

## 1996 ANGLER EFFORT AND EXPENDITURES ON NEW YORK'S GREAT LAKES WATERS

by

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### INTRODUCTION

Biological, environmental, and regulatory changes that have occurred over the past 10 years with New York's Great Lakes fisheries have made it necessary to update estimates of angler effort and expenditures. The last comprehensive assessment of these fisheries occurred in 1988 (Connelly et al. 1990). Previous assessments in 1973 (Brown 1975) and 1976-77 (Kretser and Klatt 1981) provide valuable trend data.

This study was implemented by Cornell University researchers with funding from New York Sea Grant and the New York State Department of Environmental Conservation to determine current levels of angler use on New York's Great Lakes waters (i.e., Lake Erie, the Niagara River, the St. Lawrence River, Lake Ontario and its embayments, and the portions of tributaries up to the first barrier impassable to fish).

### METHODS

Data from two mail surveys conducted in early 1997 were used to estimate angler effort and expenditures on New

York's Great Lakes waters for calendar year 1996. The first survey, hereafter referred to as the statewide angler survey, was sent to a sample of 17,000 fishing license holders in January 1997. The sample was drawn systematically from all resident and nonresident licenses that permitted fishing for the license year beginning October 1, 1995, and ending September 30, 1996. The questionnaire contained questions on 1996 fishing effort and expenditures by fishing location. The layout of the questions was identical to the 1988 statewide angler survey (Connelly et al. 1990).

The second survey, hereafter referred to as the Great Lakes survey, was sent to a sample of 5,000 fishing license holders in January 1997. The sample was drawn using the same criteria as for the statewide angler survey.

Nonrespondent telephone follow-ups were conducted for both surveys. Estimates of angler effort and expenditures were adjusted downward to correct for nonresponse bias. As had been found in a previous survey of anglers (Connelly and Brown 1992), those who traveled farther were more likely to have reported expenditures than those who traveled shorter distances.

Using only reported data would therefore lead to over-estimates of total expenditures. We corrected for this bias by weighting the data of those who traveled shorter distances more heavily (corresponding to the amount of nonresponse) than those who traveled farther distances.

Estimates of 1996 effort and expenditures were made by combining the two data sets according to methods detailed in Connelly et al. (1997). For trend comparisons between 1988 and 1996, we used only data from the statewide survey to maintain comparability.

## RESULTS AND DISCUSSION

### Survey Response

Of the 17,000 questionnaires mailed for the statewide angler survey, 822 were undeliverable and 8,760 completed questionnaires were returned, for an adjusted response rate of 54%. Of the 5,000 questionnaires mailed for the Great Lakes survey, 222 were undeliverable and 2,780 completed questionnaires were returned, for an adjusted response rate of 58%.

### 1996 Angler Effort

In 1996, 37% of people who bought a fishing license in New York, or 392,270 anglers, fished at least one day on New York's Great Lakes waters. Approximately one-

quarter (24%) of these anglers came from outside New York state.

Anglers fished Great Lakes waters an average of 13.7 days for a total of 5.4 million days in 1996. Lake Ontario received the largest proportion of fishing effort, with its eastern end (Jefferson and Oswego Counties) receiving the most use (Table 1). The St. Lawrence River and Lake Erie had almost one million days and more than half a million days of use, respectively, in 1996.

Fishing effort for 1996 was split between boat and shore fishing for most waterbodies (Table 1). Charterboat fishing was more popular on Lake Ontario than on the other waterbodies, accounting for about 14% of fishing effort. Shore fishing was the predominant use (89%) on the Salmon River.

Detailed information about where anglers live in general, what they fish for, and how much they spend at the fishing site for each of the major Great Lakes waterbodies can be found in Tables 2 through 8. The results for each waterbody are broken down by media regions. These regions represent multi-county areas served by the mass media (Figure 1). Some counties have overlapping media regions. This analysis assigns each county to the single metropolitan media area from which it draws most strongly in terms of television and newspaper coverage (SRDS 1993). This analysis indicates toward which media regions fisheries-related promotional materials could be directed (Brown 1981).

