	839	1225	1549	2167	2524	2623	3235	3348	3318	3955	3317	3183	4022	3970	3626	3335	3415	3193	2805	
GSI (females)	0.03	0.09		0.21	0.34	0.32	0.39		0.38	0.45	0.44	0.46	0.42	0.43	0.47	0.47	0.42	0.41	0.50		0.25	
% Mature (females)	0%	0%		50%	100%	71%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%	

TABLE 2.3.8. Age distribution of 35 lake whitefish sampled from summer index gillnets, by region, 2005. Also shown are mean fork length, mean weight, mean GSI (females), and percent mature (females). GSI = gonadal somatic index calculated for females only as log10(gonad weight + 1)/log10(weight). A GSI greater than approximately 0.25 indicates a mature female.

	Age																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Total
Bay of Quinte	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
Kingston Basin (nearshore)	0	2	0	0	0	1	2	0	0	0	1	1	0	1	4	0	0	0	1	0	0	0	13
Kingston Basin (offshore)	0	0	0	0	0	0	1	0	0	0	0	1	2	1	1	0	0	0	1	0	0	0	7
Northeast	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3
Total	0	16	0	0	0	1	3	0	0	0	2	2	2	2	5	0	0	0	2	0	0	0	35
Mean fork length (mm)		206				356	424				501	513	518	508	503				477				
Mean weight (g)		81				512	1057				1616	1664	1788	1544	1653				1482				
GSI (females)		0.02					0.20				0.57	0.59	0.62	0.51	0.54								
% Mature (females)		0%					0%				100%	100%	100%	100%	100%								

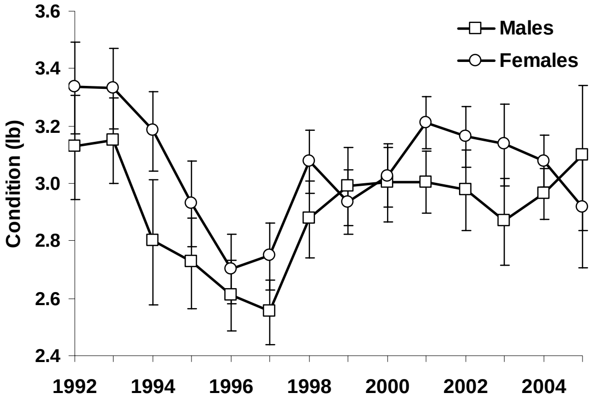


FIG. 2.3.2. Lake whitefish condition (lb) standardized for a fish of length 21 inches (480 mm fork length) caught in summer index gillnets, 1992-2005.

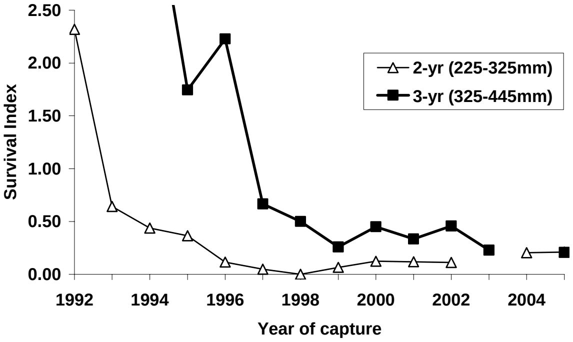


FIG. 2.3.4. Lake trout relative survival to ages 2 and 3. The survival index is the catch per unit effort of 2 and 3 year old fish, corrected for number stocked 2 or 3 years earlier; age determination is based on length-frequency data.

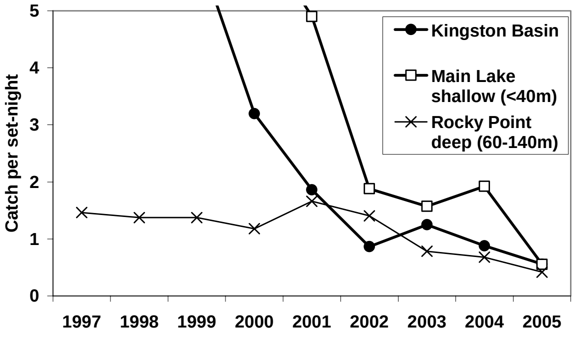


FIG. 2.3.3. Catch per unit effort of adult lake trout in bottom-set gillnets in three areas of eastern lake Ontario.

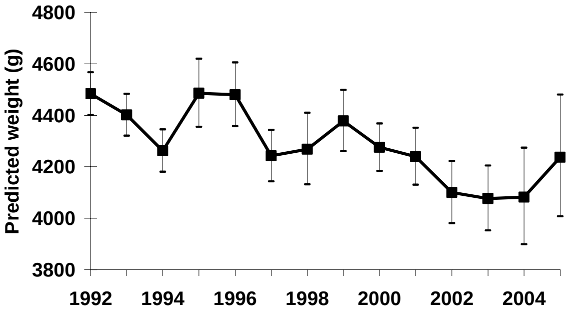


FIG. 2.3.5. Body condition of adult lake trout, indexed as the weight of 680 mm (fork length) fish predicted from length-weight regression of fish in the 655-704 mm size range; bars indicate 95% confidence limits on the prediction.

(Fig. 2.3.4). Body condition of large fish has increased slightly (Fig. 2.3.5) but given the low number of examined fish, this observation is not statistically significant; condition remains below levels observed in the 1990s. There was also a large drop in the number of A2 Lamprey wounds.

Several observation in 2005 were in sharp contrast with recent trends and observations, possibly indicating a sudden shift in the dynamics of the adult and subadult populations. In recent years the average size of mature fish has ceased to increase (actually decreasing in 2004), but in 2005 this trend was sharply reversed. The size at 50% maturity has remained roughly the same at least as far as 1992, but has increased in 2005. Finally, a size-wise comparison of relative abundance (CUE) between 2004 and 2005 suggests that the greatest decline in 2005 occurred among maturing fish with fork lengths around 450 mm. The significance of these observations is not clear.

2.4 Eastern Lake Ontario and Bay of Quinte Fish Community Index Trawling

Bottom trawling at fixed sites (Fig. 1) in eastern Lake Ontario (ranging in depth from 21-100 m) and the Bay of Quinte (ranging in depth from 4 to 23 m) has occurred annually since 1972 (except 1989). Typically, ½ mile trawl drags using a three-quarter "Yankee Standard" No. 35 bottom trawl are made at Lake Ontario sites while ¼ mile drags using a three-quarter "Western" bottom trawl are made at Bay of Quinte sites. At the deep Rocky Point trawl site (100 m, Fig. 2.4.2) the trawling distance is 1 mile. Bottom trawling is used primarily to monitor the abundance of small fish species and the young (e.g. age-0) of larger species.

Species-specific catches in the 2005 trawling program are shown in Table 2.4.1. The most abundant species in eastern Lake Ontario trawls were round goby, rainbow smelt, threespine stickleback, lake whitefish, slimy sculpin, and alewife, and in Bay of Quinte trawls were Lepomis sp. (YOY pumpkinseed and bluegill sunfish), yellow perch, white perch, alewife, round goby, freshwater drum, spottail shiner and gizzard shad. Of particular note was the capture of a single deepwater sculpin at the Rocky Point site in Lake Ontario—our first since 1996.

Catches of age-0 fish in 2005 for selected common species are shown in Table 2.4.2. Age-0 catch trends (1992-2005) for lake whitefish, yellow perch and walleye are shown in Tables 2.4.3, 2.4.4 and 2.4.5, respectively. Age-0 lake whitefish catches were high at Timber Island and moderate at Conway in 2005. Age-0 catches of yellow perch were high while walleye were low.

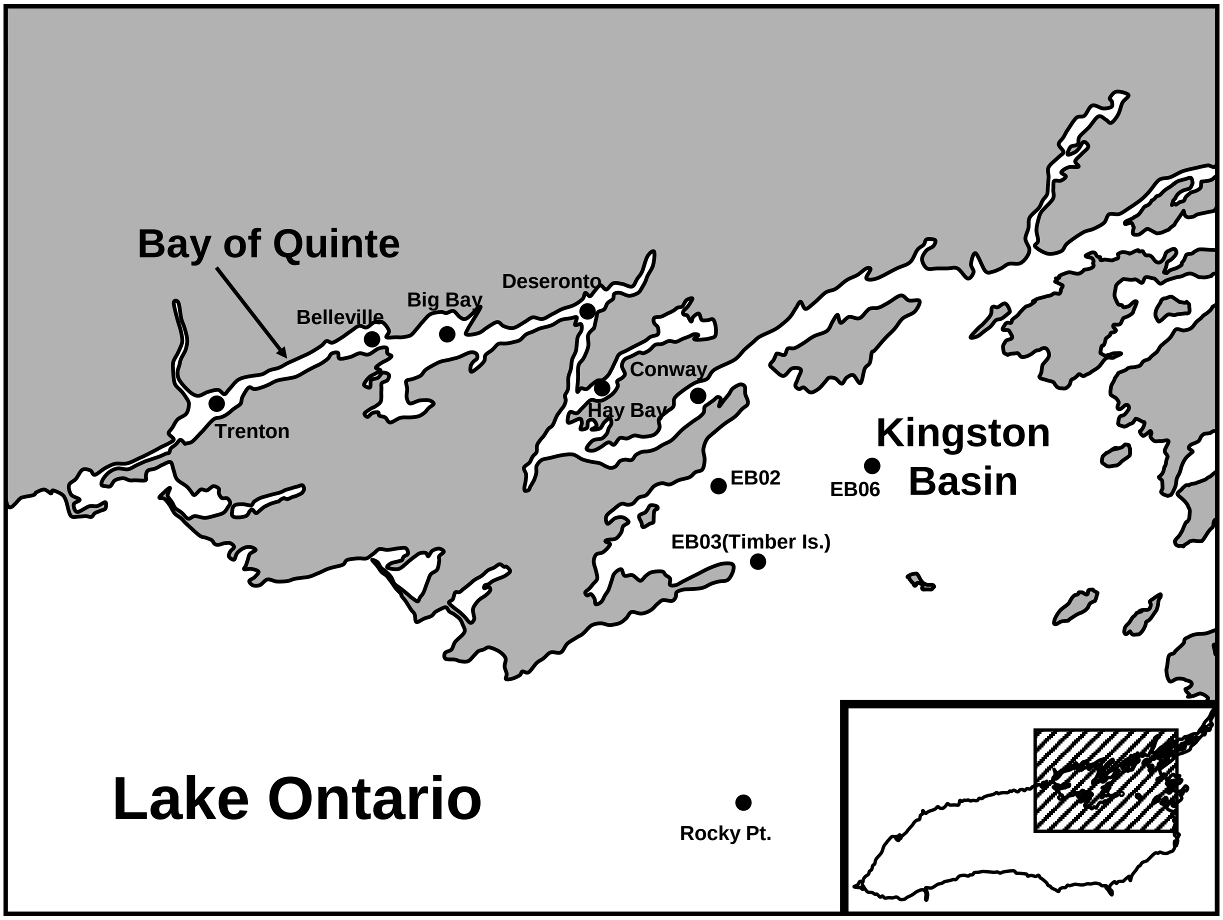


FIG. 4.2.1. Map of northeastern Lake Ontario. Shown are eastern Lake Ontario and Bay of Quinte fish community index bottom trawling site locations.

TABLE 2.4.1. Species-specific catches by site in the 2005 fish community index bottom trawling program in the Bay of Quinte and eastern Lake Ontario. Catches are the total number of fish observed at each site for the number of trawls indicated. Trawls distances were 1/4 mile in the Bay of Quinte and 1/2 mile in Lake Ontario except for Rocky Point where the trawl distance was 1 mile. Approximate site depths are indicated in brackets.

	Bay of Quinte					Lake Ontario					
Species	Trenton (4 m)	Belleville (5 m)	Big Bay (6 m)	Deseronto (5 m)	Hay Bay (7 m)	Conway (24 m)	EB02 (30 m)	EB03 (20 m)	EB06 (36 m)	Rocky Point (100 m)	Total
Alewife	4071	111	286	434	577	5	0	178	5	1	5667
Gizzard shad	243	405	207	176	0	0	0	0	0	0	1031
Chinook salmon	0	0	0	0	0	2	0	8	0	0	10
Lake trout	0	0	0	0	0	0	7	0	0	0	7
Lake whitefish	0	0	0	0	0	37	3	600	0	0	640
Cisco (Lake herring)	0	0	0	0	0	92	0	0	0	0	92
Rainbow smelt	0	0	0	0	0	81	237	308	1711	44	2381
Northern pike	1	0	0	0	0	0	0	0	0	0	1
White sucker	15	0	7	1	0	57	0	0	0	0	80
Common carp	0	4	2	1	7	0	0	0	0	0	14
Spottail shiner	196	106	450	151	633	0	0	0	0	0	1536
Brown bullhead	70	120	97	100	84	0	0	0	0	0	471
Channel catfish	0	3	1	2	0	0	0	0	0	0	6
Threespine stickleback	0	0	0	0	0	0	108	1393	167	1	1669
Trout-perch	1	78	173	48	14	147	0	41	0	0	502
White perch	2232	3807	4437	1901	197	0	0	0	0	0	12574
White bass	0	16	21	10	1	0	0	0	0	0	48
Rock bass	4	0	0	0	0	0	0	0	0	0	4
Pumpkinseed	374	14	30	118	9	0	0	0	0	0	545
Bluegill	3	3	77	1	0	0	0	0	0	0	84
Smallmouth bass	1	0	0	5	0	0	0	0	0	0	6
Largemouth bass	53	3	0	9	0	0	0	0	0	0	65
Black crappie	0	1	8	14	11	0	0	0	0	0	34
Lepomis sp.	478	3278	8481	3869	107	0	0	0	0	0	16213
Yellow perch	2727	379	725	8247	2229	645	4	0	0	0	14956
Walleye (Yellow pickerel)	15	16	52	40	33	1	0	0	0	0	157
Johnny darter	0	0	0	0	0	0	0	2	0	0	2
Logperch	422	1	0	29	3	0	0	0	0	0	455
Brook silverside	0	0	0	6	0	0	0	0	0	0	6
Round goby	105	482	76	938	321	1527	298	8788	0	0	12535
Freshwater drum	33	1718	1004	66	131	1	0	0	0	0	2953
Slimy sculpin	0	0	0	0	0	0	9	1	189	114	313
Deepwater sculpin	0	0	0	0	0	0	0	0	0	1	1
Total	11043	10544	16134	16167	4357	2595	666	11319	2072	161	75058
Number of trawls	8	8	8	8	8	12	12	12	12	4	92

TABLE 2.4.2. Species-specific young-of-the-year catches by site, for selected species, in the 2005 fish community index bottom trawling program in the Bay of Quinte and eastern Lake Ontario. Catches are the total number of fish observed for the number of trawls indicated. Trawls distances were 1/4 mile in the Bay of Quinte and 1/2 mile in Lake Ontario except for Rocky Point where the trawl distance was 1 mile. Approximate site depths are indicated in brackets.

	Bay of Quinte						Lake Ontario			
Species	Trenton (4 m)	Belleville (5 m)	Big Bay (6 m)	Deseronto (5 m)	Hay Bay (7 m)	Conway (24 m)	EB02 (30 m)	EB03 (20 m)	EB06 (36 m)	Rocky Point (100 m)
Alewife	4071	111	286	434	577	1	0	0	0	0
Gizzard shad	243	405	207	176	0	0	0	0	0	0
Lake whitefish	0	0	0	0	0	34	3	598	0	0
Cisco (Lake herring)	0	0	0	0	0	87	0	0	0	0
Rainbow smelt	0	0	0	0	0	74	6	142	1	0
White perch	2222	3807	4410	1899	196	0	0	0	0	0
Pumpkinseed	1	0	0	2	0	0	0	0	0	0
Bluegill	0	0	0	0	0	0	0	0	0	0
Lepomis sp. [1]	478	3278	8481	3869	107	0	0	0	0	0
Yellow perch	1623	300	198	3558	495	0	0	0	0	0
Walleye (Yellow pickerel)	6	11	31	14	9	0	0	0	0	0
Round goby	18	445	70	828	278	0	0	0	0	0
Freshwater drum	27	1658	938	50	108	0	0	0	0	0
Slimy sculpin	0	0	0	0	0	0	0	0	0	0
Number of trawls	8	8	8	8	8	12	12	12	12	4

TABLE 2.4.3. Mean catch-per-trawl of age-0 lake whitefish at two sites, Conway in the lower Bay of Quinte and EB03 near Timber Island in eastern Lake Ontario, 1992-2005. Four replicate trawls on each of two to four visits during August and early September were made at each site. Distances of each trawl drag were 1/4 mile for Conway and 1/2 mile for EB03.

	Conway	N	EB03 (Timber Island)	N
1992	23.4	8	0.9	12
1993	3.1	8	4.7	12
1994	40.5	8	79.7	8
1995	27.1	8	17.1	8
1996	2.6	8	0.8	8
1997	5.1	8	6.0	8
1998	0.4	8	0.0	8
1999	0.0	8	0.0	8
2000	0.4	8	0.0	8
2001	0.1	8	0.0	8
2002	0.1	8	0.0	8
2003	8.1	12	44.9	16
2004	0.0	12	2.1	12
2005	2.8	12	49.8	12

TABLE 2.4.4. Mean catch-per-trawl of age-0 yellow perch at six Bay of Quinte sites, 1992-2005. Four replicate trawls on each of two to three visits during August and early September were made at each site. Distance of each trawl drag was 1/4 mile.

	Trenton	Belleville	Big Bay	Deseronto	Hay Bay	Conway	Mean	Number of trawls
1992	3.1	1.3	0.4	0.1	0.5	0.0	0.9	48
1993	203.7	14.0	0.4	36.3	1.6	0.3	42.7	48
1994	526.6	50.6	10.3	101.5	29.3	6.9	120.8	48
1995	730.4	101.1	9.5	764.5	268.9	0.0	312.4	48
1996	2.6	2.9	4.3	2.5	8.5	0.1	3.5	48
1997	302.0	4.0	36.0	135.0	526.0	0.0	167.2	48
1998	13.1	14.0	11.5	0.1	2.9	0.0	7.0	48
1999	24.5	7.0	4.9	638.7	900.3	0.0	262.6	48
2000	0.0	5.8	5.4	0.8	6.0	0.3	3.0	48
2001	158.0	27.6	16.8	71.8	127.0	0.0	66.9	48
2002	0.0	0.3	9.2	141.8	241.1	0.0	65.4	48
2003	228.5	3.8	0.9	9.2	1.6	0.5	40.8	52
2004	0.0	0.9	4.5	8.4	18.0	0.0	5.3	52
2005	202.8	37.5	24.8	444.7	61.9	0.0	128.6	52

TABLE 2.4.5. Mean catch-per-trawl of age-0 walleye at six Bay of Quinte sites, 1992-2005. Four replicate trawls on each of two to three visits during August and early September were made at each site. Distance of each trawl drag was 1/4 mile.

	Trenton	Belleville	Big Bay	Deseronto	Hay Bay	Conway	Mean	Number of trawls
1992	6.8	12.4	14.0	37.9	6.1	0.8	13.0	48
1993	8.8	16.0	5.0	11.3	1.1	11.9	9.0	48
1994	17.0	21.0	15.0	23.8	11.5	12.5	16.8	48
1995	14.1	8.3	2.6	8.3	5.5	0.9	6.6	48
1996	4.3	7.6	4.9	1.1	0.0	1.1	3.2	48
1997	2.8	7.6	6.1	0.3	0.1	0.0	2.8	48
1998	0.1	0.4	0.6	0.1	0.0	0.0	0.2	48
1999	1.1	0.4	0.4	1.4	9.1	0.1	2.1	48
2000	0.0	3.8	1.0	0.0	0.1	0.0	0.8	48
2001	9.5	4.5	4.8	6.8	3.3	0.1	4.8	48
2002	0.0	0.0	1.1	0.1	0.0	0.0	0.2	48
2003	10.3	8.3	16.8	1.9	0.4	0.0	6.3	52
2004	0.0	0.6	11.4	1.4	0.9	0.0	2.4	52
2005	0.8	1.4	3.8	1.8	1.1	0.0	1.5	52

2.5 Juvenile Salmonid Stream Assessment

Rainbow trout were the most abundant species in the juvenile salmonid stream assessment survey followed closely by longnose dace and blacknose dace (Table 2.5.1). Both mean density and year class strength of YOY rainbow trout increased in 2005, but remained below the long term average (Fig. 2.5.1). Chinook salmon and coho salmon continued to show greater natural reproduction since 1995 (Fig. 2.5.2).

Atlantic salmon fry stocked by OMNR in Barnum House Creek in 2005 continued to show a higher density and biomass than YOY rainbow trout (Table 2.5.2). Yearling-sized Atlantic salmon were also observed in Black Creek the Little Rouge River. Atlantic salmon were not stocked in the Little Rouge River in 2004.

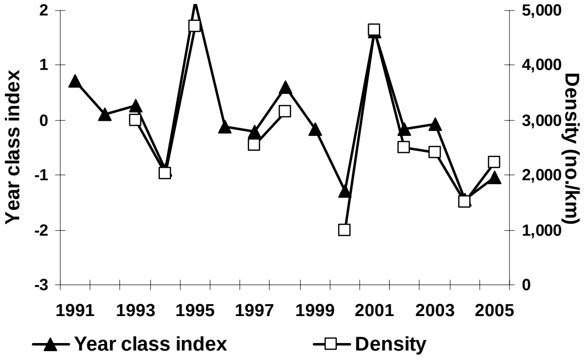


FIG. 2.5.1. Density and year class strength of young-of-the-year rainbow trout in Ontario tributaries of Lake Ontario, 1991-2005. Year-class strength was calculated as the least-square mean density of juvenile rainbow trout by year class for ages 0-2, and then, standardized with a mean of 0 and standard deviation of 1.

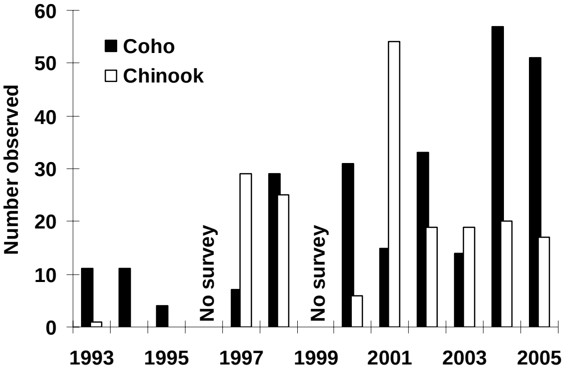


FIG. 2.5.2. Number of young-of-the-year coho and Chinook salmon observed during summer surveys of Lake Ontario tributaries in Ontario, 1993 to 2004. No surveys were conducted in 1996 and 1999. Only the numbers from the first pass of multiple pass efforts are included here.

TABLE 2.5.1. Catch by species of fish in Lake Ontario tributaries during electrofishing surveys in 2005. For salmon and trout: YOY = young-of-the-year, 1+ = yearlings and older.

Stream	Site	Number of efforts	Brook Lamprey	Sea Lamprey	Coho Salmon	Chinook Salmon	Rainbow Trout			Atlantic Salmon		Brown Trout		Brook Trout		Northern Pike/Jax	Central Mudminnow	Common White Sucker	Northern Hog Sucker	Redside Dace	Hornyhead Chub	Common Shiner	Spottail Shiner	Bluntnose Minnow	Fathead Minnow	Blacknose Dace	Longnose Dace	Creek Chub	Stonecat	Brook Sticklebck	Rock Bass	Pumpkinseed	Largemouth Bass	Yellow Perch	Rainbow Darter	Fantail Darter	Johnny Darter	Logperch	Round Goby	Mottled Sculpin	Slimy Sculpin
					YOY	YOY	YOY	1+	Adult	YOY	1+	YOY	1+	YOY	1+																										
Ancaster Cr.	AN01	1					9	3											2							18		3													
Oakville Cr. (16 Mile	OA02	1					66	19				2														1	17								7	14				4	
Silver Cr.	SI01	1																10	3	1		3				35		136							4	1	2				
Limestone Cr.	LI01	1		1			51	17						14	37			18				6				16	1	6				1	3			3	12				
Black Cr.(Credit W.B	BC04	1					3	3			1		1					13	7			11				109	52	6							5	16	2			7	
Credit R.	CR07	1					1	1				1						3	1		6	49		6	2	58	377		4						267	92	5				
Little Rouge R.	LR05	1					16	14			1															86	12	6							4		7				21
Duffins Cr. (West Br.	DU01	1					6											47				2				42	324	30	1				1		26		1				
Duffins Cr. (Broughai	DU03	1			4		20	6				1		5	9			24						2		15	1	13				2	2				2				1
Duffins Cr. (East Br.)	DU02	1					12	13					1					4				2				46	102	12							28		11				
Lynde Cr.	LD02	1					17	3										15				28				146	81	56							27		28				
Lynde Cr.	LD03	1		1			55	14						13	20											8															9
Oshawa Cr.	OH03	1		14			101	29	1			6	2					99				5		12		177	74	1												91	
Oshawa Cr.	OH02	1		1			2											22						3		130		89													
Farewell Cr.	FW01	1		11			21	4										13								74		6								4	101			51	
Bowmanville Cr.	BW02	3		14	15		129	18				55	17																												96
Bowmanville Cr.	BW03	3					10	5				19	9													48		33												5	22
Bowmanville Cr.	BW07	1					119	15				5	1					14								13	254														1
Soper Cr.	SO02	1		1	19	2	95	25				7	5																												34
Wilmot Creek	WM02	1			1	5	195	13				10	1																												38
Orono Cr. (Wilmot Cı	OR01	1				4	82	12				4	3																											24	
Graham Cr.	GR02	1						1										47				32		3		23	10	44			11				7		87				
Graham Cr.	GR03	1					1	4																		18	3	21					3			1	14				10
Ganaraska R.	GN04	1				4	57	26				13	12													1															106
Ganaraska R.	GN08	1					9	7					4	5	15																										
Ganaraska R.	GN07	1				2	212	22				2	2								1					46	60	1									14				30
Port Britain Cr.	PB01	1		4			35	9						12	22							1				17		2													27
Ganaraska R.	GN06	1						1													15	24			5	44	269	29		1							73				
Gages Cr.	GA02	1					39	55										7						1		35	13	12												26	
Cobourg Cr.	CO12	3	3	27			135	68	1					5	1											53	3	16												153	
Cobourg Cr.	CO03	2		3			16	6										36				6				105	64	86								1				22	18
Cobourg Cr. (Baltimo	CO09	3	3	2			70	11				53	4	1				20								7	67													106	
Barnum House Cr.	BR01	3					72	13		103	6																														
Shelter Valley Cr.	SE03	1			17		41	31										1					2			12	1	1							4					50	
Shelter Valley Cr.	SE02	1			4		37	37				1	2	2	11											1														6	
Colborne Cr. (Lakepo	CL01	1					5											7								46	6	23		2											
Butler Cr. (Proctor Cı	BT01	1					27	29							1			4								53	5	50												19	
Smithfield Cr.	SM01	1					2	3								2	2	22					1			2	31	26				6	6	1			18	7	1	10	
Total			6	79	60	17	1768	537	2	103	8	179	64	57	116	2	2	426	13	1	22	169	3	27	7	1485	1827	708	5	3	11	9	15	1	379	132	377	7	1	574	413

TABLE 2.5.2. Estimated density (No./m) and biomass (g/m2) by species of salmon and trout in Lake Ontario tributaries during electrofishing surveys in 2004. The abundance of young-of-the-year (YOY) salmonids was estimated for each species at each site using: N = catch + catch /(1/(1-0.2617*(mean weight)0.27116)-1). For yearlings and older salmonids the population size was estimated according to Jones and Stockwell (1995)[1]. YOY = young-of-the-year, 1+ = yearlings and older. UTM is at the upstream end of site (+5m). See Table 2.5.1 for stream name.

