

## **Eastern Basin of Lake Ontario Creel Survey, 2003**

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Lake Ontario supports the largest sport fishery in New York State (Kretser and Klatt 1981, Connely et al. 1988,1997) . The warmwater component of this fishery is concentrated primarily in the Eastern Basin, adjoining Jefferson County. The Eastern Basin has been known for many years as an extremely productive smallmouth bass (*Micropterus dolomieu*) fishery and an excellent area for warmwater sportfishing in general (Stone et al. 1951).

A 1978 creel census reported over 183,000 smallmouth bass harvested from the Eastern Basin (Panek 1981) at a time when the smallmouth bass abundance index, based on assessment netting, was 26.04 fish/net-night (Eckert, personal communication). In 1984 Eastern Basin smallmouth bass were at a low abundance (index 12.44 fish/net-night) and a creel survey reported about 91,000 harvested (NYSDEC 1989a). After recovering in the late 80's and early 90's, smallmouth bass in the Eastern Basin were in the deepest decline ever recorded by 1997, with an abundance index near 6 fish/net-night. A creel survey in 1998 found the lowest smallmouth bass harvest yet documented, approximately 36,000 fish (McCullough and Einhouse 1999).

In recent years the Lake Ontario system has been subject to a number of significant impacts including: reduced nutrient loading (and primary and secondary production), invasion and expansion of exotic species, including dreissenid mussels, the round goby (*Neogobius melanastomus*), and the zooplankters *Bythotrephes cederstroemi* and *Cercopagus pengoi*, as well as rapid growth of double-crested cormorant (*Phalacrocorax auritus*) populations. By the mid-1990's, cormorant predation on smallmouth bass represented a mortality factor, negligible at the time of earlier surveys, likely of the same order of magnitude as the sport fishery (Schneider et al. 1997).

The most recent comprehensive creel survey of the Eastern Basin warmwater fishery took place in 1998, before cormorant management efforts began. An updated creel survey was needed to characterize the sport fishery under current conditions and better understand the impacts of system changes.

The specific objectives of this creel survey were to:  
a) Estimate angler effort, catch and harvest in the New York waters of Lake Ontario's Eastern Basin during the warmwater fishing season, May 1 through September 30,2003.  
b) Characterize angler origins and preferences.  
c) Determine size structure of the fish harvest.

### **Methods**

The creel survey consisted of two independent samples. Angler interviews were conducted by direct contact at representative access sites to provide data such as catch and harvest rates, and angler characteristics. Effort data were collected by instantaneous aerial counts of fishing boats. This method was very similar to that regularly used on the open waters of Lake Erie (Einhouse and Eifert 1989, Culligan et al. 1997) which was based on the method described by Schmidt (1975). It is virtually identical to the method used to survey the Eastern Basin of Lake Ontario in 1998 (McCullough and Einhouse 1999).

As in 1998, the sampling period for this survey extended from opening of walleye season (5/3/03) through Sept. 30 (bass season opened June 21 2003). In 2003 an extended survey was conducted during the period 1 - 31 October. The survey area for boat counts and interviews included U.S. waters of Lake Ontario, including bays,

north and east of Stony Point, an area of some 256,000 acres (Figure 1). Interviews were conducted on two weekend days and two randomly selected weekdays per week, between 0900 EDT and one hour after sunset. Two interview routes were employed, covering access points from Henderson Harbor to Cape Vincent (Figure 1). One route included four and the other five marina or launch ramp sites (Table 1). Interviews were conducted by two agents, each covering one route during the survey day. Interviews collected data concerning: area and time fished, target species, fish harvested or released, and angler residence. Harvested fish were measured (total length) when feasible. Data from anglers returning to these access points but fishing outside the census area (e.g., the St Lawrence River), were not considered in this report.

Aerial counts of fishing boats were conducted on one randomly selected weekday and one randomly selected weekend day per week. A few cancellations occurred due to weather or aircraft problems. Counts were conducted through field glasses from altitudes of about 2,000 feet.

Starting times for both interview routes and boat counts were randomly chosen, as was the starting point for each survey route.

Estimates of fishing effort, catch rates and harvest, along with associated standard errors, were calculated according to Schmidt 1975 :

Fishing Effort

$$P = \{(\sum C_i)/n\} \times H \times D$$

$$S_c^2 = 1/n(n-1) \times [\sum C_i^2 - \{(\sum C_i)^2 / n\}] \times (HD)^2$$

where:

- P = fishing effort in angler-hours
  - C<sub>i</sub> = angler count for I-th flight (fishing boats from flight x anglers per boat from interviews)
  - n = number of flights
  - H = number of daylight hours per day
  - D = number of days
  - S<sub>c</sub><sup>2</sup> = standard error square of the mean angler count
- Catch and Harvest

$$CR = \{(\sum F_i)/n\} / \{(\sum H_i)/n\} = \sum F_i / \sum H_i$$

$$Y = P \times (CR)$$

where:

- CR = mean catch rate in fish harvested per angler-hour
- H<sub>i</sub> = number of angler-hours expended by I-th party
- F<sub>i</sub> = number of fish caught by I-th party
- n = number of parties interviewed
- P = fishing effort in angler-hours
- Y = harvest in number for particular species

$$S_{CR}^2 = CR^2 \times [(S_F^2/F^2) + (S_H^2/H^2) - \{2 Cov (F \times H) / (F \times H) \}]$$

$$S_Y^2 = (S_p^2 \times CR^2) + (S_{CR}^2 \times P^2)$$

$$S_F^2 = \{1/n (n-1)\} \times [\sum F_i^2 - \{(\sum F_i)^2 / n\}]$$

$$S_H^2 = \{1/n (n-1)\} \times [\sum H_i^2 - \{(\sum H_i)^2 / n\}]$$

$$Cov (F \times H) = \{1/n(n-1)\} \times \{\sum F_i H_i - [(\sum F_i \times \sum H_i) / n]\}$$

where:

- S<sub>CR</sub><sup>2</sup> = standard error square of the mean catch rate
- S<sub>Y</sub><sup>2</sup> = standard error square of estimated harvest
- S<sub>F</sub><sup>2</sup> = standard error square of the mean number of fish

- S<sub>H</sub><sup>2</sup> = standard error square of mean hours
- S<sub>p</sub><sup>2</sup> = standard error square of estimated fishing effort
- Cov (F x H) = covariance of fish and hours
- F = mean number of fish per party
- H = mean number of angler-hours per party

Information concerning the definition of strata is presented in Table 2.

