FISHING MOTIVATIONS AND INVOLVEMENT OF BOATING SALMONID ANGLERS ON LAKE ONTARIO

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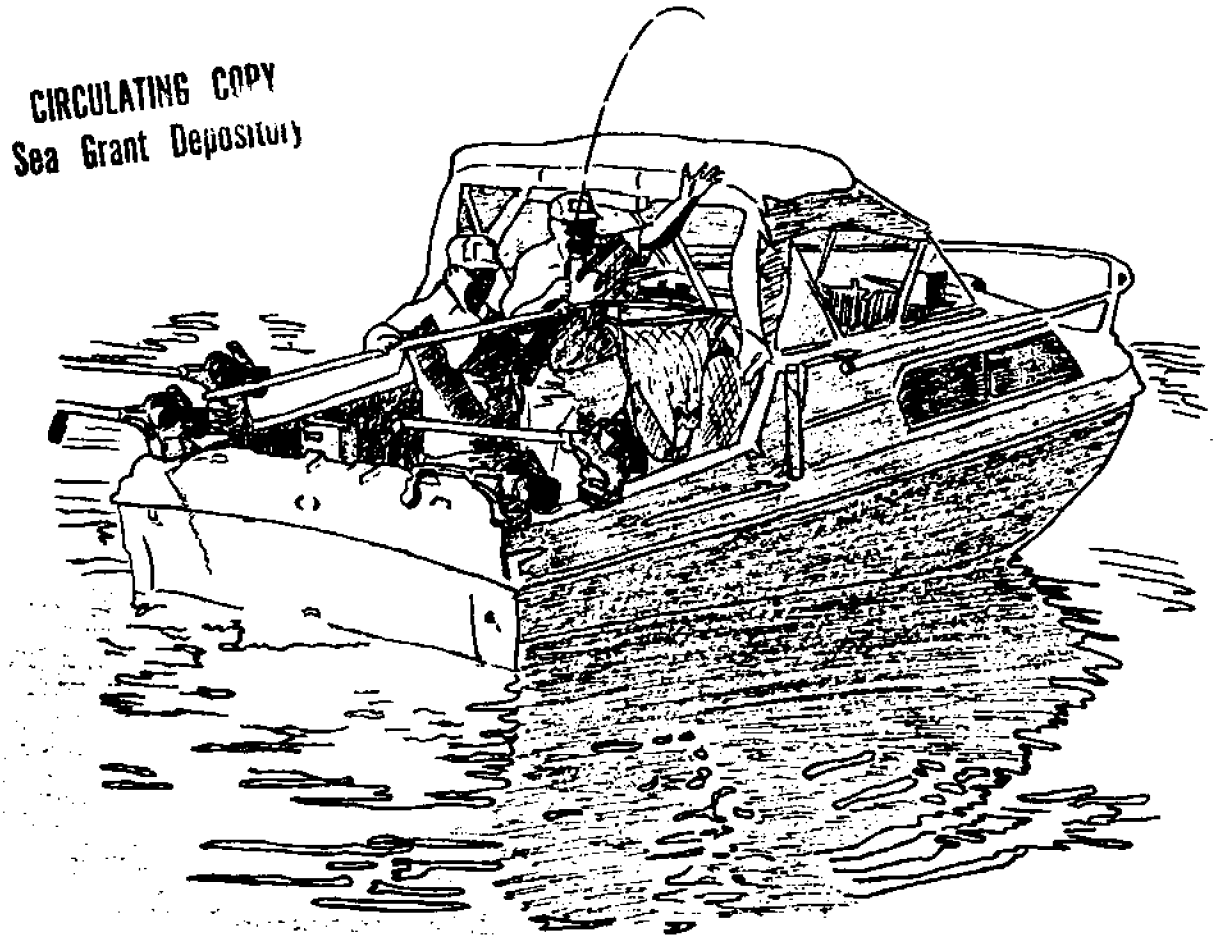
William F. Siemer, Tommy L. Brown, and Daniel J. Decker



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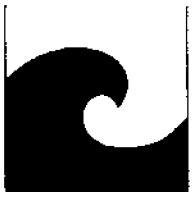

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** STUDY HIGHLIGHTS **

PURPOSE

- To develop a better understanding of the interests, motivations, and behaviors of Lake Ontario's boating salmonid anglers.

OBJECTIVES

- Assess and describe the motivational characteristics of boat owners who fish for salmonids on Lake Ontario.
- Assess, compare, and contrast the motivational profiles of boating salmonid anglers who participate in different fishing activities or the same activities at different rates.
- Assess and describe changes in motivations that occur in boating salmonid anglers over time or with continued fishing participation.
- Discuss potential implications of findings for future research on involvement in fishing and management of Lake Ontario fisheries.

METHODS

- Information from personal interviews with Lake Ontario anglers (n=42) was used to develop a framework for research on fishing involvement. This framework was used to develop a mail questionnaire to explore motivations to become and remain involved in salmonid fishing.
- A mail survey was implemented with a random sample of 1,101 boat owners (boat length 16 to 65 feet) who had registered a boat for use in 1 of 5 counties bordering western or central Lake Ontario.

RESULTS

- Four mailings yielded a 68% response (n=706), including 529 Lake Ontario boaters and 437 Lake Ontario boating salmonid anglers. All results involve only this subgroup of 437 boating salmonid anglers.

Demographics and behavior:

- The typical boating salmonid angler was a middle-aged, married male with a 21-foot boat that was used for 22-40 boating trips in 1987-88. He fished for salmonids as well as other fish species, and was likely to fish in salmonid derbies.
- In 1987-88 the majority (90-95%) of all salmonid fishing trips taken were taken by a minority (39%) of active anglers.

Motivations to fish:

- The majority of anglers placed moderate to extreme importance on satisfactions related to catching fish, being with friends and family, appreciating nature, and escaping everyday problems, indicating that motivations related to personal achievement, affiliation and nature appreciation all have some importance to most anglers. However, affiliative satisfactions were listed most frequently as the most important single motivation to go salmonid fishing.

- Anglers who participated in fishing derbies were more likely than other anglers to say catch-related motivations were their most important motivations to fish for salmonids.

- In comparison to other anglers, those who fished more than 20 days per year were also more likely than other anglers to call catch-related motivations their most important motivations to fish.

Change in fishing attitudes, practices, and motivations:

- Anglers who had fished more than 5 years were more likely than other anglers to report an increase in personal importance on fisheries conservation, fishing methods, types of fish pursued, and surroundings while fishing.

- Most anglers reported that the importance of limiting out or catching fish to eat had decreased over the course of their fishing involvement.

Motivation profiles based on personal investment theory:

- Compared to other anglers, those who fished in tournaments appeared to be more motivated to recreate by incentives related to accomplishment. Moreover, people who fished in tournaments appeared to be more likely than nonparticipants to believe that salmonid fishing presented a context for challenge, accomplishment, novelty, escape, and affiliation.

- Likewise, anglers who snagged salmon were more likely than nonsnaggers to see a whole range of strong incentives to fish for salmonids. In addition to this, snaggers indicated that incentives related to accomplishment were more powerful to them as motivations to participate in any recreation.

- Highly invested salmonid anglers appeared to be more motivated than other anglers to engage in recreation for challenge and accomplishment, and they were more likely to say these were important rewards they sought from salmonid fishing. On the other hand, while both groups held escape, nature appreciation, affiliation, and novelty to be incentives to recreate, highly invested salmonid anglers were more likely than other anglers to perceive salmonid fishing as a context in which they could attain such rewards.

SUMMARY AND IMPLICATIONS

- Most people who fish for salmonids on Lake Ontario appear to be driven to do so by a variety of motivations. For some groups of anglers (i.e., tournament anglers, and highly involved anglers) catching some fish, many fish, or trophy fish is a very important, in some cases the most important, part of why they fish. This pattern has been observed repeatedly in studies of tournament anglers (Christian 1985; Ditton and Arneson-Bewley 1986; Ditton and Loomis 1985; Falk et al. 1981; Loomis 1985; Loomis and Ditton 1987).

- The most important motivations of most Lake Ontario salmonid anglers are affiliation, appreciation, and escape. As have several previous studies (Hendee and Bryan 1978, Fedler 1984), our findings suggest that while catching and eating fish should not be discounted as fishing motivations, people fish for a variety of reasons, many of which are reported as more important motivators than catching or eating fish.

- As had been discussed by previous researchers (Absher and Collins 1987, Bryan 1977), some evidence emerged to indicate that Lake Ontario anglers undergo a process of motivational change or maturation over time involving increased importance on fishing methods and conservation/management of fisheries resources, and a stable or decreased interest in number of fish caught or kept. Anglers who stay involved in fishing over many years appear to develop a broad set of personal incentives to remain involved in this activity.

- Distinct subgroups of anglers do exist within the population of boating salmonid anglers and these subgroups (e.g., derby participants, avid participants) can be identified not only by their fishing and boating behavior, but by their fishing motivations as well.

- Personal investment theory holds promise as a tool for assessing the motivational differences that distinguish anglers in different market segments, fishing activities, and levels of fishing involvement. Simple criteria (e.g., number of days fished per year) can be used to segregate anglers at different levels of personal investment, and use of measurement scales even briefer than those in this study could result in useful motivational profiles for a wide array of angler types.

- Continued use and refinement of the measurement scales developed for this study may provide valuable insights that lead to better understanding of the recreation experiences that anglers seek from Lake Ontario, and the ways that fisheries managers and community planners can proactively address these preferences and their impacts.

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ACKNOWLEDGEMENTS

We would like to thank Chad Dawson, Michael Voiland, and David White of the New York State Sea Grant Extension program for their assistance during various stages of this study. Personal interviews with Lake Ontario anglers, which were used as the basis for development of a survey questionnaire, were conducted by Larry Watts. Nancy Connelly, Jody Enck, Ken Purdy, and Renée Shiffler provided a variety of assistance during the course of this study. Special thanks are extended to Nancy Connelly, Jody Enck, and Ken Purdy for their assistance with study design and data analysis. This study was funded by the New York Sea Grant Institute.

INTRODUCTION

Since 1968, Lake Ontario has received repeated stockings of salmonids (i.e., lake trout, rainbow trout, and Atlantic, coho, and chinook salmon) in an attempt to take advantage of a previously under-utilized water resource, to create additional fishing opportunities for recreational anglers, and to provide an impetus to the stagnant local economies of Lake Ontario's coastal communities. The ability of Great Lakes salmonid fishing to impact local and regional economies positively is well documented (Brown 1976; Brown 1982; Dawson 1986). Recreational fishing can also create notable social impacts in the local communities bordering Lake Ontario (Dawson and Voiland 1988, Dawson and Brown 1989). Meeting the challenge of wise management of both the fishery and its social and economic consequences depends in part on our understanding of those who fish for salmonids on Lake Ontario.

In 1989, a mail survey was conducted of a sample a people who registered a boat for use in a county bordering Lake Ontario to obtain some of the information decision makers (i.e., business people, community leaders, fisheries managers) need to make choices which benefit those who fish on Lake Ontario as well as the communities in which they recreate. The purpose of this study was to develop a fuller understanding of the interests, needs, motivations, and behaviors of Lake Ontario anglers. This report presents the results of that study and the implications for further research and management of Lake Ontario fisheries. Specifically, the following research questions will be addressed:

(1) What are the motivational characteristics of boat owners who fish Lake Ontario for salmonids?

(2) Do Lake Ontario anglers who participate in different types of fishing activities, or in the same activities at different rates, have distinct sets of motivations?

(3) Do motivations to fish for salmonids change over time, and if so, what kinds of changes occur?