SITE	UTM	Date	Site width (m)	Site length (m)	Coho Salmon		Chinook Salmon		Rainbow Trout				Atlantic Salmon				Brown Trout				Brook Trout				All	
					YOY		YOY		YOY		1+		YOY		1+		YOY		1+		YOY		1+		All	
					No./m	g/m^2	No./m	g/m^2	No./m	g/m^2	No./m	g/m^2	No./m	g/m^2	No./m	g/m^2	No./m	g/m^2	No./m	g/m^2	No./m	g/m^2	No./m	g/m^2	No./m	g/m^2
AN01	17 58379 478794	August 22	3.6	59.3	0.00	0.00	0.00	0.00	0.40	0.45	0.06	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	1.14
OA02	17 58626 481825	August 22	7.0	50.0	0.00	0.00	0.00	0.00	3.90	1.43	0.57	2.22	0.00	0.00	0.00	0.00	0.10	0.06	0.00	0.00	0.00	0.00	0.00	0.00	4.58	3.71
SI01	17 58700 483307	August 22	4.1	48.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LI01	17 58725 481145	August 22	4.6	53.3	0.00	0.00	0.00	0.00	3.12	1.22	0.47	2.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.84	0.35	1.14	8.51	5.57	12.44
BC04	17 59029 483232	August 23	6.5	50.5	0.00	0.00	0.00	0.00	0.08	0.68	0.07	2.18	0.00	0.00	0.02	0.10	0.00	0.00	0.02	0.57	0.00	0.00	0.00	0.00	0.19	3.53
CR07	17 59223 483308	August 23	19.0	45.7	0.00	0.00	0.00	0.00	0.08	0.00	0.02	0.19	0.00	0.00	0.00	0.00	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.20
LR05	17 63890 486732	August 23	3.0	56.7	0.00	0.00	0.00	0.00	0.89	0.60	0.36	1.50	0.00	0.00	0.02	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.27	2.24
DU01	17 64838 486008	August 24	9.0	48.0	0.00	0.00	0.00	0.00	0.41	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.08
DU03	17 65482 486321	August 24	5.9	56.3	0.19	0.12	0.00	0.00	1.10	0.41	0.14	0.31	0.00	0.00	0.00	0.00	0.05	0.03	0.00	0.00	0.27	0.10	0.22	1.25	1.97	2.22
DU02	17 65583 486064	August 24	6.8	45.3	0.00	0.00	0.00	0.00	0.91	0.20	0.41	1.08	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.18	0.00	0.00	0.00	0.00	1.34	1.46
LD02	17 66241 487268	August 18	3.9	61.5	0.00	0.00	0.00	0.00	0.95	0.36	0.06	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.01	0.79
LD03	17 66332 486570	August 18	3.3	53.8	0.00	0.00	0.00	0.00	2.91	2.59	0.38	3.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.66	0.56	7.04	4.52	13.35
OH03	17 66948 486824	September 12	5.3	59.6	0.00	0.00	0.00	0.00	4.53	3.20	0.78	5.27	0.00	0.00	0.00	0.00	0.24	0.27	0.04	1.26	0.00	0.00	0.00	0.00	5.58	9.99
OH02	17 67123 487308	August 19	1.5	52.3	0.00	0.00	0.00	0.00	0.15	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.10
FW01	17 67675 486681	September 1	5.8	54.0	0.00	0.00	0.00	0.00	1.25	0.41	0.09	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.34	0.99
BW02	17 68123 487354	September 7	5.5	54.0	0.27	0.27	0.00	0.00	4.56	1.32	0.29	1.23	0.00	0.00	0.00	0.00	1.21	0.90	0.44	6.44	0.00	0.00	0.00	0.00	6.75	10.16
BW03	17 68252 487482	September 6	3.8	58.8	0.00	0.00	0.00	0.00	0.19	0.15	0.06	0.45	0.00	0.00	0.00	0.00	0.40	0.42	0.16	3.24	0.00	0.00	0.00	0.00	0.82	4.26
BW07	17 68390 486610	August 17	8.7	48.2	0.00	0.00	0.00	0.00	7.95	1.71	0.46	1.22	0.00	0.00	0.00	0.00	0.26	0.14	0.02	0.24	0.00	0.00	0.00	0.00	8.69	3.31
SO02	17 68612 487041	August 30	5.2	55.8	0.83	0.83	0.09	0.08	5.00	2.52	0.70	3.29	0.00	0.00	0.00	0.00	0.31	0.29	0.11	1.01	0.00	0.00	0.00	0.00	7.05	8.03
WM02	17 69089 486868	September 6	6.6	55.0	0.02	0.25	0.22	0.18	10.87	3.74	0.34	1.28	0.00	0.00	0.00	0.00	0.47	0.31	0.02	0.23	0.00	0.00	0.00	0.00	11.93	6.00
OR01	17 69102 486927	September 8	4.5	57.5	0.00	0.00	0.18	0.18	4.55	1.96	0.30	1.66	0.00	0.00	0.00	0.00	0.17	0.19	0.06	1.59	0.00	0.00	0.00	0.00	5.26	5.58
GR02	17 69472 486554	August 30	5.3	40.0	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.12
GR03	17 69921 487128	August 30	3.7	54.7	0.00	0.00	0.00	0.00	0.05	0.04	0.09	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.40
GN04	17 69978 487708	September 12	6.2	79.1	0.00	0.00	0.12	0.10	2.21	0.80	0.52	2.69	0.00	0.00	0.00	0.00	0.42	0.29	0.22	6.29	0.00	0.00	0.00	0.00	3.49	10.17
GN08	17 70120 487839	September 1	3.5	50.0	0.00	0.00	0.00	0.00	0.59	0.30	0.19	1.32	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.45	0.28	0.24	0.44	2.83	1.60	5.13
GN07	17 70949 487505	August 29	11.3	67.8	0.00	0.00	0.08	0.03	9.39	2.03	0.50	1.31	0.00	0.00	0.00	0.00	0.08	0.02	0.03	0.55	0.00	0.00	0.00	0.00	10.09	3.93
PB01	17 70959 487156	August 29	4.3	59.5	0.00	0.00	0.00	0.00	1.88	0.85	0.21	1.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.43	0.57	6.74	3.21	9.16
GN06	17 71673 487338	August 29	15.6	48.7	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02
GA02	17 71938 487611	September 1	3.3	75.0	0.00	0.00	0.00	0.00	1.76	0.83	1.27	5.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.03	6.68
CO12	17 72260 487798	September 14	3.4	65.9	0.00	0.00	0.00	0.00	4.63	2.36	1.48	5.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.13	0.02	0.08	6.25	8.41
CO03	17 72368 487403	September 16	5.1	67.7	0.00	0.00	0.00	0.00	0.36	0.16	0.07	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.32
CO09	17 72732 487758	September 15	5.4	45.9	0.00	0.00	0.00	0.00	1.94	1.61	0.17	2.84	0.00	0.00	0.00	0.00	1.54	3.00	0.05	1.91	0.00	0.00	0.00	0.00	3.69	9.35
BR01	17 73662 487572	September 13	4.6	53.6	0.00	0.00	0.00	0.00	2.15	0.58	0.26	0.69	2.62	1.41	0.12	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.15	2.92
SE03	17 74024 487321	August 17	7.7	55.9	0.83	0.37	0.00	0.00	2.41	0.54	0.89	1.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.14	2.48
SE02	18 26038 488106	August 16	6.0	59.6	0.19	0.10	0.00	0.00	2.13	0.53	1.02	3.26	0.00	0.00	0.00	0.00	0.05	0.02	0.04	1.08	0.11	0.03	0.26	2.07	3.80	7.10
CL01	18 26394 487646	August 16	3.9	47.5	0.00	0.00	0.00	0.00	0.34	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.16
BT01	18 28019 488056	August 15	5.1	72.5	0.00	0.00	0.00	0.00	1.19	0.45	0.64	2.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	1.84	2.84
SM01	18 28596 487954	August 15	3.5	46.9	0.00	0.00	0.00	0.00	0.11	0.13	0.08	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.82
Average			5.83	55.63	0.06	0.05	0.02	0.01	2.23	0.91	0.34	1.56	0.07	0.04	0.00	0.01	0.14	0.16	0.03	0.66	0.08	0.05	0.08	0.75	3.07	4.20

[1] Jones, M.L. and J.D. Stockwell. 1995. A rapid assessment procedure for the numeration of salmonine populations in streams. N. Amer. J. Fish. Man. 15:551-562.

2.6. Lake-wide Hydroacoustic Assessment of Prey Fish

The status of prey fish in Lake Ontario is assessed in hydroacoustic surveys conducted jointly since 1991 by Ontario Ministry of Natural Resources (OMNR) and New York State of Department of Environmental Conservation (NYSDEC). The surveys are conducted in mid-summer and cover the entire lake. The 2005 survey consisted of five shore-to-shore north-south transects in the main lake and one U-shaped transect in the Kingston Basin. Acoustic data used to estimate population densities were collected using a Biosonics 120 kHz split-beam echosounder, and additionally eleven tows with midwater trawls were made to investigate the species composition and biological attributes of the prey fish. Most of the tows in 2005 were made with a 2 m^2 Tucker trawl capable of collecting three discrete samples at different depths during a single deployment, and better suited for capture smaller fish than our traditionally used gear.

Population estimates for 2004 and 2005 have been completed and indicate that adult alewife and rainbow smelt continue to be at low levels. The abundance estimate for yearling-and-older (YAO) alewife were 228 and 72 million fish for years 2004 and 2005 respectively, suggesting three consecutive years of extremely low population levels (Fig. 2.6.1). The estimates of YAO rainbow smelt were 72 and 304 million fish for years 2004 and 2005 respectively, indicating an upswing in 2005 after two years of extreme low abundance (Fig. 2.6.2).

Threespine sticklebacks were not assessed in 2005 because not enough tows were made with the traditional midwater trawl previously used to assess sticklebacks. We anticipate that the information from the new Tucker trawl first used in 2005 will assist us in developing an acoustic based method for assessment of this species.

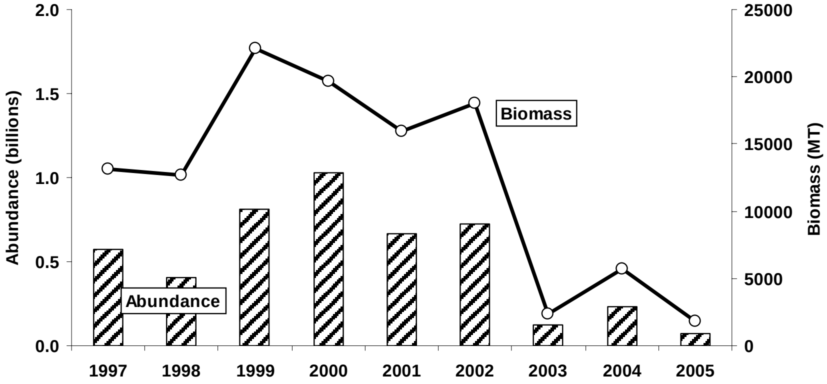


FIG. 2.6.1. Abundance and biomass of yearling-and-older alewife. Abundance estimates were obtained directly from hydroacoustic surveys, biomass estimates were obtained by applying average weights measured in midwater trawls to abundance estimates. Average weights used in biomass calculations in 2002, 2004 and 2005 were based on pooled data from other years.

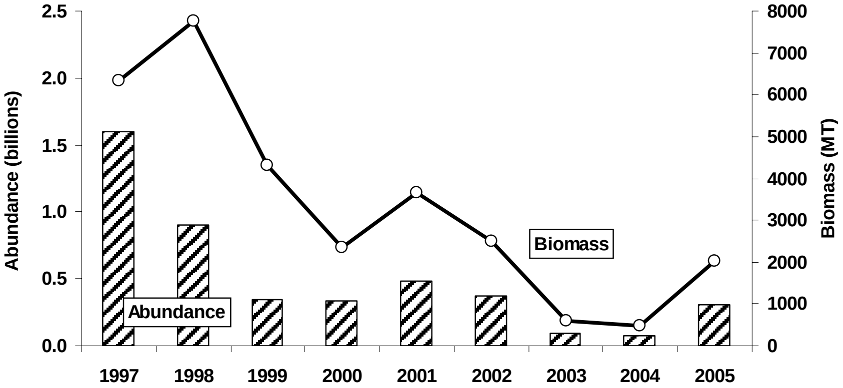


FIG. 2.6.2. Abundance and biomass of yearling-and-older rainbow smelt. Abundance estimates were obtained directly from hydroacoustic surveys, biomass estimates were obtained by applying average weights measured in midwater trawls to hydroacoustic abundance estimates. Average weights used in biomass calculations in 2002 through 20054 were based on pooled data from other years.

2.7 Bay of Quinte Nearshore Community Index Netting

The provincially standardized nearshore community index netting program (NSCIN) was initiated on the upper Bay of Quinte (Trenton to Deseronto) in 2001, and was expanded to include the lower Bay of Quinte (Deseronto to Lake Ontario) in 2002. The NSCIN program utilized 6-foot trapnets and was designed to evaluate the abundance and other biological attributes of fish species that inhabit the littoral area. Suitable trapnet sites were chosen from randomly selected UTM grids containing shoreline on the Bay of Quinte.

In 2005, 72 trapnet sites were sampled from September 7 to October 5 in a variety of nearshore habitat types and with water temperatures ranging from 17.4 to 22.1 ^{o}C (Table 2.7.1). Seventy-four

TABLE 2.7.1. Survey information for the 2005 NSCIN trapnet program on the Bay of Quinte.

	Upper Bay	Lower Bay
Survey dates	Sep 7 to Sep 30	Sep 13 to Oct 5
Water temperature (^{o}C)	Mean = 22.1 (range = 19.0-22.1)	Mean = 20.6 (range = 17.4-21.0)
No. of trapnet lifts	36	36
No. sites by depth (m):		
Target (2-2.5 m)	15	8
> Target (max)	19 (3.1 m)	28 (3.5 m)
< Target (min)	2 (1.7 m)	0
No. sites by substrate:		
Hard	23	22
Soft	13	14
No. sites by cover:		
None	2	0
1-25%	22	10
25-75%	7	19
>75%	5	7

TABLE 2.7.2. Species-specific catch in the 2005 NSCIN trapnet program on the Bay of Quinte. Statistics shown include total catch, arithmetic mean catch-per-trapnet (number and weight) and percent relative standard error of the mean log10(catch by number + 1). %RSE = 100*SE/Mean.

	Upper Bay				Lower Bay				Total Bay of Quinte			
	Number			Weight	Number			Weight	Number			Weight
Species	Total	Mean	RSE (%)	Mean (kg)	Total	Mean	RSE (%)	Mean (kg)	Total	Mean	RSE (%)	Mean (kg)
Bluegill	1600	44.44	10	3.6	232	6.44	15	0.5	1832	25.44	9	2.0
Brown bullhead	644	17.89	14	5.6	773	21.47	13	6.7	1417	19.68	10	6.1
Pumpkinseed	575	15.97	13	0.9	752	20.89	16	1.2	1327	18.43	10	1.1
Gizzard shad	735	20.42	18	2.7	303	8.42	24	1.1	1038	14.42	15	1.9
Black crappie	292	8.11	9	1.9	119	3.31	14	0.8	411	5.71	8	1.3
Freshwater drum	157	4.36	16	5.9	195	5.42	22	7.4	352	4.89	13	6.6
Walleye (Yellow pickerel)	77	2.14	16	2.7	107	2.97	19	4.2	184	2.56	12	3.4
Largemouth bass	99	2.75	17	0.8	56	1.56	23	0.5	155	2.15	14	0.7
White sucker	40	1.11	18	1.0	81	2.25	16	2.0	121	1.68	12	1.5
White perch	99	2.75	25	0.4	7	0.19	39	0.0	106	1.47	23	0.2
Channel catfish	62	1.72	22	4.7	41	1.14	23	3.1	103	1.43	16	3.9
Yellow perch	36	1.00	26	0.1	37	1.03	20	0.1	73	1.01	16	0.1
Northern pike	23	0.64	25	1.1	35	0.97	20	1.6	58	0.81	16	1.3
Rock bass	18	0.50	27	0.1	39	1.08	22	0.1	57	0.79	17	0.1
Smallmouth bass	40	1.11	25	1.0	11	0.31	33	0.3	51	0.71	20	0.7
Common carp	4	0.11	48	0.8	19	0.53	23	3.9	23	0.32	22	2.3
Longnose gar	14	0.39	44	0.5	8	0.22	43	0.3	22	0.31	31	0.4
Bowfin	9	0.25	44	0.5	11	0.31	40	0.6	20	0.28	29	0.6
White bass	7	0.19	39	0.0	8	0.22	44	0.0	15	0.21	29	0.0
Silver sedhorse	10	0.28	46	0.4	0	0.00		0.0	10	0.14	48	0.2
Shorthead redhorse	9	0.25	44	0.3	1	0.03	100	0.0	10	0.14	41	0.1
Golden shiner	1	0.03	100	0.0	5	0.14	49	0.0	6	0.08	44	0.0
River redhorse	5	0.14	60	0.4	0	0.00		0.0	5	0.07	61	0.2
American eel	2	0.06	100	0.1	1	0.03	100	0.0	3	0.04	72	0.1
Lake whitefish	1	0.03	100	0.1	0	0.00		0.0	1	0.01	100	0.0
Total Catch	4559				2841				7400			

hundred fish comprising 25 species were captured (Table 2.7.2). The most abundant species by number were bluegill (1832), brown bullhead (1417), pumpkinseed (1327), gizzard shad (1038) and black crappie (411). The most abundant species by weight were freshwater drum, brown bullhead, channel catfish, walleye and common carp. The centrarchid family of fish (bluegill, pumpkinseed, black crappie, largemouth bass, rock bass and smallmouth bass) comprised a total of 52% by number and 17% by weight of the catch. Mean length and weight statistics for all fish species caught in the 2005 NSCIN trapnet program on the Bay of Quinte are shown in Table 2.7.3.

TABLE 2.7.3. Mean fork length and weight statisitics for fish species caught in the 2005 NSCIN trapnet program on the Bay of Quinte.

	Total Catch	Mean Fork Length (mm)	N	Mean Weight (g)
Longnose gar	22	730	22	1.184
Bowfin	20	566	20	2.074
Gizzard shad	1038	168	321	0.130
Lake whitefish	1	540	1	2.023
Northern pike	58	629	58	1.686
White sucker	121	409	117	0.880
Silver sedhorse	10	451	10	1.691
Shorthead redhorse	10	388	10	1.076
River redhorse	5	528	5	2.469
Common carp	23	682	22	7.326
Golden shiner	6	153	6	0.100
Brown bullhead	1417	278	565	0.312
Channel catfish	103	526	102	2.750
American eel	3	800	1	1.525
White perch	106	201	95	0.159
White bass	15	196	15	0.208
Rock bass	57	166	57	0.113
Pumpkinseed	1327	132	634	0.058
Bluegill	1832	145	767	0.080
Smallmouth bass	51	353	51	0.936
Largemouth bass	155	228	151	0.291
Black crappie	411	221	410	0.231
Yellow perch	73	188	73	0.097
Walleye (Yellow pickerel)	184	482	184	1.383
Freshwater drum	352	459	298	1.360

Walleye

The age distribution of walleye (Table 2.7.4) showed a broad range of ages from 2 to18 years. However, only young fish were caught in the upper Bay while some older walleye were present in the lower Bay of Quinte. Age-2 (2003 year-class) and age-4 (2001 year-class) fish were very common comprising 43% and 33% of the overall walleye catch, respectively. Age-1 (2004 year-class) and age-3 (2002 year-class) fish were relatively uncommon.

Northern pike

The age distribution of northern pike (Table 2.7.5) showed a range of ages from 2 to10 years with a relatively even representation of age-classes.

TABLE 2.7.4. Age distribution of 84 walleye sampled from late-summer NSCIN trapnets, by region in the Bay of Quinte, 2005. Also shown are mean fork length, mean weight, mean GSI (females), and percent mature (females). GSI = gonadal somatic index calculated for females only as log10(gonad weight + 1)/log10(weight).

	Age																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Total
Upper Bay of Quinte	0	21	2	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	35
Lower Bay of Quinte	0	15	1	17	4	0	0	1	2	3	0	1	0	2	2	0	0	1	49
Total	0	36	3	28	5	0	0	1	2	3	0	1	0	2	2	0	0	1	84
Mean fork length (mm)		387	466	487	514			629	595	591		652		600	579			581	
Mean weight (g)		630	1147	1295	1598			3029	2379	2438		3337		2435	1954			2234	
GSI (females)		0.17	0.42	0.39	0.42			0.56	0.49	0.54		0.54		0.57	0.49				
% Mature (females)		5%	100%	71%	67%			100%	100%	100%		100%		100%	100%				

Catch Trends

A summary of species-specific NSCIN trapnet catches for 2001-2005 is shown in Table 2.7.6. Of note is the overall decline in total fish abundance—especially for the dominant species including brown bullhead, pumpkinseed, bluegill and yellow perch. Also of interest is the relatively high abundance of gizzard shad.

TABLE 2.7.5. Age distribution of 32 northern pike sampled from late-summer NSCIN trapnets, by region in the Bay of Quinte, 2005. Also shown are mean fork length, mean weight, mean GSI (females), and percent mature (females). GSI = gonadal somatic index calculated for females only as log10(gonad weight + 1)/log10(weight).

	Age										
	1	2	3	4	5	6	7	8	9	10	Total
Upper Bay of Quinte	0	3	2	3	4	1	0	0	1	0	14
Lower Bay of Quinte	0	2	5	1	1	2	4	1	1	1	18
Total	0	5	7	4	5	3	4	1	2	1	32
Mean fork length (mm)		534	573	624	670	648	717	712	713	812	
Mean weight (g)		1095	1293	1539	1949	1979	2266	2117	2158	2857	
GSI (females)		0.43	0.43	0.34	0.42	0.57	0.43	0.46	0.38	0.45	
% Mature (females)		100%	100%	67%	100%	100%	100%	100%	100%	100%	

TABLE 2.7.6. Species-specific NSCIN trapnet catches in the upper and lower Bay of Quinte, 2001-2005. No netting was completed in the lower Bay of Quinte in 2001. The numbers of trapnet sets are indicated.