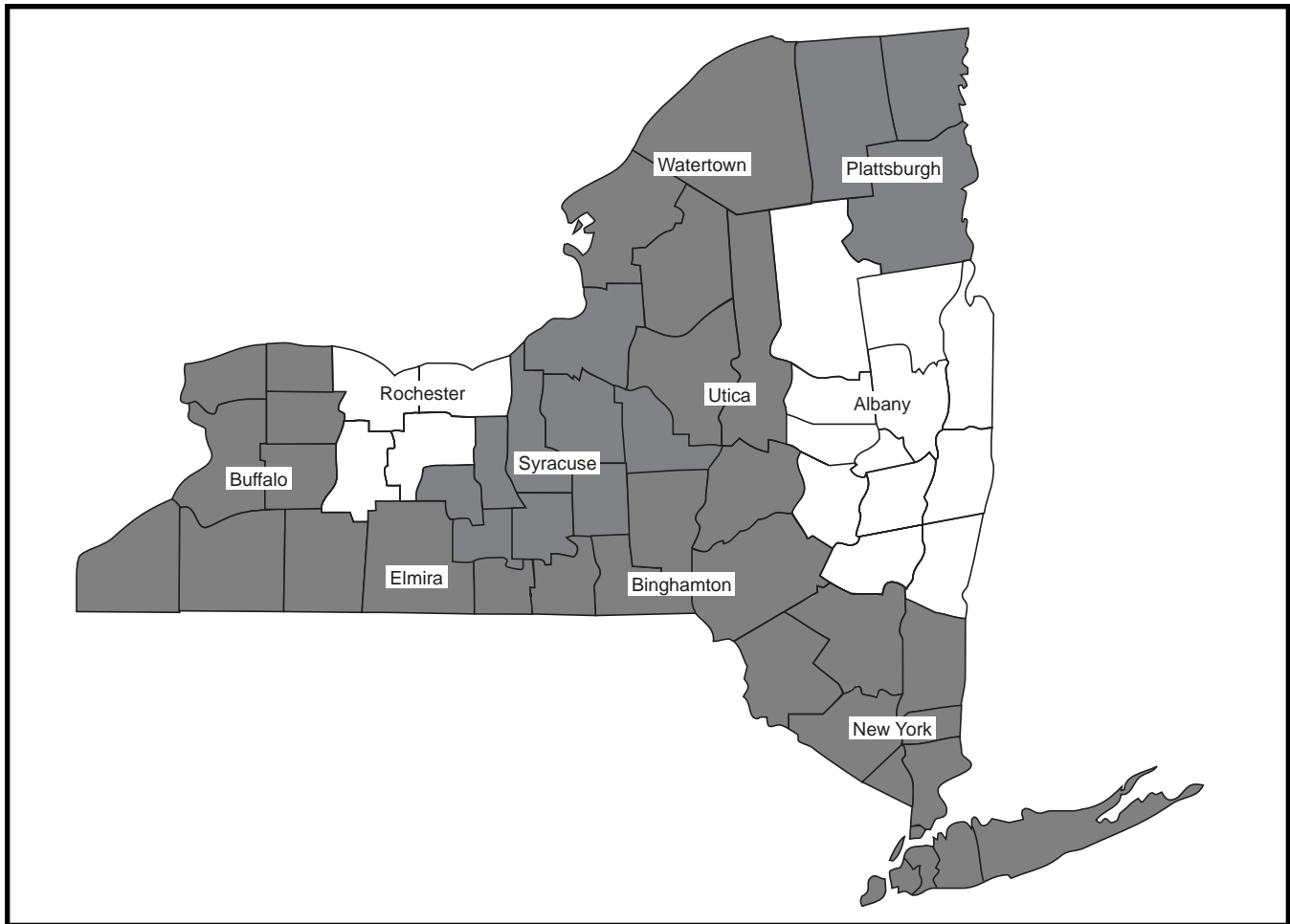
**Table 1.** 1996 angler numbers, effort, and expenditures by major New York Great Lakes waterbodies.<sup>1</sup>