BACKGROUND AND NEED

Though behavioral scientists have devoted some effort to understanding fishing behavior in general, little work has focused specifically on Great Lakes anglers. Moreover, most behavioral studies involving fishing have provided data at a rudimentary level. Preference studies and studies categorizing reasons for fishing are examples (Carls 1980). Peyton and Gigliotti (1988) note that both types of information need to be interpreted within a broader conceptual framework, one that addresses the variation in motivations and satisfactions among angler groups, and within individual anglers by situation and over time. In this way insight is gained not only into what various fishing publics do, but why and how those activities are likely to change in the future.

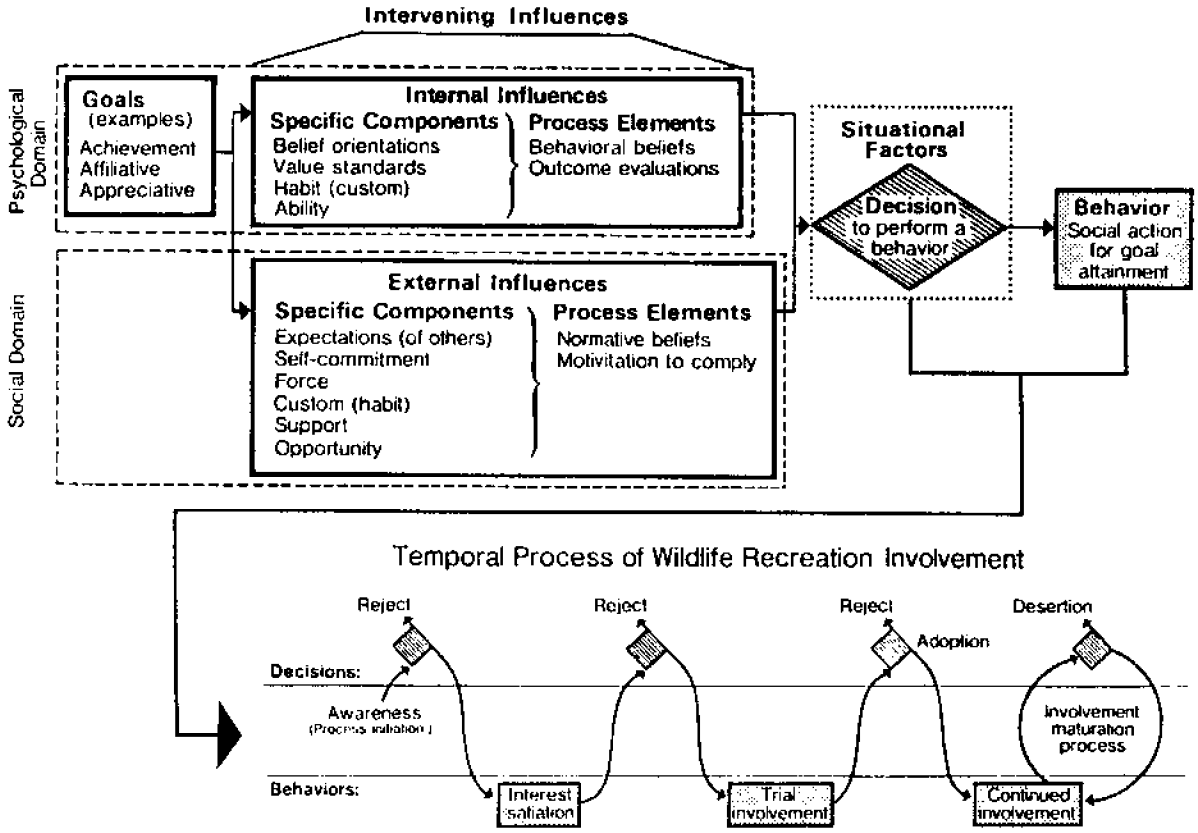
A valid information base dealing with angler motivations in specific contexts is needed as an aid for fisheries managers who must predict public response to particular management actions. Fisheries management decisions based on insufficient or misinterpreted information regarding motivations to fish may create disruptive management issues that damage the public image and credibility of a fisheries management agency (Peyton and Gigliotti 1988). One example of this problem occurred in Texas in 1984 (Matlock et al. 1988) where, following a large-scale kill of spotted seatrout (*Cynoscion nebulosus*) and red drum (*Sciaenops ocellatus*), the Texas Parks and Wildlife Commission (TPWC) placed an emergency 120-day prohibition on the retention of either fish species in East Matagorda Bay. The TPWC then began efforts to adopt the temporary rule as a permanent regulation for Matagorda Bay. The TPWC believed

this means of reducing fish harvest would be acceptable to anglers. Their assumption was based on literature that suggested retention and consumption of fish were less important to anglers than other reasons to fish (e.g., nature appreciation, escape from everyday problems) (Matlock et al. 1988). They believed that the prohibition would be accepted since "retaining fish is generally not very important to most fishermen if they are allowed to continue fishing" (Matlock et al. 1988:25). In fact, negative reaction to the proposed regulation was widespread and "adamant" (Matlock et al. 1988:25). This unexpected public response caused fisheries managers in the TPWC to question the validity and usefulness of current literature on fishing motivations (Matlock et al. 1988) and has prompted other researchers to point out that our understanding of the human dimensions of fishery management, including our understanding of angler motivations, is still limited and "fundamental in orientation" (Ditton and Fedler 1988:6). Continued work is needed to create the situation-specific and applied human information base that can be of practical value to fisheries managers as they develop and maintain socially viable fisheries programs.

METHODS

The Conceptual Framework

Decker et al. (1987) developed a general behavioral model (Figure 1) for hunting that combines elements of the Fishbein and Ajzen (1975) and Reeder (1973) behavioral models with innovation-adoption theory (Rogers and Schoemaker 1971). In its most general form, this model is believed to be applicable to any outdoor recreational activity. Summarized, the Decker et al. (1987) model recognizes outdoor recreational activities to be psychologically motivated and socially mediated. Primary motivations for a



Source: Decker, D. J., T. L. Brown, B. L. Driver, and P. J. Brown. 1987. Theoretical developments in assessing social values of wildlife: toward a comprehensive understanding of wildlife recreation involvement. In D. J. Decker and G. R. Goff (eds.), Valuing Wildlife: Economic and Social Perspectives. Westview Press, Boulder, CO. 424 pp.

Figure 1. A conceptual schematic drawing of the social-psychological process determining wildlife recreation behavior.

given activity are aggregated into a small number of categories (i.e., achievement-related, affiliative-related, or appreciative-related). Situational factors such as the characteristics of the natural resource (e.g., fish size, fish abundance) or the individual recreationist (e.g., physical ability, financial resources), and an individual's perceptions thereof, are believed to determine whether a particular activity will be pursued as a means of satisfying personal motivations or goals. Awareness of an activity may be followed by interest, trial involvement, early adoption, and continued involvement (with the option to reject or discontinue the activity at any point in the process). Based on this model the investigators adopted the following assumptions about involvement in fishing.

- Fishing is a social action, involving a decision-making process for each individual.
- The decision to fish could involve one or a combination of elements: family, economic, social-fraternal, recreational, or health.
- Social Learning Theory can be used to explain the social process whereby people learn to place importance on various components of fishing. That is, people learn their goals, values, etc. through personal means (e.g., role modeling) and vicarious means (e.g., written communication).
- Individuals may not readily recognize all the social-psychological influences impinging upon their decision to begin or discontinue their participation in fishing.
- Resource-related factors (e.g., access, fish abundance, crowding, toxics) are important to fishing initiation or discontinuation only to the degree that they affect social-psychological constructs (e.g., individual goals, beliefs, and values relevant to fishing participation).
- Individuals develop interest in Great Lakes fishing through a temporal process having 4 stages: awareness, interest, trial, and continuation/desertion.

Preliminary Research

Personal on-site interviews were conducted with a purposeful sample of 42 licensed Lake Ontario anglers from September-November 1987. The Decker et al. (1987) model was used as a means of conceptualizing and classifying the activities and interests of these anglers. Interviews were exploratory and flexible, but followed a line of questions designed to explore elements which parallel those within the Decker et al. (1987) behavioral model of participation in wildlife-recreation. Questions probed the following aspects of fishing involvement: initiation into fishing, initiation into Lake Ontario fishing, antecedents to fishing participation, influences which affect angler participation, fishing participation over time, catch and harvest goals, boat-related satisfactions, and attitudes toward fishing derbies. Interviews were analyzed qualitatively by comparing and contrasting patterns of fishing participation with patterns suggested for participation in wildlife-recreation (Brown 1982; Brandenburg et al. 1982; Bryan 1977; Decker et al. 1987; Jackson et al. 1979; Purdy and Decker 1986; Reeder 1973).

All interviews were conducted by a charter boat captain who was familiar with Lake Ontario fishing. The interviewer used his established network of contacts with Lake Ontario anglers to solicit participation. Interviews were tape-recorded on-site, and then mailed to the Human Dimensions Research Unit (HDRU), where they were reviewed, transcribed, and analyzed. The results of this exploratory research are summarized in Siemer et al. (1989).

Questionnaire Development

Based on personal interviews with Lake Ontario anglers, we developed a slightly modified version of the Decker et al. (1987) model of the process determining involvement in wildlife-related recreation to describe involvement

in salmonid fishing by boating anglers on Lake Ontario (Siemer et al. 1989). This framework was used to develop of a mail questionnaire to explore the motivations associated with becoming and remaining involved in salmonid fishing on Lake Ontario. The format of some questionnaire items was adapted from mail questionnaires by Absher and Collins (1987), Decker et al. (1986), Peyton and Gigliotti (unpubl. data), Purdy et al. (1985), and Purdy and Decker (1986). Scales measuring motivations to fish and personal investment in fishing were based on the theoretical constructs developed by Maehr and Braskamp (1986), and adapted from items developed specifically for applications to angler research by Absher and Collins (1987).

The final survey instrument included items on: fishing involvement, changes in fishing involvement, personal incentives to become involved in recreational activities, and personal incentives to become involved in salmonid fishing (Appendix A). Nine items relating to use and perceived need for boating facilities on Lake Ontario were included for a separate research project. Several personal demographic items were also included to enhance analysis of fishing motivations and demand for boating facilities.

Sampling and Implementation

The target population of this study was boating salmonid anglers on Lake Ontario. The most practical way to access this population was to draw a random sample of names from the population of persons who had registered a 16 to 65-foot powerboat for use in the New York State counties which border western and central Lake Ontario (i.e., Monroe, Niagara, Orleans, Oswego, and Wayne Counties) in 1988. This sampling strategy allows for development of a theoretical model for study of involvement in fishing on Lake Ontario or generalizations about the demand for boating facilities of people who own and

operate 16 to 65-foot boats on Lake Ontario. The sample does not allow for generalizations regarding the motivations, preferences, or behaviors of people who fish on Lake Ontario but do not own a boat, own a boat less than 16 feet or more than 65 feet in length, or use their boat in Jefferson county or only rarely on Lake Ontario.

A sample of 1,110 boat registrants from a total population of 32,514 owners of 16 to 65-foot boats registered in the counties bordering western Lake Ontario was randomly drawn from the 1988 boat registration listing compiled by the New York State Department of Motor Vehicles (Tables 1-3). Persons who had registered a boat for use other than pleasure boating (n=9) were deleted from the sample. Each member of the sample was mailed a questionnaire on 3 January 1989. Up to 3 follow-up mailings were sent to nonrespondents at 7- to 10-day intervals. Staff in the HDRU coded responses. Data were keypunched by Cornell Computer Services, Data Entry Section.