The fishing population surveyed consisted of daylight (sunrise to sunset) boat anglers. The major assumptions underlying effort calculation in this survey were: 1) fishing boats interviewed at the selected access sites experienced catch rates representative of the entire boat angling population within each survey area and stratum, and 2) all fishing boats, both in the act of fishing, and also traveling, could be distinguished from other pleasure boats.

## Results

The 2003 Eastern Basin Lake Ontario angler survey included 39 aerial boat counts and 1,065 interviews at access sites during the primary survey period of May through September. Of these, 998 interviews, involving 1,701 individual angler trips, documented fishing within the limits of the Eastern Basin study area. The extended survey in October included six sets of aerial observations and 97 interviews.

Catch and Harvest Smallmouth bass were the most commonly caught and harvested gamefish species in the Eastern Basin Lake Ontario fishery, with 0.54 fish/angler-hour caught, and 0.20 fish/angler-hour harvested by anglers targeting bass (Table 3), with an estimated total harvest of 18,984 fish (Table 4). The Chaumont Bay and Henderson Bay areas produced the greatest harvest (Table 5). The average total length of harvested smallmouth bass was 15.2 in (387 mm, Table 6).

Walleye (*Sander vitreus*), which provided no detectable harvest in surveys prior to 1998, were the second most harvested game fish, with targeted rates per angler-hour of 0.09 fish caught and harvested before the opening of bass season, and 0.14 caught and 0.10 harvested during bass season (Table 3). Throughout the survey period about 6,500 walleye were harvested (Table 4), mostly in the Chaumont Bay area (Table 7). The average total length of harvested walleye was 27.2 in (691.3 mm, Table 6).

Yellow perch (*Perca flavescens*) were the most commonly harvested pan fish, with over 81,000 fish taken (Table 4). Henderson Bay was by far the most productive area for perch harvest (Table 8). Brown bullhead (*Ameiurus nebulosus*) was another panfish species with significant harvest (Table 4). Among game fish, lake trout (*Salvelinus namaycush*) and chinook salmon (*Oncorhynchus tshawytscha*) were also harvested (Table 4). Total length distributions of harvested fish (excepting chinook salmon, due to a small sample) are presented in Figure 2.

Angler Effort and Characteristics Total effort for pre-bass season (3 May through 20 June) was greatest in Chaumont Bay which is known for early season walleye fishing. Lowest effort was in the offshore/ Stony and Galloo Islands area, which is the most distant area from Eastern Basin ports and has the longest average trip (Table 9).

Highest effort during the bass season (sampled June 21 through September 30) occurred in the Chaumont Bay and Hardscrabble areas which are known primarily for smallmouth bass and yellow perch fishing and are easily accessible to small boats (Table 10).

During the pre-bass season, with the walleye and northern pike seasons open, the largest group of anglers (42%) said they were targeting walleye. Six percent were fishing specifically for northern pike, and 22% reported fishing for any warmwater (non-salmonid) gamefish, apparently a combination of walleye and northern pike. Panfish anglers comprised 19% of those interviewed and salmonid anglers 13% (Table 11).

During the bass season 35% of anglers reported fishing for smallmouth bass, 11% for walleye and 2% for other warmwater gamefish (largemouth bass or muskellunge). Interviewees targeting lake trout comprised 9%, chinook salmon 7%, and 15% targeting other, or any, salmonids (Table 11).

Over 70% of anglers participating in the Eastern Basin fishery in 2003 were from New York State led by residents of Jefferson County (local, 29%) and Monroe County (Rochester area, 7%). Pennsylvania and New Jersey residents, with 15% and 6% of all interviewed anglers, respectively, were best represented among non-New York residents from 17 states and provinces (Table 12).

Extended survey Smallmouth bass were the most commonly caught and harvested gamefish species in the fishery during October, with 0.38 fish/angler-hour caught, and 0.23 fish/angler-hour harvested by anglers targeting bass (Table 18), and total harvest of about 500 fish (Table 19). There was little harvest of other gamefish species (Table 18). Yellow perch were by far the most significant species in the October harvest with over 8,000 fish taken (Table 19). Approximately 6,500 angler-hours of effort were expended in October, mostly in sheltered bays (Table 20).

## Discussion

Changes in Composition of the Sport Fishery Significant changes have occurred over the past 37 years. Historically, the open water fishery of New York's Lake Ontario Eastern Basin has been dominated by smallmouth bass (Jolliff and LeTendre 1966, Panek

1981, NYSDEC 1989a, McCullough and Einhouse 1999). To a lesser degree, this remained so in 2003.

Based on index gill netting (Chrisman and Eckert 1998) smallmouth bass abundance increased dramatically after the 1984 creel survey (NYSDEC 1989a), peaked in 1989, then declined to its lowest recorded level in 2002. Peak abundance was approximately six times greater than that in 1998 (Chrisman and Eckert 1998). While we were not able to document a pattern, it is likely that success and participation in the Eastern Basin smallmouth bass fishery were much higher when bass were more abundant relative to 1984 or 1998. However, with smallmouth bass abundance remaining low (Eckert 2003), success and participation in 2003 were certainly lower than in 1984 or 1998. Cormorant management efforts designed partly to reduce mortality on and increase abundance of smallmouth bass, although showing progress, are not expected to provide substantial benefits to the bass population until after 2005 (McCullough et al. 2004).