Location fished	Number of anglers	Angler effort (in days)	At-location expenditures	Percent of days spent fishing from		
				charterboat	other boat	shore
<b>Lake Ontario (and bays)</b>	188,210	2,089,130	\$56,448,290	14%	50%	36%
Jefferson & Oswego Counties	87,300	1,011,140	32,627,730	10	54	36
Cayuga & Wayne Counties	32,260	307,100	6,171,330	14	51	35
Monroe County	40,840	330,080	6,918,100	10	48	42
Orleans & Niagara Counties	35,810	229,800	7,660,950	**	**	**
Angler unsure what section	26,930	211,000	3,070,180	**	**	**
<b>Lake Erie</b>	63,020	661,710	9,376,430	6	70	24
<b>Niagara River</b>	39,120	495,820	3,095,190	1	51	48
Upper	21,150	260,140	1,266,910	**	**	**
Lower	22,200	217,560	1,936,280	**	**	**
<b>St. Lawrence River</b>	78,240	923,230	30,715,860	5	75	20
<b>Salmon River</b>	58,790	364,500	15,779,200	4%	7%	89%
<b>Cattaraugus Creek</b>	20,090	156,700	\$1,178,380	**	**	**

<sup>1</sup>Data based on combination of statewide and Great Lakes surveys.

\*\*Insufficient sample size to estimate.

**Figure 1.** Major media regions in New York State.



Anglers fishing Lake Ontario mainly come either from media regions bordering Lake Ontario (59% of Lake Ontario anglers) or from out-of-state (23%; Table 2). Table 3 includes media region information for specific sections of Lake Ontario. For Lake Erie, 83% of anglers come from the Buffalo media region and 10% are from out-of-state (Table 4). The St. Lawrence River attracts 20% of its anglers from the Watertown media region, 68% from other regions in New York, and 12% from outside New York state (Table 5). The Niagara River draws anglers mainly from the Buffalo media region (85%), with 11% from out-of-state (Table 6). The Salmon River attracts 15% of its anglers from the Syracuse media region, 8% from the Albany region, 8% from the New York City region, 19% from other regions in New York, and 50% from out-of-state (Table 7). Cattaraugus Creek receives 90% of its anglers from the Buffalo media region (Table 8).

Coldwater and warmwater fishing activities are reported in Tables 2 through 8. Coldwater species consisted of lake trout, rainbow/steelhead trout, brown trout, coho or Chinook salmon, Atlantic/landlocked salmon, and brook trout. Warmwater gamefish consisted of walleye, bass, crappie, northern pike, and muskie. Anglers fishing Lake Ontario, the Salmon River, and Cattaraugus

Creek spent the majority of their time fishing for coldwater species, while anglers fishing Lake Erie, the St. Lawrence River, and the upper Niagara River fished mainly for warmwater species (Tables 2 to 8).

### **1996 Angler Expenditures**

In 1996, anglers spent more than \$170 million on trips to New York's Great Lakes waters. Most of this, approximately \$134 million, was spent at the fishing site, with the remainder, \$37 million, spent en route. Per day expenditures were higher for out-of-state residents (\$57.03 at-site, \$13.08 en route) than for residents (\$13.08 at-site, \$5.74 en route).

### **1996 Angler Satisfaction**

Overall, anglers were neutral to satisfied with their Great Lakes fishing experiences. Satisfaction with each fishing location was measured on a 7-point scale where 1 = very dissatisfied, 4 = neutral, and 7 = very satisfied. Anglers who fished the St. Lawrence River had the highest mean level (5.2) of satisfaction. All other waterbodies were in the 4.5 to 4.8 range.

**Table 2.** 1996 number of anglers, angler effort, expenditures, and species fished for on Lake Ontario by New York state media regions.<sup>1</sup>

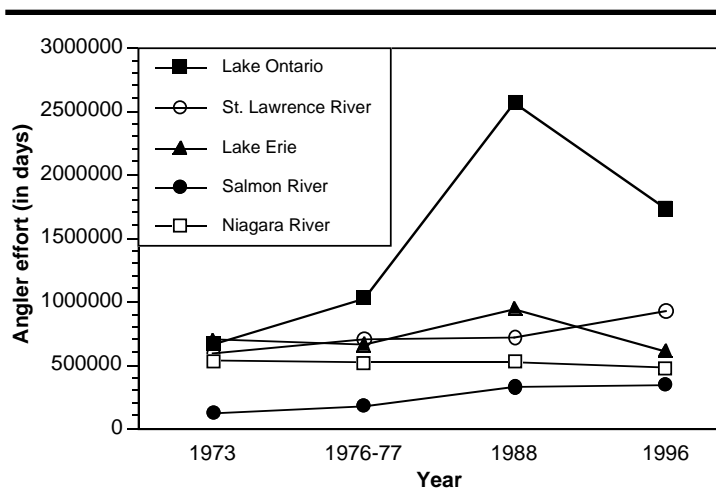
NY State Media Regions	Number of anglers	Angler effort (in days)	At-location expenditures	% days fishing for coldwater fish species	% days fishing for warmwater fish species
<b>Bordering Lake Ontario</b>					
Buffalo	27,870	275,310	\$3,208,290	48%	26%
Rochester	44,120	652,830	10,246,970	21	43
Syracuse	25,740	352,790	4,796,140	42	33
Watertown	13,550	200,350	2,030,770	21	56
<b>Other NYS Media Regions</b>					
Albany	9,480	72,540	3,939,260	80	12
Binghamton	6,190	59,160	2,741,490	63	30
Elmira	3,290	27,350	733,610	**	**
New York City	8,320	80,970	4,687,830	89	7
Plattsburgh	**	**	**	**	**
Utica	5,610	40,630	1,409,870	**	**
<b>Out-of-state</b>	<b>43,740</b>	<b>325,640</b>	<b>22,516,030</b>	<b>80</b>	<b>13</b>
<b>Total</b>	<b>188,210</b>	<b>2,089,130</b>	<b>\$56,448,290</b>	<b>48%</b>	<b>30%</b>