Statistical analyses were conducted using the Statistical Package for the Social Sciences computer software (SPSSx) (SPSS 1986). Chi-square (X^2) statistics were used for group comparisons. Principal components factor analysis (utilizing principal axis factoring) was used as a technique to extract factors from scales to assess motivations to engage in recreation generally and salmonid fishing specifically. An *a priori* type of segmentation referred to as heavy-half/light-half segmentation (S.L.J. Smith 1989) was used to divide 1988 salmonid anglers into 2 market segments, based on the number of days they fished for salmonids in 1988.

Table 1. Number and percent of boat registrants in the sample, by county of residence.

County	Number	Percent	County	Number	Percent
Albany	1	0.1	Onondaga	66	5.9
Broome	8	0.7	Ontario	5	0.5
Cayuga	3	0.3	Orange	1	0.1
Chautauqua	1	0.1	Orleans	40	3.6
Chemung	2	0.2	Oswego	121	10.9
Erie	23	2.1	Out-of-State	13	1.2
Genesee	1	0.1	Queens	1	0.1
Jefferson	4	0.4	Rensselaer	2	0.2
Livingston	7	0.6	Schenectady	1	0.1
Madison	1	0.1	Seneca	2	0.2
Monroe	552	49.7	Wayne	90	8.1
Niagara	159	14.3	Westchester	1	0.1
Oneida	5	0.5			
			Total	1,110	100.0

Table 2. Total number and percent of motorized boat registrants in 5 New York State counties compared to number and percent of similar registrants in the sample.*

County	Number of Registrants		Percent of Registrants	
	Sample	Population	Sample	Population
Monroe	534	24,108	48.1	43.5
Niagara	182	9,636	16.4	17.4
Orleans	42	2,173	3.8	3.9
Oswego	223	12,252	20.1	22.1
Wayne	129	7,282	11.6	13.1
Total	1,110**	55,451	100.0	100.0

*Only owners of 16 to 65 foot boats are included in the sample.

**The final sample included 1,101 registrants. Nine registrants were deleted because they were not registered for use as pleasure boats.

Table 3. Total number and percent of motorized boat registrants in all length classes compared to number and percent of sampled registrants, by length class.

Length Class	Number of Registrants		Percent of Registrants	
	Total	Sample	Total	Sample
≤16 ft.	22,910	0	41.3	0.0
16-25 ft.	29,464	1023	53.1	92.2
26-39 ft.	2,947	85	5.3	7.6
40-65 ft.	103	2	0.2	0.2
66+ ft.	27	0	0.1	0.0
Total	55,451	1,110	100.0	100.0

Nonrespondent Follow-Up Survey

In February of 1989 100 nonrespondents to the mail survey were contacted by telephone and asked to answer a few key questions about their involvement in fishing and boating on Lake Ontario (Appendix B). Based on Chi-square comparisons, nonrespondents were not as likely as respondents to boat, fish, or fish for salmonids on Lake Ontario (Appendix C and D). Nonrespondents who did fish and boat on Lake Ontario differed from respondents in terms of the importance they placed on salmonid fishing, the number of days they fished for salmonids, and their most common means of access to the lake. These differences are not important for the purposes of this study, thus no adjustments in reported frequencies, means, or other statistics of respondent data were made to account for possible nonresponse bias.

RESULTS

An initial sample size of 1,101 resulted in 69 undeliverable questionnaires and 706 codeable returns (68% of the deliverable questionnaires). The respondent group included 529 individuals who owned and operated a 16 to 65 foot powerboat on Lake Ontario in 1988. About 61% (n=437) of the respondents had fished for trout or salmon from a boat on Lake Ontario. About half (n=352) had done so in the last 2 years.

In this report we focus on the characteristics, behaviors, and motivations of the 437 boat owners who have fished for trout or salmon in Lake Ontario. Results are reported in 4 sections that parallel the study questions stated in the introduction of the report.

Demographic, Boating, and Fishing Characteristics

Demographics

Nearly all respondents who fished for Lake Ontario salmonids were male (98%) (Table 4). More than half (53%) were 18-34 years old. The majority of respondents were married (84%), had children living at home (56%), had completed 14 years of school, and earned a household income of $40,000 or more. Most respondents resided in Monroe (45%), Niagara (13%), Wayne (12%), Oswego (10.6%), or Onondaga (5.7%) County. They were occupied as craftsman (30%), professional/technical workers (29%), retired persons (13%), or managers/officials (12%).

Demographically, Lake Ontario anglers appeared to be a relatively homogenous group, but it is likely that they differ in some ways from the population of all anglers using Lake Ontario (e.g., anglers who don't own a boat, nonsalmonid anglers), or the population of anglers statewide. A 1988 statewide survey of fishing license holders in New York (Brown and Connelly, unpubl. data) indicates that Lake Ontario boating anglers are similar to statewide anglers in education level, but are more likely than statewide anglers to be male and earn a household income of more than $32,000.

Boating and fishing behavior

The typical boating salmonid angler had been boating at least once a year on Lake Ontario for the past 16 years. He operated a 21-foot boat for sportfishing (85%) and pleasure cruising (75.8%). In 1988 he used his boat primarily in Monroe (30.5%), Wayne (20.2%), Oswego (18.6%), or Niagara County (14.3%) (Table 5), but he also used it at least 1 time in 1988 on water other than Lake Ontario. He began fishing for Lake Ontario salmonids in 1980, and was likely to participate in a salmonid fishing tournament (53.9%) and

Table 4. Characteristics of respondents who have fished for salmonids on Lake Ontario (n=437).

Variable	Frequency	Percent
Sex		
Male	427	97.9
Female	9	2.1
Marital Status		
Married	366	83.9
Other	70	16.1
Age		
18-25	7	1.6
26-33	58	13.2
34-41	110	25.2
42-50	119	27.3
51-58	62	14.2
59-66	45	10.3
67-74	23	5.3
75+	11	2.5
(Missing)	2	---
Occupation		
Student/unemployed	24	5.5
Professional/technical	122	28.5
Farmer	1	0.2
Management/official	53	12.4
Clerical/sales	13	3.0
Craftsman	127	29.7
Housewife	8	1.9
Military	13	3.0
Laborer	13	3.0
Retired	54	12.6
County of Residence		
Monroe	197	45.4
Niagara	57	13.1
Wayne	54	12.4
Oswego	46	10.6
Onondaga	25	5.7
Orleans	17	3.9
Out-of-state	9	2.1
Broome	6	1.4
Other (>1% per county)	23	5.3

Table 4. (cont.)

Variable	Frequency	Percent
Highest Grade Completed		
8 or below	10	2.3
9-12	176	40.6
13-16	199	46.0
17 or above	48	11.1
Household Description		
No children	81	18.8
No children at home	109	25.3
Children - youngest >6 yrs.	66	15.6
Children older than 6 yrs.	175	40.6
Total Household Income		
Less than $19,999	28	7.1
20,000-29,999	49	12.4
30,000-39,999	72	18.4
40,000-49,999	75	19.0
50,000-59,999	59	15.0
50,000-69,999	33	8.4
70,000-79,000	27	6.9
80,000 or more	51	12.9

Table 5. Fishing participation profile of respondents who had fished for salmonids on Lake Ontario (n=437).

Variable	Frequency	Valid %
1st Year - Lake Ontario fishing		
1985-1988	109	25.5
1981-1984	106	24.8
1977-1980	127	29.1
1973-1976	53	12.1
1969-1972	16	3.7
1965-1968	6	1.4
1961-1964	1	0.2
1957-1960	3	0.7
1956 or before	6	1.4
Years fished on Lake Ontario		
1-2	68	15.8
3-4	86	20.0
5-6	87	20.2
7-8	47	10.9
9-10	55	12.8
11-12	28	6.5
13-14	19	4.4
15-16	17	4.0
17+	23	5.3
County of Primary Boat Use		
Monroe	181	41.7
Niagara	61	14.1
Orleans	20	4.6
Oswego	100	23.0
Wayne	72	16.6
Time devoted to salmonid fishing on Lake Ontario		
More than on all other recr. activities	90	20.8
More than most other recr. activities	77	17.8
Some, less than many other activities	148	34.3
Very little time	117	27.1

Table 5. (cont.)

Variable	Frequency	Percent
Importance of Lake Ontario salmonid fishing		
Most important recr. activity	66	15.3
More important than many other activities	98	22.7
Somewhat important	168	39.0
Not very important	99	23.0
Expected participation in salmonid fishing on Lake Ontario, 1989-1990		
Expected to increase	172	39.7
Expected to remain about the same	198	45.7
Expected to decrease	30	6.9
Expected to stop completely	11	2.5
Unsure	22	5.1

nonsalmonid fishing (94%), but not in fly-fishing (21.1%) or salmon snagging (10.8%) (Table 6). He fished 27 days in 1988, including 11 or more days fishing for salmonids, and 11 or more days fishing for other species of fish (Table 7).

Segmenting boating anglers by participation frequency

Further insights about Lake Ontario's boating anglers can be obtained by dividing the group into a "light-half" and "heavy-half" (S.L.J. Smith 1988) based on the number of days they fished for salmonids in 1988. Those who fished fewer than the median number of days (20) represent 61% of the boating salmonid anglers who responded, but account for <10% of the total days fished for salmonids in 1988. This group may be referred to as the light-half participants. The remaining 39% of the boating salmonid anglers who responded, the heavy-half participants, accounted for at least 90% of the days fished for salmonids in 1988.

Both groups appeared to be similar in sex ratio, age structure, types of primary occupations, educational background, income, and number and age of children living at home (Table 7), but the boating and fishing behavior of light and heavy participants differed in many ways (Table 8). Heavy-half participants were more likely to have: owned their boat for 4 years or less, used their boat for fishing charters, and to report the primary use of their boat as sportfishing. In comparison to people who fished for salmonids less often, heavy-half participants had been fishing for Lake Ontario salmonids for more years and were more likely to say their fishing would increase in 1989. They were also more likely than light-half participants to participate in salmonid fishing tournaments or derbies.

Table 6. Fishing activity in 1986-1987 and 1987-1988 for respondents who had fished for salmonids on Lake Ontario (n=437).

Variable	Fishing License Year 1986-1987		Fishing License Year 1987-1988	
Fly fishing in streams	Frequency	Percent	Frequency	Percent
No	293	78.6	291	78.9
Yes	80	21.4	78	21.1
Salmon snagging on streams				
No	319	85.5	329	89.2
Yes	54	14.5	40	10.8
Salmonid fishing derbies				
No	152	40.8	170	46.1
Yes	221	59.2	199	53.9
Fishing days - Lake O. salmonids				
0	12	2.9	17	4.3
1-10	184	44.6	172	43.4
11-21	67	16.2	60	15.2
21-30	49	11.9	47	11.9
31 or more	101	24.5	100	25.3
Fishing days - other				
0	45	10.6	52	12.7
1-10	167	39.4	163	40.0
11-20	94	22.2	87	21.3
21-30	45	10.6	35	8.6
31 or more	73	17.2	71	17.4

Table 7. A comparison of demographic characteristics of boating anglers who fished 20 days or less for salmonids in 1987-88 (i.e., light-half) to those who fished 21 days or more for salmonids in 1987-88 (i.e., heavy-half*).

Socioeconomic characteristics	Light half (n=232)	Heavy-half (N=147)	Chi-square Statistic	Significance Level
Sex	%	%		
Male	98.3	100.0	1.176	NS**
Female	1.7	0.0		
Marital Status				
Married	84.1	84.4	0.000	NS
Single/divorced/separated	15.9	15.6		
Age				
18-33	16.9	14.3	3.746	NS
34-50	49.8	59.9		
51-66	24.2	19.0		
67+	9.1	6.8		
Occupation				
Student/unemployed	4.4	7.0	8.485	NS
Professional/technical	29.4	25.9		
Farmer	0.0	0.0		
Management/official	14.0	11.2		
Clerical/sales	3.9	2.1		
Craftsman	26.3	36.4		
Housewife	1.3	2.1		
Military	3.5	2.1		
Laborer	3.5	1.4		
Retired	13.6	11.9		
Area of Communication Influence				
Rochester	65.3	55.1	16.47	<0.001
Buffalo	18.1	23.9		
Syracuse	13.4	8.7		
Other - N.Y. counties	2.8	5.8		
Out-of-state	0.5	6.5		
Highest Grade Completed				
5-8	1.7	4.2	20.790	NS
9-12	39.1	42.2		
13-16	47.8	44.2		
17+	11.4	10.9		

Table 7. (cont.)