Walleye were a negligible part of the fishery in New York waters of Lake Ontario's Eastern Basin at the time of creel surveys through 1984. Anecdotal reports of successful walleye fishing in the late 1980's were substantiated in 1991 when the Lake Ontario Fishing Boat Census, though not covering most of the Eastern Basin, detected an increase in walleye harvest at its easternmost sites (Eckert et al. 1992). By 1998 the quality of this fishery (targeted catch rate = 0.10-0.23, harvest rate = 0.09-0.19 walleye/angler-hour) was similar to that of the well known Lake Erie walleye fishery (targeted catch rate 0.21 walleye/angler-hour; targeted harvest rate 0.19 walleye /angler-hour (Einhouse and Eifert 1989)). The magnitude of the fishery was considerably lower, however, with an estimated harvest of some 15,000 fish in the Eastern Basin compared to 50,000 in New York waters of Lake Erie (Culligan et al. 1997). By 2003 the Lake Ontario Eastern Basin walleye fishery showed evidence of a decline with catch rates during the bass season reduced from 0.23 to 0.14 and targeted harvest rate down from 0.19 to 0.10 walleye/angler-hour (Table 3), and harvest on the order of 6,500 fish (Table 4). Reduced recruitment of walleye from the Bay of Quinte is probably involved in this decline (Stewart et al. 2000).

In 1978 yellow perch harvest approached 108,000 fish and 14% of angling parties targeted yellow perch (Panek 1981). Only 3-4% of anglers targeted perch in 1998, and

harvest declined to 60,500 fish. In 2003 the yellow perch fishery had expanded again with a harvest of over 81,000 fish (Table 4), closer to 90,000 if October harvest is considered (Table 19). Interest in yellow perch also increased with 7-10% of anglers targeting the species (Table 11). Although specifically targeted by only 2% of angling parties, rock bass (*Ambloplites rupestris*) contributed significantly to the Eastern Basin fishery in 1978 with a harvest of over 95,000 fish (Panek 1981). In 1998 and in 2003 harvest of rock bass was negligible.

Chinook salmon, lake trout and other trout and salmon were targeted by 31% of angler-trips during the 2003 bass season (Table 11), more than double the 15% of trips during the 1998 bass season (McCullough and Einhouse 1999). They were not present at all during the 1978 or 1966 studies, which preceded large scale salmonid stocking (Table 13). Anglers targeting northern pike, which were a small but notable part of the fishery in 1966 (Jolliff and LeTendre 1966), have been a minor component in subsequent studies.

The rapid expansion of trout and salmon stocking and subsequent fishing opportunities in Lake Ontario during the 1980's was accompanied by greatly increased publicity for all aspects of the Lake Ontario fishery, including the Eastern Basin. An expansion of the charter fishing fleet (not as dramatic for the Eastern Basin as for other parts of Lake Ontario), and public access facilities, occurred during the same period. Interest in the walleye fishery resulted in additional publicity. These factors have led to increased knowledge of, and access to, the Lake Ontario Eastern Basin fishery for non-New York State resident anglers. These anglers now account for nearly 30% of all angler trips in this fishery, up from about 5% in 1966 (Table 17).

Comparability of Data Five studies specifically covering Lake Ontario's Eastern basin fishery have been conducted over the last 37 years. All five studies were based on direct contact interviews. In the 1966 survey work, interviews were conducted from a roving boat (Jolliff and LeTendre 1966). In 1978 (Panek 1981) interviews were conducted both from a roving boat and at access sites. Access site interviews were the basis of catch and harvest rate, and angler characteristic data in the 1984 (NYSDEC 1989b), 1998 (McCullough and Einhouse 1999) and current studies. Many of the access sites covered were common to all four most recent studies. Due to the similarity of interview techniques,

direct comparisons of catch and harvest rates are reasonable.

Due to the wide range of estimation techniques used, comparisons among effort estimates must be made with caution. Each of the Eastern Basin angler surveys prior to 1998 used a different technique to estimate angling effort. Jolliff and LeTendre (1966) conducted aerial counts but results were not reported and no effort estimates were made. In 1978 (Panek 1981), effort estimation was based on a combination of counts from a roving boat and from vantage points on shore. The 1984 survey (NYSDEC 1989b) employed counts at selected public access points to collect effort information. In both 1998 and the current study, counts of boats from the air formed the basis of angling effort estimation. For 1998 and 2003, effort comparisons can be made with confidence.

The ability to distinguish fishing and non-fishing boats poses difficulties for all boat count techniques. The aerial count technique is the most comprehensive used to date, in that boats are generally more visible from the air, all areas were examined on each count day, and all fishing boats are counted whether or not they return to a public access point. This would be expected to result in a more complete count, and a higher effort estimate than other techniques. Since all boats were counted which were visibly fishing, or were of a fishing type and were not visibly engaged in another activity (such as swimming or skiing), any mis-identifications that occurred would have resulted in positive bias to the effort estimate.

Catch and Harvest Rates - The Lake Ontario Eastern Basin targeted smallmouth bass harvest rate (0.20 fish/angler hour) in 2003 was unchanged from 1998 although the catch rate was substantially lower (0.54 vs 0.69 fish/angler-hour). Both 2003 rates were lower than studies conducted prior to 1998 (Table 14). The 2003 targeted harvest rate was only 34% of the 1966 (lake) rate and 43% of the 1978 level, and targeted catch was 55% of the 1966 (lake) rate. Overall (targeted and non-targeted) catch and harvest rates were lower than for 1998 and only 33% and 36%, respectively, of 1984 rates. Based on assessment netting, smallmouth bass abundance was low in 1984, although not as low as in 1998 or in 2003 (Chrisman and Eckert 1998, Eckert 2004). The decline in harvest between earlier studies and 1998 was due to lower harvest rates (Tables 14-16). The decline in smallmouth bass harvest between 1998

and 2003 was due to reduced effort (Tables 15&16). The 2003 smallmouth bass catch rate, though poor for the Eastern Basin, was still relatively good compared to other bass fisheries in New York State: Green (1978) reported an average targeted catch rate for cooperating anglers in other NY waters of 0.10 bass/angler-hour. The highest catch rate for smallmouth bass in 11 non-Great Lakes waters during 1977-1980 was 0.65 fish per angler-hour (Green et al. 1981) somewhat higher than 0.54 for the Eastern Basin in 2003.