<sup>1</sup>Data based on combination of statewide and Great Lakes surveys.

\*\*Insufficient sample size to estimate.

Anglers also were asked to rate each location on a 7-point scale where 1 = a common or ordinary fishing site and 7 = a special or unique fishing site. Results of this type of rating were more variable than satisfaction; the Salmon River and the St. Lawrence River were rated more unique (5.1 and 5.0, respectively) and Lake Erie and the upper Niagara River more common (3.9 and 3.8, respectively). Lake Ontario was rated intermediate at 4.3, while the lower Niagara River rated 4.5 and Cattaraugus Creek rated 4.0.

**Figure 2.** Estimated angler effort in number of days by major New York Great Lakes waterbodies. (Sources: Brown 1975, Kretser and Klatt 1981, and Connelly et al. 1990.)



### Great Lakes Fishing Trends

The most dramatic changes in Great Lakes fishing effort in New York over the past 20 years have occurred on Lake Ontario (Figure 2). Effort increased during the 1970s and 1980s and was highest in the late 1980s to early 1990s when it was over 2.5 million days. Effort dropped by one-third between 1988 and 1996.<sup>1</sup> Changes have occurred between 1988 and 1996 in the species fished for on trips to Lake Ontario. The proportion of effort associated with salmon decreased, whereas the proportion of effort associated with warmwater fish, especially bass, increased (Table 9). The number of anglers fishing Lake Ontario decreased by 44% between 1988 and 1996. This decline in angler effort and numbers caused an estimated decrease of approximately 23% in at-location expenditures (1988 estimates were adjusted upwards to account for inflation for these comparisons with 1996 data).

Changes in Lake Erie fishing effort were similar to Lake Ontario but not as dramatic (Figure 2). Lake Erie did not experience the large increase in fishing effort seen on Lake Ontario in the early 1980s but did experience a simi-

<sup>1</sup> Estimates of 1996 fishing effort reported in Table 1 differ somewhat from Figure 2. Data for 1996 in Table 1 represent a combination of the two angler survey data sets and should be most accurate. To analyze trends in Figure 2, we used only statewide angler survey data to reduce the chance for methodologically based differences.

lar decrease in effort between 1988 and 1996. Fifteen percent of this effort was devoted to bass fishing in 1988 compared to 31% in 1996 (Table 9). The percentage of effort devoted to walleye declined somewhat. The estimated number of anglers fishing Lake Erie declined 29% between 1988 and 1996. This led to an estimated decline in at-location angler expenditures of 33% between 1988 and 1996.

Despite changes in fishing regulations on the Salmon River, angler effort was basically unchanged between 1988 and 1996 (Figure 2). The percentage of anglers coming from out-of-state increased from 40% in 1988

to 48% in 1996. The percentage of total effort associated with coho and Chinook salmon dropped from 47% in 1988 to 37% in 1996; the proportion of effort associated with rainbow/steelhead trout increased between 1988 and 1996 (Table 9). The estimated number of anglers fishing the Salmon River remained fairly stable between 1988 and 1996, while estimated at-location expenditures for anglers increased by approximately 40%.