Socioeconomic characteristics	Light-half (n=232)	Heavy-half (N=147)	Chi-square Statistic	Significance Level
Household description				
No children	19.3	17.8	4.213	NS
No children at home	28.1	20.5		
Children (<6 yrs. old) at home	15.8	15.1		
Children (>6 yrs. old) at home	36.8	46.6		
Total household income				
19,999 or less	6.9	7.4	3.31	NS
20,000-29,999	14.2	11.8		
30,000-39,999	18.6	17.6		
40,000-49,999	17.6	22.1		
50,000-59,999	13.7	15.4		
60,000-69,999	8.8	7.4		
70,000-79,999	7.8	4.4		
80,000 or more	12.3	14.0		

*Heavy-half is the 39% of the population that accounts for 66% of the total boating trips by boating anglers and at least 90% of all salmonid fishing trips.

**Not significant.

Table 8. A comparison of boating and fishing characteristics of boating anglers who fished 20 days or less for salmonids in 1987-88 (i.e., light-half) to those who fished for salmonids 21 or more days in 1987-88 (i.e., heavy-half).

Boating characteristics	Light half (n=232)	Heavy half (N=147)	Chi-square Statistic	Significance Level
Boat length				
16-25 feet	89.5	84.7	5.21	NS*
26-34 feet	7.0	13.9		
35-60 feet	2.0	1.4		
Years boat owned				
1-4 years	60.2	77.0	15.92	<0.001
5-8 years	18.9	16.8		
9 or more years	20.9	6.2		
Boat used for pleasure cruising (1988)				
Yes	84.4	62.1	21.475	<0.001
No	15.6	37.9		
Boat used for sportfishing (1988)				
Yes	81.5	95.9	14.736	<0.001
No	18.5	4.1		
Boat used for water skiing (1988)				
Yes	45.9	33.8	4.625	0.031
No	54.1	66.2		
Boat used for fishing charters (1988)				
Yes	1.0	16.6	27.741	<0.001
No	99.0	83.4		
Most common use of boat				
Pleasure cruising	41.4	5.4	72.13	<0.001
Sportfishing	47.9	75.0		
Water skiing	7.9	1.8		
Other (including fishing charters)	2.8	17.4		
Most common way boat is berthed				
On a trailer	58.5	53.1	9.7	<0.050
At a seasonal dock	29.3	40.0		
At a moor or anchor	2.0	3.4		
Other	10.2	3.5		

Table 8. (cont.)

Boating characteristics	Light-half (n=232)	Heavy-half (N=147)	Chi-square Statistic	Significance Level
Boat type				
Inboard	11.7	8.3	12.314	0.006
Outboard	35.1	33.3		
In/out	46.8	58.3		
Sail	6.3	0.0		
Use of boat on other waters				
No	32.8	49.7	9.306	0.002
Yes	67.2	50.3		
Own a summer home				
No	76.1	76.6	0.000	NS
Yes	23.9	23.4		
First year of fishing on Lake Ontario				
before 1968	1.8	3.7	28.59	<0.001
1968-1974	6.6	11.8		
1975-1981	34.6	56.0		
1982-1988	57.0	28.5		
Years fished for Lake Ontario salmonids				
1-5	56.8	25.0	41.53	<0.001
6-10	28.7	40.4		
11-15	10.4	25.1		
16-20	3.5	6.3		
21 or more	0.8	3.5		
Salmon snagging in 1988				
No	90.1	85.2	1.377	NS
Yes	9.9	14.8		
Salmonid fishing tournaments in 1988				
No	58.6	18.3	52.937	<0.001
Yes	41.4	81.7		
Expected participation rate for salmonid fishing				
Increase in 1989	33.2	53.7	17.559	<0.001
Remain the same in 1989	53.7	38.8		
Decrease in 1989	8.3	6.1		
Stop in 1989	1.7	0.0		
Unsure	3.1	1.4		

*Not significant.

Fishing, Salmonid Fishing, and Recreation Motivations

Interviews with Lake Ontario anglers (Siemer et al. 1989) and studies of recreational hunters (Decker et al. 1984, Decker et al. 1987, Purdy and Decker 1986) suggest that people may have at least 3 broad sets of motivations to participate in fish or wildlife-related activities: achievement, affiliation, and nature appreciation/escape. Respondents were asked to describe the personal importance they placed on these 3 sets of satisfactions that might be gained from salmonid fishing on Lake Ontario. More than half (58%) indicated that catching many fish, large fish, or hard to catch fish (i.e., achievement motivations) were important as motivations to fish for salmonids (Table 9). A majority (74%) said affiliative motivations (being with friends or family) were moderately to extremely important motivations to engage in this activity. Similarly, the majority (69%) of respondents said escape and nature appreciation were moderately to extremely important as motivations to fish. Affiliative incentives were listed most frequently as the most important of the 3 sets as reasons to fish for salmonids.

Their responses to 19 specific items on motivations to fish provided more specific indicators of the respondents' fishing motivations. Each of the items in this scale had 5 response options (strongly agree to strongly disagree). To calculate item means, items were scored from -2 (strongly disagree) to +2 (strongly agree), and the total score was divided by the number of valid cases. The items which ranked highest in importance were related to affiliation, nature appreciation, and escape (Table 10). Having a novel and exciting experience also rated high as a motivation to fish. For most respondents competition, accomplishment, and recognition did not rate highly as motivations to fish.

Table 9. Importance of 3 groups of satisfactions that one could seek from fishing as reported by boaters who had fished on Lake Ontario (n=437).

Response category	3 groups of satisfactions that one could seek from fishing					
	Achievement*		Affiliation**		Appreciation***	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Not important	87	20.7	8	1.9	13	3.1
Slightly important	78	18.6	24	5.7	26	6.2
Moderately important	140	33.3	75	17.9	87	20.6
Very important	83	19.8	183	43.6	150	35.5
Extremely important	28	6.7	128	30.5	140	33.2
Don't know	4	1.0	2	0.5	6	1.4
Most important satisfaction (n=416)	59	14.2	224	53.8	133	32.0

*Catching the limit of fish, catching large fish, landing hard-to-catch fish, showing catch to family or friends, being thought of as a skilled angler, or using particular kinds of equipment.

**Sharing a fishing activity with family or friends, sharing stories of fishing with companions, maintaining traditions of fishing with companions, or simply being on the water with other people I like.

***Appreciating or learning about the natural environment, reflecting on my personal life, or getting away from everyday problems and surroundings through fishing.

Table 10. Importance of 19 possible motivations to become involved in salmonid fishing to boaters who have fished for salmonids on Lake Ontario (n=437).

	Valid Cases	Percent of Respondents: Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree	Mean Item Score
Spend time with friends.....	366	0.3	0.0	7.9	53.8	38.0	1.29
Experience and appreciate nature....	360	0.6	0.8	8.6	51.1	38.9	1.27
Release tension and relax.....	364	0.5	2.5	9.6	49.7	37.6	1.21
Have some thrills and excitement....	362	0.3	1.7	8.3	58.3	31.5	1.19
Spend time with family.....	361	0.6	3.9	14.4	48.2	33.0	1.10
Have new and different experiences..	358	0.3	2.0	12.0	63.1	22.6	1.06
Challenge my knowledge and skills...	363	0.6	3.6	14.3	54.5	27.0	1.04
Get a change of scenery.....	360	0.3	3.9	18.9	57.2	19.7	0.92
Get involved in interesting tasks...	356	0.3	4.2	24.4	55.1	16.0	0.82
Meet new people.....	359	0.6	7.8	24.0	52.1	15.6	0.75
Learn what I am capable of.....	358	1.1	9.5	27.1	47.8	14.5	0.65
Reflect on my personal life.....	359	0.6	10.6	37.0	40.4	11.4	0.52
Compete with myself.....	359	1.1	13.1	32.9	41.5	11.4	0.50
Test myself against the environment.	356	1.7	17.1	24.7	43.8	12.6	0.49
Excel at something.....	357	2.0	14.0	31.7	40.3	12.0	0.46
Be with one particular person.....	357	1.4	15.7	49.0	25.8	8.1	0.24
Be recognized for my efforts.....	351	2.0	23.6	36.5	31.9	6.0	0.16
Show others I can accomplish things.	358	2.8	22.6	37.2	31.3	6.1	0.15
Test myself against other people....	357	2.8	25.5	36.4	26.3	9.0	0.13

Identical items, prefaced by a general statement about recreation, were used to assess motivations to participate in recreation. Based on mean response score a similar hierarchy of importance emerged among motivations to participate in any type of recreation (Table 11).

Motivations of light- and heavy-half participants

The majority of both light- and heavy-half participants reported affiliative motivations as their most important reasons to fish for salmonids (Table 12), but a larger proportion of heavy-half anglers called achievement motivations most important, and a smaller proportion called appreciative motivations their most important incentives to salmonid fish. Moreover, heavy-half anglers appeared to place more importance on all 3 types of fishing motivations, with more heavy-half participants reporting that achievement, affiliation, and nature appreciation were all very or extremely important personal reasons to fish for salmonids.

Specific hypotheses about fishing motivations

Based on the results of open-ended interviews with anglers Siemer et al. 1989 developed a number of hypotheses regarding the strength of these motivational antecedents of salmonid fishing for various types of anglers. These hypotheses will be stated and addressed one by one.

Hypothesis H-1.1: People who participate in fishing tournaments are more likely than other anglers to say catch-related satisfactions are their most important incentives to fish.

The data support Hypothesis 1.1. Anglers who engaged in salmon fishing tournaments were more likely to place higher importance on catch-related satisfactions than anglers not involved in that activity (Table 13).

Hypothesis H-1.2: People who fish for salmonids frequently are more likely than other anglers to consider catch-related satisfactions their most important incentives to fish.

Table 11. Importance of 19 possible motivations to become involved in recreation to boaters who have fished for salmonids on Lake Ontario (n=437).

	Valid Cases	Valid Percent of Respondents: Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree	Mean Item Score
Experience and appreciate nature....	404	0.2	0.2	2.7	51.0	45.8	1.42
Release tension and relax.....	402	0.0	1.2	4.0	50.5	44.3	1.38
Spent time with friends.....	401	0.0	0.5	2.7	55.4	41.4	1.38
Spend time with family.....	399	0.0	1.8	6.3	48.9	43.1	1.33
Get a change of scenery.....	398	0.0	2.3	11.8	61.6	24.4	1.08
Have some thrills and excitement....	397	0.5	4.5	7.3	62.5	25.2	1.07
Have new and different experiences..	392	0.8	3.1	7.4	66.3	22.4	1.07
Challenge my knowledge and skills...	398	0.3	3.0	11.1	62.1	23.6	1.06
Get involved in interesting tasks...	387	0.5	3.1	17.3	62.5	16.5	0.91
Meet new people.....	397	0.5	6.0	19.1	60.5	13.9	0.81
Learn what I am capable of.....	396	1.0	9.8	17.7	57.1	14.4	0.74
Excel at something.....	395	1.3	11.1	21.5	51.1	14.9	0.67
Reflect on my personal life.....	392	0.5	8.9	28.3	47.4	14.8	0.67
Compete with myself.....	391	0.8	12.5	23.5	49.4	13.8	0.63
Test myself against the environment.	393	2.3	15.3	22.9	49.9	9.7	0.49
Be with a particular person.....	391	1.8	16.4	42.2	29.4	10.2	0.30
Be recognized for my efforts.....	388	2.1	24.7	31.2	37.4	4.6	0.18
Test myself against other people....	391	3.1	28.4	26.6	36.1	5.9	0.13
Show others I can accomplish things.	392	3.3	25.3	31.1	36.0	4.3	0.13

Table 12. A comparison of importance placed on 3 possible motivations to fish by anglers who had fished 20 days or less for salmonids in 1987-88 (i.e., light-half) to those who fished for salmonids 21 or more days in 1987-88 (i.e., heavy-half*).