Angler effort and characteristics Direct comparison of total effort estimates with earlier surveys is difficult due to varying estimation techniques. Comparison of effort between 1998 and 2003 is, however, based on the same technique. Despite reduced smallmouth bass fishing quality (catch and harvest rates), no reduction in angler effort during the bass season was detected in 1998. In fact, effort appeared to have increased relative to 1978 and remained relatively unchanged compared to 1984. Estimated effort did decline by almost 150,000 angler-hours (41%), between 1998 and 2003 (Table 16) although targeted smallmouth bass harvest rate did not change (catch rate declined). Recreational angling effort is generally expected to respond negatively to reductions in angling quality, as may have been the case for the Eastern Basin in 2003. The Eastern Basin smallmouth bass fishery may have exhibited a higher quality and greater effort between 1984 and 1998 when bass were more abundant (Chrisman and Eckert 1998), but this is not documented.

In 1998 anglers continued to target bass at the about same rate (48%) they did in 1978 (McCullough and Einhouse 1999, Panek 1981). In 2003, however, only 35% of anglers interviewed during the bass season, through September, reported targeting smallmouth bass (Table 13). Anglers targeting walleye were a significant part of the fishery (11%) during the 2003 bass season; 15% of bass season anglers targeted walleye in 1998 (Table 13). As the proportion of anglers targeting warmwater gamefish declined, relative preference for salmonid gamefish increased. Despite reduced effort and (by some estimators) reduced fishing quality for bass, anglers traveled to the Eastern Basin area from a distance (29% non-resident) to a greater extent than they had in earlier surveys (Table 17).

Angler expenditures were not specifically estimated in this study. Angler expenditures are influenced by many factors and can be estimated in various ways, but total

expenditures are always closely related to angler effort and residence. Total expenditures in 1998 would not have shown a decline from 1984 since no decline in effort was documented. Effort, and therefore estimated expenditures, declined substantially between 1998 and 2003. Based on the average New York Great Lakes angler trip on-site (\$21.72/trip) and en-route (\$6.66/trip) expenditure estimates developed by Connelly et al. (1997), a conservative angler expenditure estimate for the Eastern Basin fishery in 1998 was \$1,866,074 on-site and \$572,194 en route. Using the same estimators for May through September 2003 results in estimated expenditures of \$985,849 on-site and \$302,281 en route.

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### **Literature Cited**

Chrisman, J.R. and T.H. Eckert. 1998. Population trends among smallmouth bass in the eastern basin of Lake Ontario. Section 3 *in* NYSDEC Annual report 1997, Bureau of Fisheries Lake Ontario Unit and St. Lawrence River Unit to the Great Lakes Fishery Commission's Lake Ontario Committee.

Connely, N.A., T.L. Brown, B.A. Knuth. 1988. New York Statewide Angler Survey. NYS Department of Environmental Conservation, Albany.

Connely, N.A., T.L. Brown, B.A. Knuth. 1997. New York Statewide Angler Survey 1996. NYS Department of Environmental Conservation.

Culligan, W.J., F.C. Cornelius, D.W. Einhouse, D.L. Zeller, R.C. Zimar, B.J. Beckwith, M.A. Wilkinson. 1997. 1997 Annual Report to the Lake Erie Committee. NYS Department of Environmental Conservation, Albany.

Eckert, T.H. 1992. Lake Ontario fishing boat census 1991. Report to the Lake Ontario Committee, GLFC March 1992.

Eckert, T.H. 2004. Summary of 1976-2004 warm water assessment. Section 4 *in* NYSDEC Annual report 2003, Bureau of Fisheries Lake Ontario Unit and St. Lawrence River Unit to the Great Lakes Fishery Commission's Lake Ontario Committee.

Einhouse, D.W. and J.M. Eifert. 1989. 1988 Open water sport fishing survey of New York waters of Lake Erie. NYS Department of Environmental Conservation.

Green, D. 1978. Population dynamics of largemouth and smallmouth bass in New York waters. New York Federal Aid Fish and Wildlife Restoration Project F-35-R, Performance Report. NYS Department of Environmental Conservation, Albany.

Green, D.M., B.J. Schonhoff, W.D. Youngs. 1986. The New York State Bass Study 1977 - 1980. NYS Department of Environmental Conservation, Albany.

Jolliff, T.M., G.C. LeTendre. 1966. The Eastern Lake Ontario - St. Lawrence River, New York creel census of 1966. New York State Department of Environmental Conservation.

Kretser, W. and L. Klatt. 1981. New York Statewide Angler Survey 1980. NYS Department of Environmental Conservation.

McCullough, R.D. and D. W. Einhouse. 1999. Lake Ontario - eastern basin creel survey 1998. Final report: to assess the impact of Double-crested Cormorant predation on the smallmouth bass and other fishes of the eastern basin of Lake Ontario. NYS Department of Environmental Conservation Special Report, Albany.

McCullough, R.D., J.F. Farquhar and I.M. Mazzocchi. 2004. Cormorant management activities in Lake Ontario's eastern basin. Section 13 *in* NYSDEC Annual report 2003, Bureau of Fisheries Lake Ontario Unit and St. Lawrence River Unit to the Great Lakes Fishery Commission's Lake Ontario Committee.

NYSDEC. 1989a. New York State Great Lakes Angler Survey. Volume II. NYS Department of Environmental Conservation.

NYSDEC. 1989b. New York State Great Lakes Angler Survey. Volume I. NYS Department of Environmental Conservation.

Panek, F.M. 1981. The warmwater sport fishery of eastern Lake Ontario. N.Y. Fish and Game Journal, 28(2):178-190.