	Upper Bay					Lower Bay				Total			
Species	2001	2002	2003	2004	2005	2002	2003	2004	2005	2002	2003	2004	2005
Longnose gar	9	12	41	70	14	13	16	2	8	25	57	72	22
Bowfin	13	5	21	19	9	24	36	12	11	29	57	31	20
Gizzard shad	40	52	72	2	735	27	19	7	303	79	91	9	1038
Lake trout	0	0	0	1	0	0	0	0	0	0	0	1	0
Lake whitefish	0	0	0	0	1	0	0	0	0	0	0	0	1
Northern pike	37	21	31	25	23	42	36	28	35	63	67	53	58
Mooneye	1	0	0	0	0	0	0	0	0	0	0	0	0
White sucker	37	53	62	45	40	107	141	92	81	160	203	137	121
Silver sedhorse	0	0	25	29	10	0	3	2	0	0	28	31	10
Shorthead redhorse	0	0	3	17	9	0	0	0	1	0	3	17	10
Greater redhorse	0	0	8	2	0	0	0	0	0	0	8	2	0
River redhorse	2	0	5	6	5	0	0	0	0	0	5	6	5
Moxostoma sp.	28	15	3	0	0	0	0	0	0	15	3	0	0
Goldfish	0	0	0	0	0	1	0	0	0	1	0	0	0
Common carp	3	4	10	3	4	12	11	8	19	16	21	11	23
Golden shiner	1	0	1	0	1	3	1	3	5	3	2	3	6
Rudd	0	0	0	0	0	1	0	0	0	1	0	0	0
Brown bullhead	6036	3450	1344	750	644	2501	2844	1254	773	5951	4188	2004	1417
Channel catfish	78	78	54	48	62	41	50	43	41	119	104	91	103
American eel	16	5	0	1	2	6	6	2	1	11	6	3	3
White perch	79	104	277	132	99	39	270	84	7	143	547	216	106
White bass	2	5	4	4	7	1	6	4	8	6	10	8	15
Rock bass	33	24	23	21	18	51	149	34	39	75	172	55	57
Pumpkinseed	3218	2631	970	552	575	4087	745	660	752	6718	1715	1212	1327
Bluegill	5317	5135	2385	2707	1600	453	253	299	232	5588	2638	3006	1832
Smallmouth bass	34	60	13	59	40	28	38	25	11	88	51	84	51
Largemouth bass	89	220	285	219	99	181	92	124	56	401	377	343	155
Black crappie	353	540	368	580	292	209	187	155	119	749	555	735	411
Yellow perch	135	123	70	30	36	117	50	60	37	240	120	90	73
Walleye (Yellow pickerel)	114	89	80	92	77	164	295	202	107	253	375	294	184
Freshwater drum	229	119	137	77	157	186	252	190	195	305	389	267	352
Total catch	15904	12745	6292	5491	4559	8294	5500	3290	2841	21039	11792	8781	7400
Effort (number of nets set)	36	36	36	36	36	36	36	36	36	72	72	72	72

2.8 St. Lawrence River Fish Community Index Netting – Thousand Islands

The St. Lawrence River fish community is dominated by a rich assemblage of warm-water species; over 85 fish species have been reported. Smallmouth bass and northern pike are the most abundant top predators, while other important members of the fish community include yellow perch, rock bass, brown bullhead, and pumpkinseed. Other less abundant, but important, fish species inhabiting the St. Lawrence River include walleye, lake sturgeon and muskellunge.

This section summarizes index gillnetting catches for all fish species (Table 2.8.1) in 2005 and updates trends in abundance for yellow perch, smallmouth bass and northern pike.

The fall gillnetting program is designed to detect long-term changes in the fish communities and has been established in four distinct sections of the river; Thousand Islands, Middle Corridor, Lake St. Lawrence and Lake St. Francis. These programs have been coordinated with the New York State Department of Environmental Conservation

Table 2.8.1 Species-specific catch-per-standard-gillnet lift. Thousand Islands area, St. Lawrence River, 1987-2005. All catches prior to 2001 have been adjusted by a factor of 1.58 to be comparable to the new netting standard initiated in 2001.

	1987	1989	1989	1991	1993	1995	1997	1999	2001	2003	2005
Lake Sturgeon	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.02	0.02
Longnose gar	0.00	0.00	0.00	0.03	0.00	0.00	0.03	0.00	0.00	0.07	0.04
Bowfin	0.08	0.13	0.09	0.00	0.06	0.03	0.07	0.00	0.02	0.07	0.05
Alewife	0.49	0.00	0.00	0.09	0.03	0.03	0.00	0.00	0.00	0.00	0.02
Gizzard shad	0.00	0.41	0.36	0.46	0.00	0.00	0.00	0.03	0.06	0.00	0.04
Chinook salmon	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.03	0.02	0.00	0.00
Brown trout	0.00	0.05	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rainbow trout	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
Lake trout	0.00	0.13	0.16	0.00	0.16	0.13	0.13	0.00	0.00	0.00	0.00
Lake herring	0.00	0.00	0.03	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00
Northern pike	4.46	6.73	6.26	4.35	3.62	2.61	2.40	2.14	1.33	2.05	1.78
Muskellunge	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.02	0.04	0.00
Esocidae hybrids	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00
Mooneye	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
White sucker	1.09	2.10	2.04	1.39	1.49	1.37	1.25	1.78	0.75	0.93	0.64
Moxostoma sp.	0.00	0.08	0.13	0.06	0.13	0.33	0.00	0.23	0.08	0.11	0.10
Common carp	0.05	0.13	0.09	0.09	0.03	0.09	0.36	0.13	0.08	0.12	0.04
Chub	0.00	0.05	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Golden shiner	0.05	0.05	0.03	0.00	0.06	0.03	0.00	0.03	0.00	0.00	0.04
Brown bullhead	2.56	1.79	1.79	2.46	1.06	0.95	1.91	3.85	3.00	2.66	4.69
Channel catfish	0.81	0.08	0.13	0.55	0.16	0.30	0.30	0.56	0.25	0.35	0.20
White perch	0.08	0.00	0.00	0.36	0.03	0.06	0.00	0.07	0.10	0.02	0.15
White bass	0.05	0.60	0.73	0.43	0.24	0.00	0.07	0.00	0.00	0.00	0.00
Rock bass	4.14	4.46	4.87	5.44	4.77	5.56	4.87	7.54	9.48	7.23	7.28
Pumpkinseed	4.61	6.19	5.80	5.81	3.89	2.80	2.40	3.23	1.40	1.21	0.67
Bluegill	0.65	0.88	0.76	0.43	0.06	0.00	0.16	0.07	0.02	0.14	0.10
Smallmouth bass	3.16	5.67	5.44	4.31	2.34	1.55	1.48	3.19	1.67	3.97	7.59
Largemouth bass	0.13	0.36	0.40	0.13	0.16	0.16	0.03	0.23	0.08	0.22	0.33
White crappie	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Black crappie	0.13	0.16	0.13	0.09	0.06	0.03	0.03	0.10	0.06	0.07	0.16
Yellow perch	27.79	17.62	17.02	15.41	16.23	22.67	21.33	22.22	18.06	20.32	14.26
Walleye	0.21	0.60	0.55	0.33	0.33	0.27	0.59	0.07	0.19	0.23	0.23
Round goby	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.77
Freshwater drum	0.00	0.00	0.03	0.09	0.00	0.03	0.10	0.00	0.06	0.04	0.30
Total Catch	50.56	48.25	46.94	42.39	34.90	39.11	37.56	45.49	36.75	39.87	39.54

(NYSDEC) assessment programs to provide ‘river-wide’ coverage of fisheries resources.

Due to insufficient stock from the supplier, mono-filament nets were used beginning in 2001. The netting programs from 2001 to 2005 continued to use both old multi-filament and mono-filament. In order to compare the catches of the new and old net designs, half of the gillnet sets were made with multi-filament nets and the other half of the sets were made with mono-filament nets. The 2005 netting in the Thousands Islands was conducted between September 12 and October 4. This program maintained the database established in 1987 and represented the tenth netting program in the Thousand Islands section of the St. Lawrence River.

The overall catch from 48 gillnet sets in the 2005 Thousand Islands project was 1,495 fish comprising 25 species (a complete summary of standardized gillnet catch-per-unit-effort is listed in Table 2.8.1). The average number of fish captured per net set during 2005 (39.5 fish per net, both netting types combined) was nearly equal to that observed in the 2003 survey, however the numbers of fish remain lower than those observed during the late 1980s (Fig. 2.8.1).

As was the case in 2001 and 2003, average catches were higher in mono-filament nets than in multi-filament nets. For this reason, a correction factor of 1.58 was applied. See the 2001 annual report for discussion of the statistical treatment of the two net types.

Yellow Perch

Yellow perch continue to be the most abundant fish captured in the Thousand Islands gillnet program. The total catch in 2005 decreased from 2003 levels and was lower than any other year in the history of the index program in the Thousand Islands section (Fig. 2.8.2). Age analysis of fish sampled during the 2005 netting program estimated the average age of the yellow perch community to be 4.2 years (Fig. 2.8.3).

Centrarchids

Six centrarchid species were captured in the netting program: rock bass, pumpkinseed, bluegill, smallmouth bass, largemouth bass and black crappie. Rock bass catches were slightly greater in 2005 than 2003, yet still very high relative to other species.

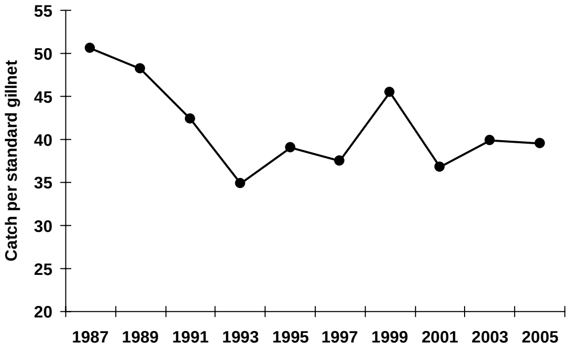


FIG. 2.8.1. Total number of fish captured in standard gillnets in the Thousand Islands area, St. Lawrence River, 1987-2005.

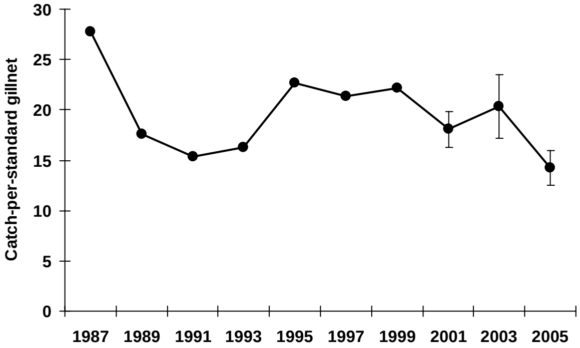


FIG. 2.8.2. Yellow perch catch in standard gillnets set in the Thousand Islands area 1987-2005. Confidence intervals (95%) were not applied to corrected historical data.

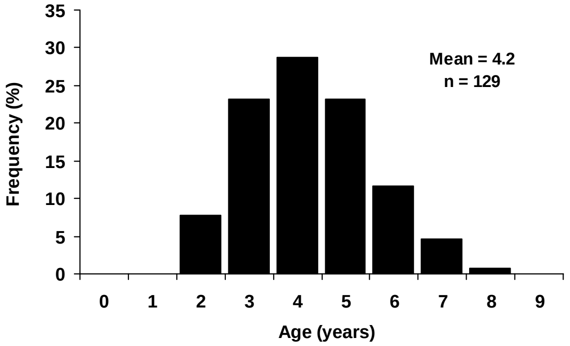


FIG. 2.8.3. Yellow perch age frequency determined from gillnets set in the Thousand Islands area in 2005.

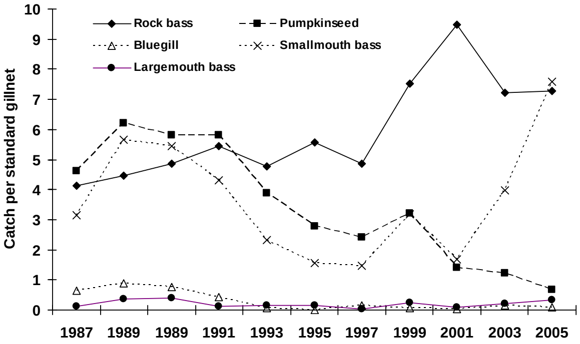


FIG. 2.8.4. Centrarchid catches in standard gillnets set in the Thousand Islands area, St. Lawrence River, 1987-2005.

Pumpkinseed populations appear to have continued to decline in 2005 continuing the trend observed since 2001 (Fig. 2.8.4). Smallmouth bass catches almost doubled in 2005 in comparison to 2003, reaching levels not previously observed by the index (Fig. 2.8.4). The 2005 smallmouth bass catch consisted of strong representation from a broad range of age-classes (Fig. 2.8.5). Largemouth bass catches increased marginally in 2005 in comparison to 2003 (Fig. 2.8.4). Catch of black crappie more than doubled in 2005 from 2003 and reached catch rates similar to those observed in the late 1980s (Table 2.8.1).

Northern Pike

In 2003 the catch of northern pike increased. However, this trend did not continue in 2005 as the catch rate dropped (Fig. 2.8.6). A decline in northern pike catches through the 1990s has also been reported over the same time period in the New York waters of the Thousand Islands, with weak fluctuations since 1997.

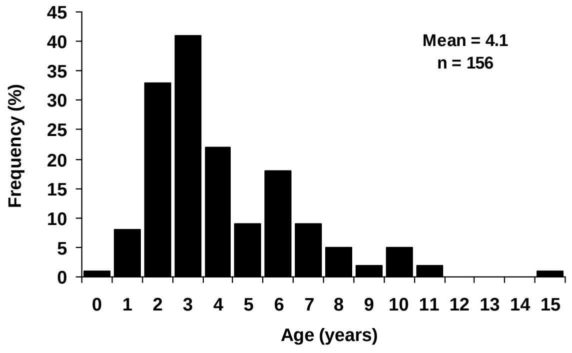


FIG. 2.8.5. Smallmouth bass age frequency determined from gillnets set in the Thousand Islands area in 2005.

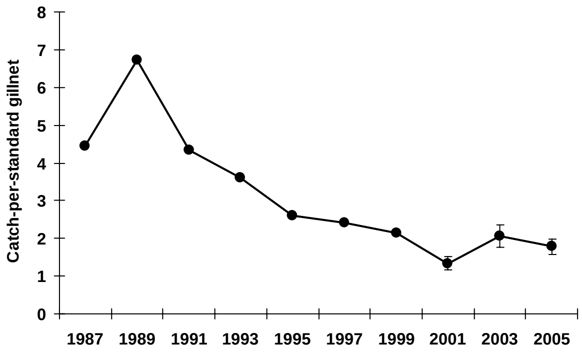


FIG. 2.8.6. Northern pike catch in standard gillnets set in the Thousand Islands area, St. Lawrence River, 1987-2005. Confidence limits (95%) were not applied to corrected historical data.

2.9 Credit River Chinook Assessment

Chinook salmon growth and condition were monitored during the fall spawning run in the Credit River at the Reid Milling dam in Streetsville. Chinook salmon were electrofished in the Credit River for spawn collection by the Ringwood Fish Culture Station. LOMU crews measured fish for length and weight, and collected otoliths for ageing. The body condition of Chinook salmon in the Credit River was determined as the estimated weight of a 900 mm fish.

The mean weight of 900 mm male and female Chinook salmon in the Credit River is shown in Fig. 2.9.1. Male Chinook salmon were significantly lighter than all previous years since 1989. Female Chinook salmon in the were not significantly different since 2003. Growth in length has declined for 3 yr-old Chinook salmon in both the Credit River (Fig. 2.9.2) and Lake Ontario (Fig. 2.9.3), and was the lowest ever observed (Fig. 2.9.3). For 2 yr-old Chinook salmon the trend in length is less clear, as males in the Credit increased while females declined and combined sex samples in Lake Ontario declined as well. Although lengths of 2 yr-old Chinook salmon are now lower than the late 1990s, lengths remain similar to the late 1980s.

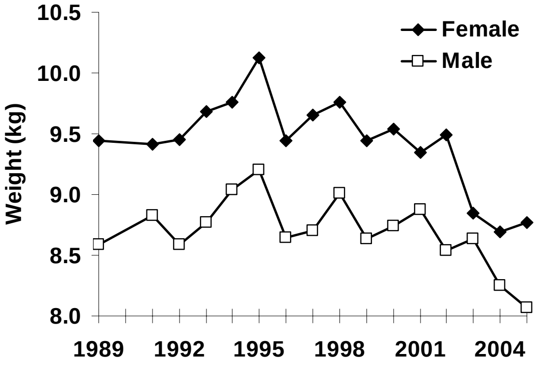


FIG. 2.9.1. Mean weight of a 900 mm Chinook salmon in the Credit River, 1989-2005, during the spawning run (approximately October 1).

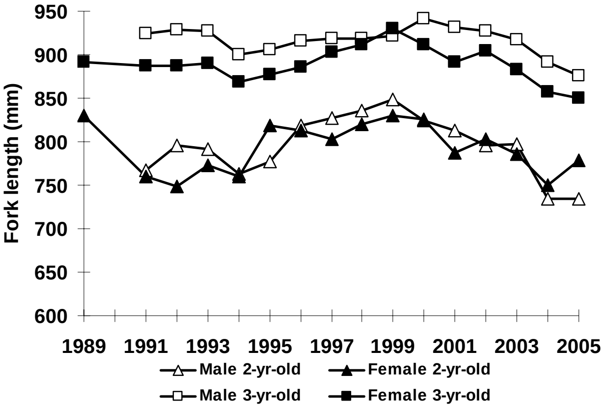


FIG. 2.9.2. Fork length of Chinook salmon in the Credit River, 1989-2005, during the spawning run (approximately October 1).

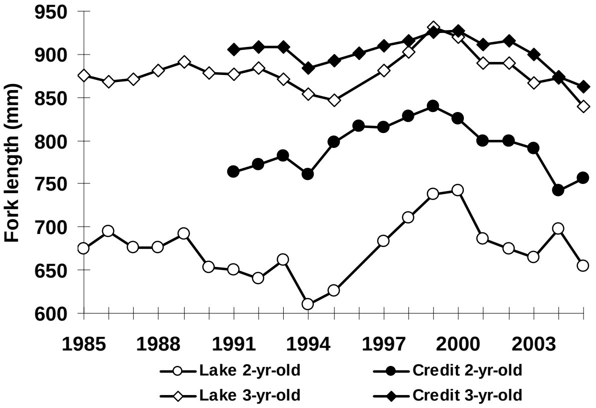


FIG. 2.9.3. Fork length of Chinook salmon, caught by anglers in Lake Ontario during summer 1985-2005, and caught for spawn collection in the Credit River (approximately Oct. 1), 1991-2005.

3. Recreational Fishing Surveys

3.1 Western Lake Ontario Boat Fishery

The portion of the salmon and trout fishery that launches boats from ramps (launch daily fishery) in western Lake Ontario was monitored in most years since 1977. The sampling design was based on seasonal stratification by month from April-September, and spatial stratification into six sectors from the Niagara River to Wellington. Anglers were interviewed at selected high-effort ramps after fishing was completed. Boat trailers were counted to estimate effort at all ramps from the Niagara River to Wellington, and these counts were used to 'scale-up' effort, catch, and harvest, accordingly. Estimates for the total salmon and trout fishery were made using the ratio of effort, catch, and harvest between launch daily and marina based fisheries in 1995.

In 2005, Chinook salmon dominated the catch and harvest in the Lake Ontario boat angler fishery, followed by rainbow trout (Table 3.1.1). Together the two species represented about 95% of the catch and harvest. Declines in catch over the past decade have paralleled a decline in effort. The effort of launch daily anglers and all boat anglers was estimated at 212,544 and 390,633 angler-hours, respectively. Effort increased in 2005 from the two previous years (Table 3.1.2).

Catch rates for the time series from 1977-2004 show major shifts in salmon and trout populations and the quality of angling in Lake Ontario (Fig. 3.1.1). Coho salmon was the dominant salmonid in Lake Ontario during the 1970s. Catch rates of rainbow trout and Chinook salmon increased as more were stocked in the 1980s but only Chinook salmon has maintained high catch rates in recent years.

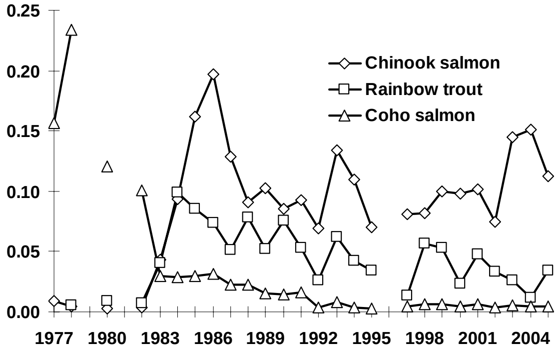


FIG. 3.1.1. The catch rate of Chinook and coho salmon, and rainbow trout in the salmonid boat fishery in western Lake Ontario (Ontario portion), 1977-2005.

TABLE 3.1.1. Angling statistics for the salmonid boat fishery in western Lake Ontario (Ontario portion) during April -September, 2005.

	Launch daily anglers					All boat anglers				
Species	Catch	Harvest	Catch rate (fish/angler-hour)	Harvest rate (fish/angler-hour)	Release rate (%)	Catch	Harvest	Catch rate (fish/angler-hour)	Harvest rate (fish/angler-hour)	Release rate (%)
Chinook salmon	23,927	10,266	0.1126	0.0483	57	42,468	20,731	0.1087	0.0531	51
Rainbow trout	7,171	4,909	0.0337	0.0231	32	20,974	17,548	0.0537	0.0449	16
Coho salmon	877	394	0.0041	0.0019	55	1,072	579	0.0027	0.0015	46
Brown trout	194	63	0.0009	0.0003	67	202	68	0.0005	0.0002	66
Lake trout	475	71	0.0022	0.0003	85	595	84	0.0015	0.0002	86
Atlantic salmon	83	83	0.0004	0.0004	0	123	123	0.0003	0.0003	0
Unidentified salmonine	295	59	0.0014	0.0003	80	556	109	0.0014	0.0003	80
Total salmonines	33,021	15,845	0.1554	0.0745	52	65,989	39,242	0.1689	0.1005	41

TABLE 3.1.2. Angling statistics for the salmonid boat fishery in the western Lake Ontario (Ontario portion), 1977-2005.

	Catch					Harvest					
Year	Chinook salmon	Rainbow trout	Coho salmon	Brown trout	Lake trout	Chinook salmon	Rainbow trout	Coho salmon	Brown trout	Lake trout	Effort (angler-hr)
1977	4,047	NA	72,718	NA	NA	3,972	NA	72,586	NA	NA	465,137
1978	1,928	2,109	97,924	450	72	1,892	2,096	97,746	450	72	418,895
1980	1,774	5,769	79,326	86	317	1,774	5,756	79,129	86	273	656,086
1982	2,730	5,435	74,854	129	1,512	2,447	4,126	66,998	129	1,172	744,802
1983	23,303	21,774	16,049	1,566	4,627	17,083	17,190	13,546	1,190	3,537	534,473
1984	41,764	43,774	12,867	5,224	9,259	32,906	35,627	10,458	3,991	6,242	444,448
1985	187,686	98,471	34,203	7,032	42,147	125,322	83,530	22,239	4,108	25,305	1,157,073
1986	268,877	100,824	43,294	2,831	24,775	157,675	73,377	29,200	1,471	9,013	1,363,082
1987	155,796	62,565	27,380	2,905	21,225	108,024	44,977	12,262	1,399	8,391	1,215,219
1988	112,289	96,008	27,983	5,542	9,307	74,606	73,561	16,180	3,100	3,012	1,233,013
1989	103,796	52,545	15,082	3,029	11,868	71,025	35,230	11,315	1,548	3,856	1,010,516
1990	94,786	84,229	15,906	2,817	12,201	60,701	67,529	10,516	1,040	2,832	1,112,047
1991	99,841	57,281	17,643	7,151	41,277	66,079	38,712	14,574	3,119	6,843	1,082,287
1992	69,959	26,742	3,222	4,010	7,891	50,182	18,381	1,826	1,761	2,997	1,012,822
1993	111,852	51,733	6,845	2,174	6,332	64,444	28,738	4,643	1,208	3,434	836,572
1994	66,031	25,227	2,254	3,983	13,623	38,170	14,382	1,517	2,251	5,443	601,325
1995	35,783	17,345	1,366	1,911	9,965	21,055	10,625	745	1,049	4,025	512,738
1997	43,032	7,011	2,620	1,820	17,075	23,655	3,985	1,474	1,035	2,322	531,072
1998	38,845	26,815	3,173	1,561	1,712	23,363	16,976	1,682	829	667	473,843
1999	49,843	26,539	3,305	904	5,366	28,925	18,463	3,211	428	1,408	499,159
2000	47,536	11,171	2,354	1,560	3,183	28,430	5,884	1,304	537	789	484,727
2001	41,227	19,095	2,506	1,840	2,874	19,624	11,393	1,582	1,002	357	404,368
2002	30,313	13,503	1,568	639	567	15,840	8,756	1,382	277	117	405,730
2003	50,290	9,137	1,784	931	2,244	17,659	4,928	1,297	311	480	346,766
2004	42,997	4,908	1,048	570	2,300	18,182	3,480	875	154	444	276,896
2005	42,468	20,974	1,072	202	595	20,731	17,548	579	68	84	390,633

3.2 Bay of Quinte Recreational Fishery

Recreational angling surveys were conducted on the Bay of Quinte, from Trenton to just east of Glenora, during the walleye angling season. The ice fishery was surveyed from late December to February 29 and the open-water boat fishery was surveyed from the first Saturday in May to late November. Angling effort was measured using aerial counts during the ice fishing survey, and a combination of aerial counts and on-water counts during the open-water survey. On-ice and on-water angler interviews provide information on catch/harvest rates and biological characteristics of the harvest.

Ice fishery

Seven hundred and seventy-four anglers were interviewed by field crews during the ice fishery. Forty-four percent of anglers interviewed were local, 49% were from Ontario (outside the local area), and 7% were from the US (Fig. 3.2.1). Eight different species were observed during the ice fishery (Table 3.2.1). All angling effort was targeted at walleye (Table 3.2.2). Fishing effort in 2005 (59,227 angler hours) was down slightly from the previous year. Numbers of walleye caught and harvested were 3,450 and 1,947 respectively. Walleye fishing success (number of walleye caught and harvested per hour were 0.059 and 0.034 respectively) was down compared to the previous year. The numbers of walleye caught, harvested and released, by size-class, are shown in Fig. 3.2.2.