Reported change in fishing attitudes and practices	Light-half (n=232) %	Heavy-half (N=147) %	Chi-square Statistic	Significance Level
Importance of achievement motivations:				
Not important	22.8	13.7	39.497	<0.001
Slightly important	24.1	11.0		
Moderately important	36.2	32.2		
Very important	13.8	28.8		
Extremely important	2.7	14.4		
Importance of affiliative motivations:				
Not important	1.3	2.0	15.039	0.004
Slightly important	5.4	4.8		
Moderately important	21.4	10.9		
Very important	47.3	40.8		
Extremely important	24.6	41.5		
Importance of Appreciative motivations:				
Not important	2.7	2.7	12.482	0.028
Slightly important	7.1	4.8		
Moderately important	23.6	17.7		
Very important	37.3	31.3		
Extremely important	27.6	43.5		
Most important set of motivations:				
Achievement	10.7	21.5	10.224	0.006
Affiliation	54.9	54.9		
Appreciation	34.4	23.6		

* Anglers were divided into a light-participation group (i.e., 20 or fewer days salmonid fishing in 1988) and a heavy-participation group (i.e., 21 or more salmonid fishing days in 1988). The heavy-half is the 39% of the population that accounts for 66% of the total boating trips by boating anglers and about 90-95% of all salmonid fishing trips.

Table 13. A comparison of motivations of Lake Ontario anglers who participate in salmonid fishing tournaments to those who do not participate in fishing tournaments.

Participation in Lake Ontario Fishing Tournaments	Most Important Motivation for Fishing						
	Achievement		Affiliation		Appreciation		
	n	Percent	n	Percent	n	Percent	Row total
YES	42	17.8	133	56.4	61	25.8	123
NO	13	10.6	63	51.2	47	38.2	236
Column total	55	15.3	196	54.6	108	30.1	359

$X^2 = 7.25$, df = 2, P = 0.026

Anglers who called salmonid fishing one of their most important activities or one of the recreational activities they spent a great deal of time on were also more likely than other anglers to say catch-related satisfactions were their most important fishing motivations (Table 14-15). Heavy-half anglers also were more likely to call achievement motivations their most important reasons to fish for salmonids (see Table 12).

Hypothesis H-1.3: People who snag salmonids consider catch-related satisfactions to be their most important incentives to fish.

Comparison of salmonid anglers who had snagged salmon in 1987-88 to other anglers did not reveal significant differences in achievement, affiliative, or appreciative motivations (Table 16).

Change in Fishing Attitudes, Practices, and Motivations

Several researchers have suggested that anglers may undergo a process of activity maturation (Bryan 1977, Absher and Collins 1987). It is believed that over time the angler's primary orientation toward catching many fish (of any species) is gradually replaced by emphasis on catching trophy fish. Some researchers suggest that over time fishing setting and technique grow more important. The angler comes to define success as catching and releasing a wary or wild fish, and using methods that challenge one's skill and knowledge of a fish's habits and natural history. Anglers who "mature" still further are thought to develop interests that extend beyond personal fishing success; these anglers develop interest in maintaining the quality of the fishery resource and passing on fishing resources, knowledge, skills, and ethics to other anglers (especially younger generations of anglers). We were interested specifically in the development or "maturation" of salmonid anglers on Lake Ontario. Based on previous angler interviews (Siemer et al. 1989) the

Table 14. A comparison of the importance placed on 3 possible motivations to fish by anglers who placed different importance on salmonid fishing on Lake Ontario in comparison to other recreational activities.

Personal Importance of Salmonid Fishing vs. Other Recreational Activities	Most Important Motivation for Fishing						
	Achievement		Affiliation		Appreciation		
	n	Percent	n	Percent	n	Percent	Row total
More important than all other recreational activity	21	33.9	27	43.5	14	22.6	62
More important than most recreational activities	12	12.2	57	58.2	29	29.6	98
Somewhat important; other recreational activities more important	19	11.4	88	53.0	59	35.5	166
Not at all important	7	7.9	50	56.2	32	26.0	89
Column total	59	14.2	222	53.5	134	32.3	415

$X^2 = 25.15$, df = 6, P = 0.000

Table 15. Most important motivation to fish for Lake Ontario salmonids by anglers who spent different amounts of their recreational time salmonid fishing on Lake Ontario.

Time Spent Salmonid Fishing	Most Important Motivation for Fishing						
	Achievement		Affiliation		Appreciation		
	n	Percent	n	Percent	n	Percent	Row total
More time than any other recreational activity	27	31.0	42	48.3	18	20.7	87
More time than most other recreational activities	12	15.8	40	52.6	24	31.6	76
Some time; less than many other recreational activities	12	8.2	88	59.9	47	32.0	147
Very little time	8	7.5	54	50.5	45	42.1	107
Column total	59	14.1	224	53.7	134	32.1	417

$X^2 = 33.33$, df = 6, P = 0.000

Table 16. A comparison of motivations of Lake Ontario anglers who snag salmon to those who do not snag salmon.

Snagging Participant	Most Important Motivation for Fishing						
	Achievement		Affiliation		Appreciation		
	n	Percent	n	Percent	n	Percent	Row total
NO	42	14.3	160	54.4	92	31.3	294
YES	12	19.4	34	54.8	16	25.8	62
Column total	64	15.2	194	54.5	108	30.3	356

$X^2 = 1.376$, df = 2, P = 0.50

following hypotheses were developed regarding their motivational shifts over time.

H-2.1-2.8: Over time, anglers develop greater interest in, or place greater importance on: appreciation of nature; maintenance of fisheries resources; catch and release fishing; knowing fish habits and natural history; using challenging fishing methods; catching trophy fish; fishing in particular settings; and fishing for particular species.

H-2.9-2.10: Over time anglers lose interest in, or place less importance on: catching fish to eat; keeping fish that are caught, catching a limit of fish.

A 13-item scale was used to assess whether respondents' attitudes and practices related to fishing had changed over the course of their involvement in Lake Ontario salmonid fishing. The results were consistent with the hypothesized relationships. The majority of respondents indicated they had become more interested in conservation of the fishery, understanding fish habits, using particular fishing methods, and fishing in particular surroundings (Table 17). For most respondents the importance of limiting out or catching fish to eat remained constant or decreased.

To explore these hypotheses further, anglers were placed in 3 groups based on their years of experience fishing for salmonids on Lake Ontario. Chi-square tests indicated that the changes in attitudes and practices that occurred were not the same for all 3 groups (Table 18), and the differences were consistent with our hypotheses. Anglers who had fished for salmonids more than 5 years were more likely to report an increase in the importance they placed on: conservation of the fishery, using particular fishing methods, pursuing certain species of fish, and being in certain surroundings while fishing.

Table 17. Changes in fishing attitudes and practices reported by anglers who had fished 2 or more years for salmonids on Lake Ontario (n=405).

Change in Importance/Interest in:	Increased or Increased Greatly %	Stayed the Same %	Decreased or Decreased Greatly %	Don't Know %	Missing %
Maintaining the fishery	74.0	17.0	1.5	2.2	2.2
Enjoyment of nature	69.6	24.2	1.7	0.7	0.7
Catch-and-release fishing	69.4	22.0	3.0	1.2	1.2
Fishing method	65.0	23.7	3.0	2.0	2.0
Learning salmonids' habits	64.2	25.0	5.4	0.7	0.7
Catching trophy fish	54.0	26.9	11.1	1.7	1.7
Surroundings while fishing	53.1	37.5	1.5	3.0	3.0
Specializing for certain species	42.5	41.7	8.1	2.5	2.5
Using lighter tackle	42.5	42.7	6.4	3.5	3.5
Teaching other to fish	40.5	46.7	4.2	3.7	3.7
Catching fish	35.1	46.4	12.8	1.0	4.7
Catching fish to eat	19.5	32.6	41.0	0.7	0.7
Limiting out	11.6	42.2	33.8	5.2	5.2

Table 18. Changes in personal fishing interests and practices of anglers who have fished for salmonids on Lake Ontario for 2-5, 6-10, or 11-15 years.

Change in Importance/ Interest in:	n	Decr. %	Same %	Incr. %	χ^2	P
Maintaining the fishery						
2-5 years salmonid fishing	163	2.5	30.0	70.6	14.46	<0.005
6-10 years salmonid fishing	128	0.8	11.7	87.5		
11-15 years salmonid fishing	60	1.7	11.7	86.7		
Enjoyment of nature						
2-5 years salmonid fishing	170	2.9	24.1	72.9	1.94	NS*
6-10 years salmonid fishing	131	0.8	25.2	74.0		
11-15 years salmonid fishing	62	1.6	25.8	72.6		
Catch-and-release fishing						
2-5 years salmonid fishing	167	4.2	32.9	62.9	14.46	<0.010
6-10 years salmonid fishing	129	3.1	17.1	79.8		
11-15 years salmonid fishing	62	1.6	16.1	82.3		
Fishing method						
2-5 years salmonid fishing	161	6.2	33.5	66.2	17.81	<0.005
6-10 years salmonid fishing	126	1.6	18.3	80.2		
11-15 years salmonid fishing	60	0.0	23.3	76.7		
Learning salmonids' habits						
2-5 years salmonid fishing	166	9.6	28.3	62.0	8.99	<0.025
6-10 years salmonid fishing	123	4.9	26.8	68.3		
11-15 years salmonid fishing	60	0.0	23.3	76.7		
Catching trophy fish						
2-5 years salmonid fishing	160	15.0	35.0	50.0	9.07	<0.025
6-10 years salmonid fishing	129	10.0	27.9	62.0		
11-15 years salmonid fishing	58	8.6	20.7	70.7		
Surroundings while fishing						
2-5 years salmonid fishing	162	2.4	36.4	61.1	22.92	<0.005
6-10 years salmonid fishing	129	0.7	40.3	58.9		
11-15 years salmonid fishing	39	0.0	40.3	58.9		

Table 18. (cont.)

Change in Importance/ Interest in:	n	Decr. %	Same %	Incr. %	X^2	P
Specializing for certain species						
2-5 years salmonid fishing	161	11.8	53.4	34.8	17.50	<0.005
6-10 years salmonid fishing	128	6.3	43.8	50.0		
11-15 years salmonid fishing	68	7.4	25.0	55.9		
Using lighter tackle						
2-5 years salmonid fishing	156	6.4	58.3	35.3	16.86	<0.005
6-10 years salmonid fishing	129	9.3	38.0	52.7		
11-15 years salmonid fishing	62	3.2	38.7	58.1		
Teaching others to fish						
2-5 years salmonid fishing	159	6.3	57.9	35.8	9.78	<0.050
6-10 years salmonid fishing	129	3.9	45.7	44.5		
11-15 years salmonid fishing	40	2.5	67.5	30.0		
Catching fish						
2-5 years salmonid fishing	168	15.5	45.2	39.3	4.86	NS
6-10 years salmonid fishing	129	9.3	53.5	37.2		
11-15 years salmonid fishing	60	18.3	50.0	31.7		
Catching fish to eat						
2-5 years salmonid fishing	164	37.2	39.0	23.8	5.39	NS
6-10 years salmonid fishing	127	49.6	30.7	19.7		
11-15 years salmonid fishing	61	49.2	31.1	19.7		
Limiting out						
2-5 years salmonid fishing	151	41.7	49.7	8.6	5.34	NS
6-10 years salmonid fishing	121	33.9	49.6	16.5		
11-15 years salmonid fishing	59	35.6	47.5	16.9		

*Not significant.