Schmidt, B.R. 1975. Results and evaluation of an aerial creel survey technique on Lake Sharpe, South Dakota. Masters Thesis. South Dakota State University, Brookings, South Dakota, USA.

Schneider, C.P., A. Schiavone and R.D. McCullough. 1997. The impact of double-crested cormorant predation on smallmouth bass stocks in the Eastern Basin of Lake Ontario. Section 4 *in* NYSDEC Annual report 1996, Bureau of Fisheries Lake Ontario Unit and St. Lawrence River Unit to the Great Lakes Fishery Commission's Lake Ontario Committee.

Stewart, T.J., J. Bowlby, J.A. Hoyle, A. Mathers and T. Schaner. 2000. Status and prognosis for Bay of Quinte walleye. Ontario Ministry of Natural Resources Annual Report of the Lake Ontario Management Unit to the Great Lakes Fishery Commission.

Stone, U.B., D.G. Pasko and R.M. Roecker. 1951. A study of smallmouth bass, Lake Ontario- St. Lawrence River. NYS Conservation Department. Div. Fish and Game Research Series No. 2.

*Figure 1. Study area: U.S. waters of Lake Ontario's eastern basin.*

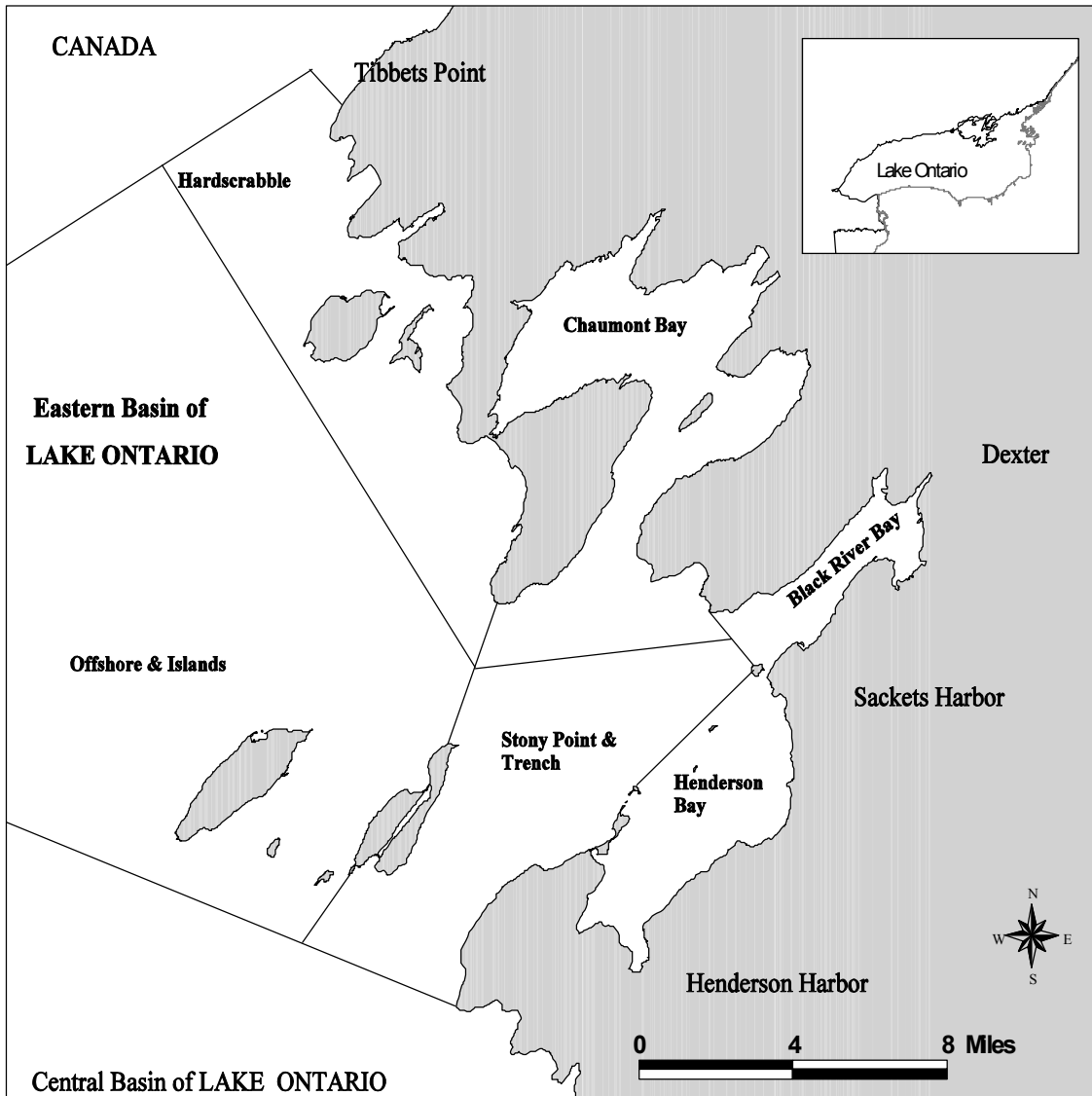
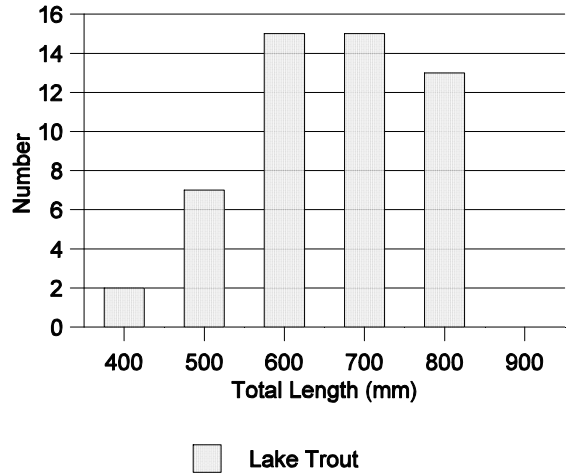
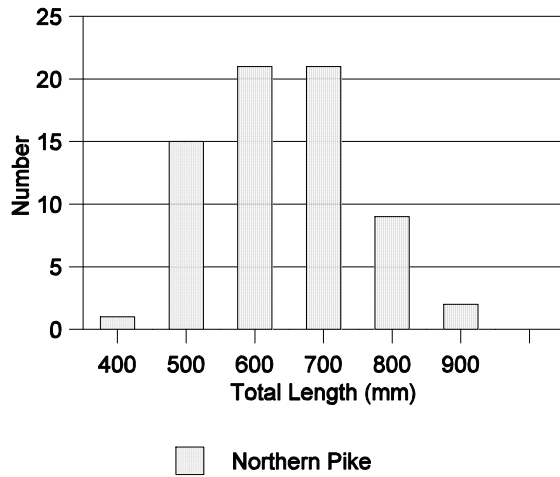
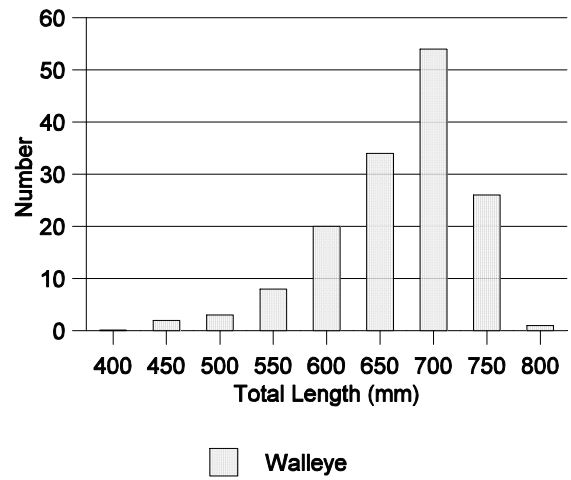
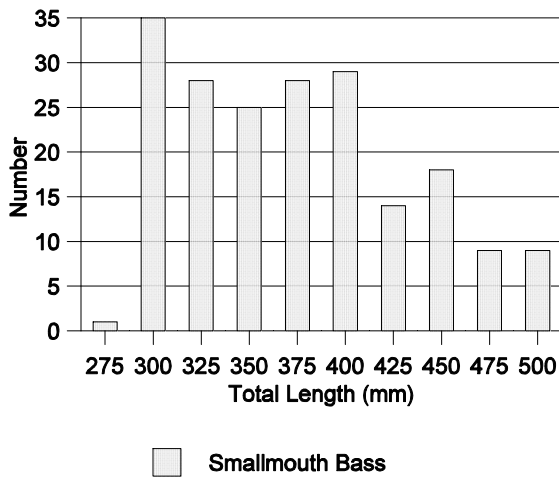