Open-water fishery

Over 3,300 anglers (1,451 boats) were interviewed by field crews during the open-water fishery. Thirty-four percent of anglers interviewed were local, 56% were from Ontario (outside the local area), 8% were from the US and 2% were from elsewhere in Canada (Fig. 3.2.1). Nineteen different species were caught during the open-water fishing season (Table 3.2.1). Angling effort was targeted primarily at walleye (91%, Table 3.2.3). Fishing effort in 2005 (225,385 angler hours for all anglers and 205,933 hours for anglers targeting walleye) was very similar to the previous year. Numbers of walleye caught and harvested were 42,213 and 25,757 respectively; also very similar to the previous year. Walleye fishing success (number of walleye caught and harvest per hour by anglers targeting walleye were 0.204 and 0.125 respectively) was also remarkably similar to the previous year. Over 50% of harvested walleye were age-2 (Table 3.2.4, Fig. 3.2.3) from the 2003 year-class and 30% were age-4 from the 2001 year-class. Very few age-3 walleye were harvested. Other species caught included over 77,000 yellow perch and about 11,000 largemouth bass (Table 3.2.1). The numbers of walleye caught, harvested and released, by size-class, are shown in Fig. 3.2.2. Most walleye caught and harvested were less than 480 mm (19 in) total length. However, with removal

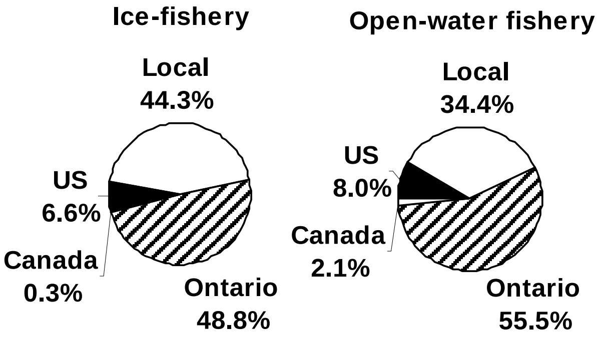


FIG. 3.2.1. Origin of anglers participating in the Bay of Quinte ice and open-water fisheries, 2005.

TABLE. 3.2.1. Numbers of fish caught during Bay of Quinte ice and open-water fisheries, 2005.

	Ice-fishery	Open-water fishery
Longnose gar	-	211
Bowfin	-	45
Lake whitefish	93	-
Northern pike	70	3,047
Carp	-	44
Brown bullead	-	3,444
Channel catcfish	31	603
White perch	-	8,326
White bass	-	18
Rock bass	399	1,913
Pumpkinseed	-	3,399
Blugill	63	641
Smallmouth bass	-	9,542
Largemouth bass	-	11,011
Black crappie	-	201
Sunfish	-	2,662
Yellow perch	29,314	77,681
Walleye	3,450	42,213
Round goby	21	7,893
Freshwater drum	-	7,799
Total catch	33,442	180,693

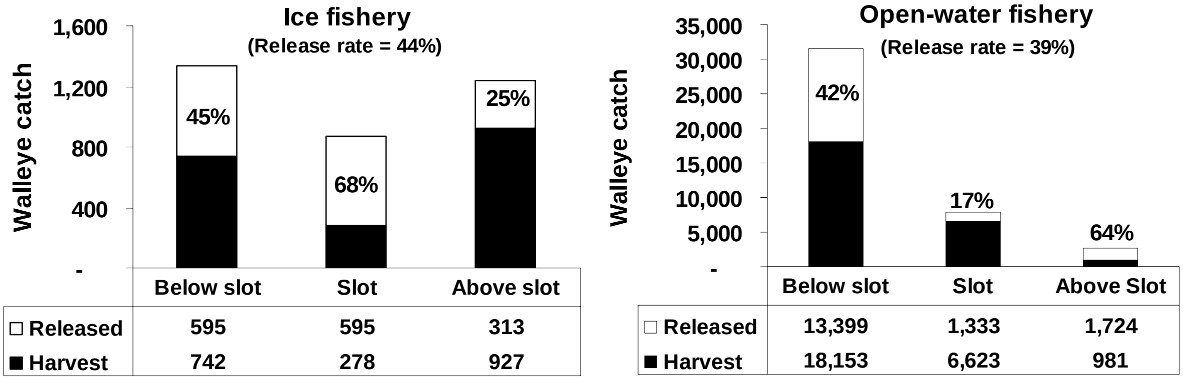
of the slot size restriction prior to the 2005 open-water fishing season, the release rate of “slot-sized” (i.e., the size of fish formerly restricted) walleye declined from 75% in 2004 to 17% in 2005. Release rate of walleye below the slot increased from 24% in 2004 to 42% in 2005, while the release for fish above the slot was about the same.

TABLE 3.2.2. Summary of fishing effort (virtually all fishing effort is targeted at walleye), numbers of fish harvested and caught, and walleye angling success (CUE and HUE are the numbers of walleye caught and harvested, respectively, per hour) during the Bay of Quinte ice fishery (first ice formation to February 28), 1993-2005.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Fishing Effort (angler hours):													
Total All Anglers	271,088	300,049	215,518	392,602	220,263	117,602	140,363	139,047	77,074	37,129	16,237	79,767	59,227
Number of Walleye:													
Caught	21,326	31,060	28,939	58,468	42,315	11,167	23,293	9,949	982	2,601	321	8,413	3,450
Harvested	14,816	8,557	17,445	20,972	22,631	6,089	15,285	9,240	938	2,468	70	4,075	1,947
Walleye Angling Success:													
CUE	0.079	0.104	0.134	0.149	0.192	0.095	0.166	0.072	0.013	0.070	0.020	0.105	0.059
HUE	0.055	0.029	0.081	0.053	0.103	0.052	0.109	0.066	0.012	0.066	0.004	0.051	0.034

TABLE 3.2.3. Summary of fishing effort (expressed in angler hours separately for all anglers and those targeting walleye), numbers of fish harvested and caught, and walleye angling success (CUE and HUE are the numbers of walleye caught and harvested, respectively, per hour by anglers targeting walleye) during the Bay of Quinte open-water recreational fishery (first Saturday in May, opening day ofwalleye season, to November 30), 1993-2005. 1The number of smallmouth and largemouth bass are for the last Saturday in June (opening day of bass season) to November 30, and are only available for the past three years.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Fishing Effort (angler hours):													
Total All Anglers	644,477	693,731	519,276	665,436	544,476	481,553	379,012	309,259	247,537	177,092	219,684	241,700	225,385
Anglers Targeting Walleye	637,401	689,543	512,054	660,005	539,276	475,678	374,128	296,841	222,052	154,570	194,168	203,082	205,933
Number of Fish Harvested:													
Northern Pike	2,279	1,717	375	1,228	1,501	1,539	1,413	2,561	1,658	7,084	818	1,356	748
Smallmouth Bass[1]									778	519	704	1,075	1,312
Largemouth Bass[1]									4,890	2,340	4,333	6,808	3,871
Yellow Perch	8,205	5,226	14,587	33,609	31,462	41,313	35,102	17,630	7,768	3,876	4,588	3,440	5,569
Walleye	145,383	145,642	98,537	117,931	82,790	52,844	33,575	22,811	28,078	17,903	34,905	24,277	25,757
Number of Fish Caught:													
Northern Pike	10,318	11,691	2,964	5,884	7,912	7,950	11,577	15,809	10,835	7,084	5,134	7,834	3,047
Smallmouth Bass[1]									6,347	2,884	3,453	4,052	9,542
Largemouth Bass[1]									19,675	11,387	15,002	22,946	11,011
Yellow Perch	141,424	80,699	102,433	298,677	402,216	620,849	391,708	260,029	143,530	104,071	125,129	70,369	77,681
Walleye	266,638	262,760	166,229	209,280	134,651	70,527	47,562	28,024	40,734	29,459	70,471	39,251	42,213
Walleye Angling Success													
CUE	0.417	0.378	0.320	0.317	0.250	0.148	0.127	0.094	0.182	0.186	0.344	0.193	0.204
HUE	0.227	0.209	0.189	0.179	0.154	0.111	0.090	0.077	0.126	0.113	0.178	0.119	0.125



	Below slot	Slot	Above slot
☐ Released	595	595	313
■ Harvest	742	278	927

	Below slot	Slot	Above Slot
☐ Released	13,399	1,333	1,724
■ Harvest	18,153	6,623	981

FIG. 3.2.2. Walleye catch (harvested and released) by size-category during the ice and open-water fisheries on the Bay of Quinte, 2005. "Below slot" is <480 mm total length, "Slot" is 480 mm to 630 mm total length and "Above slot" is >630 mm total length. Percentages shown are walleye release rates, overall and by size-category. *Note that the slot size harvest restriction was removed just prior to the 2005 open-water fishery.*

TABLE 3.2.4. Age-specific walleye harvest during the Bay of Quinte open-water recreational fishery, 1993-2005.

	Age						
Year	2	3	4	5	6	7+	Total
1993	25,311	51,389	42,373	10,474	6,184	9,653	145,383
1994	14,816	74,746	29,598	15,192	5,907	5,383	145,642
1995	2,493	51,808	28,592	8,527	2,136	4,982	98,537
1996	4,986	36,636	35,628	23,451	8,185	9,044	117,931
1997	22,536	35,639	10,206	8,908	3,270	2,231	82,790
1998	2,733	15,793	24,296	4,859	2,126	3,037	52,844
1999	2,763	8,500	8,925	7,225	2,550	3,613	33,575
2000	2,570	10,924	2,249	2,249	2,570	2,249	22,811
2001	14,649	2,442	6,453	1,395	1,570	1,570	28,078
2002	5,182	11,072	236	236	-	1,178	17,903
2003	18,422	8,034	4,017	139	-	4,294	34,905
2004	629	20,503	1,006	377	126	1,635	24,277
2005	13,926	1,109	7,764	739	1,109	1,109	25,757

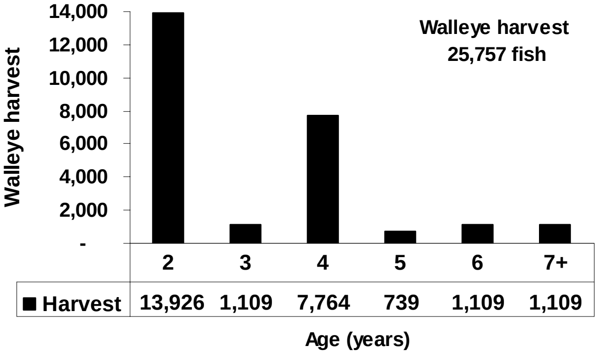


FIG. 3.2.3. Age-specific walleye harvest during the Bay of Quinte open-water recreational fishery, 2005.

4. Commercial Fishery

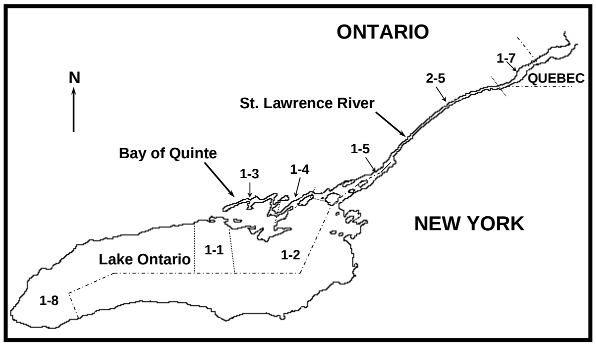


FIG. 4.1.1. Map of Lake Ontario and the St. Lawrence River showing commercial fishing quota zones in Canadian waters.

4.1 Quota and Harvest Summary

Lake Ontario supports a locally important commercial fish industry. The commercial harvest comes primarily from the Canadian waters of Lake Ontario east of Brighton (including the Bay of Quinte) and the St. Lawrence River (Fig. 4.1.1). Commercial harvest statistics for 2005 were obtained from the Ontario Commercial Fisheries Association (OCFA) which, in partnership with the Ontario Ministry of Natural Resources, manages the Province of Ontario's commercial harvest database. Commercial quota and harvest statistics for 2005 are shown in Tables 4.1.1 and 4.1.2 respectively.

Lake Ontario

The total harvest of all species was 395,365 lb ($310,084) in 2005, and has declined by 70% since 1996 (Fig. 4.1.2, Table 4.1.3).

Lake whitefish
Lake whitefish harvest was 52,189 lb, 22% of the quota. The annual lake whitefish harvest has declined by 93% since 1996. Biological attribute (e.g., size and age structure) information for harvested lake whitefish is reported in Section 4.2.

Yellow perch
Yellow perch harvest was 99,461 lb, 22% of the quota. Yellow perch harvest had increased significantly from 1996 to 1999, declined by over 72% between 1999 and 2004, but increased somewhat in 2005.

Walleye
Walleye harvest was 9,313 lb, 18% of the quota.

St. Lawrence River

The total harvest of all species was 221,294 lb ($206,479) in 2005, a significant increase compared with the previous year (Fig. 4.1.3, Table 4.1.4).

Yellow perch
Yellow perch harvest was 32,447, 21% of the quota.

TABLE 4.1.1. Commercial fish quota (lb) issued to commercial licences in the Canadian waters of Lake Ontario, 2005. See Fig. 1 for a map of the quota zones. Quota represents the amount issued to all fishers at the end of the year or, in the case of yellow perch in quota zones 1-5, 2-5 and 1-7, includes quota available in a "pool".

	Quota by quota zone (lb)								Quota by waterbody (lb)	
	1-1	1-2	1-3	1-4	1-8	1-5	2-5	1-7	Lake Ontario	St. Lawrence River
Alewife							600		-	600
Black crappie	4,540	2,500	20,550	800	2,800	18,590	18,140	4,840	31,190	41,570
Bowfin					500				500	-
Brown bullhead	36,200								36,200	-
Common carp			1,000						1,000	-
Lake whitefish	12,836	153,741	31,719	40,615	416	-	-	-	239,327	-
Lepomis	28,130								28,130	-
Walleye	4,510	36,998	-	10,717	800	-	-	-	53,025	-
Yellow perch	35,590	182,508	96,128	126,170	13,000	65,696	83,174	5,760	453,396	154,630
Total	121,806	375,747	149,397	178,302	17,516	84,286	101,914	10,600	842,768	196,800

TABLE 4.1.2. Commercial harvest (lb) and value ($) for fish species harvested from the Canadian waters of Lake Ontario and the St. Lawrence River, 2005. See Fig. 1 for a map of the quota zones.

										Harvest (lb) and value by water body			
				Quota zone						Lake Ontario		St. Lawrence River	
Species	1-1	1-2	1-3	1-4	1-8	1-5	2-5	1-7	Price per lb	Harvest (lb)	Value	Harvest (lb)	Value
Black crappie	132	32	10,299	5	702	11,402	2,308	654	$ 2.19	11,170	$ 24,462	14,364	$ 31,457
Bowfin	735	107	2,566	-	57	4,375	-	-	$ 0.31	3,465	$ 1,074	4,375	$ 1,356
Brown bullhead	10,344	2,055	62,262	1,546	5,558	28,808	18,552	22,972	$ 0.37	81,765	$ 30,253	70,332	$ 26,023
Channel catfish	-	-	2	4	1,769	-	-	-	$ 0.41	1,775	$ 728	-	$ -
Common carp	-	1,403	2,286	496	1,736	146	-	-	$ 0.24	5,921	$ 1,421	146	$ 35
Freshwater drum	197	941	31,015	9,090	1,100	28	-	-	$ 0.09	42,343	$ 3,811	28	$ 3
Lake herring	5	128	1,327	203	-	-	-	-	$ 0.28	1,663	$ 466	-	$ -
Lake whitefish	7	40,903	10,761	518	-	-	-	-	$ 0.52	52,189	$ 27,138	-	$ -
Rock bass	1,448	1,145	5,353	797	23	556	335	-	$ 0.45	8,766	$ 3,945	891	$ 401
Suckers	108	2,389	8,601	47	424	14	-	1,282	$ 0.10	11,569	$ 1,157	1,296	$ 130
Sunfish	846	75	50,275	65	62	61,397	14,714	18,688	$ 1.07	51,323	$ 54,916	94,799	$ 101,435
Walleye	1,004	2,892	-	5,373	44	-	-	-	$ 2.00	9,313	$ 18,626	-	$ -
White bass	-	65	88	357	31	1	-	-	$ 0.33	541	$ 179	1	$ 0
White perch	18	55	8,787	5,182	59	2,615	-	-	$ 0.33	14,101	$ 4,653	2,615	$ 863
Yellow perch	2,228	22,770	29,465	44,902	96	19,811	9,800	2,836	$ 1.38	99,461	$ 137,256	32,447	$ 44,777
Totals	17,072	74,960	223,087	68,585	11,661	129,153	45,709	46,432		395,365	$ 310,084	221,294	$ 206,479

TABLE 4.1.3. Commercial harvest (lb; 1960-2005) and landed value ($; 1985-2005) trends for the Canadian waters of Lake Ontario, including the Bay of Quinte.

	Harvest (lb)	Value ($)		Harvest (lb)	Value ($)
1960	1,834,000		1983	2,263,000	
1961	2,026,000		1984	2,050,000	
1962	1,620,000		1985	1,497,000	$ 906,879
1963	1,847,000		1986	1,759,000	$ 1,577,086
1964	1,814,000		1987	756,000	$ 993,609
1965	2,226,000		1988	1,190,000	$ 896,481
1966	1,347,000		1989	1,211,000	$ 989,563
1967	1,617,000		1990	1,165,000	$ 907,409
1968	1,829,000		1991	1,210,000	$ 1,003,909
1969	2,130,000		1992	1,191,000	$ 1,039,892
1970	2,798,000		1993	1,103,000	$ 746,892
1971	2,804,000		1994	1,243,097	$ 1,277,262
1972	2,455,000		1995	1,218,508	$ 1,322,557
1973	2,279,000		1996	1,284,022	$ 1,456,736
1974	2,299,000		1997	1,078,250	$ 996,383
1975	2,664,000		1998	973,006	$ 1,059,212
1976	2,935,000		1999	964,743	$ 1,067,904
1977	2,456,000		2000	914,014	$ 990,544
1978	2,469,000		2001	840,557	$ 861,978
1979	2,042,000		2002	602,338	$ 475,262
1980	1,982,000		2003	447,633	$ 324,320
1981	2,387,000		2004	404,236	$ 249,444
1982	1,999,000		2005	395,365	$ 310,084

TABLE 4.1.4. Commercial harvest (lb; 1988-2005) and landed value ($; 1989-1994 and 1996-2005) trends for the Canadian waters of the St. Lawrence River.

	Harvest (lb)	Value ($)
1988	318,000	
1989	273,800	$ 217,000
1990	305,100	$ 237,000
1991	247,600	$ 328,100
1992	292,700	$ 257,300
1993	237,000	$ 171,900
1994	262,240	$ 257,900
1995	375,763	
1996	445,052	$ 399,856
1997	353,838	$ 397,494
1998	378,729	$ 424,111
1999	368,035	$ 438,581
2000	341,672	$ 407,647
2001	272,523	$ 352,551
2002	266,817	$ 241,817
2003	211,254	$ 203,710
2004	143,845	$ 102,646
2005	221,294	$ 206,479

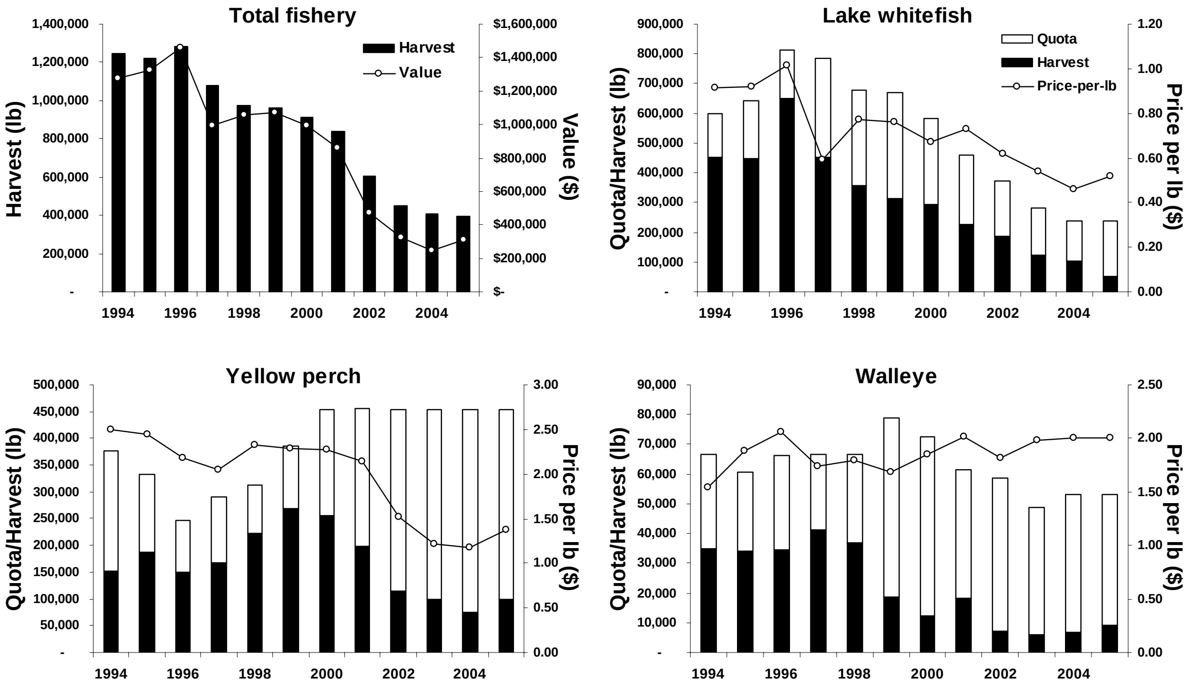


FIG. 4.1.2. Total harvest and value for the Lake Ontario commercial fishery and quota, harvest and price-per-lb for lake whitefish, yellow perch and walleye, 1994-2005.

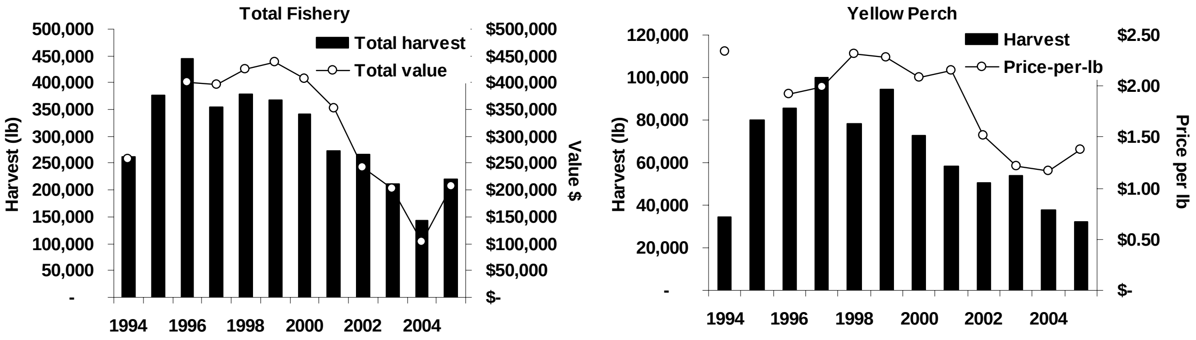


FIG. 4.1.3. Total harvest and value for the St. Lawrence River commercial fishery, and harvest and price-per-lb for yellow perch, 1994-2005.

4.2 Lake Whitefish Commercial Catch Sampling

Sampling of commercially harvested lake whitefish for biological attribute information occurs annually. While total lake whitefish harvest can be determined from commercial fish Daily Catch Reports (DCRs; see section 4.1), biological sampling of the catch is necessary to break-down total harvest into size and age-specific harvest. Age-specific harvest data can then be used in catch-age modeling to estimate population size and mortality schedule.

Biological sampling generally focuses on the largest components of the commercial lake whitefish fishery. Proportion (by weight) of commercial lake whitefish harvest by gear type, quota zone, and month for 2005 is reported in Table 4.2.1. For many years the largest components of the fishery were the November spawning-time gillnet fishery on the south shore of Prince Edward County (commercial fishing Quota Zone 1-2) and the October/November spawning-time impoundment gear fishery in the Bay of Quinte (QZ 1-3). Consequently, age-specific harvest from these two components (representing 70% of total harvest in 2005) of the fishery is reported here. A limited amount of biological sampling also took place during a small impoundment gear fishery (April/May 2005); also in QZ 1-2. In 2005, 17% of the total lake whitefish harvest occurred during summer in QZ 1-2 as part of an extended gillnet fishing season (see Section 8.6).

The lake whitefish sampling design involves obtaining large numbers of length tally measurements and a smaller length-stratified sub-sample for more detailed biological sampling (Table 4.2.2). In total, fork length was measured for 3,595 fish and age was interpreted (i.e., using otoliths) for 458 fish.

Lake Ontario Spawning Stock (QZ 1-2)

Mean fork length and age were 502 mm and 11.9 years, respectively (Fig. 4.2.1). Fish ranged from ages 5 to 22 years. Age-13 (1992 year-class) and age-10 (1995 year-class) fish were the most abundant, collectively representing over 40% of the harvest. Fish age-10 to 15 comprised 85% of the harvest. Mean age of the commercial lake whitefish harvest increased steadily after 1995 as the strong early-1990s year-classes “moved through” the fishery, and as age at first recruitment to the fishery increased over the same time-period (Table 4.2.3).

TABLE 4.2.1. Proportion (by weight) of commercial lake whitefish harvest by gear type, quota zone, and month, 2005. Bolded values indicate months and quota zones where biological samples were collected. Values in italics highlight an "extended" lake whitefish season for 2005 in quota zone 1-2 (see Section 8.6).