Light- and heavy-half participants

Comparison of light- and heavy-half participants provides additional support for Hypothesis 2.1 and 2.2. Heavy-half anglers (who had fished for salmonids more total years and more days in 1987-88) were more likely than other anglers to report increased personal importance placed on catching fish, catching large fish, becoming species and technique specialists, learning about fish habits, and conserving fisheries resources (Table 19). Heavy-half anglers were also more likely to report declined personal interest in "limiting out" on a fishing trip. Both light- and heavy-half anglers were more likely than not to report a decreased importance placed on catching fish to eat and increased importance placed on nature and their natural surroundings while fishing.

Using Personal Investment Theory to Profile Angler Groups

Maehr and Braskamp (1986) have developed a theoretical framework that facilitates the study of motivations and their relationship to involvement in an activity. They suggest that personal meanings (i.e., people's perceptions of self and the particular situation they are in) are the immediate antecedents to motivations (i.e., psychological drives that propel people to attempt to achieve certain goals or end states). Moreover, because they determine what motivates a person, personal meanings are assumed to determine how involved (i.e., how personally invested) a person becomes in any given activity. Maehr and Braskamp (1986) suggest that a careful assessment of personal meanings, especially a subset of meanings they call personal incentives to behave, may allow for further hypothesis development regarding the motivations which underlie a given pattern of behavior (e.g., involvement in fishing). Maehr and Braskamp (1986) assume that people have latent

Table 19. Changes in fishing attitudes and practices reported by anglers who had fished 20 days or less for salmonids in 1987-88 (i.e., light-half) to those who fished for salmonids 21 or more days in 1987-88 (i.e., heavy-half*).

Reported change in fishing attitudes and practices	Light-half (n=232) %	Heavy-half (N=147) %	Chi-square Statistic	Significance Level
Importance of catching fish has:				
Decreased	15.5	7.6	19.79	<0.001
Stayed the same	55.5	40.1		
Increased	29.1	51.7		
Importance of "limiting out" has:				
Decreased	37.6	37.1	34.13	<0.001
Stayed the same	57.4	36.4		
Increased	5.1	26.4		
Importance of catching larger fish has:				
Decreased	16.4	2.8	41.29	<0.001
Stayed the same	34.2	17.0		
Increased	44.7	80.2		
Importance of specializing for certain fish has:				
Decreased	10.0	5.6	34.01	<0.001
Stayed the same	55.6	28.5		
Increased	34.4	66.0		
Importance of fishing method has:				
Decreased	4.8	0.7	33.35	<0.001
Stayed the same	35.1	11.1		
Increased	60.1	88.2		
Interest in fish habits has:				
Decreased	7.8	1.4	50.25	<0.001
Stayed the same	36.9	8.3		
Increased	55.3	90.3		
Interest in using lighter tackle has:				
Decreased	5.2	10.4	13.73	<0.001
Stayed the same	54.0	34.7		
Increased	40.8	54.9		

Table 19. (cont.)

Reported change in fishing attitudes and practices	Light-half (n=232) %	Heavy-half (N=147) %	Chi-square Statistic	Significance Level
Interest in teaching others to fish has:				
Decreased	4.9	3.5	51.88	<0.001
Stayed the same	67.0	26.5		
Increased	33.0	70.0		
Interest in maintaining the Lake Ontario fishery has:				
Decreased	3.3	0.0	12.57	<0.001
Stayed the same	22.9	11.0		
Increased	73.8	84.1		
Interest in catch-and-release fishing has:				
Decreased	4.7	0.0	21.77	<0.001
Stayed the same	30.0	13.6		
Increased	65.6	86.4		
Interest in catching fish to eat has:				
Decreased	44.3	44.1	1.01	NS**
Stayed the same	33.2	37.2		
Increased	22.4	18.6		
Importance of the fishing environment has:				
Decreased	2.4	0.7	3.26	NS
Stayed the same	43.9	37.3		
Increased	53.8	62.0		
Enjoyment of nature while fishing has:				
Decreased	2.3	1.4	0.49	NS
Stayed the same	26.4	25.2		
Increased	71.4	73.5		

* Anglers were divided into a light-participation group (i.e., 20 or fewer days salmonid fishing in 1988) and a heavy-participation group (i.e., 21 or more salmonid fishing days in 1988). Heavy-half anglers represent 39% of the population, but account for 66% of the total boating trips by boating anglers and about 90-95% of all salmonid fishing trips.

**Not significant.

knowledge of what they expect from a specific situation, and, if properly questioned, can articulate these expectations. That is, people can explain what they hope to accomplish in a given situation.

It is assumed that behavior is often activated by more than one motive, and that a specific behavior may represent a compromise between competing motives, or a substitute behavior that is not obviously related to the motives. No matter what the behaviors undertaken, however, we assume that they are the consequence of motives, even if the angler is not aware of the motives underlying the specific action.

The behavioral expression of motivation is assumed to be mediated by the social context (i.e., the physical and interpersonal environment) in which it occurs. That is, behavior is believed to be determined by a unique combination of situational and personal factors. Habits, abilities, behavioral beliefs, self-perceptions, opportunities, and self-commitment are just some of the factors suggested to mediate behavioral expression of motivations (Reeder 1973, Crano and Messe 1982). Any number of these and other factors can affect the way people perceive a situation and ultimately how they should and do act. Maehr and Braskamp (1986) suggest that the cognitions, or personal meanings an individual holds about the situation are the immediate antecedents to personal investment.

The emphasis of this theoretical perspective is placed on the individual's thoughts, perceptions, and feelings at the moment of behaving because these are believed to determine personal investment in an activity (i.e., the direction, persistence, and intensity of one's behavior). This emphasis on cognitive processes as the immediate antecedent of motivation necessitates that one take account of both personality and situational

determinants to understand the meanings that antecede a given behavior. Certainly a whole range of enduring and context-specific meanings exist that might affect involvement in salmonid fishing, but it may be possible to make a practical assessment of a person's motivations to fish by assessing a limited number of personal incentives that person associates with this activity.

Recognizing that a wide array of personal incentives exist, there is practical value in organizing these diverse personal incentive possibilities into a limited set of categories. Our interviews with Lake Ontario anglers (Siemer et al. 1989) provided excellent baseline information to develop such categories. This investigation and others on involvement in wildlife-related recreation (Decker et al. 1984, Decker et al. 1987, Purdy and Decker 1986) led the investigators to conclude that the majority of specific reasons or motivations for fishing can be combined into 3 broad categories: achievement, affiliative, and appreciative/escape. These motivations had different degrees of saliency for different people and were regarded as more or less important depending upon the situation. We recognize that other goals for fishing participation exist in addition to these 3. We also recognize that the 3 goal orientations could be broken down into more specific categories, as has been done by Knopf (1972).

Similar kinds of attributes of personal meanings can be assessed for recreation generally, and salmonid fishing specifically. In other words, an angler might be asked if he personally thinks of things like competition, recognition, or affiliation as incentives to become involved in a recreation activity. Next, the angler could be asked if he defines salmonid fishing as an activity that provides an opportunity to gain things that he values personally (e.g., recognition, affiliation). Absher and Collins (1987) have

utilized personal investment theory (Maehr and Braskamp 1986) to study recreational specialization by salmonid anglers on southern Lake Michigan. Their work offers an example of the utility of this theory for research on the motivations and involvement patterns of any given group of recreational anglers.

Motivation scales

We operationalized personal investment theory by developing two scales, one designed to assess personal incentives to become involved in recreation, and one to assess incentives to engage in salmonid fishing. The purpose of the recreation and salmonid fishing motivation scales was to assess underlying motivations by drawing inferences from the personal incentives each respondent held regarding recreation generally and salmonid fishing specifically. The purpose of including these scales in the questionnaire was to provide a second means of exploring fishing motivations, one complementary to 4 motivation items in the questionnaire that were based on previous work by Decker et al. (1987).

Measures of the variables of interest were evaluated and finalized through a series of peer reviews. Following peer review, 40 items designed to measure motivations associated with involvement in recreation (20 items), and salmonid fishing specifically (20 items) were pretested with 24 students, faculty, and staff in the Department of Natural Resources, Cornell University (Appendix E). Reliability coefficients of both scales were estimated to compute Cronbach's alpha.

Responses (n=23) to 2 items regarding nature appreciation and understanding were highly correlated (Pearson product-moment correlation coefficient = 0.8722) so these items were combined. Reliability analysis

indicated that the reliability of the general recreation scale could be increased by deleting 2 items from the scale (Table 20). Identical analysis of the salmonid fishing scale suggested that deletion of 3 items would increase the Cronbach's alpha of that scale (Table 21). In light of these results, 1 item in each scale was modified, but no additional items were deleted. The remaining item in the fishing motivation scale and 2 items in the general recreation scale that did not add to overall scale reliability were not deleted. It was decided that retaining these items would result in an acceptable level of reliability (Tables 22 and 23) and reduce likelihood that single item factors would be created within either scale.

Factor analysis using principal components extraction (Kim 1975) of items from the general recreation scale indicated that the scale items could be categorized into 5 sets of motivations (Table 24). The 5 sets were interpreted to represent motivations related to: challenge, accomplishment, affiliation, escape/appreciation, or novelty (Figure 2).

The same technique suggested that the fishing motivation items could be categorized into 4 groups, representing motivations related to: challenge, accomplishment, affiliation/appreciation/escape, or novelty (Table 25, Figure 3). Items related to being with people (i.e., affiliation), releasing tension (i.e., escape), and experiencing nature (i.e., appreciation) were expected to group into 3 separate motivational dimensions rather than one. Future applications of this scale will be needed to determine if the relationship among these items is better explained by more than 1 motivational dimension.

Table 20. Reliability coefficient estimates for items within a scale designed to assess 24 pretest respondents' motivations to engage in recreational activities.*

Item description	Cronback's alpha if item deleted
I like to get involved in recreational activities that allow me to:	
Challenge my knowledge and skills	0.8660
Have some thrills and excitement	0.8700
Have new and different experiences	0.8699
Get involved in interesting tasks	0.8717
Excel at something	0.8702
Learn what I am capable of	0.8669
Compete with myself	0.8717
Test myself against the environment	0.8645
Test myself against other people	0.8646
Show others I can accomplish things	0.8580
Be recognized for my efforts	0.8666
Spend time with friends	0.8721
Spend time with family	0.8710
Be with people who enjoy what I do	0.8698
Reflect on my personal life	0.8639
Get a change of scenery	0.8767
Release tension and relax	0.8819
Work out some problems	0.8716
Experience and appreciate nature	0.8708
Get a better understanding of the natural world	0.8633
Overall alpha	0.8750

*Response options for all items were: strongly agree, agree, no opinion, disagree, and strongly disagree.