Figure 2. Total length distribution of harvested game fish (N = 196 smallmouth bass, 148 walleye, 69 northern pike, 52 lake trout).



**Table 1. Interview route descriptions.**

	South Interview Route	North Interview Route
Access Sites	Lake Ontario Mariners Marina/Harbors End Marina Henderson Town Launch Henchens Marina Dexter Village Launch Sackets Harbor Launch	Cape Vincent Launch Inner Mud Bay Marinas Martins Marina Pier 2 Chaumont Bay Launch
Travel Time	1.5 hours	1.25 hours
Interview Time per Site	1.5 hours	1.9 hours
Data Management Time	1.0 hours	1.0 hours

**Table 2. Creel survey effort estimation parameters.**

	Pre-Bass Stratum	Bass Season Stratum	Bass Season October
Survey Period	3 May 03 -20 June 03	21 June 03 -30 September 03	1 October 03 - 31 October 03
Number of Weekend/Holidays	15	32	8
Number of Weekdays	34	70	23
Mean Daylength (hours)	14.9	14.0	11.0

**Table 3 . Harvest (fish kept) and catch (fish released + kept) rates per angler-hour of smallmouth bass and walleye for targeted and overall fisheries.**

Species	Fishery	Harvest/Angler-Hour		Catch/Angler-Hour	
		1998	2003	1998	2003
Smallmouth Bass	Targeted (bass seas)	0.20	0.20	0.69	0.54
Smallmouth Bass	Overall (bass season)	0.10	0.08	0.35	0.23
Walleye	Targeted (pre-bass)	0.09	0.09	0.10	0.09
Walleye	Targeted (bass seas)	0.19	0.10	0.23	0.14
Walleye	Overall (pre-bass)	0.06	0.06	0.07	0.06
Walleye	Overall (bass seas)	0.04	0.02	0.04	0.01

**Table 4. Total harvest of major game fish and pan fish (May through September).**

Species	Harvest		Standard Error		95% Conf. Limits +/-	
	1998	2003	1998	2003	1998	2003
Smallmouth Bass	35,736	18,984	4,674	1,976	26% (9,291)	21% (3,952)
Walleye	15,141	6,584	1,761	723	23% (3,482)	22% (1,446)
Northern Pike	4,326	2,668	727	538	34% (1,454)	40% (1,076)
Lake Trout	2,658	4,134	715	632	54% (1,435)	31% (1,264)
Chinook Salmon	2,435	1,780	489	310	40% (974)	35% (620)
Yellow Perch	60,591	81,733	8,634	11,488	28% (16,965)	28% (22,976)
Brown Bullhead	6,281	14,811	2,101	4,331	67% (4,208)	58% (8,662)

**Table 5. Harvest of smallmouth bass during the bass season (through September) .**

Area	Bass Season Harvest		Standard Error	
	1998	2003	1998	2003
Black River Bay	918	1,428	322	307
Chaumont Bay	7,166	6,604	1,635	1,287
Hardscrabble	12,457	3,931	3,645	911
Offshore/Islands	5,312	1,620	1,582	521
Stony Pt/Trench	2,829	826	897	225
Henderson Bay	7,054	4,574	1,573	1,001
Season Total	35,736	18,984	4,674	1,976