Fishing effort along the St. Lawrence River was relatively constant between 1973 and 1988, but increased by 29% between 1988 and 1996 (Figure 2). The distribution of effort among species showed little change between 1988

**Table 3.** 1996 number of anglers, expenditures, major media regions that anglers reside in, and species fished for on Lake Ontario by section of Lake Ontario fished.<sup>1</sup>

Section of Lake Ontario fished	Number of anglers	Media regions anglers reside in	% days fishing for coldwater species	% days fishing for warmwater species
Jefferson & Oswego Co.	87,300	24%:Syracuse 22%: out-of-state 15% Watertown	44%	37%
Cayuga & Wayne Co.	32,260	43%: Rochester 18%: out-of-state 16%: Syracuse	38	38
Monroe Co.	40,840	54%: Rochester 13%: out-of-state	43	30
Niagara & Orleans Co.	35,810	58%: Buffalo 18%: out-of-state 10%: Rochester	59	21
Angler unsure what section	26,930		53%	19%

<sup>1</sup>Data based on Great Lakes survey.

**Table 4.** 1996 number of anglers, angler effort, expenditures, and species fished for on Lake Erie by New York state media regions.<sup>1</sup>

NY State Media Regions	Number of anglers	Angler effort (in days)	At-location expenditures	% days fishing for coldwater fish species	% days fishing for warmwater fish species
<b>Bordering Lake Erie</b>					
Buffalo	52,450	601,710	\$7,212,720	4%	75%
<b>Other NYS Media Regions</b>	4,290	29,330	874,720	**	**
<b>Out-of-state</b>	6,280	30,670	1,288,990	6	72
<b>Total</b>	<b>63,020</b>	<b>661,710</b>	<b>\$9,376,430</b>	<b>4%</b>	<b>75%</b>

<sup>1</sup>Data based on combination of statewide and Great Lakes surveys.

\*\*Insufficient sample size to estimate.

**Table 5.** 1996 angler numbers, effort, expenditures, and species fished for on the St. Lawrence River by media regions.<sup>1</sup>

NY State Media Regions	Number of anglers	Angler effort (in days)	At-location expenditures	% days fishing for coldwater fish species	% days fishing for warmwater fish species
<b>Bordering the St. Lawrence River</b>					
Watertown	15,690	271,490	\$1,909,100	<1%	69%
<b>Other NYS Media Regions</b>					
Binghamton	3,780	31,690	1,089,890	**	**
Buffalo	10,490	110,760	4,480,140	0	77
New York City	2,830	17,710	1,348,540	**	**
Rochester	14,460	165,140	8,274,490	0	64
Syracuse	13,320	145,030	4,684,630	<1	77
Utica	4,440	52,940	2,228,380	**	**
Other	4,160	41,930	1,287,110	**	**
<b>Out-of-state</b>	9,070	86,540	5,413,570	<1	75
<b>Total</b>	<b>78,240</b>	<b>923,230</b>	<b>\$30,715,860</b>	<b>&lt;1%</b>	<b>75%</b>

**Table 6.** 1996 number of anglers, angler effort, expenditures, and species fished for on the entire Niagara River, upper Niagara River, and lower Niagara River by New York state media regions.<sup>1</sup>

NY State Media Regions	Number of anglers	Angler effort (in days)	At-location expenditures	% days fishing for coldwater fish species	% days fishing for warmwater fish species
<b>Entire Niagara River</b>					
<b>Bordering the Niagara River</b>					
Buffalo	33,330	459,760	\$2,089,020	**	**
<b>Other NYS Media Regions</b>	4,370	**	**	**	**
<b>Out-of-state</b>	4,370	30,260	863,030	**	**
<b>Total</b>	<b>39,120</b>	<b>495,820</b>	<b>3,095,190</b>	<b>25%</b>	<b>50%</b>
<b>Upper Niagara River</b>					
<b>Bordering the Upper Niagara River</b>					
Buffalo	19,590	252,500	1,164,870	4	66
<b>Other NYS Media Regions</b>	**	**	**	**	**
<b>Out-of-state</b>	**	**	**	**	**
<b>Total</b>	<b>21,150</b>	<b>260,140</b>	<b>1,266,910</b>	<b>5</b>	<b>67</b>
<b>Lower Niagara River</b>					
<b>Bordering the Lower Niagara River</b>					
Buffalo	17,800	189,190	1,041,947	36	37
<b>Other NYS Media Regions</b>	**	**	**	**	**
<b>Out-of-state</b>	3,250	25,080	781,680	**	**
<b>Total</b>	<b>22,200</b>	<b>217,560</b>	<b>\$1,936,280</b>	<b>41%</b>	<b>36%</b>

<sup>1</sup>Data based on combination of statewide and Great Lakes surveys.