	Gillnet		Impoundment gear				Total
Month	1-2	1-4	1-1	1-2	1-3	1-4	
January	0.000	0.008	0.000	0.000	0.000	0.000	0.008
February	0.000	0.000	0.000	0.000	0.000	0.000	0.000
March	0.000	0.000	0.000	0.001	0.000	0.000	0.001
April	0.000	0.000	0.000	**0.056**	0.003	0.000	0.059
May	0.000	0.000	0.000	0.011	0.000	0.000	0.011
June	0.000	0.000	0.000	0.000	0.000	0.000	0.000
July	*0.000*	0.000	0.000	0.000	0.000	0.000	0.000
August	*0.032*	0.000	0.000	0.000	0.000	0.000	0.032
September	*0.119*	0.000	0.000	0.000	0.000	0.000	0.119
October	*0.015*	0.001	0.000	0.011	**0.045**	0.000	0.072
November	**0.444**	0.002	0.000	0.013	**0.159**	0.000	0.617
December	**0.081**	0.000	0.000	0.000	0.000	0.000	0.081
Total	0.690	0.011	0.000	0.092	0.207	0.000	1.000

TABLE 4.2.2. Number of lake whitefish sampled for length and age, by quota zone and month, in the 2005 commercial catch sampling program.

Quota Zone	Month	Lengthed	Aged
1-2	April	180	0
	May	50	0
	November	1463	143
	December	742	0
1-3	October	633	0
	November	815	171
Total		**3,883**	**314**

Bay of Quinte Spawning Stock (QZ 1-3)

Mean fork length and age were 492 mm and 11.8 years, respectively (Fig. 4.2.2). Fish ranged from ages 6 to 22 years. Age-14 fish were the most abundant. This represents the twelfth consecutive year that the 1991 year-class was the most abundant year-class (ranging from 26-62% of the harvest during the 12-year time period) in the Quota Zone 1-3 commercial harvest. Similar to the Lake Ontario commercial harvest, mean age of the commercial lake whitefish harvest in the Bay of Quinte increased steadily after 1995 as the 1991 year-class “moved through" the fishery, and as age at first recruitment to the fishery increased over the same time-period (Table 4.2.4).

Lake Whitefish Condition

Lake whitefish (Lake Ontario and Bay of Quinte spawning stocks combined) condition (lb) standardized for a fish of length 21 inches (480 mm fork length) is shown in Figure 4.2.3. Condition declined markedly in 1994, appeared to "bottom-out" during the 1996-1999 time period, improved slightly through 2004 but declined slightly in 2005.

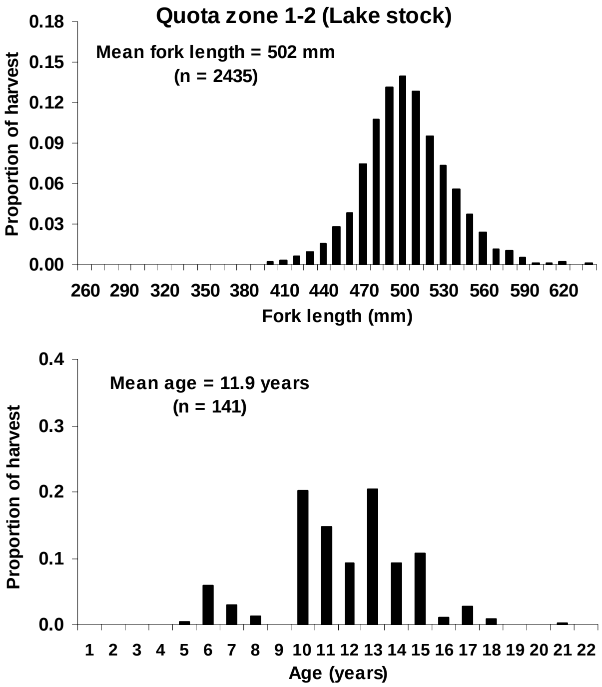


FIG. 4.2.1. Size and age distribution (by number) of lake whitefish sampled in Quota Zone 1-2 during the 2005 commercial catch sampling program.

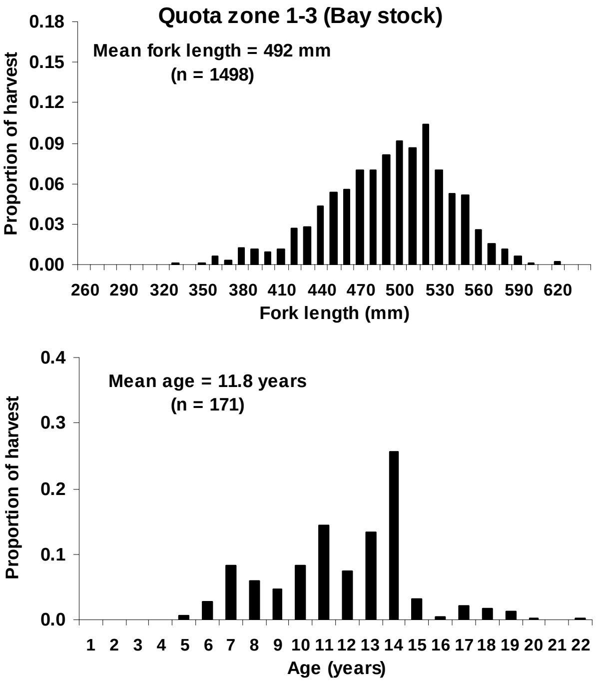


FIG. 4.2.2. Size and age distribution (by number) of lake whitefish sampled in Quota Zone 1-3 during the 2005 commercial catch sampling program.

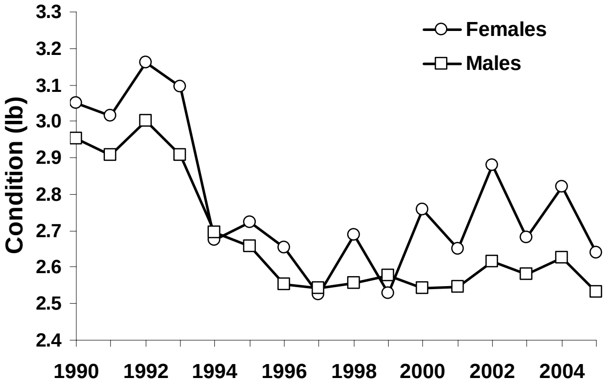


FIG. 4.2.3. Lake whitefish (Lake Ontario and Bay of Quinte spawning stocks combined) condition (lb) standardized for a fish of length 21 inches (480 mm fork length), 1990-2005.

TABLE 4.2.3. Age distribution (proportion by number) of lake whitefish harvested in Quota Zone 1-2, 1993-2005.

Age	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	0.000	0.071	0.015	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4	0.050	0.206	0.093	0.158	0.001	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	0.282	0.193	0.220	0.136	0.075	0.066	0.000	0.001	0.002	0.000	0.000	0.011	0.003
6	0.342	0.246	0.197	0.296	0.179	0.247	0.067	0.020	0.054	0.008	0.000	0.002	0.059
7	0.249	0.220	0.212	0.093	0.270	0.205	0.238	0.156	0.093	0.163	0.016	0.003	0.029
8	0.068	0.014	0.222	0.102	0.096	0.090	0.238	0.267	0.166	0.096	0.076	0.001	0.012
9	0.000	0.006	0.028	0.159	0.140	0.060	0.067	0.253	0.292	0.132	0.118	0.245	0.000
10	0.000	0.003	0.002	0.034	0.133	0.108	0.076	0.105	0.219	0.338	0.137	0.103	0.202
11	0.000	0.004	0.000	0.009	0.094	0.060	0.067	0.063	0.070	0.134	0.376	0.156	0.148
12	0.008	0.004	0.000	0.000	0.003	0.060	0.210	0.033	0.034	0.074	0.186	0.329	0.092
13	0.000	0.007	0.001	0.003	0.000	0.030	0.029	0.070	0.018	0.024	0.045	0.084	0.205
14	0.000	0.002	0.006	0.000	0.000	0.018	0.000	0.013	0.031	0.012	0.010	0.031	0.092
15	0.000	0.003	0.000	0.003	0.002	0.006	0.000	0.018	0.020	0.011	0.009	0.003	0.107
16	0.000	0.000	0.004	0.003	0.001	0.006	0.000	0.000	0.000	0.007	0.013	0.008	0.011
17	0.000	0.000	0.000	0.001	0.003	0.000	0.000	0.000	0.000	0.000	0.013	0.020	0.028
18	0.000	0.021	0.000	0.001	0.004	0.006	0.010	0.000	0.000	0.000	0.000	0.005	0.009
19	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001
20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001
21	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
22	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Mean	6.0	5.9	6.4	6.6	7.9	8.1	9.1	9.2	9.3	9.7	10.8	11.1	11.9

TABLE 4.2.4. Age distribution (proportion by number) of lake whitefish harvested in Quota Zone 1-3, 1993-2005.

Age	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	0.014	0.293	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4	0.093	0.232	0.617	0.079	0.000	0.000	0.039	0.012	0.000	0.000	0.001	0.001	0.000
5	0.106	0.069	0.161	0.385	0.104	0.088	0.070	0.010	0.000	0.000	0.019	0.000	0.006
6	0.306	0.122	0.016	0.145	0.527	0.140	0.109	0.055	0.101	0.017	0.010	0.033	0.027
7	0.237	0.115	0.040	0.047	0.075	0.390	0.101	0.179	0.150	0.094	0.044	0.046	0.082
8	0.119	0.093	0.053	0.047	0.087	0.081	0.450	0.172	0.068	0.133	0.122	0.070	0.059
9	0.057	0.031	0.066	0.119	0.058	0.015	0.062	0.409	0.178	0.141	0.194	0.097	0.046
10	0.014	0.009	0.028	0.097	0.057	0.037	0.008	0.051	0.448	0.176	0.084	0.125	0.082
11	0.027	0.031	0.013	0.044	0.058	0.074	0.031	0.000	0.000	0.314	0.037	0.096	0.144
12	0.013	0.004	0.000	0.004	0.015	0.096	0.023	0.011	0.005	0.027	0.369	0.052	0.073
13	0.014	0.001	0.002	0.017	0.010	0.066	0.054	0.021	0.033	0.013	0.035	0.371	0.133
14	0.000	0.000	0.000	0.006	0.000	0.015	0.031	0.068	0.004	0.014	0.032	0.049	0.257
15	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.001	0.008	0.032	0.021	0.010	0.032
16	0.000	0.000	0.002	0.000	0.009	0.000	0.000	0.001	0.000	0.039	0.005	0.024	0.005
17	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.008	0.000	0.000	0.021	0.016	0.020
18	0.000	0.000	0.000	0.003	0.000	0.000	0.016	0.001	0.004	0.000	0.000	0.007	0.017
19	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.003	0.012
20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.003
21	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
22	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Mean	6.7	5.2	5.2	6.9	7.1	8.2	8.3	8.8	9.0	10.1	10.6	11.4	11.8

5. Age & Growth Summary

Biological sampling of fish from Lake Ontario Management Unit field projects routinely involves collection and archival of structures used for such purposes as age interpretation and validation, origin determination (e.g. stocked versus wild), life history characteristics and other features of fish growth. In 2005, a total of 8,749 structures were collected and 2,745 were processed for age interpretation from 32 different fish species and 11 different field projects (Table 5.1) .

TABLE 5.1. Species-specific summary of age and growth structures collected/archived (n = 8,749) and interpreted for age (2,475) in support of 11 different Lake Ontario Management Unit field projects, 2005.

	Cleithra		Opercula		Otoliths		Scales		Spines	
Species	Collected/ archived	Interpreted for age	Collected/ archived	Interpreted for age	Collected/ archived	Interpreted for age	Collected/ archived	Interpreted for age	Collected/ archived	Interpreted for age
Alewife	0	0	0	0	136	0	0	0	0	0
American eel	0	0	0	0	218	0	0	0	0	0
Atlantic salmon	0	0	0	0	1	0	1	0	0	0
Black crappie	0	0	0	0	0	0	144	111	0	0
Bluegill	0	0	0	0	0	0	133	75	0	0
Brown bullhead	0	0	0	0	0	0	0	0	25	0
Brown trout	0	0	0	0	19	0	27	0	0	0
Burbot	0	0	0	0	6	0	0	0	0	0
Channel catfish	0	0	0	0	0	0	0	0	7	0
Chinook salmon	0	0	0	0	417	222	378	0	0	0
Cisco (Lake herring)	0	0	0	0	82	0	82	0	0	0
Coho salmon	0	0	0	0	9	0	13	0	0	0
Coregonus sp.	0	0	0	0	2	0	2	0	0	0
Freshwater drum	0	0	0	0	439	0	330	0	0	0
Gizzard shad	0	0	0	0	0	0	31	0	0	0
Lake trout	0	0	0	0	173	0	195	0	0	0
Lake whitefish	0	0	0	0	536	354	506	69	0	0
Largemouth bass	0	0	41	0	41	0	92	41	5	0
Northern pike	114	101	0	0	2	0	47	0	0	0
Pumpkinseed	0	0	0	0	0	0	207	65	0	0
Rainbow smelt	0	0	0	0	226	0	0	0	0	0
Rainbow trout	0	0	0	0	110	0	412	214	0	0
Rock bass	0	0	0	0	1	0	132	26	0	0
Round goby	0	0	0	0	140	0	12	0	0	0
Slimy sculpin	0	0	0	0	108	0	0	0	0	0
Smallmouth bass	0	0	0	0	1	0	200	189	83	80
Threespine stickleback	0	0	0	0	20	0	0	0	0	0
Walleye	0	0	0	0	453	297	666	220	9	0
White bass	0	0	0	0	0	0	35	0	0	0
White perch	0	0	0	0	0	0	159	0	0	0
White sucker	0	0	57	0	0	0	0	0	0	0
Yellow perch	0	0	0	0	132	132	1262	279	70	0
Total	114	101	98	0	3272	1005	5066	1289	199	80

6. Contaminant Monitoring

Lake Ontario Management Unit cooperates annually with several agencies to collect fish samples for contaminant testing. In 2005, most (n = 283) most contaminant samples collected were for the Ministry of the Environment and Energy's (MOEE) Sport fish Monitoring program (Table 6.1). Samples were obtained from existing fisheries assessment programs on Lake Ontario, Bay of Quinte, Ganaraska River and the St. Lawrence River. In addition, 14 lake trout and 80 rainbow smelt were collected from the Kingston Basin during August fish community index gillnetting operations for the Department of fisheries and Oceans' (DFO) Contaminant Surveillance program.

TABLE 6.1. Number of fish samples collected for contaminant analysis by the Ministry of Environment and Energy (MOEE), 2005.

Species	Upper Bay of Quinte	Ganaraska River Lake Ontario	Thousand Islands St. Lawrence River	Total
Black crappie	0	0	0	0
Bluegill	20	0	3	23
Brown bullhead	20	0	10	30
Channel catfish	17	0	0	17
Largemouth bass	2	0	7	9
Northern pike	20	0	20	40
Pumpkinseed	0	0	11	11
Rainbow trout	0	20	0	20
Rock bass	1	0	20	21
Smallmouth bass	8	0	20	28
Walleye	20	0	10	30
White perch	14	0	0	14
Yellow perch	20	0	20	40
Total	142	20	121	**283**

7. Enforcement Update

UNAVAILABLE AT TIME OF PRINTING

8. Management Activities

8.1 Stocking

In 2005, OMNR stocked about 2.0 million salmon and trout into Lake Ontario (Table 8.1.1). Figure 8.1.1 shows stocking trends in Ontario waters from 1968 to 2005. The New York State Department of Environmental Conservation (NYSDEC) also stocked 3.45 million salmon and trout into the lake in 2005.

Just over 550,000 Chinook salmon spring fingerlings were stocked at various locations to provide put-grow-and-take fishing opportunities. About 20,000 Chinook salmon were held in pens at two embayment sites in eastern Lake Ontario for a short period of time prior to stocking. This ongoing project is being done in partnership with a local community group to determine whether these fish successfully imprint on the embayments. It is hoped that pen-imprinting will help improve returns of mature adults to this area in the fall, thereby enhancing local nearshore and shore fishing opportunities. Follow-up monitoring is ongoing through the use of angler diaries.

OMNR stocked about 75,000 Atlantic salmon advanced fry and 122,000 fall fingerlings, in support of an ongoing program to restore self-sustaining populations of this native species to the Lake Ontario watershed. We have assessed the feasibility of restoring Atlantic salmon to Lake Ontario, and are encouraged by the results of scientific research that has been done, to date. OMNR is working cooperatively with partners to develop options for moving forward with the next phase of Atlantic salmon restoration. Any changes in stocking rates will be consistent with restoration goals and objectives. This program supports Ontario's new Biodiversity Strategy, and will be delivered by both OMNR and its partners.

TABLE 8.1.1. Salmon and trout stocked into Province of Ontario waters of Lake Ontario, 2005, and target for 2006.

		Number Stocked	
Species		**2005**	**2006**
Atlantic salmon	Fry	77,223	400,000
	Fall fingerlings	121,839	100,000
		199,062	**500,000**
Brown trout	Fall fingerlings	65,508	
	Spring yearlings	173,799	100,000
		239,307	**100,000**
Chinook salmon	Spring fingerlings	**555,260**	**540,000**
Coho salmon	Fall fingerlings	166,870	0
	Spring yearlings	83,097	0
		249,967	**0**
Lake trout	Spring yearlings	**461,219**	**440,000**
Rainbow trout*	Fry	128,500	
	Fall fingerlings	66,539	
	Spring yearlings	141,435	80,000
		336,474	**80,000**
Salmon & trout total		**2,041,289**	**1,660,000**

*Includes only a portion of the partnership stocking events.

About 460,000 lake trout yearlings were also stocked as part of an established, long-term rehabilitation program. Lake trout stocking is focused in eastern Lake Ontario where most of the historic spawning shoals are found. The Mishibishu strain of lake trout will be phased out of the provincial hatchery system. This strain will be replaced by Slate Islands strain in Lake Ontario. We do not anticipate that this change will significantly affect lake trout restoration efforts.

To help address significant financial and capacity issues in the provincial fish culture system, a number of cost-saving measures were taken within the Lake Ontario stocking program this year. As an interim measure, approximately 40% of the brown trout and rainbow trout ear-marked for stocking as yearlings in the spring of 2006 were stocked out early as fingerlings in the fall of 2005. About 67,000 rainbow trout and 65,000 brown trout fall fingerlings were stocked by OMNR, in addition to 131,000 rainbow trout and 174,000 brown trout yearlings. These fish were stocked at various locations to provide shore and boat fishing opportunities.

Approximately 83,000 coho salmon were stocked into the Credit River as spring yearlings. All the remaining coho in the hatchery were stocked out as fall fingerlings and no egg collection was done in the Credit River in 2005. Approximately 167,000 fall fingerlings were stocked into the Credit River, Humber River and Bronte Creek. Coho return to the boat fishery has been low in recent years. Of the 150,0000 coho stocked annually by OMNR, less than 1,000 fish were harvested from Ontario waters in 2005 (see Section 3.1). Less than 2% of the salmon and trout caught by Lake Ontario boat anglers was coho. This may be due, at least in part, to declines in survival precipitated by ecological changes in the lake. We have not been able to meet egg collection

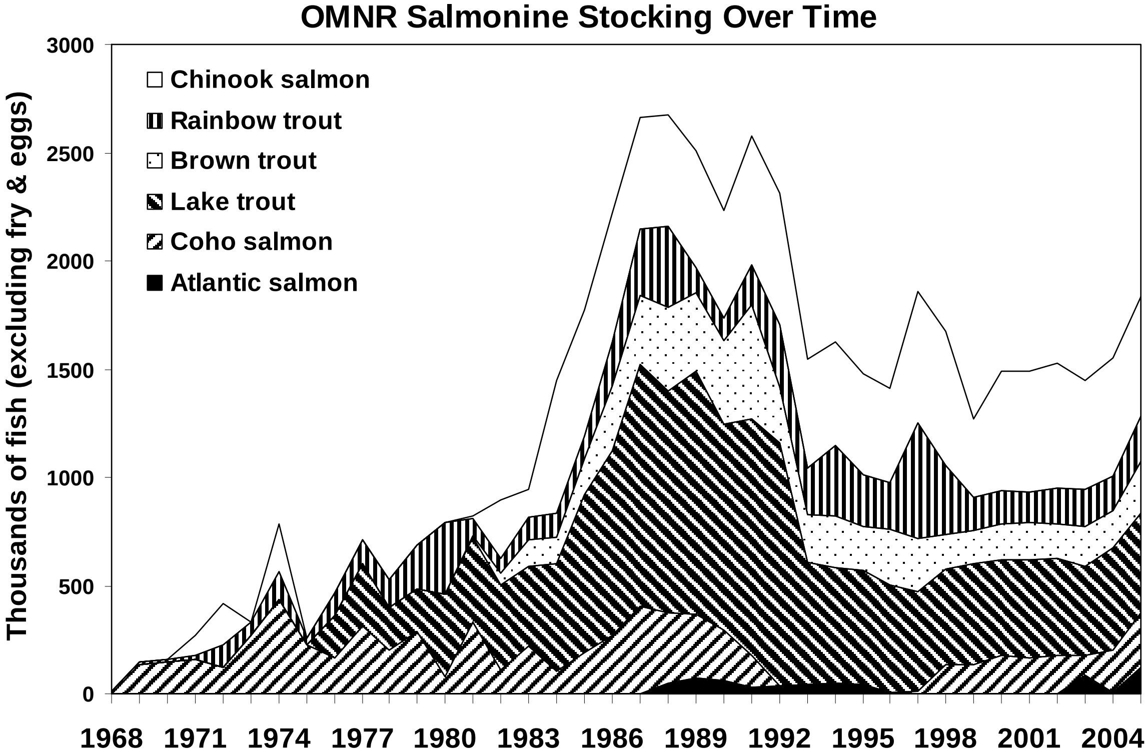


FIG. 8.1.1. Trends in salmon and trout stocking in Ontario water of Lake Ontario, 1968-2005.

targets from fish returning to spawn in the Credit River, since the re-instatement of the program in 1997. Consequently, we have been forced to rely heavily on importation of eggs from the Salmon River in New York State, which then have to be held in quarantine.

OMNR remains committed to providing diverse fisheries and the associated benefits in Lake Ontario and its tributaries, based on wild and stocked fish as appropriate. OMNR is committed also to restoration of native species and supports efforts to maintain/ restore healthy, stable Lake Ontario fish communities.

Detailed information about OMNR's 2005 stocking activities is found in Appendix C.

8.2 Fishing Regulation Changes

Recreational Fishing

Changes to the catch and possession limits for yellow perch in Divisions 11 (St. Lawrence River) and 12A (Lake St. Francis) were implemented in 2005. The new limits for yellow perch in these areas are 50 and 25 fish for holders of Sport and Conservation Fishing Licences, respectively.

Changes to the existing walleye slot limit were made prior to the start of the 2005 open-water angling season. The lower size limit (48 cm or 18.9 in.) was removed. Under the regulation change, anglers in the Bay of Quinte and Lake Ontario may keep walleye that are up to 63 cm (24.8 in.) in length. The catch and possession limits for walleye are four and two fish for holders of Sport and Conservation Fishing Licences, respectively. Holders of both types of licences are allowed to keep one walleye greater than 63 cm in length, as part of their catch limit.

The sport fishery for American eel was closed in 2005 due to serious concerns about the decline of this species in Ontario (and globally).

A new provincial regulation (under the federal Fisheries Act) prohibits the possession of certain live invasive fish species. This will help reduce the rate of spread of non-native species such as the round goby to inland waters by way of bait buckets.

A review of rainbow trout regulations in Lake Ontario and its tributaries is ongoing.

Commercial Fishing

The ban on possession of live invasive fish (including bighead, black, sliver and grass carp, all species of snakehead, and round and tubenose goby) means that some species currently sold live in food markets must be imported freshly killed or frozen. This legislation will help prevent introductions of new invasive species into Ontario waters.

Ecological Framework for Recreational Fisheries Management in Ontario

The development of an ecological framework for the management of recreational fisheries in the Province of Ontario is ongoing. The purpose of this initiative is to streamline and simplify fishing regulations, and help ensure sustainable fisheries. New fisheries management zones (FMZs) are being established across the province. The ministry has set out recommended seasons and creel and size limits for all regulated sport fish species in each of the new zones (to go into effect in 2007). Anglers are encouraged to visit MNR's website at www.mnr.gov.on.ca/MNR/fishing/fmz/index.html to get more information about this process. Proposed changes to fishing regulations are posted on the Environmental Registry at www.ene.gov.on.ca/samples/search/Ebrquery_REG.htm for public comment.

8.3 Native Species Restoration

Atlantic Salmon Restoration Program

Atlantic salmon were extirpated from Lake Ontario by the late 1800s, primarily as a result of the loss of spawning and nursery habitat in the streams. They were a valued resource for First Nations communities and early European settlers. As a top predator, they played a key ecological role in the offshore fish community. As such, Atlantic salmon are recognized as an important part Ontario's natural and cultural heritage. This species is also a good indicator of environmental health and is highly valued by anglers.

While there are certainly many challenges to restoring a native species, the results of our studies, to date, lead us to be optimistic about our chances for successful re-introduction of self-sustaining populations of Atlantic salmon to Lake Ontario. Research has demonstrated that habitat conditions in the streams are suitable for juvenile fish. OMNR is committed to advancing the Atlantic salmon restoration program, with the continued support of our partners and local community groups. It is a long-term commitment that will be played out over the next 10 to 20 years, using an adaptive management approach which is based on: 1) sound, scientific methods, 2) a plan that is dynamic and responsive to new findings, 3) strong partnerships, and 4) community involvement.

The task of revising our existing Atlantic salmon restoration plan is underway, using the recovery planning process prescribed under the new Canadian federal Species at Risk Act as a guide. A draft will be completed by the spring of 2006. It will include action plans for: 1) fish production, 2) improving awareness and public involvement, 3) research and assessment priorities, and 4) habitat improvement opportunities in suitable streams.

New benchmarks (targets) will be set. We will focus efforts on a small set of "best-bet" streams—those with the most suitable spawning and nursery habitat. Stocking rates will be increased to allow us to definitively assess the rate of adult returns to selected streams and production of wild juveniles. We plan to compare stocking of various life history stages to determine which is most effective for restoration (using existing broodstock originating from the LaHave River, Nova Scotia). As resources allow, we also plan to acquire two additional Atlantic salmon stocks, with desirable characteristics for restoration.