Table 21. Reliability coefficient estimates for items within a scale designed to assess motivations of 24 pretest respondents' motivations to engage in salmonid fishing on Lake Ontario.*

Item description	Cronback's alpha if item deleted
I go fishing because it gives me a chance to:	
Challenge my knowledge and skills	0.8591
Have some thrills and excitement	0.8597
Have new and different experiences	0.8556
Get involved in interesting tasks	0.8580
Excel at something	0.8572
Learn what I am capable of	0.8481
Compete with myself	0.8485
Test myself against the environment	0.8611
Test myself against other people	0.8565
Show others I can accomplish things	0.8452
Be recognized for my efforts	0.8540
Spend time with friends	0.8650
Spend time with family	0.8616
Be with people who enjoy what I do	0.8704
Reflect on my personal life	0.8446
Get a change of scenery	0.8548
Release tension and relax	0.8591
Work out some problems	0.8496
Experience and appreciate nature	0.8559
Get a better understanding of the natural world	0.8501
Overall alpha	0.8620

*Response options for all items were: strongly agree, agree, no opinion, disagree, and strongly disagree.

Table 22. Reliability coefficient estimates for items within a 19-item scale designed to assess boating anglers' motivations to engage in recreational activities.*

Item description	Cronback's alpha if item deleted
I like to get involved in recreational activities that allow me to:	
Challenge my knowledge and skills	0.8446
Excel at something	0.8365
Compete with myself	0.8353
Learn what I am capable of	0.8320
Test myself againsts other people	0.8389
Test myself against the environment	0.8372
Show others I can accomplish things	0.8354
Be recognized for my efforts	0.8379
Have some thrills and excitement	0.8416
Have new and different experiences	0.8393
Get involved in interesting tasks	0.8428
Spend time with friends	0.8474
Spend time with family	0.8473
Be with one particular person	0.8585
Meet new people	0.8480
Reflect on my personal life	0.8444
Get a change of scenery	0.8466
Release tension and relax	0.8465
Experience and appreciate nature	0.8468
Overall alpha	0.8490

*Response options for all items were: strongly agree, agree, no opinion, disagree, and strongly agree.

Table 23. Reliability coefficient estimates for items within a 19-item scale designed to assess motivations of 337 respondents to engage in salmonid fishing on Lake Ontario.*

Item description	Cronback's alpha if item deleted
I go fishing because it gives me a chance to:	
Challenge my knowledge and skills	0.8863
Excel at something	0.8843
Compete with myself	0.8852
Learn what I am capable of	0.8835
Test myself againsts other people	0.8873
Test myself against the environment	0.8879
Show others I can accomplish things	0.8848
Be recognized for my efforts	0.8856
Have some thrills and excitement	0.8881
Have new and different experiences	0.8867
Get involved in interesting tasks	0.8879
Spend time with friends	0.8897
Spend time with family	0.8907
Be with one particular person	0.8966
Meet new people	0.8881
Reflect on my personal life	0.8904
Get a change of scenery	0.8896
Release tension and relax	0.8898
Experience and appreciate nature	0.8905
Overall alpha	0.8930

*Response options for all items were: strongly agree, agree, no opinion, disagree, and strongly agree.

Table 24. Factor loadings of 18 items on motivations to become involved in recreation.

Reasons to get involved in recreation	Factor 1 (Challenge)	Factor 2 (Accomplishment)	Factor 3 (Affiliation)	Factor 4 (Escape/ Appreciation)	Factor 5 (Novelty)
Challenge my knowledge and skill	.5915	.0867	.1004	.0454	.1389
Excel at something	.5964	.3718	.0396	.0693	.1521
Compete with myself	.6450	.3598	.0525	.0932	.1428
Learn what I am capable of	.6232	.3741	.0394	.1873	.2263
Test myself against others	.3118	.6534	.0101	.0173	.1482
Test myself against the environment	.3197	.4849	.0136	.2082	.2021
Show others I can accomplish things	.1991	.8117	.0166	.0585	.1577
Be recognized for my efforts	.1877	.7973	.0403	.0093	.1263
Spend time with friends	.0524	.0203	.8675	.1652	.1848
Spend time with family	.0912	.0250	.5906	.2677	.0739
Meet new people	.0761	.1771	.1951	.2030	.1357
Reflect on my personal life	.0952	.1452	.0204	.5227	.1690
Get a change of scenery	.0573	.0137	.0474	.6999	.1237
Release tension and relax	.0329	.0253	.2646	.6954	.0410
Experience and appreciate nature	.0872	.0161	.2233	.6846	.0251
Have thrills and excitement	.1973	.1890	.1069	.0876	.6510
Have new and different experiences	.1148	.1845	.1418	.2106	.7982
Get involved in interesting tasks	.2716	.1366	.1003	.1001	.4713

(Cumulative % = 52.3; Cronbach's alpha = 0.8603)

I like to get involved in recreational activities that allow me to:

	Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree
CHALLENGE MOTIVATIONS*					
Challenge my knowledge and skill	( )	( )	( )	( )	( )
Excel at something	( )	( )	( )	( )	( )
Compete with myself	( )	( )	( )	( )	( )
Learn what I am capable of	( )	( )	( )	( )	( )
ACCOMPLISHMENT MOTIVATIONS					
Test myself against others	( )	( )	( )	( )	( )
Test myself against the environment	( )	( )	( )	( )	( )
Show others I can accomplish things	( )	( )	( )	( )	( )
Be recognized for my efforts	( )	( )	( )	( )	( )
AFFILIATION MOTIVATIONS					
Spend time with friends	( )	( )	( )	( )	( )
Spend time with family	( )	( )	( )	( )	( )
ESCAPE/APPRECIATION MOTIVATIONS					
Meet new people	( )	( )	( )	( )	( )
Reflect on my personal life	( )	( )	( )	( )	( )
Get a change of scenery	( )	( )	( )	( )	( )
Release tension and relax	( )	( )	( )	( )	( )
Experience and appreciate nature	( )	( )	( )	( )	( )
NOVELTY MOTIVATIONS					
Have thrills and excitement	( )	( )	( )	( )	( )
Have new and different experiences	( )	( )	( )	( )	( )
Get involved in interesting tasks	( )	( )	( )	( )	( )

*The items of the recreation motivations scale are organized and labelled to demonstrate the motivational dimensions believed to be represented. This presentation format is not the same as that used in the survey questionnaire.

Figure 2. A recreation motivations scale.

Table 25. Factor loadings of 18 items on motivations to fish for Lake Ontario salmonids.

Reasons to get involved in Lake Ontario salmonid fishing	Factor 1 (Challenge)	Factor 2 (Accomplishment)	Factor 3 (Affiliation/ Appreciation/Escape)	Factor 4 (Novelty)
Challenge my knowledge and skills	.6184	.2317	.1586	.2927
Excell at something	.5857	.5026	.0743	.1748
Compete with myself	.6903	.3745	.1527	.0303
Learn what I am capable of	.6702	.3831	.1930	.1424
Test myself against other people	.2921	.7161	.0552	.0736
Test myself against the environment	.2362	.4885	.2094	.1777
Show others I can accomplish things	.2310	.8227	.0803	.1631
Be recognized for my efforts	.2308	.8314	.0643	.1017
Spend time with friends	.1487	.0193	.5840	.3549
Spend time with family	.1655	.0518	.5059	.1489
Meet new people	.2921	.2481	.4073	.0655
Reflect on my personal life	.1116	.2394	.5354	.0254
Get a change of scenery	.0213	.1181	.6423	.1925
Release tension and relax	.0514	.0435	.7401	.1755
Experience and appreciate nature	.0843	.2279	.7526	.1479
Have some thrills and excitement	.1401	.1824	.2787	.7593
Have new and different experiences	.1837	.2271	.3486	.6256
Get involved in interesting tasks	.3072	.1439	.3458	.3698

(Cumulative % = 54.3; Cronbach's alpha = 0.8966)

I enjoy trout and salmon fishing because it gives me a chance to:

	Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree
CHALLENGE MOTIVATIONS*					
Challenge my knowledge and skills	( )	( )	( )	( )	( )
Excel at something	( )	( )	( )	( )	( )
Compete with myself	( )	( )	( )	( )	( )
Learn what I am capable of	( )	( )	( )	( )	( )
ACCOMPLISHMENT MOTIVATIONS					
Test myself against other people	( )	( )	( )	( )	( )
Test myself against the environment	( )	( )	( )	( )	( )
Show others I can accomplish things	( )	( )	( )	( )	( )
Be recognized for my efforts	( )	( )	( )	( )	( )
AFFILIATION/APPRECIATION/ESCAPE MOTIVATIONS					
Spend time with friends	( )	( )	( )	( )	( )
Spend time with family	( )	( )	( )	( )	( )
Meet new people	( )	( )	( )	( )	( )
Reflect on my personal life	( )	( )	( )	( )	( )
Get a change of scenery	( )	( )	( )	( )	( )
Release tension and relax	( )	( )	( )	( )	( )
Experience and appreciate nature	( )	( )	( )	( )	( )
NOVELTY MOTIVATIONS					
Have some thrills and excitement	( )	( )	( )	( )	( )
Have new and different experiences	( )	( )	( )	( )	( )
Get involved in interesting tasks	( )	( )	( )	( )	( )

*The items of the salmonid fishing motivations scale are organized and labelled to demonstrate the motivational dimension believed to be represented. This presentation format is not the same as that used in the survey questionnaire.

Figure 3. A salmonid fishing motivations scale.

Recreation and salmonid fishing motivation profiles of select salmonid angler groups

As a group, respondents indicated that opportunities for affiliation and escape were their strongest incentives to participate in a given recreational activity. They indicated that their strongest incentives to fish for Lake Ontario salmonids were the opportunity to do something interesting and spend time with family or friends (Table 26).

We had several hypotheses regarding people who engaged in different fishing activities (i.e., fishing tournaments, salmon snagging, or fly-fishing) were explored using personal investment theory:

H-3.1: **People who participate in fishing tournaments hold personal incentives to recreate and fish for salmonids that distinguish them from people who do not fish in tournaments.**

H-3.2: **People who snag salmon hold personal incentives to recreate and fish for salmonids that distinguish them from people who do not snag salmon.**

H-3.3: **People who fly-fish hold personal incentives to recreate and fish for salmonids that distinguish them from people who do not fly-fish.**

H-3.4: **People who fish only for salmonids hold personal incentives to recreate and fish for salmonids that distinguish them from people who fish for salmonids and other species.**

To explore these questions, anglers were segregated into a number of activity groups and compared by their mean factor scores within the recreation and salmonid motivation scales. The results of these comparisons appear on Tables 27-32.

Anglers who fished only for trout or salmon, and anglers who had participated in fly-fishing in the last 2 years, were not found to hold different personal incentives than anglers who did not fall in these categories (Tables 27-28). A number of differences in incentives were found

Table 26. Factor scores for boating salmonid anglers from scales to assess motivations to become involved in recreation and motivations to get involved in salmonid fishing.

Motivation Factors	Mean	Median	Mode	Standard Deviation
General recreation motivations:				
Challenge	0.782	1.0	1.0	0.673
Accomplishment	0.244	0.3	1.0	0.785
Affiliation	1.353	1.0	1.0	0.552
Escape/Appreciation	1.082	1.0	1.0	0.480
Novelty	1.028	1.0	1.0	0.589
Fishing Motivations:				
Challenge	0.672	0.8	1.0	0.728
Accomplishment	0.250	0.3	0.0	0.800
Affiliation/Appreciation/Escape	1.009	1.0	1.0	0.525
Novelty	1.027	1.0	1.0	0.573

Table 27. A comparison of Lake Ontario anglers who fish only for salmonids to those who also fish for nonsalmonids by mean factor scores on a recreation motivation scale and a fishing motivation scale.