\*\*Insufficient sample size to estimate.

and 1996 (Table 9). Although angler effort increased, the number of anglers fishing the St. Lawrence River has decreased by about 14%. Estimated at-location expenditures increased by nearly two-thirds.

Angler effort decreased by an estimated 9% along the Niagara River between 1988 and 1996. Angler effort for different fish species showed little change along the upper river, but changed somewhat on the lower river. In 1988, the species most fished for on the lower river was rainbow/steelhead trout; in 1996 bass was the species most fished for. The number of anglers fishing the Niagara River in 1996 decreased 24% from 1988, while the at-location expenditures decreased by 35%.

Fishing effort increased slightly on Cattaraugus Creek between 1988 and 1996. The number of anglers increased by 29% and angler at-location expenditures doubled.

## CONCLUSION

New York's Great Lakes fisheries provided many anglers (almost 400,000) with satisfying fishing opportunities in 1996. These anglers, in turn, made a large economic contribution to the state and in particular to Great Lakes coastal communities. The detailed data in this fact sheet may assist local government leaders and business owners, tourism planners, county extension specialists, and fisheries managers with planning and marketing efforts.

## ACKNOWLEDGMENTS

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**Table 7.** 1996 number of anglers, angler effort, expenditures, and species fished for on the Salmon River by New York state media regions.<sup>1</sup>

NY State Media Regions	Number of anglers	Angler effort (in days)	At-location expenditures	% days fishing for coldwater fish species	% days fishing for warmwater fish species
<b>Bordering the Salmon River</b>					
Syracuse	8,680	56,910	\$715,750	83%	12%
<b>Other NYS Media Regions</b>					
Albany	4,690	27,200	1,308,360	**	**
New York City	4,890	32,990	1,543,360	**	**
Other	11,390	68,190	1,503,510	**	**
<b>Out-of-state</b>	29,140	179,210	10,708,220	98	1
<b>Total</b>	<b>58,790</b>	<b>364,500</b>	<b>\$15,779,200</b>	<b>95%</b>	<b>3%</b>

**Table 8.** 1996 number of anglers, angler effort, expenditures, and species fished for on the Cattaraugus Creek by New York state media regions.<sup>1</sup>

NY State Media Regions	Number of anglers	Angler effort (in days)	At-location expenditures	% days fishing for coldwater fish species	% days fishing for warmwater fish species
<b>Bordering the Cattaraugus Creek</b>					
Buffalo	18,000	138,700	\$834,560	85%	6%
<b>Other NYS Media Regions</b>					
	**	**	**	**	**
<b>Out-of-state</b>	**	**	**	**	**
<b>Total</b>	<b>20,090</b>	<b>156,700</b>	<b>\$1,178,380</b>	<b>85%</b>	<b>6%</b>

<sup>1</sup>Data based on combination of statewide and Great Lakes surveys.

\*\*Insufficient sample size to estimate.

**Table 9.** Percent of angler effort by species in 1996 and 1988 by major New York Great Lakes waterbodies.

Waterbodies/Species	Percent angler effort	
	1988	1996
<b>Lake Ontario and embayments</b>		
Coho and Chinook salmon	34%	19%
Bass	15	23
Brown trout	9	7
Lake trout	9	8
Rainbow/steelhead trout	8	9
Atlantic/landlocked salmon	5	*
Yellow perch	*	5
No specific type	11	11
Other	9	17
<b>Lake Erie</b>		
Walleye	53	42
Bass	15	31
Yellow perch	6	8
No specific type	15	11
Other	11	8
<b>Salmon River</b>		
Coho and Chinook salmon	47	37
Rainbow/steelhead trout	36	40
Atlantic/landlocked salmon	10	11
Other	7	12
<b>St. Lawrence River</b>		
Bass	38	36
Northern pike	29	25
Yellow perch	7	10
Walleye	*	9
No specific type	14	11
Other	11%	10%

<sup>1</sup> 1988 data based on Connelly et al. (1990); 1996 data based on statewide survey.

\* Percent of effort was less than 5%, so effort was included in "other" category.

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