Broodstocks will be developed and the performance of their progeny will be evaluated. Performance of Atlantic salmon in the lake also needs to be assessed, particularly in light of the dramatic changes to the Lake Ontario ecosystem in recent years. Efforts to address potential challenges to restoration will be continued.

American Eel

The number of eel migrating upstream at the ladder, located at the R.H. Saunders Hydroelectric Dam on the St. Lawrence River, remains at a very low level (see Section 2.2). The low levels of upstream eel migration suggest that the abundance of large eel in the upper St. Lawrence River and Lake Ontario will remain low for at least the next decade. Actions taken by the Lake Ontario Management Unit to address the declining abundance of eel included:
1) continued operation of the eel ladder at the R.H. Saunders Hydroelectric Dam;
2) holding (in cooperation with partners) a 'Technical workshop aimed at investigating methods for providing safe downstream passage for the American eel (*Anguilla rostrata*) past hydroelectric facilities on the St. Lawrence River' during February, 2005;
3) participating in workshops to evaluate the status of American eel under both the US – Endangered Species Act and the Canadian – Species at Risk Act;
4) participating in the development of a management plan for American eel in Canadian waters in cooperation with the Department of Fisheries and Oceans Canada and the Province of Quebec; and
5) leading, along with Quebec, the development of management plans to improve passage of eel around hydroelectric generating facilities in the St. Lawrence River.

Deepwater Cisco

Deepwater ciscoes once dominated the deepwater fish community in Lake Ontario. However, this species complex has been rare in the lake since the late 1950s. Current ecological conditions favour a restoration endeavour: food resources are present (*Mysis spp.)*, non-native competitors have declined in abundance, deepwater fishing is rare, and contaminant loads are declining.

The objectives of the restoration program are:
1) To identify potential impediments to the development of a hatchery program to rear ciscoes for release as fry (i.e. collection of gametes, strain identification, fish health issues, culture);
2) To assess the distribution, growth, survival and the diet of hatchery ciscoes once released into a natural environment (Lake Ontario); and
3) To examine the genetics of the offspring of the stocked ciscoes.

The Lake Ontario Management Unit (LOMU) in collaboration with the Chippewa Ottawa Resource Authority (CORA), the Great Lakes Fisheries Commission (GLFC), New York State Department of Environmental Conservation (NYSDEC), the United States Geological Survey (USGS), and Laval University, Quebec have made plans in 2005 to obtain and raise cisco gametes. With the help of CORA and commercial fisherman Ralph Wilcox, collection and fertilization of deepwater cisco eggs from Whitefish Bay, Lake Superior occurred in December and January of 2005. Ripe, adult ciscoes, including those that were stripped to supply fertilized gametes were sent to the New York State Department of Environmental Conservation Rome Fish Disease Control Center for disease testing. The results of these tests are pending. Approximately five hundred eyed eggs have been housed at the Nunns Creek Fishery Enhancement Facility, located near Hessel, Michigan and await transfer to a U. S Federal, State or Tribal facility with greater capacity. The ciscoes will be reared for up to eighteen months during which time they will undergo stress tests and disease screening to ascertain possible risks to rehabilitation in Lake Ontario.

8.4 Bay of Quinte Fisheries Advisory Committee (BQFAC)

The Bay of Quinte Fisheries Advisory Committee was formed in May 2003 as a direct result of input received from public meetings concerning the status of the walleye population in the Bay of Quinte and eastern Lake Ontario. The ten member committee was selected to be representative of both local and provincial interests in the fisheries of the Bay of Quinte. Their mandate was to provide input and advice and develop and make recommendations to MNR about the sustainable management of fish communities and fisheries in the Bay of Quinte and eastern Lake Ontario so they may continue to provide social and economic benefits to the local region as well as to the province. The committee was also to play a role in promoting fishing in the area, and in supporting/enhancing communications with local stakeholders.

The committee met four times in 2005 and as in previous years of its operation the committee heard presentations from both MNR and local stakeholders with respect to fisheries issues in the Bay of Quinte. In 2004 an independent review of the Lake Ontario Management Unit (LOMU) assessment program was conducted at the request of the BQFAC. The reviewers, Patrick J. Sullivan and Lars Rudstam from Cornell University, submitted their report to the BQFAC and LOMU on April 7, 2004. The BQFAC reviewed the report and discussed the results with both the reviewers and Ministry biologists prior to drafting their response. In their response the committee recommended to the Minister of Natural Resources that a cost-benefit analysis of the conclusions stated within the report be conducted and that immediate emphasis should be placed on those conclusions related to gear catchability.

In late 2004 the BQFAC recommended to the Minister that the walleye slot limit be removed in the Bay of Quinte in time for the opening of the open-water fishery on May 7, 2006. The committee worked tirelessly with MNR staff to achieve the removal of the slot limit. On May 6, 2006 the Minister of Natural Resources announced that after substantial review the province was increasing walleye fishing opportunities in eastern Lake Ontario by removing the lower size limit on walleye in the Bay of Quinte. Under the new regulation anglers were able to keep walleye up to 63 cm in length and one walleye greater than 63 cm (catch and possession limits dictated by licence, see Section 8.2).

The BQFAC held an Open House on October 3, 2005 at the Fairfield Inn & Suites by Marriott in Belleville, ON. The purpose of the open house was to allow the local community to:
1) Meet the members of the Committee and learn about the BQFAC mandate;
2) Learn what the BQFAC has accomplished for fisheries management in the Bay of Quinte; and
3) Find out how to work with the BQFAC to help shape the future of fisheries management in the Bay of Quinte through the Bay of Quinte Fisheries Management Plan (BQFMP).

Following the open house the BQFAC worked with Randy French of French Planning Services to develop a survey that was handed out at the 1st Open House for the BQFMP held at the Fairfield Inn & Suites in Belleville on December 7th, 2005. The committee will continue to work with both MNR and BQFMP planning teams in 2006.

8.5 Fisheries Management Plans

Bay of Quinte Fisheries Management Plan

The Ministry, along with multi-agency, government, and stakeholder partners, is undertaking the development of a Fisheries Management Plan for the Bay of Quinte (BQFMP). The plan will focus on the promotion of sustainable use of the fish communities in the Bay of Quinte and the improvement of communications between government agencies and stakeholders by providing a framework for the coordinated and cooperative management of the Bay. The Bay of Quinte is a very dynamic ecosystem so the BQFMP will be developed so as to have the capacity to respond to environmental changes.

The Steering and Planning & Development Committees for the FMP were assembled in 2005. An initial focus group meeting was held on July 20, 2005. This meeting brought together staff from multiple agencies and stakeholder groups, with past or present interest in the Bay of Quinte, to more clearly define the BQFMP planning process. The Steering committee met several times during 2005 to work on the terms of reference for the Plan and to provide comment with respect to the initial public consultation exercises.

The planning team of the BQFMP invited the public to attend the initial Open House for the BQFMP on December 7th, 2005 at the Fairfield Inn & Suites by Marriot in Belleville, ON. The purpose of the Open House was to share information:
1) about the development of the Bay of Quinte Fisheries Management Plan (BQFMP) and how the public could become involved;
2) about the state of the Bay of Quinte fisheries; and
3) to receive public feedback.

Presentations about the fisheries management planning process and of background information about the Bay of Quinte fish community were provided. A survey developed by the FMP planning team, the BQFAC, and French Planning Services was distributed to those in attendance. The survey was designed to allow the public and stakeholder groups to identify issues facing the Bay of Quinte fisheries, to comment on how the aquatic resources of the Bay were currently being used and how they would like to see fishery used and managed into the future. Results of the survey will be shared with the public at the next Open House to be held in late May 2006.

Public participation in resource management is an important ingredient in its success. All those who share an interest in the aquatic resources of the Bay of Quinte must have access to information and opportunities to provide input and help shape the decisions that affect both their lives and the resource. For more information on how you can become involved in the Fisheries Management Planning process, please contact the Lake Ontario Management Unit.

Lake St. Francis Fisheries Management Plan

A Fisheries Management Plan (FMP) is currently being developed for Lake St. Francis. The FMP will outline values and concerns expressed by the public, MNR, and other agencies, groups, and stakeholders. The FMP will take into account the various input gathered during public consultations, and develop management strategies that will help guide fisheries management over the next five years.

In 2005, two public meetings were held to provide background information on the Lake St. Francis fish community and solicit public input on the objectives and management techniques. The multi-agency Steering Committee reviewed the public input and developed a draft Fisheries Management Plan which will be provided to the public for review and finalized during 2006. Concurrently with FMP development, a Fish Habitat Management Plan (FHMP) was being written by the Raisin Region Conservation Authority. The FHMP will form an important component of the FMP, and overall management of Lake St. Francis. The FHMP is being developed in order to address concerns identified by the International Joint Commission (IJC) at the Cornwall Area of Concern (AOC).

Hamilton Harbour Fisheries Management Plan

The MNR and Royal Botanical Gardens are developing a Fisheries Management Plan for Hamilton Harbour (HHFMP) in partnership with the federal and municipal governments, Hamilton and Halton Region Conservation Authorities, several regional conservation groups and a number of local stakeholders. The HHFMP will provide direction for the management of the fisheries resource in Hamilton Harbour for a period of five years. The development of the HHFMP will be based on a sound understanding and inventory of background biological and physical conditions and input received from the public during consultation.

The first phase of public consultation for the HHFMP took place in July 2005. The public was informed of the state of fish communities in the Hamilton Harbour watershed, and in turn, the public identified fisheries-related issues, concerns, and management. In December 2005, the second phase of public consultations presented goals, objectives, and management zones for the HHFMP to the public for review and comment. Members of the Steering Committee, Science and Technical Committee, and Anglers Working Group, as well as the members of the public, supported the information presented. A draft of the HHFMP, including a comprehensive list of management recommendations is expected in spring 2006.

8.6 Lake Whitefish Commercial Test Netting

In 2003 The Ontario Living Legacies Program (OLL) funded a 10-week lake whitefish commercial test netting program. In 2004 this program was extended to encompass 26 weeks beginning in early April and lasting through to late October. The project provided information about expanded fishing opportunities for a fishery that has been in existence since the 1800s. The results of the 2004 program (see 2004 Annual Report) indicated that an extension of the lake whitefish fishery in Quota Zone (QZ) 1-2 may increase commercial harvest opportunities there. Consequently, legal harvest of lake whitefish in QZ 1-2, which in 2004 extended from October 22 to December 31, was changed to extend from July 5, 2005 to December 31, 2005. However, fishing did not commence until August 5, 2005. In 2005 the partnership between the Ontario Commercial Fisheries Association (OCFA), fisherman from eastern Lake Ontario, and the Lake Ontario Management Unit (LOMU) was renewed for the third year in a row and commercial lake whitefish catches were witnessed by an onboard fisheries observer. The information obtained through the onboard fisheries observer was used to gain an understanding of the incidental catch rates for lake trout, non-native salmonids, and walleye when targeting whitefish outside of the spawning season fishery. Approximately 17% of the total lake whitefish harvest from Lake Ontario occurred during the extension to gillnet season in QZ 1-2 (See Section 4.2).

8.7 Fish Disease

During 2005 a large die off of fish occurred during April and May in the Bay of Quinte. The species most affected was freshwater drum or sheepshead. During the early period on the die off there were reports of more than 200 dead and dying fish per day per location. Lake Ontario Management Unit (LOMU) staff inspected areas where fish were dying on a weekly basis. A small sample of fish was collected by LOMU staff and sent to Dr. J. Lumsden at the University of Guelph for testing. Histological examination revealed a high probability that there was a virus present. Further virology testing by the Atlantic Veterinary College and the World Organization of Animal Health (OIE) reference laboratory in Weymouth, England, confirmed the presence of the North American strain of the viral hemorrhagic septicemia virus (VHSV), the causative agent of the fish disease viral hemorrhagic septicemia (VHS). VHS has not been confirmed as the cause of the drum deaths. The Department of Fisheries and Oceans tested 20 more drum, collected by LOMU during autumn, and failed to find the virus. This is the first confirmed occurrence of this virus in a freshwater fish species in North America, and the first time it has been detected outside of marine/estuarine waters in Canada. VHS is an OIE notifiable disease, and as such the Chief Veterinary Officer of Canada has notified the OIE of this occurrence.

Shortly after the drum die off round goby and muskellunge were reported dead and dying from several locations. The goby were mostly confined to deeper waters surround Prince Edward County's lake shore and Prince Edward Bay area. Wave action eventually brought these fish to shorelines. LOMU staff inspected and sampled for both muskellunge and goby. Samples of both species were sent to the University of Guelph by the LOMU but no results have been provided yet.

The muskellunge were sighted through out the 1000 Islands. This die off was quite significant in numbers and killed many large fish. Dr. J. Casselman and the LOMU participated in sampling of many dead muskellunge. The only disease testing done by NYSDEC and SUNY so far indicates a bacterial kidney infection and not VHS. Further testing is pending.

Later in the summer and fall, birds and fish were reported dead at several eastern Lake Ontario locations. The lake unit did not participate in sampling of these areas but Ontario Parks and NYSDEC sampled birds at two locations to reveal botulism again.

LOMU participated in communications planning for all disease outbreaks and a communications network was set up among several OMNR and public health inspectors.

8.8 Salmon and Trout Management Review

A review of the bi-national objectives that have been set for managing Lake Ontario's offshore fish communities and fisheries is ongoing.

The Ontario Ministry of Natural Resources (OMNR) and the New York State Department of Environmental Conservation (NYSDEC) share responsibility for managing Lake Ontario. OMNR is committed to working with all stakeholders and interested members of the public to help sustain exciting and diverse fisheries in Lake Ontario, as well as a healthy aquatic environment. We wish to continue to support the social, cultural and economic benefits of Lake Ontario that are valued by local residents and businesses.

Lake Ontario has experienced a period of significant ecological change in recent years, which creates a unique set of challenges for fisheries managers. Any changes in fisheries management direction will be made using the best scientific information available and will reflect input received from stakeholders and the public.

In the summer of 2004, we distributed a survey to over 600 individuals with an interest in Lake Ontario. A series of backgrounders accompanied the survey to provide current information about Lake Ontario fish communities and fisheries and identify management challenges. The survey was developed to seek the views of stakeholders on a variety of topics including angling preferences, status of the environment, status of fish species and management preferences. We are pleased to report that over 250 completed surveys were returned. We would like to thank the Lake Ontario stakeholders who took the time to complete this survey. The survey data were worked up jointly by Cornell University (Ithaca, New York) and MNR (Brown and Daniels, in press).

Summary of Survey Results

Over 90% of the survey respondents fished. About one-third were boaters and about one-quarter were environmentalists or naturalists. Approximately one-third of the respondents had a business-related interest in Lake Ontario. Although anglers fished for a broad range of species, the majority of anglers listed Chinook salmon (or salmon) and rainbow trout amongst the three species they fished for most frequently. Brown trout, bass, walleye and coho salmon were also amongst the most preferred species for anglers. Most anglers ate sport fish from Lake Ontario.

Anglers, in general, placed great importance on a number of fishing-related opportunities, including: good catch rates, access for fishing, fish that are safe to eat, and the opportunity to catch wild fish. Access to fishable waters was of great importance to rainbow trout anglers, specifically. Factors of moderate to great importance to an enjoyable rainbow trout fishing experience included: good catch rates, abundance of wild fish, potential to catch a large or trophy-sized fish, to be able to fish in solitude in a natural setting, and to be able to fish in designated catch-and-release areas.

The vast majority of respondents placed great importance on the health of the lake and its streams and wetlands, as well as safe drinking water. The impacts of invasive species and cormorants were among the issues of most serious concern to respondents. Rainbow trout anglers were most concerned about the quality of spawning and nursery habitat, the ability of fish to reach available spawning habitat and over-harvest in the streams.

On average, respondents felt that current levels of Chinook stocking represented the most acceptable balance between the return of fish to the creel and the risk of collapsing the fishery. Despite that, the majority of respondents believed that the current stocking levels of Coho salmon and rainbow trout are too low. Many also indicated that stocking levels of Atlantic salmon, brown trout and Chinook salmon are too low.

A total of 352 comments were offered by respondents. Most of the comments related to regulations (e.g. rainbow trout regulations, level of enforcement, harvest/use of roe), Lake Ontario issues (e.g. cormorants, invasive species), fisheries management (e.g. sport fishery, self-sustaining populations), the stocking program (e.g. species/ numbers/distribution of fish, stocking policy), public involvement (e.g. information/education, participation in field projects) and habitat (e.g. habitat loss). Sixteen respondents expressed support for this type of survey. Respondents indicated a strong preference to receive information about Lake Ontario via our LOMU Annual Reports.

Survey results will be carefully considered as we shape the plan for managing Lake Ontario’s fisheries in the future.

A copy of the survey report can be obtained by contacting the Lake Ontario Management Unit (see contact information given in the Forward).

9. Research Activities

9.1 Offshore Food Web

Effects Of Exotic Species On The Potential For Lake Ontario To Support A Re-Introduced Bloater Population

Investigator: T. J. Stewart, Lake Ontario Management Unit and University of Toronto

Lake Ontario has had a long-history of aquatic species extirpations and introductions; food web structures continue to respond and change. During the late 1990s, the Lake Ontario offshore food web was dramatically altered. The recently established *Bythotrephes sp.* was joined by three new invasive invertebrates, including *Cercopagis pengoi*. *Diporeia*, previously the dominant offshore benthic invertebrate, all but disappeared and dreissenid mussels expanded to ever greater depths. Offshore prey fish populations changed with the expansion of the invasive round goby, a recovery of the native threespine stickleback, and a shift in the depth distribution of exotic alewife and rainbow smelt. The Lake Ontario Management Unit has renewed efforts to re-introduce the bloater (*Coregonus hoyi*) into a food web substantially changed from its historical state. This project is assembling information to quantitatively assess feeding interactions in order to better understand the recent Lake Ontario offshore food web. The eventual aim will be to use this information to describe past, present and possible future food web structures to predict the likely ecological consequences of bloater re-introduction.

In 2005, we completed a second year of a whole-lake survey of offshore prey fish diets collecting approximately 9000 preserved and frozen prey fish samples. Analysis of last year's samples for alewife, smelt, and sticklebacks was completed and the analysis for slimy sculpin is ongoing.. Preliminary findings indicate mysids continues to dominate the diet of adult smelt, and have substantially increased in the diet of alewife, compared to the 1990s. Stickleback diets, described for the first time in Lake Ontario, indicate a reliance on copepods and cladocerans. However, mysids occurred in 13% of the stickcleback samples analyzed as did *Bythotrephes* (11%), and *Cercopagis* (9%). These finding indicate that feeding relationships continue to change in Lake Ontario and will be important in predicting the outcome of bloater re-introduction. A co-operative angler program was also initiated in 2005 and approximately 200 Chinook were collected and processed for energy density, mercury body-burden, growth, and diet. Analysis of these samples indicate that alewife continue to dominate the diet of Chinook salmon.

This research relied on cooperation of the United States Geological Survey (USGS), New York State Department of Environmental Conservation (NYDEC), and the Department of Fisheries and Oceans. Support for the project was provided by COA, the Great Lakes Fish and Wildlife Restoration Act, and the Great Lakes Fishery Commission.

9.2 Lake Trout Diet

Alternative Ecological Pathways in the Eastern Lake Ontario Food Web—Round Goby in the Diet of Lake Trout

Investigators: J. P. Dietrich, B. J. Morrison, and J. A. Hoyle, Lake Ontario Fisheries Management Unit.

Round goby (*Neogobius melanostomus*) range expansion and their possible inclusion in the diet of lake trout (*Salvelinus namaycush*) were investigated. Fish community index bottom trawls in eastern Lake Ontario (Kingston basin) during summer 2003 and 2004 indicated the presence of the round goby at relatively low densities in Prince Edward Bay in depths up to 30 m. Lake trout stomach contents showed round goby to be the second most common diet item at almost 20% by number (36% by mass). Round goby ingested by lake trout ranged in total length from 50 to 110 mm. The most important prey species in terms of numbers (68%) and mass (56%) was alewife (*Alosa pseudoharengus*) at 68% and 56% respectively. Alewives were the most important diet item for smaller lake trout sampled,; larger lake trout ingested more round goby by mass than alewife. Round goby range expansion to deep water and prominence in the diet of lake trout signal significant change in the eastern Lake Ontario food web.

9.3 Lake Whitefish Research

Larval whitefish feeding and growth

A larval lake whitefish feeding and growth study was re-established in 2003 to augment similar work conducted annually from 1991-1996 (excluding 1994) in the Bay of Quinte and eastern Lake Ontario. The objective of these studies was to assess larval lake whitefish diet and growth relative to zooplankton community structure before and after dreissenid mussel invasion.

The 2005 larval whitefish feeding and growth study was conducted on 19 days from April 5-May 12 at four nursery areas (Table 9.3.1). Water temperature ranged from 2.0 to 13.5 ^{o}C over the duration of the study. A total of 1002 larval whitefish were caught in 56 tows and 840 min of sampling effort. A total of 807 lengths, 211stomachs, 126 otolith samples, and 556 genetic samples were collected from the larval fish. Fifty-four zooplankton samples were also taken from larval whitefish habitat.

Graduate studies

Part of LOMU's research on whitefish involved collaboration with the University of Guelph that began in 2003. It has both an age-0 growth and abundance component and a genetics component. Two M.Sc. Candidates are associated with this work, Colette Ward and Andrea Bernard. Brief updates of their work are provided as follows.

The M.Sc. project of Colette Ward is entitled "Evaluating hypotheses for declines in age-0 lake whitefish in eastern Lake Ontario". The project is being conducted at the University of Guelph, in collaboration with MNR and Department of Fisheries and Oceans (Great Lakes Laboratory for Fisheries and Aquatic Sciences - GLLFAS). It is funded by the University, Ontario Ministry of Natural Resources (OMNR), and the Canada Ontario Agreement. In the late 1990s and early 2000s, age-0 whitefish in Lake Ontario exhibited dramatic declines in catch-per-unit-effort. This research is evaluating whether these declines are attributed to changes in zooplankton prey availability following introductions of Dreissenid mussels and a predatory zooplankter, and/or shifts in reproductive investment and spawning stock biomass. Unfortunately, analyses of growth and survival during the larval stage proved difficult, because larval otoliths could not be prepared to a uniform specification common to all samples. The research is now focusing on the age-0 juvenile stage collected in late summer, and preliminary results were presented at the Canadian Conference for Fisheries Research in January 2006. The project has been aided greatly by zooplankton data provided by the GLLFAS, and archived age-0

TABLE 9.3.1. Summary of sampling, effort and catch statistics obtained during the 2005 larval lake whitefish feeding and growth study in the Bay of Quinte (Trident Point, Sherman's Point and Indian Point) and eastern Lake Ontario (Petticoat Point).

Area	Date	Water temperature (^{O}C)	Number of larval tows	Total effort (min)	Number of larval whitefish caught	Number lengthed	Mean length (mm)	Number of stomach samples	Number of otolith samples	Number of zooplankton samples	Number of genetic samples
Trident Point	10-Apr	5.9	3	45.0	46	46	13.8	20	10	2	16
	15-Apr	7.2	4	60.0	53	53	14.2	20	10	2	23
	21-Apr	10.3	4	60.0	14	14	16.1	4	10	2	0
	05-May	10.4	1	15.0	0	0		0	0	2	0
Shermans Point	05-Apr	3.3	4	60.0	53	53	13.7	20	10	4	23
	12-Apr	6.0	4	60.0	28	28	13.6	18	10	4	0
	19-Apr	10.5	3	45.0	81	81	15.1	20	10	4	51
	22-Apr	10.8	4	60.0	127	127	16.1	20	10	4	97
	26-Apr	10.0	4	60.0	100	100	17.3	20	10	4	70
	03-May	10.5	1	15.0	0	0		0	0	4	0
	09-May	13.5	1	15.0	1	0		0	0	4	0
	12-May	13.5	0	0.0						4	
Indian Point	07-Apr	2.0	4	60.0	2	2	14.2	0	2	2	0
	14-Apr	4.1	3	45.0	2	2	14.2	0	2	2	0
	20-Apr	9.6	4	60.0	80	80	14.9	20	10	2	50
	25-Apr	6.6	3	45.0	19	19	15.1	9	10	2	0
	04-May	8.1	2	30.0	261	100	16.7	20	10	2	156
	10-May	12.6	3	45.0	133	100	18.1	20	10	2	70
Petticoat Cove	18-Apr	7.2	4	60.0	2	2	14.6	0	2	2	0
Totals	19		56	840	1002	807		211	126	54	556

whitefish data provided by the OMNR (Aquatic Research and Development Section). The project advanced into the analysis and report writing phase in 2005, and is expected to be completed by Fall 2006.

Andrea Bernard's, M.Sc. project is entitled "Cryptic stock structure of lake whitefish in eastern Lake Ontario". It is sponsored by the University of Guelph, the OMNR, and by the Canada Ontario Agreement. The major focus of this project is to assess the genetic stock structure of lake whitefish in the eastern basin of Lake Ontario using both contemporary and archived tissues. There are three putative stocks in the area, corresponding to distinct spawning areas in eastern Lake Ontario: the Bay of Quinte, the south shore of Prince Edward County, and Chaumont Bay, New York. In 2005, genetic analyses were performed on two of the three stocks at two temporal periods and the majority of the statistical analyses have been completed. Current results suggest that there is no statistical evidence that the Bay of Quinte and south shore individuals are distinct spawning groups, as even a small amount of straying or mixing could lead to this result. Genetic analyses on the contemporary Chaumont Bay stock will be performed early in 2006. This project is expected to be completed by August of 2006.