**Table 6. Total lengths of harvested fish.**

Species	Number Measured	Mean Total Length mm (inches)	Range mm (inches)
Smallmouth bass	196	387.1 (15.2)	293-521 (11.5-20.5)
Walleye	148	691.3 (27.2)	470-802 (18.5-31.6)
Lake Trout	52	704.2 (27.7)	440-885 (17.3-34.8)
Northern pike	69	684.2 (26.9)	306-934 (12.0-36.8)

**Table 7. Harvest of walleye during the pre-bass and bass seasons (through September).**

Area	Pre-Bass Harvest		Standard Error		Bass Season Harvest		Standard Error	
	1998	2003	1998	2003	1998	2003	1998	2003
Black River Bay	3,709	800	707	231	306	171	109	68
Chaumont Bay	1,039	1,920	280	496	1,221	1,185	538	310
Hardscrabble	800	187	263	84	995	930	417	234
Offshore/Islands	86	88	69	57	5,995	590	1,368	193
Stony Pt/Trench	141	102	94	52	849	130	305	47
Henderson Bay	0	189	-	69	0	254	-	107
Season Total	5,775	3,286	813	563	9,366	3,261	1,562	454

**Table 8. Harvest of yellow perch during the pre-bass and bass seasons.**

Area	Pre-Bass Harvest		Standard Error		Bass Season Harvest		Standard Error	
	1998	2003	1998	2003	1998	2003	1998	2003
Black River Bay	67	477	29	265	109	9392	60	2,559
Chaumont Bay	432	540	294	257	4,236	6,875	1,732	1,962
Hardscrabble	716	147	322	92	11,155	6,903	3,820	2,515
Offshore/Islands	0	0	-	-	528	804	263	570
Stony Pt/Trench	0	0	-	-	294	1,283	170	554
Henderson Bay	0	82	-	63	43,054	55,231	7,527	3,381
Season Total	1,215	1,246	437	386	59,376	80487	8,623	11,482

**Table 9. Fishing effort during the pre-bass season (angler -hours, angler-trips)**

Area	Angler-Hours		Std. Error		Mean Hrs/Trip		Angler-Trips	
	1998	2003	1998	2003	1998	2003	1998	2003
Black River Bay	41,366	17,478	6,539	3,859	5.6	5.4	7,360	3,254
Chaumont Bay	28,958	25,233	5,423	5,862	5.6	7.1	5,207	3,563
Hardscrabble	20,962	9,562	4,646	2,856	5.2	4.7	4,037	2,020
Offshore/Islands	3,755	1,357	1,744	636	8.3	5.5	454	246
Stony Pt/Trench	7,108	1,912	2,255	586	7.0	6.6	1,015	289
Henderson Bay	10,673	2,863	3,044	764	3.6	4.9	2,949	583
Total Pre-Bass	112,822	58,406	10,542	7,665	-	-	21,023	9,955
Total Pre-Bass & Bass (thru Sept)	475,476	273,102	33,426	16,226	-	-	85,915	45,389

**Table 10. Fishing effort during the bass season (angler -hours, angler-trips)**

Area	Angler-Hours		Std. Error		Mean Hrs/Trip		Angler-Trips	
	1998	2003	1998	2003	1998	2003	1998	2003
Black River Bay	30,780	18,334	3,196	2,378	4.8	5.5	6,399	3,339
Chaumont Bay	87,906	63,908	15,068	7,647	5.3	6.2	16,725	10,344
Hardscrabble	88,610	45,052	23,347	8,095	5.3	6.0	16,811	7,515
Offshore/Islands	40,173	16,936	8,128	3,894	7.2	7.3	5,551	2,311
Stony Pt/Trench	68,474	35,919	11,441	6,544	6.6	7.1	10,337	5,029
Henderson Bay	46,711	34,548	5,131	4,109	5.2	5.0	9,068	6,896
Total Bass Season (thru Sept)	362,654	214,696	31,720	14,302	-	-	64,892	35,434
Total Pre-Bass & Bass (thru Sept)	475,476	273,102	33,426	16,226	-	-	85,915	45,389

*Table 11. Angler preferences - percent of anglers targeting species or types in 2003.*

Target Species	Pre-Bass Season (May 3 - June 20)	Bass Season Open (June 21 - Sept. 30)
Walleye	42%	11%
Smallmouth Bass	trace	35%
Northern Pike	6%	trace
Other non-salmonid gamefish	trace	2%
Any non-salmonid gamefish	22%	5%
<b>WARMWATER GAMEFISH TOTAL</b>	<b>70%</b>	<b>53%</b>
Yellow Perch	10%	7%
Other panfish	8%	trace
Any panfish	1%	trace
<b>PANFISH TOTAL</b>	<b>19%</b>	<b>7%</b>
Chinook Salmon	0%	7%
Lake Trout	2%	9%
Other trout or salmon	2%	1%
Any trout or salmon	9%	14%
<b>SALMONID TOTAL</b>	<b>13%</b>	<b>31%</b>
Anything	5%	7%
	*	*
Anglers Interviewed	1030	1701

\* may not total 100% due to rounding

other non-salmonid gamefish: largemouth bass, muskellunge

other panfish: brown bullhead, channel catfish, rock bass

other trout or salmon: brown trout, lake trout, rainbow/steelhead

**Table 12. Residence of interviewed anglers (May through September).**

Angler Residence	Number of Anglers		Percent of Total Anglers*	
	1998	2003	1998	2003
Jefferson County (local)	777	552	36	29
Monroe County	175	137	8	7
Onondaga County	119	124	6	6
Oswego County	110	97	5	5
Oneida County	90	67	4	4
37 other counties	325	375	15	20
<b>N Y RESIDENT TOTAL</b>	<b>1596</b>	<b>1352</b>	<b>74</b>	<b>71</b>
Pennsylvania	289	284	13	15
New Jersey	100	124	5	6
other states/provinces (1998-23, 2003-15)	165	153	8	8
<b>NON-RESIDENT TOTAL</b>	<b>554</b>	<b>561</b>	<b>26</b>	<b>29</b>
<b>TOTAL ANGLERS</b>	<b>2150</b>	<b>1913</b>		