9.4 Bay of Quinte Ecosystem Modelling (ECOPATH)

The Lake Ontario Management Unit (LOMU) participated in an ecosystem modelling project designed to compute energy flows among biota in the Bay of Quinte for key time-stanzas and to compare results to those found for Oneida Lake, New York. This endeavour involves the collaboration of the Ontario Ministry of Natural Resources Assessment (i.e. LOMU), OMNR Research, the Department of Fisheries and Oceans (DFO), the University of Waterloo, Cornell University, the University of Syracuse, University of Toledo, and the Great Lakes Fisheries Commission (GLFC).

Ecosystem modelling was done using ECOPATH with ECOSIM (Christensen et al. 2004[1]), which is a holistic model with two base components: 1) construction of balances matrices detailing fauna biomass, production, and consumption in a static ecosystem, and 2) a simulation tool that employs the balanced ecosystem matrices to predict the effects of manipulations or changes to the ecosystem (e.g. invasion of a non-native species).

The final ECOPATH workshop was held in November 2005 in Picton, Ontario. Topics of discussion included; changes to the balanced ECOPATH models for the Bay of Quinte, simulation scenarios, documentation, and products. LOMU in cooperation with OMNR Research also completed a draft chapter entitled; Methods for estimating ECOPATH inputs for fish groups of the upper Bay of Quinte, Lake Ontario. This chapter will be included in a Canadian Technical Report of Fisheries and Aquatic Sciences describing the methodology involved in completing this modelling project. Related primary publications are expected to follow in 2006/07.

[1] *Christensen, V, C.J. Walters and D. Pauly. 2004. Ecopath with Ecosim: a User's Guide. To be published as Fisheries Centre Research Reports, Volume 12 (4), University of British Columbia, Vancouver. 154 p. (available online at www.ecopath.org and www.fisheries.ubc.ca).*

9.5 Round Goby Allometrics

Allometric Relationships between Persistent Diagnostic Bones and the Overall Size of Round Goby found in the Diets of Predators

Investigators: J. P. Dietrich, B. J. Morrison, T. Schaner, Lake Ontario Management Unit, A. C. Taraborelli, Watershed Ecosystems Graduate Program, Trent University.

Identification and persistence of ten diagnostic bones in the diets of predators and the allometric relationships between these bones and overall body size was examined for round goby *Neogobius melanostomus*. Round goby was consumed most often by yellow perch *Perca flavescens* and largemouth bass *Micropterus dolomieu*. The most persistent diagnostic bone in predator diets was the otolith followed by the bones of the mouth and pharynx (i.e. premaxilla, dentary and dentigerous plate). Each of the ten allometric equations gave coefficients of determination (r^2) that were greater than 0.8 and highly significant, especially the equations predicting body size from cleithral, opercular and mouth and pharyngeal bone measurements. These predictive equations and the diagnostic features of the bones will allow for a more comprehensive analysis of the diet of round goby predators.

10. Partnerships

10.1 Western Lake Ontario Inshore Assessment Initiative

In support of the Canada-Ontario agreement (COA), which respects the Great Lakes Basin ecosystems, recent recommendations for the renewed assessment of the western Lake Ontario fish community have been presented (i.e. Paine 2004[1]). Fish community assessment programs in western Lake Ontario have greatly decreased since 1996. The Lake Ontario Management Unit (LOMU) recognized the need to access fish community and fisheries data both for the nearshore and offshore ecosystems of the western basin. As a result, in 2004 LOMU reinitiated a partnership with the Toronto Region Conservation Authority (TRCA) to access historical nearshore assessment databases. The objectives of this partnership are: 1) to compile and analyze fish assessment data for the Toronto Waterfront and present it in a comprehensive fashion, and 2) to initiate cooperation in the creation of a meta-database describing fish assessment programs situated in western Lake Ontario.

Data shared to date include species-specific catch information gained through extensive electrofishing of sites along the Toronto Waterfront (i.e., Etobicoke Creek to the Rouge River) from 1988-2003 for specific project, habitat assessment, and Remedial Action Plan (RAP) purposes. Representatives from LOMU met with their counterparts at the TRCA during 2005 to discuss the progress of the database detailing electrofishing data. To date, the database details 36 unique embayment sites from 1988-2003 and 23 unique open coast sites from 1989-2003 and over 45 fish species.

This data is currently being used to create a document summarizing and assessing the fish communities of the Toronto Waterfront from 1988-2005. This document will serve as an important tool for the Toronto Waterfront RAP steering committee. Efforts continued for further partnering with other groups to allow for the completion of a comprehensive meta database that will catalogue the fish community assessment programs that have or are currently ongoing for all of western Lake Ontario.

10.2 St. Lawrence River Muskellunge Spawning and Nursery Site Identification

The muskellunge (*Esox masquinongy*) is the largest game fish in Ontario waters. Its scattered provincial distribution is made up of several genetically distinct populations. The St. Lawrence River population produces the largest individuals in the province, and supports an important sport fishery. Concern regarding this population led to the creation of The St. Lawrence River Esocid Working Group under the supervision of the Lake Ontario Committee, of the Great Lakes Fishery Commission. The Esocid Working Group consists of members from New York State Department of Environmental Conservation (NYSDEC), the Ontario Ministry of Natural Resources (OMNR), SUNY College of Environmental Science and Forestry, and the Royal Ontario Museum (ROM).

In the past, the Esocid Working Group produced management plans pertaining to St. Lawrence River muskellunge; the most recent being the Update of the Strategic Plan For Management of the St. Lawrence River Muskellunge Population and Sport Fishery Phase III: 2003-2010. One objective outlined in the report was the protection of muskellunge spawning and nursery habitats. However, these habitats were not well documented or identified within the St. Lawrence River. Consequently, the OMNR conducted a young-of-the-year seining program from 1989-1995 in an effort to identify nursery sites within the Canadian waters of the St. Lawrence River. Efforts were discontinued following this period.

In 2005, efforts were renewed through a partnership between Muskies Canada Inc. (MCI - Gananoque Chapter) and the Lake Ontario Management Unit (LOMU) with support from Kemptville District MNR, Fisheries and Oceans Canada (Prescott), and Parks Canada (St. Lawrence Islands National Park). Sampling occurred from August 4-26 during which 123 seining events were completed. This was the largest project, in terms of total netting effort, to date.

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[1] *Paine, J. R. 2004. Assessment of the needs, impediments and opportunities for enhanced surveillance of the western Lake Ontario fish community and fisheries in support of the Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystems. Internal Report to the Lake Ontario Management Unit. Ontario Ministry of Natural Resources, Picton, Ontario, Canada.*

In total, 8,624 fish were captured, representing 27 species. Of the 39 esocids captured in 2005, 13 were muskellunge, 15 were northern pike and 11 were grass pickerel. YOY muskellunge were captured at eleven sites; seven of which were not previously confirmed as muskellunge nursery areas (Table 10.2.1).

This data is currently being incorporated into a more extensive summary report that will be completed in 2006 and distributed to agencies participating in muskellunge management on the St. Lawrence River.

TABLE 10.2.1. Muskellunge nursery sites identified during the 2005 seining project. Sites that were also identified in previous years are identified (shaded).

Site ID	Year Identified	Description
162 / 59	2005 / 1992	Between Chimney Island and mainland
166 / 67	2005 / 1992	Tip of Curtis Island / Stave Island
168 / 71	2005 / 1992	Sugar Island
169	2005	Sugar Island
180	2005	Forsyth Island - bay on S. side of island
187	2005	SE corner of MacDonald Island
205	2005	SE corner of Tar Island
218	2005	North end of Tar Island – Duck Island
220 / 17	2005 / 1989	Grenadier Island. - bay east of Duck Isl., Van Buren Isl.
228	2005	Grenadier Island - bay east of Duck Island
229	2005	Grenadier Island - bay east of Duck Island

10.3 Eel Abundance in the Upper St. Lawrence River and Eastern Lake Ontario

In 2005, the Lake Ontario Management Unit and Dr. John Casselman of Queen’s University collaborated to continue an electrofishing assessment of American eels. Mr. J. Rorabeck conducted electrofishing at two standardized sites: one in the upper St. Lawrence River in the Mallorytown area and another at the Ducks (Main Duck Island and Yorkshire Bar, in the east end of Lake Ontario). These two sites have been fished in a consistent manner for 12 years and 23 years, respectively. The sites are found in the vicinity of these average coordinates: upper St. Lawrence 44^{o}26$^{.}$78’N, 75$^{.}$00^{o}51$^{.}$12’E and Ducks 43^{o}55$^{.}$76’N, 76^{o}36$^{.}$11’E. The quantitative electrofishing uses set transects electrofished in the daytime and at night for a standard length and a consistent habitat 3 m and less to provide catch per hour and catch per unit area, expressed in ha. The method is designed particularly to catch eels, using oscillating DC current, and when eels were abundant was used very successfully to harvest the species. Eels were dip-netted, measured, and released. The results are compared with hoop net CUE expressed as eels per hoop net day. Day/night catches are usually quite different and have been kept and tracked differently.

In the upper St. Lawrence River, electrofishing was conducted during the same period in spring from June 20-26. The same 11 transects were sampled during the day and night, and one extra transect was done at night for a total of 23 transects. Average area of each transect was 0.65 ha, and length was 590 m. In total, six eels were electrofished.

Around the Ducks, electrofishing was conducted during the same time period of July 9-21. Sixteen daytime transects were run, and at night the same areas were fished using 34 transects, a total of 50 transects. Average area of each transect was 0.35 ha, and length was 517 m. In total, 15 eels were electrofished. Transects around the Ducks followed the shoreline of Main Duck and Yorkshire Island and Bar and included some offshore reefs and shallows.

Specific locations of all transects, which were sampled multiple times over the period, are well documented and have been for the duration of the study, first by specific landmarks and subsequently with GPS.

During 2005, 0.084 eels were caught per hr of daytime electrofishing in the upper St. Lawrence River, representing 0.166 eels per ha. This catch was 51% higher than catches in 2004, suggesting a slight increase in abundance. However, statistical analysis indicates that the two catches were not significantly different. From 2003-2004 catches declined by 23%, suggesting that the increase in 2005 was a change in trend. This was confirmed by data on hoop net eel catches, which changed from 0.10 to 0.07 to 0.16 eels per hoop from 2003-2005 (provided by J. Rorabeck, commercial fisher). These catches indicate a decrease of about 25% from 2003-2004, corroborating the electrofishing index, and an increase from 2004-2005, as was seen with electrofishing but with a difference of 56% higher.

In eastern Lake Ontario at the Ducks, no eels were caught in daytime electrofishing. Habitat is different and has been dramatically affected by dreissenids, which established during the 1990s. Night-time electrofishing gave 1.230 eels per hr (95% C.L. 0.310-2.151) representing 1.270 eels per ha (95% C.L. 0.246- 2.294). The daytime catch was down in 2005 compared with previous years, when some eels were caught during the daytime. The night time catch increased considerably from 2004- 2005 (2.4-fold). The night time catch indicates a change in the trend, since the average decrease from 2000-2004 was 23% per yr, very similar to the upper St. Lawrence River.

These electrofishing indices of eel abundance in the upper St. Lawrence River and eastern Lake Ontario suggest that numbers of yellow eels increased slightly in 2005. Eels caught in this survey are larger than those that ascend the eel ladder at the Moses Saunders generating station and are more typical of the larger, older yellow eels that were caught in the commercial fishery. Although there has been a slight increase in the number of eels ascending the ladder, this does not explain the increase in catch in 2005 in this survey unless growth rate in the past few years has been atypically fast. This requires a more detailed age and growth analysis of the few samples caught. It seems more probable that the increased numbers of larger yellow eels in the netting and electrofishing survey indicates a redistribution of eel abundance related to the OMNR eel fishing closure in 2004, when exploitation was removed.

10.4 Assessing *Mysis relicta* and *Diporeia* spp populations in Lake Ontario 2004-2005

Partners: Department of Fisheries and Oceans, Burlington ON, Ontario Ministry of Natural Resources, LOMU
Investigators: Ora Johannsson, Ron Dermott, Michael Arts

Mysis relicta and *Diporeia* spp. are the only large macroinvertebrates in the offshore foodweb and are important components, transferring energy from phytoplankton and zooplankton to fish. The lack of mid-trophic level, foodweb diversity in the offshore leaves this foodweb particularly vulnerable to the impact of exotic invasive species. The Laurentian Great Lakes have suffered from four recent invertebrate invaders which have altered the pelagic and benthic foodwebs; namely, dreissenid mussels (*Dreissena polymorpha,* and *D. bugensis*) in 1988 (Griffiths *et* al. 1991, Dermott and Munawar 1993), *Bythotrephes longimanus* (formerly also known as *B. cederstroemi*) in 1982 (Frikker and Abbot 1984), and *Cercopagis pengoi* in 1998 (MacIsaac *et* al. 1999). COA provided DFO with funding to assess the status of Lake Ontario *M. relicta* and *Diporeia* spp populations in 2004 and 2005 and to determine if they have changed since the early 1990s prior to development of noticeable populations of these exotic species.

In March 2005, DFO completed a report “Assessment of *Mysis relicta* and *Diporeia* spp. Populations in Lake Ontario: October 2004” in which the results from the October 2004 open-lake survey were presented. The key findings of this report were:

1) The abundances of M. relicta and Diporeia in the 2000s were lower than in the 1990s.
2) The size frequency distributions indicated that there has been a disappearance of large *M. relicta* (>13mm) in 2002-2004 compared to 1990, but not compared with 1995. As alewife abundance is down in the 2000s, predation by alewife can not be the only factor structuring the size distribution of larger mysids. Other predator(s) and/or limited food resources might also be important.
3) Gravid females densities were not significantly different between the 1990s and 2000s in the nearshore, but the densities were lower in 2004 (0.5 m-2) relative to 1990 (4.3 m-2) and 2002 (2.7 m-2). In the offshore, gravid female densities were significantly lower 2002-2004, but the percentage of gravid females was not significantly different.
4) *Bythotrephes* abundance greatly increased in 2004. No *Cercopagis* were seen in the fall samples although they were present in 2003.

The decrease in mysid abundance was partially attributed to the increased presence of *Dreissena* spp., *Cercopagis* and *Bythotrephes* and their competition for food with native species. This was expected to be exacerbated by the decreased nutrient levels in the lake and generally lower offshore productivity which is also associated with the development of extensive dreissenid beds in both Lakes Erie and Ontario.

In 2004, mysid samples had also been collected for nucleic acid and lipid analyses. The nucleic acid samples were analyzed and checked for quality assurance. The lipid samples will be analyzed in the winter of 2006. Both sets of data still require statistical analysis. Results from these analyses will be included in the 2005 report. A more extensive spatial survey of *M. relicta*,and *Diporeia* spp was conducted on the Griffon CCGS (Fig. 10.4.1). Zooplankton samples were also collected from a few representative regions of the lake. By the end of December 2005, the mysid samples had been analyzed for abundance, number of gravid females, number of *Bythotrephes*, *Cercopagis* and *Leptodora* (predatory cladocerans) and in some instances for mysid size distribution.

Work on the Lake Ontario *M. relicta* and *Diporeia* data will continue in 2006. A report based on the November 2005 survey and the biochemical analyses (RNA/DNA and lipids) of *M. relicta* collected in 2004 will be written in March. It will assess *M. relicta* and *Diporeia* abundance, size distribution, biomass and fecundity in 2005 compared to past years and to the distribution of *Bythotrephes* and *Cercopagis*. Contractors are currently working on the zooplankton and *Diporeia* samples for 2005, and Dr. Arts is working on the lipid analyses. Mysid samples were also collected in the fall of 2005 for nucleic acids and lipids in case the 2004 results revealed interesting patterns that should be verified. These analyses will wait on the results from 2004 and funding.

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*Griffiths, R.W., D.W. Schloesser, J.H. Leach and W.P. Kovalak. 1991. Distribution and dispersal of the zebra mussel (*Dreissena polymorpha*) in the Great Lakes region. Can. J. Fish. Aquat. Sci. 48: 1381-1388.*

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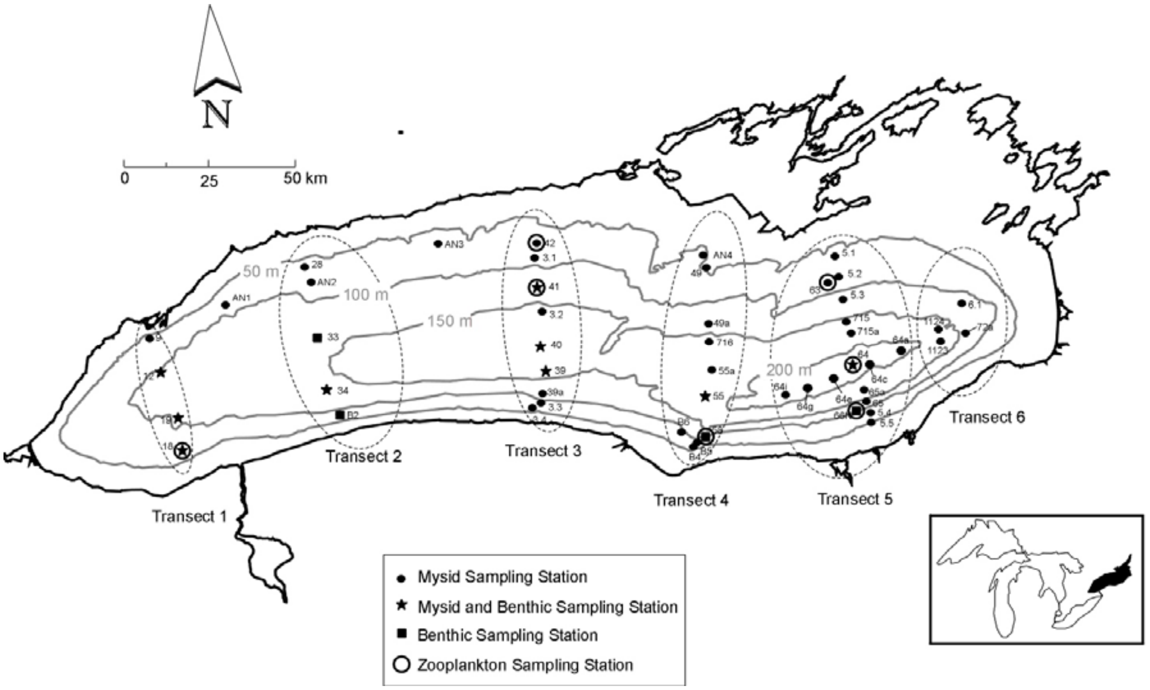

Fig. 10.4.1. Stations sampled in November 2005 on Lake Ontario for Mysids, benthos and zooplankton.

11. Communications

Lake Ontario Management Unit staff use a variety of formal and informal ways to communicate with the public, stakeholders, partners, the media, and other resource management agencies. Good communications strategies are important to effectively convey results of fisheries assessment, management and enforcement programs. Seeking input from client groups through formal consultation processes helps us to understand their values, ideas and concerns. Staff also interacts with clients on a day-to-day basis through phone calls, site visits and contacts made in the field or during enforcement patrols. Staff actively participates on a variety of bi-national and inter-agency committees to share information and expertise, and to develop solutions to problems of common concern in the Great Lakes Basin. A strong network of communications outside and within OMNR is critical to making sound resource management decisions (e.g. setting sport fishing regulations, commercial fishing quotas, stocking levels, fisheries management objectives).

Table 11.1 summarizes some of the major communications initiatives undertaken by the unit in 2005. In addition to the items listed in the table, LOMU staff responded to a broad range of questions and information requests from the public, stakeholders, the media and other agencies. Staff also provided support to senior managers by developing a variety of communications and briefing materials relating to the management of Lake Ontario fisheries and fish communities.

TABLE 11.1 Lake Ontario Management Unit communications initiatives, 2005.

Communications plans

- Bay of Quinte Fisheries Management Plan (approved)
- Lake Ontario Atlantic Salmon Restoration (drafted)
- Lake Ontario Salmon & Trout Management Review (continued implementation)
- Lake St. Francis Fisheries Management Plan (approved and implemented)

News releases / Public Notices

- April 11, 2005 – Fishing Regulations Changed to Ensure Conservation – New Rules For Yellow Perch Fishing In Eastern Ontario
- May 6, 2005 – Province Increases Walleye Fishing Opportunities In Eastern Lake Ontario
- October 3, 2005 – Open House - *Bay of Quinte Fisheries Advisory Committee*
- November 30, 2005 – BAY OF QUINTE PLAN TO BENEFIT FISHERY – Fisheries Management Plan Will Improve Health Of Bay Ecosystem
- December 7, 2005 – Invitation to Participate - Bay of Quinte Fisheries Management Plan Open House

Fact sheets / brochures / articles

- *"Scientists Study Thiamine Deficiency in Salmon"* (COA newsletter "the connection", November 2005)

Websites / web products developed

- Bay of Quinte Fisheries Advisory Committee website (www.bqfac.ca) – under development
- Lake Ontario Management Unit annual reports (access to reports in PDF format provided through the Great Lakes Fishery Commission website)
- Lake Ontario stocking history (access to data provided through the Great Lakes Fishery Commission website)

Media contacts

- Inquiries about removal of walleye slot limit in the Bay of Quinte
- Inquiries about participation in the Fisheries Management Plan for the Bay of Quinte
- Various inquires about fish and fishing in the Bay of Quinte

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Parnell, I.J., L. Greig and D.R. Marmorek. 2005b. Developing and Action Plan for American Eels in the St. Lawrence River – Lake Ontario Region, Decision Analysis Alternatives Workshop. Draft report prepared by ESSA Technologies Ltd., Richmond Hill, ON, for the American Eel Steering Committee and the Ontario Ministry of Natural Resources, Picton, ON, 62 pp.

Parnell, I.J., and L. Greig. 2005. Developing an Action Plan for American eels in the St. Lawrence River – Lake Ontario Region: Decision Analysis. Prepared by ESSA Technologies Ltd., for the Passage and Associated Habitat Subcommittee of the Canadian Eel Working Group. 87 pp.

Sprules, W. G., Minns, C. K., Stewart, T. J. 2005. Effects of exotic species on the potential for Lake Ontario to support a re-introduced bloater population. Research Progress Report to the Great Lakes Fishery Commission. 4 pgs.

Stewart, T. J. 2005. Food habits of Lake Ontario offshore prey fish: A reassessment of the magnitude and dynamics of planktivory. Research Progress Report to the Great Lakes Fish and Wildlife Restoration Act. 18 pgs.

Wurster, C. M. and W. P. Patterson, D. J. Stewart, J.N. Bowlby and T. J. Stewart. 2005. Thermal histories, stress, and metabolic rates of chinook salmon (*Oncorhynchus tshawytscha*) in Lake Ontario: evidence from intra-otolith stable isotope analyses. Canadian Journal of Fisheries and Aquatic Science. 62:700–713.

Papers presented

- *“Asynchronous Larval Growth and Condition of Whitefish Spawning Stocks in Lake Ontario* (presented by C. Ward, J. Hoyle, B. Morrison & D. Noakes at 2005 OMNR Fisheries Research and Assessment Meeting)
- *“Hydroacoustic prey fish assessment in Lake Ontario”* (presented by T. Schaner and R. O’Gorman at the 2005 Conference on Great Lakes Research hosted by the International Association for Great Lakes Research in Ann Arbor, MI)
- *“Inferred Larval Growth Rates of Whitefish Spawning Stocks in Lake Ontario”* (poster presented by C. Ward, J. Hoyle, B. Morrison & D. Noakes at C.C.F.F.R. January 2005)
- *“Stock-recruitment and survival of walleye in Lake Ontario in response to Dreissenid Invasion”* (presented by J.N. Bowlby at the 2005 OMNR Fisheries Research and Assessment Meeting)
- *“Thiamine Deficiency Complex in Lake Ontario”* (prepared by S. Brown & M. Daniels, presented by S. Brown at the Early Mortality Syndrome Workshop hosted by GLFC in Ann Arbor, MI, September 2005)

Workshops / conferences hosted

- Technical workshop aimed at investigating methods for providing safe downstream passage for the American eel (*Anguilla rostrata*) past hydroelectric facilities on the St. Lawrence River (February 2005, Cornwall ON)
- Quinte-Oneida Workshop (April 2005, Picton ON)
- Developing an Action Plan for American Eels in the St. Lawrence River - Lake Ontario Region, Decision Analysis Scoping Workshop (May 2005, Ottawa ON)
- Coho Salmon Program Review (May 2005, Peterborough, ON)
- Developing an Action Plan for American Eels in the St. Lawrence River - Lake Ontario Region: Decision Analysis (September 2005, Ottawa ON)
- Developing and Action Plan for American Eels in the St. Lawrence River – Lake Ontario Region, Decision Analysis Alternatives Workshop

Workshops / conferences attended

- Allowable Harm Assessment Workshop (hosted by DFO in Burlington, ON, October 2005)
- Early Mortality Syndrome Workshop (hosted by GLFC in Ann Arbor MI)
- Fish Culture Strategic Planning Workshop (hosted by Fish Culture Section in Peterborough, ON, February 2005)
- Lake Ontario Committee annual meeting (hosted by GLFC in Niagara Falls, NY)

- Lake Ontario Predator / Prey Modeling Workshop (hosted by GLFC in Ivy Lea, NY, May 2005)
- Lake Whitefish Natural Mortality Workshop II (hosted by GLFC in Ann Arbor, MI, September 2005)
- Lower Food Web Assessment Workshop (Shackleton, NY)
- National Advisory Process meeting to review information for the American eel (*Anguilla rostrata*)
- Provincial Fishing Regulation Workshop (hosted by MNR Fisheries Section in Peterborough, ON, September 2005)
- Species-at-Risk Information Session (hosted by DFO in Burlington, April 2005)
- USFWS – American Eel Status Review Workshop 1: Atlantic Coast/Islands Threats
- USFWS – American Eel Status Review Workshop 2: Great Lakes/Canada Threats and Population Dynamics

Committee / task group membership

- Atlantic Salmon Recovery Team
- Atlantic Salmon Strain Evaluation Steering & Technical Committees
- Bay of Quinte Fisheries Advisory Committee (BQFAC)
- Bi-national committees, under the Great Lakes Fishery Commission (GLFC)
    - Council of Lakes Committee (CLC)
        - Great Lakes Mass Marking Implementation Task Group
    - Council of Lakes Technical Committee
    - Great Lakes Hydroacoustics Standards Development Group
    - Lake Ontario Committee (LOC)
    - Lake Ontario Technical Committee (LOTC)
    - Law Enforcement Committee
- Canada-Ontario Agreement (COA) – Lake Ontario Basin Technical Team
- COA Implementation Team
- COA Renewal Team
- Code of Professionalism Working Group
- Double-crested Cormorant Steering and Technical Committees
- Fish Culture Program Review Team
- Fish Habitat Advisory Committee
- Fish Habitat Advisory Compliance Working Group
- FISHNET 3 Creel Re-engineering – Business Support Team (Great Lakes rep.)
- Great Lakes Environmental Assessment Stocking Committee
- Great Lakes Fisheries Management I&IT Strategy Project
- Great Lakes I&IT Strategic Investment Plan Project
- Inter-agency committees:
    - Bay of Quinte Fisheries Management Plan – Planning and Development Committee
    - Bay of Quinte Fisheries Management Plan – Steering Committee
    - Bay of Quinte Restoration Council – Remedial Action Plan (RAP)
    - Canadian Eel Science Working Group
    - Eel Management Committee
    - Hamilton Harbor Remedial Action Plan (RAP) Team
    - Hamilton Harbour Bay Area Implementation Team (BAIT)
    - Hamilton Harbour Fisheries Management Plan Steering Committee
    - Lake Ontario Lake-wide Management Plan Working Group
    - Lake St. Francis Fisheries Management Plan Steering Committee
    - Management Committee - Lake Ontario Lake-wide Management Plan (LaMP)
    - Provincial Contaminants / Food Safety Team
    - St. Lawrence River Restoration Council – Remedial Action Plan (RAP)
    - Thiamine Deficiency Complex Implementation Committee
    - Toronto & Region Remedial Action Plan (RAP) Team

    - USFWS – Fisheries Advisory Committee for Fish Enhancement, Research and Mitigation Fund
    - Watershed / fisheries management planning teams – various
    - Watershed-based Fisheries Management Plan Steering Committee (Great Lakes rep.)
- Lake Ontario Commercial Fish Liaison Committee (LOCFLC)
- *Mysis* in Lake Ontario study group
- Southern Region Fishing Division Boundary Committee
- Southern Region Integrated Wind Power Team
- Southern Region Walleye Management Review Group
- Sport Fishing Regulatory Tool Kit Teams – various

Presentations to client groups

- *Salmon & Trout in Western Lake Ontario* (presented by B. Morrison to the Port Whitby Sport Fishing Association and J.N. Bowlby to Metro East Anglers)
- *Salmon & Trout Management Review* (presented by M. Daniels to the Port Whitby Sport Fishing Association, Ontario Federation of Anglers and Hunters)
- Presentations at public meetings – Lake St. Francis Fisheries Management Plan (June and March 2005)
- Presentations to the Bay of Quinte Fisheries Advisory Committee:
    - Fisheries management planning for the Bay of Quinte (P. Edwards)
    - Contaminants in the Bay of Quinte & the Bay of Quinte Remedial Action Plan (P. Edwards)
    - Update: Rationalization of walleye egg taking in the Bay of Quinte (P. Edwards)
    - Northern pike: potential for a commercial allocation (P. Edwards & R. MacGregor)
    - Spring 2005 Fish Die Offs – Eastern Lake Ontario & St. Lawrence River (B. Morrison)
- Presentations during the BQFAC Open House – October 2005
    - Walleye in the Bay of Quinte (B. Morrison)
- Presentations for the Bay of Quinte Fisheries Management Plan
    - multi-agency Focus Group meeting – July 2005 – Bay of Quinte: Developing a Fisheries Management Plan
    - Open House 1 – December 2005 – Bay of Quinte Fisheries Management Planning Process (P. Edwards); MNR Fisheries Assessment Activities and Fish Community Status in the Bay of Quinte (J. Hoyle)
- Presentations to and for Bay of Quinte RAP Restoration Council
    - Team Leaders Meeting – April 2005 – Fish Populations in the Bay of Quinte; Wildlife Populations and Habitat in the Bay of Quinte (impaired beneficial uses) (P. Edwards)

First Nations Liaison

- Presentations to the Mohawks of the Bay of Quinte
    - Bay of Quinte: Developing a Fisheries Management Plan (P. Edwards)

Client contacts

Angler-interviews

- 2005 Bay of Quinte winter creel – 774 anglers interviewed
- 2005 Bay of Quinte summer creel – 3,300 boat anglers interviewed
- 2005 Lake Ontario western basin creel – 2,680 boat anglers interviewed

Client liaison and partnerships

- Chinook pen-imprinting project (with Central Lake Ontario Sport Anglers) (ongoing).

- Proposal to export carp to France (in collaboration with proponent, various provincial and federal agencies, local community groups).
- St. Lawrence River Muskellunge Young-of-the-Year Seining Project (in cooperation with Muskies Canada – Gananoque Chapter, Parks Canada, Fisheries and Oceans Canada – Prescott Office and MNR – Kemptville District Office).
- Tag returns by Lake Ontario anglers (walleye, Atlantic salmon).
- Tours of Glenora Fisheries Station.

Appendix A:
Lake Ontario Management Unit Staff, 2005

PETERBOROUGH

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Robert MacGregor – Lake Manager
Marion Daniels – Management Biologist

Unclassified Staff:
Michelle Weller – A/Section Secretary
Stephen Casselman – Management Biologist
Patricia Edwards – Management Biologist

GLENORA

R.R.#4, 41 Hatchery Lane, Picton, ON KOK 2TO
Tel: 613-476-2400   Fax: 613-476-7131

Linda Blake – Administrative Assistant
Alastair Mathers – Lake Ontario COA Coordinator
Bruce Morrison – Assessment Supervisor
Tom Stewart – Project Coordinator
Jim Bowlby – Assessment Biologist
Jim Hoyle – Assessment Biologist
Ted Schaner – Assessment Biologist
Dawn Walsh – Operations Supervisor
John Haagsma – A/Operations Supervisor
Kelly Sarley – Database Technician, Computer Operator
Dale Dewey – Operations Coordinator
Wayne Miller – Senior Technician, Base Operations
Charles Wood – Senior Marine and Fisheries Technician
Dave Goodfellow – Great Lakes Technician
Tom Lawrence – Great Lakes Technician
Steve McNevin – Great Lakes Technician
Derrick Humber – Enforcement Supervisor
Matthew Orok – Lake Unit Conservation Officer
Gord Rooney – Lake Unit Conservation Officer

Unclassified Staff:
Colin Lake – A/Management Biologist
Jason Dietrich – Assessment Biologist
Tim Dale – Great Lakes Fisheries Technician
Randy Gurnsey – Great Lakes Fisheries Technician
Tony McCambridge – Great Lakes Fisheries Technician
Rob Slapkauskas – Great Lakes Fisheries Technician
Ted Allan – Great Lakes Fisheries Technician
Zach Richmond – Great Lakes Fisheries Technician
Tyson Scholz – Great Lakes Fisheries Technician
Stephen Wickens – Great Lakes Fisheries Technician
Alan McIntosh – Boat Captain

Lorne Daines – Student Fisheries Technician
Andrea Hicks – Student Fisheries Technician
Elizabeth Miller – Student Fisheries Technician
Michael Zylstra – Student Fisheries Technician
Andrew Orok – A/Lake Unit Conservation Officer
Tony McCambridge – Commercial Fish Assistant (DCO)

DARLINGTON PROVINCIAL PARK

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Kevin Hoare – Lake Unit Conservation Officer
Bill Ingham – Lake Unit Conservation Officer
John Haagsma – A/ Lake Unit Conservation Officer

AQUATIC RESEARCH AND DEVELOPMENT SECTION – GLENORA

Dr. Tim Johnson – Research Scientist
Les Stanfield – Research Biologist
Laurie Allin – Research Technician

Unclassified Staff:
Suzanne Gouveia – Research Biologist

Appendix B. Lake Ontario Management Unit 2005 Operational Staff Field and Lab Schedule

Field or lab project	Dates	Species assessed, monitored or stocked	Length of data series (yrs)	Lead biologist	Funding source
Bay of Quinte On-Ice Creel	Jan 1 - Feb 28	Walleye	24	Hoyle	BASE
Ganaraska Fishway - Rainbow Trout Assessment	March 29 - April 22	Adult rainbow trout	32	Bowlby	COA
Larval Whitefish Trawls	April 4 - May 20	Larval lake whitefish	8	Hoyle	COA
Lake Trout Tug Stocking	April 11 - May 13	Juvenile lake trout	n/a	Daniels	BASE
Bay of Quinte Open Water Creel	May 7 - Nov 20	Walleye, smallmouth bass, largemouth bass, northern pike	29	Hoyle	BASE
Whitefish Commercial Catch Sampling	Seasonal	Lake whitefish	19	Hoyle	BASE
Western Basin Salmonid Creel	April 1 - Sept 25	All salmon and trout	29	Bowlby	BASE/COA
Juvenile Atlantic Salmon Stocking	May 10 - 13	Juvenile atlantic salmon	n/a	Daniels	COA
Goby Predators - Trapnetting	Seasonal	Diets of round goby predators	2	Schaner	COA
Moses Saunders Eel Ladder Monitoring	May 23 - Oct 28	Migrating American eel	32	Lake	COA
Eastern Lake Ontario and Bay of Quinte Community Index Netting	June 27 - Sept 9	Eastern Lake Ontario and the Bay of Quinte fish community	47	Hoyle	BASE
Lake Whitefish Test Netting - Partnership with OCFA	July 1 - Oct 31	Lake Whitefish and incidentally caught fish	3	Dietrich	COA
Juvenile Salmonid Stream Assessment	Aug 15 - Sept 23	Wild juvenile rainbow trout and other trout and salmon	13	Bowlby	COA
Lake Ontario Hydroacoustics	July 25 - Aug 5	Alewife, rainbow smelt and three-spine stickleback	15	Schaner	COA
Bay of Quinte Nearshore Community Index Netting	Sept 6 - Oct 7	Bay of Quinte fish community	4	Hoyle	COA
St. Lawrence River Indexing Netting - Thousand Islands	Sept 12 - Oct 7	St. Lawrence River fish community	21	Lake	COA
Credit River Chinook Assessment and Egg Collection	Oct 3 - Oct 13	Adult chinook salmon	31	Bowlby	COA
Age and Growth	July 4 - March 31	Multiple species	n/a	Multiple	COA

Appendix C. Atlantic salmon stocked in the Province of Ontario waters of Lake Ontario, 2005.

SITE NAME	MONTH STOCKED	YEAR SPAWNED	HATCHERY	STRAIN/ EGG SOURCE	AGE (MONTHS)	MEAN WT (G)	MARKS	NUMBER STOCKED
ATLANTIC SALMON - DELAYED FRY								
CREDIT RIVER								
West Credit Belfountain	6	2004	Partnership	LaHave/Normandale	2	0.2	None	**2,323**
ATLANTIC SALMON - ADVANCED FRY								
BARNUM HOUSE CREEK								
Middle	5	2004	Ringwood	LaHave/Normandale	6	1.0	None	37,500
Upper	5	2004	Ringwood	LaHave/Normandale	6	1.0	None	37,400
								74,900
ATLANTIC SALMON - FALL FINGERLINGS								
CREDIT RIVER								
Black Cr Limehouse	11	2004	Ringwood	LaHave/Normandale	12	4.6	None	29,471
Forks of the Credit	11	2004	Ringwood	LaHave/Normandale	12	5.3	None	29,506
Forks of the Credit Park	11	2004	Ringwood	LaHave/Normandale	12	6.1	None	29,524
West Credit Belfountain	11	2004	Ringwood	LaHave/Normandale	12	9.8	None	33,338
								121,839
TOTAL - ATLANTIC SALMON DELAYED FRY								**2,323**
TOTAL - ATLANTIC SALMON ADVANCED FRY								**74,900**
TOTAL - ATLANTIC SALMON FALL FINGERLINGS								**121,839**
TOTAL - ATLANTIC SALMON								**199,062**

Appendix C. Brown trout stocked in the Province of Ontario waters of Lake Ontario , 2005.

SITE NAME	MONTH STOCKED	YEAR SPAWNED	HATCHERY	STRAIN/ EGG SOURCE	AGE (MONTHS)	MEAN WT (G)	MARKS	NUMBER STOCKED
				BROWN TROUT - FALL FINGERLINGS				
LAKE ONTARIO								
Ashbridge's Bay Ramp	10	2004	Harwood	Ganaraska/Normandale	11	23.4	AdRV	15,733
	11	2004	Chatsworth	Ganaraska/Normandale	11	14.7	AdRV	17,007
Bluffer's Park	10	2004	Harwood	Ganaraska/Normandale	11	23.8	AdRV	15,761
	11	2004	Chatsworth	Ganaraska/Normandale	11	14.7	AdRV	17,007
								65,508
				BROWN TROUT - SPRING YEARLINGS				
BRONTE CREEK								
Bronte Beach Park	4	2003	Chatsworth	Ganaraska/Normandale	16	30.8	RV	**15,000**
DUFFIN CREEK								
401 Bridge	4	2003	Harwood	Ganaraska/Normandale	17	40.8	RV	**11,107**
LAKE ONTARIO								
Ashbridge's Bay Ramp	3	2003	Harwood	Ganaraska/Normandale	16	54.8	RV	6,030
	4	2003	Harwood	Ganaraska/Normandale	17	55.9	RV	11,015
Bluffer's Park	3	2003	Harwood	Ganaraska/Normandale	16	50.9	RV	6,154
	4	2003	Harwood	Ganaraska/Normandale	17	48.6	RV	10,099
Burlington Canal	4	2003	Chatsworth	Ganaraska/Normandale	16	32.6	RV	17,369
Fifty Point CA	4	2003	Chatsworth	Ganaraska/Normandale	16	33.8	RV	15,000
Humber Bay Park	4	2003	Chatsworth	Ganaraska/Normandale	16	33.8	RV	10,355
Jordan Harbour	4	2003	Chatsworth	Ganaraska/Normandale	16	33.9	RV	10,996
Lakeport	3	2003	Harwood	Ganaraska/Normandale	16	49.9	RV	4,992
	4	2003	Harwood	Ganaraska/Normandale	17	58.3	RV	5,430
Millhaven Wharf	4	2003	White Lake	Ganaraska/Normandale	16	26.3	RV	15,046
Oshawa Harbour	3	2003	Harwood	Ganaraska/Normandale	16	38.7	RV	4,949
	4	2003	Harwood	Ganaraska/Normandale	17	58.3	RV	6,175
Port Dalhousie East	4	2003	Chatsworth	Ganaraska/Normandale	16	34.1	RV	24,082
								147,692
TOTAL - BROWN TROUT FALL FINGERLINGS								**65,508**
TOTAL - BROWN TROUT SPRING YEARLINGS								**173,799**
TOTAL - BROWN TROUT								**239,307**

Appendix C. Chinook salmon stocked in the Province of Ontario waters of Lake Ontario, 2005.

SITE NAME	MONTH STOCKED	YEAR SPAWNED	HATCHERY	STRAIN/ EGG SOURCE	AGE (MONTHS)	MEAN WT (G)	MARKS	NUMBER STOCKED
				CHINOOK - SPRING FINGERLINGS				
BOWMANVILLE CREEK								
CLOCA Ramp	4	2004	Ringwood	Wild - Credit R.	5	4.4	None	25,000
BRONTE CREEK								
2nd Side Road Bridge	4	2004	Ringwood	Wild - Credit R.	5	5.0	None	25,000
5th Side Road Bridge	4	2004	Ringwood	Wild - Credit R.	5	5.0	None	25,000
								50,000
CREDIT RIVER								
Huttonville	4	2004	Ringwood	Wild - Credit R.	5	4.1	None	42,000
Norval	4	2004	Ringwood	Wild - Credit R.	5	4.1	None	43,000
								85,000
DON RIVER								
Donalda Golf Club	4	2004	Ringwood	Wild - Credit R.	5	4.8	None	**15,000**
HIGHLAND CREEK								
Colonel Danforth Park	4	2004	Ringwood	Wild - Credit R.	5	4.3	None	**15,000**
HUMBER RIVER								
East Branch Islington	4	2004	Ringwood	Wild - Credit R.	5	4.8	None	15,000
	5	2004	Ringwood	Wild - Credit R.	6	5.6	None	7,609
								22,609
LAKE ONTARIO								
Ashbridge's Bay Ramp	4	2004	Ringwood	Wild - Credit R.	5	4.7	None	10,000
Barcovan	5	2004	Ringwood*	Wild - Credit R.	6	5.2	Ad	10,007
Beacon Inn	5	2004	Ringwood	Wild - Credit R.	6	5.5	None	25,000
Bluffer's Park	5	2004	Ringwood	Wild - Credit R.	6	5.5	None	42,610
Burlington Canal	4	2004	Ringwood	Wild - Credit R.	5	4.4	None	50,000
Consecon Robinson Pt	5	2004	Ringwood	Wild - Credit R.	6	5.5	LV	15,011
Lakeport	4	2004	Ringwood	Wild - Credit R.	5	4.4	None	15,000
Oshawa Harbour	4	2004	Ringwood	Wild - Credit R.	5	3.6	None	25,000
Port Dalhousie East	5	2004	Ringwood	Wild - Credit R.	6	5.2	None	100,000
Wellington Channel	5	2004	Ringwood	Wild - Credit R.	6	6.0	LV	15,011
	5	2004	Ringwood*	Wild - Credit R.	6	6.7	Ad	10,012
Whitby Harbour	4	2004	Ringwood	Wild - Credit R.	5	3.6	None	25,000
								342,651
TOTAL - CHINOOK SALMON								**555,260**

* - Pen-Imprinted

Appendix C. Coho salmon stocked in the Province of Ontario waters of Lake Ontario, 2005.

SITE NAME	MONTH STOCKED	YEAR SPAWNED	HATCHERY	STRAIN/ EGG SOURCE	AGE (MONTHS)	MEAN WT (G)	MARKS	NUMBER STOCKED
				COHO - FALL FINGERLINGS				
BRONTE CREEK								
Lowville Park	10	2004	Normandale	Wild - Salmon R.	9	18.6	AdRV	16,525
	10	2004	Ringwood	Wild - Salmon R.	10	13.8	AdRV	6,641
								23,166
CREDIT RIVER								
Eldorado Park	9	2004	Ringwood	Wild - Salmon R.	9	14.6	AdRV	11,000
	10	2004	Ringwood	Wild - Credit R.	10	14.4	RV	21,605
Huttonville	9	2004	Ringwood	Wild - Salmon R.	9	14.6	AdRV	11,000
	10	2004	Ringwood	Wild - Credit R.	10	14.4	RV	21,033
Norval	9	2004	Ringwood	Wild - Salmon R.	9	14.6	AdRV	1,154
	10	2004	Ringwood	Wild - Salmon R.	10	13.8	AdRV	9,855
	10	2004	Ringwood	Wild - Credit R.	10	14.4	RV	21,057
								96,704
HUMBER RIVER								
East Branch Islington	9	2004	Ringwood	Wild - Salmon R.	9	14.6	AdRV	**47,000**
				COHO - SPRING YEARLINGS				
CREDIT RIVER								
Eldorado Park	3	2003	Ringwood	Wild - Credit R.	15	20.7	Ad	41,460
Norval Nashville North	3	2003	Ringwood	Wild - Credit R.	15	20.2	Ad	41,637
								83,097
TOTAL - COHO FALL FINGERLINGS								**166,870**
TOTAL - COHO SPRING YEARLINGS								**83,097**
TOTAL - COHO SALMON								**249,967**

Appendix C. Lake trout stocked in the Province of Ontario waters of Lake Ontario, 2005.

SITE NAME	MONTH STOCKED	YEAR SPAWNED	HATCHERY	STRAIN/ EGG SOURCE	AGE (MONTHS)	MEAN WT (G)	MARKS	NUMBER STOCKED
				LAKE TROUT - SPRING YEARLINGS				
LAKE ONTARIO								
Cobourg Harbour Pier	3	2003	Harwood	Seneca Lake/Harwood	15	28.7	AdRP	41,529
Fifty Point CA	3	2003	Harwood	Seneca Lake/Harwood	15	29.7	AdRP	41,302
	4	2003	Harwood	Seneca Lake/Harwood	16	27.1	AdRP	15,513
	4	2003	Harwood	Slate Islands/Dorion	17	35.2	AdRP	13,521
North of Main Duck Sill	4	2003	Harwood	Michipicoten Island/Dorion	17	44.6	AdRP	15,379
	4	2003	Harwood	Mishibishu Lakes/Tarentorus	17	34.6	AdRP	36,198
	5	2003	Harwood	Seneca Lake/Harwood	17	40.1	AdRP	9,348
	5	2003	Harwood	Michipicoten Island/Dorion	18	48.1	AdRP	23,060
	5	2003	Harwood	Mishibishu Lakes/Tarentorus	18	29.6	AdRP	8,855
	5	2003	Harwood	Slate Islands/Dorion	18	43.4	AdRP	52,891
Pigeon Island	5	2003	Harwood	Michipicoten Island/Dorion	18	50.7	AdRP	9,712
South of Long Point	4	2003	Harwood	Seneca Lake/Harwood	16	35.7	AdRP	9,103
	4	2003	Harwood	Michipicoten Island/Dorion	17	43.8	AdRP	15,308
	4	2003	Harwood	Mishibishu Lakes/Tarentorus	17	36.7	AdRP	25,104
	5	2003	Harwood	Seneca Lake/Harwood	17	38.3	AdRP	143,708
	5	2003	Harwood	Slate Islands/Dorion	18	39.4	AdRP	688
TOTAL - LAKE TROUT								**461,219**

Appendix C. Rainbow trout stocked in the Province of Ontario waters of Lake Ontario, 2005.

SITE NAME	MONTH STOCKED	YEAR SPAWNED	HATCHERY	STRAIN/ EGG SOURCE	AGE (MONTHS)	MEAN WT (G)	MARKS	NUMBER STOCKED
				RAINBOW TROUT - FRY				
CREDIT RIVER								
Paper Mill	6	2005	Partnership	Wild - Credit R.	2	0.19	None	**106,500**
DON RIVER								
Bathurst S. of 16th Ave.	6	2005	Partnership	Wild - Oshawa Cr.	2	0.17	None	**11,000**
ROUGE RIVER								
Morningside Cr.	6	2005	Partnership	Wild - Oshawa Cr.	2	0.17	None	**11,000**
				RAINBOW TROUT - FALL FINGERLINGS				
BRONTE CREEK								
2nd Side Road Bridge	11	2005	Normandale	Ganaraska/Normandale	7	10.9	RP	16,524
Lowville Park	11	2005	Normandale	Ganaraska/Normandale	7	10.9	RP	16,526
								33,050
CREDIT RIVER								
Huttonville	11	2005	Normandale	Ganaraska/Normandale	7	10.8	RP	16,742
Norval	11	2005	Normandale	Ganaraska/Normandale	7	10.8	RP	16,747
								33,489
				RAINBOW TROUT - SPRING YEARLINGS				
BRONTE CREEK								
2nd Side Road Bridge	4	2004	Normandale	Ganaraska/Normandale	12	22.3	AdRV	12,112
Lowville Park	4	2004	Normandale	Ganaraska/Normandale	12	21.0	AdRV	10,458
	5	2004	Normandale	Ganaraska/Normandale	14	41.9	AdRV	1,018
								23,588
CREDIT RIVER								
Huttonville	4	2004	Normandale	Ganaraska/Normandale	12	19.1	AdRV	4,183
Norval	4	2004	Normandale	Ganaraska/Normandale	12	20.0	AdRV	12,044
								16,227
HUMBER RIVER								
East Branch Islington	4	2004	Normandale	Ganaraska/Normandale	12	19.1	AdRV	16,208
King Vaughan Line	4	2004	Normandale	Ganaraska/Normandale	12	19.4	AdRV	16,005
								32,213
LAKE ONTARIO								
Glenora	5	2004	Harwood	Ganaraska/Normandale	14	31.7	AdRV	8,799
Jordan Harbour	4	2004	Normandale	Ganaraska/Normandale	12	17.6	AdRV	17,257
Millhaven Wharf	5	2004	Harwood	Ganaraska/Normandale	14	31.3	AdRV	9,700
North of Main Duck Sill	5	2004	Harwood	Ganaraska/Normandale	14	33.2	AdRV	5,948
Port Dalhousie East	4	2004	Normandale	Ganaraska/Normandale	12	20.5	AdRV	17,203
								58,907
ROUGE RIVER								
Berczy Cr.	5	2004	Partnership	Wild - Rouge R.	12	7.5	Ad	3,500
Bruce Cr.	5	2004	Partnership	Wild - Rouge R.	12	7.5	Ad	3,500
Little Rouge R.	5	2004	Partnership	Wild - Rouge R.	12	7.5	Ad	3,500
								10,500
TOTAL - RAINBOW TROUT FRY								**128,500**
TOTAL - RAINBOW TROUT FALL FINGLERLINGS								**66,539**
TOTAL - RAINBOW TROUT SPRING YEARLINGS								**141,435**
TOTAL - RAINBOW TROUT								**336,474**