\* may not total to 100% due to rounding

*Table 13. Top four angler preferences - percent of anglers targeting species or types.*

Year	Period	Target	Percent	Source
1966	June 18-Sept.5	Bays:Smallm bass	72	Jolliff and LeTendre 1966
		Yellow perch	14	
		Anything	8	
		Northern pike	2	
		Lake: Small bass	85	
		Yellow perch	11	
		Anything	3	
		Northern pike	trace	
1978	June 17-Oct.27	Smallmouth bass	52	Panek 1981
		Anything	19	
		Yellow perch	14	
		Largemouth bass	10	
1984	May through Sept.	Not reported		NYSDEC 1989a
1998	May 1 - June 19 (Pre-Bass Season)	Walleye	63	McCullough and Einhouse 1999
		Any non-sal gamefish	14	
		Anything	6	
		Any panfish	4	
1998	June 20 - Sept. 30 (Bass Season)	Smallmouth Bass	48	McCullough and Einhouse 1999
		Walleye	15	
		Chinook Salmon	12	
		Anything	8	
2003	May 30 - June 20 (Pre-Bass Season)	Walleye	42	present study
		Any non-sal gamefish	22	
		Yellow Perch	10	
		Any salmonid	9	
2003	June 21 - Sept. 30 (Bass Season)	Smallmouth Bass	35	present study
		Any salmonid	14	
		Walleye	11	
		Lake Trout	9	

**Table 14. Smallmouth bass catch and harvest rates for targeted and overall fishery.**

Year	Period	Type of Effort	Harvest/ Ang-Hr	Catch / Anal.-Hr	Source
1966	June 18-Sept.5, bays	Targeted	0.18	0.26	Jolliff and LeTendre 1966
	June 18-Sept 5, lake	Targeted	0.59	0.98	
	June 18-Sept.5, bays	Overall	-	0.24	
	June 18-Sept 5, lake	Overall	-	0.91	
1978	June 17-Oct.27	Overall	0.47*	1.25**	Panek 1981
1984	June through Sept.	Overall	0.22**	0.69**	NYSDEC 1989a
1998	June 20 - Sept. 30	Targeted	0.20	0.69	McCullough and Einhouse 1999
		Overall	0.10	0.35	
2003	June 21 - Sept. 30	Targeted	0.20	0.54	Present Study
		Overall	0.08	0.23	

\* catch rate of legal size fish

\*\* total SMBcaught or harvested/ total angler -hours in fishery)

**Table 15. Smallmouth bass harvest (number of individuals).**

Year	Period	Smallmouth Bass Harvest (numbers)	Source
1966	June 18-Sept.5	no estimate	Jolliff and LeTendre 1966
1978	June 17-Sept.30	180,331	Panek 1981
	June 17-Oct.27	183,324	
1984	June through Sept.	84,712	NYSDEC 1989a
	June through Oct.	90,360	
1998	June 20 - Sept. 30	35,736	McCullough and Einhouse 1999
2003	June 21 - Sept 30	18,984	Present
	June 21 - Oct. 31	19,502	

**Table 16. Overall angling effort during the bass season (angler-hours).**

Year	Period	Angler-Hours	Source
1966	June 18-Sept.5	no estimate	Jolliff and LeTendre 1966
1978	June 17- Sept. 30	259,153	Panek 1981
1984	June through Sept*.	387,673	NYSDEC 1989a
1998	June 20-Sept. 30	362,654	McCullough and Einhouse 1999
2003	June 21 - Sept. 30	214,696	Present

\*includes some pre-bass season

**Table 17. Angler residence trends.**

Year	Period	Percent Non-NYS Resident	Source
1966	June 18-Sept 5	Approx. 5	Jolliff and LeTendre 1966
1978	June 17 through Oct.	4	Panek 1981
1984	May through Sept.	17	NYSDEC 1989a
1998	May through Sept.	26	McCullough and Einhouse 1999
2003	May through Sept.	29	Present Study

**Table 18 . October harvest (fish kept) and catch (fish released + kept) rates per angler-hour of smallmouth bass and walleye for targeted and overall fisheries.**

Species	Fishery	Harvest/Angler-Hour	Catch/Angler-Hour
		2003	2003
Smallmouth Bass	Targeted (Oct)	0.23	0.38
Smallmouth Bass	Overall (Oct)	0.06	0.11
Walleye	Targeted (Oct)	0.03	0.03
Walleye	Overall (Oct)	0	0.01

*Table 19. Total harvest of major game fish and pan fish (October).*

Species	Harvest	Standard Error	95% Conf. Limits +/-
	2003	2003	2003
Smallmouth Bass	518	214	419
Walleye	37	21	41
Northern Pike	93	45	88
Lake Trout	0	-	-
Chinook Salmon	62	28	55
Yellow Perch	8,227	3,655	7164
Brown Bullhead	0	-	-

*Table 20. Fishing effort during the October (angler -hours, angler-trips)*

<i>Area</i>	<i>Angler-Hours</i>	<i>Std. Error</i>	<i>Mean Hrs/Trip</i>	<i>Angler-Trips</i>
	2003	2003	2003	2003
Black River Bay	1437	600	6.9	209
Chaumont Bay	1202	612	3.4	352
Hardscrabble	653	367	3.5	186
Offshore/Islands	777	447	5.7	136
Stony Pt/Trench	499	355	5.8	86
Henderson Bay	2057	637	4.2	487
Total October	6,625	1,265	-	1,456
Total Bass Season (thru Sept)	214,696	14,302		35,434
Total Pre-Bass & Bass (thru Sept)	273,102	16,226	-	45,389

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