Motivation Factors	n	$\bar{x}$	Pooled T-Value	Pooled 2-tailed P
General recreation motivations:				
Challenge				
Salmonid fishing specialists	327	0.23	-0.46	NS*
General anglers	25	0.18		
Accomplishment				
Salmonid fishing specialists	326	1.35	-0.34	NS
General anglers	25	1.32		
Affiliation				
Salmonid fishing specialists	329	1.07	-0.25	NS
General anglers	25	1.06		
Escape/Appreciation				
Salmonid fishing specialists	325	1.04	-0.05	NS
General anglers	25	0.92		
Novelty				
Salmonid fishing specialists	325	1.04	-0.94	NS
General anglers	25	0.92		
Fishing Motivations:				
Challenge				
Salmonid fishing specialists	300	0.69	-0.60	NS
General anglers	23	0.60		
Accomplishment				
Salmonid fishing specialists	297	0.26	-0.36	NS
General anglers	23	0.20		
Affiliation/Appreciation/Escape				
Salmonid fishing specialists	299	1.03	-0.84	NS
General anglers	23	0.94		
Novelty				
Salmonid fishing specialists	298	1.06	-1.41	NS
General anglers	23	0.88		

*Not significant.

Table 28. A comparison of salmonid anglers who participate in fly-fishing to those who do not fly-fish by mean factor scores on a recreation motivation scale and a fishing motivation scale.

Motivation Factors	n	$\bar{x}$	Pooled T-Value	Pooled 2-tailed P
General recreation motivations:				
Challenge				
Fly-fishing participants	84	0.88	-1.26	NS*
Fly-fishing nonparticipants	273	0.77		
Accomplishment				
Fly-fishing participants	83	0.18	0.87	NS
Fly-fishing nonparticipants	270	0.27		
Affiliation				
Fly-fishing participants	84	1.33	0.43	NS
Fly-fishing nonparticipants	271	1.36		
Escape/Appreciation				
Fly-fishing participants	84	1.08	0.07	NS
Fly-fishing nonparticipants	273	1.08		
Novelty				
Fly-fishing participants	83	1.06	-0.33	NS
Fly-fishing nonparticipants	270	1.03		
Fishing Motivations:				
Challenge				
Fly-fishing participants	76	0.78	-1.15	NS
Fly-fishing nonparticipants	251	0.66		
Accomplishment				
Fly-fishing participants	75	0.31	-0.40	NS
Fly-fishing nonparticipants	248	0.26		
Affiliation/Appreciation/Escape				
Fly-fishing participants	76	1.06	-0.66	NS
Fly-fishing nonparticipants	251	1.01		
Novelty				
Fly-fishing participants	76	1.11	-1.17	NS
Fly-fishing nonparticipants	248	1.02		

*Not significant.

in comparisons of tournament/nontournament and snagging/nonsnagging anglers (Tables 29-30). Anglers who fished in tournaments appeared to be more motivated to recreate by incentives related to accomplishment. Moreover, people who fished in tournaments were more likely than nonparticipants to believe that salmonid fishing presented a context for challenge, accomplishment, novelty, escape, and affiliation. Likewise, anglers who snagged salmon were more likely than nonsnaggers to see a whole range of strong incentives to fish for salmonids. In addition to this, snaggers indicated that incentives related to accomplishment were more powerful to them as motivations to participate in any recreation.

We were also interested in comparing and contrasting the motivations of people who were highly involved in salmonid fishing to those who had remained less committed to the activity. We hypothesized that people who were highly invested in salmonid fishing would hold personal incentives to recreate and salmonid fish that distinguish them from less invested salmonid anglers. To test this salmonid anglers were divided into 2 groups.

Four criteria were used to segregate personal investments groups. People who had fished for Lake Ontario salmonids 8 years or more (mean years fished was 7), had fished for Lake Ontario salmonids 21 or more days in 1988 (mean days fished was 21-30), said they spent more time on salmonid fishing than any other recreational activity, and said salmonid fishing was their most important recreational activity, were placed in the high personal investment category. Other salmonid anglers were placed in the low personal investment category.

Several motivational differences were found between the 2 groups (Table 31). Highly invested salmonid anglers appeared to be more motivated to engage

Table 29. A comparison of Lake Ontario anglers who participate in salmonid fishing tournaments to those who do not participate in fishing tournaments by mean factor scores on a recreation motivation scale and a fishing motivation scale.

Motivation Factors	n	$\bar{x}$	Pooled T-Value	Pooled 2-tailed P
General recreation motivations:				
Challenge				
Tournament participants	231	0.82	-0.71	NS*
Tournament nonparticipants	128	0.77		
Accomplishment				
Tournament participants	229	0.31	-2.06	0.041
Tournament nonparticipants	126	0.14		
Affiliation				
Tournament participants	230	1.34	-0.50	NS
Tournament nonparticipants	127	1.37		
Escape/Appreciation				
Tournament participants	231	1.05	1.68	NS
Tournament nonparticipants	128	1.14		
Novelty				
Tournament participants	228	1.05	-0.71	NS
Tournament nonparticipants	127	1.00		
Fishing Motivations:				
Challenge				
Tournament participants	217	0.84	-5.36	0.000
Tournament nonparticipants	112	0.40		
Accomplishment				
Tournament participants	214	0.40	-4.21	0.000
Tournament nonparticipants	111	0.02		
Affiliation/Appreciation/Escape				
Tournament participants	217	1.08	-2.85	0.010
Tournament nonparticipants	112	0.90		
Novelty				
Tournament participants	215	1.13	-3.73	0.000
Tournament nonparticipants	111	0.88		

*Not significant.

Table 30. A comparison of Lake Ontario anglers who snag salmon to those who do not snag salmon by mean factor scores on a recreation motivation scale and a fishing motivation scale.

Motivation Factors	n	$\bar{x}$	Pooled T-Value	Pooled 2-tailed P
General recreation motivations:				
Challenge				
Snagging anglers	62	0.98	-2.33	0.020
Nonsnagging anglers	294	0.76		
Accomplishment				
Snagging anglers	61	0.42	-1.88	NS*
Nonsnagging anglers	291	0.21		
Affiliation				
Snagging anglers	61	1.48	-1.87	NS
Nonsnagging anglers	293	1.33		
Escape/Appreciation				
Snagging anglers	61	1.31	-0.85	NS
Nonsnagging anglers	295	1.07		
Novelty				
Snagging anglers	61	1.20	-2.42	0.016
Nonsnagging anglers	291	1.00		
Fishing Motivations:				
Challenge				
Snagging anglers	52	0.92	-2.39	0.020
Nonsnagging anglers	274	0.65		
Accomplishment				
Snagging anglers	52	0.51	-2.29	0.020
Nonsnagging anglers	270	0.23		
Affiliation/Appreciation/Escape				
Snagging anglers	52	1.16	-2.15	0.030
Nonsnagging anglers	274	0.99		
Novelty				
Snagging anglers	52	1.19	-1.98	0.050
Nonsnagging anglers	271	1.02		

*Not significant.

Table 31. A comparison of highly invested* Lake Ontario salmonid anglers to less invested anglers by mean factor scores on a recreation motivation scale and a fishing motivation scale.

Motivation Factors	n	$\bar{X}$	Pooled T-Value	Pooled 2-tailed P
General recreation motivations:				
Challenge				
Highly invested anglers	74	0.88	-2.42	0.016
Less invested anglers	130	0.63		
Accomplishment				
Highly invested anglers	74	0.43	-2.73	0.007
Less invested anglers	129	0.10		
Affiliation				
Highly invested anglers	74	1.28	0.74	NS**
Less invested anglers	129	1.35		
Escape/Appreciation				
Highly invested anglers	74	1.01	1.46	NS
Less invested anglers	131	1.12		
Novelty				
Highly invested anglers	74	1.03	-0.59	NS
Less invested anglers	129	0.98		
Fishing Motivations:				
Challenge				
Highly invested anglers	74	1.03	-6.16	0.000
Less invested anglers	115	0.39		
Accomplishment				
Highly invested anglers	74	0.65	-5.87	0.000
Less invested anglers	114	-0.04		
Affiliation/Appreciation/Escape				
Highly invested anglers	74	1.17	-4.20	0.000
Less invested anglers	116	0.82		
Novelty				
Highly invested anglers	74	1.18	-3.79	0.000
Less invested anglers	115	0.85		

*Highly invested salmonid anglers were defined as those who had fished for Lake Ontario salmonids 8 or more years and 21 or more days in 1988, reported spending more time on salmonid fishing than any other recreational activity, and said salmonid fishing was their most important recreational activity.

**Not significant.

in recreation for challenge and accomplishment, and they were more likely to say these were important rewards they sought from salmonid fishing. On the other hand, while both groups held escape, nature appreciation, affiliation, and novelty to be incentives to recreate, highly invested salmonid anglers were more likely to perceive salmonid fishing as a context in which they could attain such rewards.

Highly invested anglers are a subset of the heavy-half angler group. As might be expected, a comparison of light- and heavy-half anglers reveals the same motivational patterns seen for moderately and highly invested anglers (Table 32). That is, heavy- and light-half anglers were similar in terms of their general recreation motivations, but heavy-half anglers appear more likely to see salmonid fishing as a vehicle to fulfill a broad range of the goals they hope to achieve through recreation.

DISCUSSION AND IMPLICATIONS

This survey suggests that most people who fish for salmonids on Lake Ontario are motivated to do so by a variety of expected outcomes, including: sharing experiences with friends and family, escaping everyday worries, enjoying the natural environment, and participating in interesting or novel activities. For some groups of anglers (i.e., tournament anglers, and highly involved anglers) catching some fish, many fish, or trophy fish is very important. In some cases it is the most important part of why they fish. This pattern has been observed repeatedly in studies of tournament anglers (Christian 1985: Ditton and Arneson-Bewley 1986; Ditton and Loomis 1985; Falk et al. 1981; Loomis 1985; Loomis and Ditton 1987).

Table 32. A comparison of Lake Ontario light-half* anglers to heavy-half anglers by mean factor scores on a recreation motivation scale and a fishing motivation scale.

Motivation Factors	n	$\bar{x}$	Pooled T-Value	Pooled 2-tailed P
General recreation motivations:				
Challenge				
Light-half anglers	218	0.70	-2.68	0.008
Heavy-half anglers	142	0.89		
Accomplishment				
Light-half anglers	216	0.15	-3.15	0.002
Heavy-half anglers	142	0413		
Affiliation				
Light-half anglers	218	1.35	-0.06	NS**
Heavy-half anglers	141	1.35		
Escape/Appreciation				
Light-half anglers	220	1.09	0.53	NS
Heavy-half anglers	142	1.05		
Novelty				
Light-half anglers	217	1.00	-1.35	NS
Heavy-half anglers	141	1.09		
Fishing Motivations:				
Challenge				
Light-half anglers	193	0.50	-5.91	0.000
Heavy-half anglers	138	0.96		
Accomplishment				
Light-half anglers	191	0.04	-6.11	0.000
Heavy-half anglers	137	0.57		
Affiliation/Appreciation/Escape				
Light-half anglers	193	0.92	-4.81	0.000
Heavy-half anglers	137	1.18		
Novelty				
Light-half anglers	192	0.95	-3.95	0.000
Heavy-half anglers	137	1.19		

* Light-half participants are those who fished for salmonids 20 or fewer days in 1988. Heavy-half participants fished for salmonids 21 or more days in 1988.

**Not significant.

The opportunity to catch some fish, large fish, or many fish, is also of some import to most other people who engage in this type of fishing. Yet, the most important motivations of most Lake Ontario salmonid anglers are affiliation, appreciation of nature, and escape. Our findings corroborate previous studies (Hendee and Bryan 1978, Fedler 1984), suggesting that while catching and eating fish should not be discounted as fishing motivations or important contributers to angler satisfaction, people fish for a variety of reasons, many of which are reported as more important motivators than catching or eating fish.

We found some evidence to support the notion that anglers undergo a process of motivational change or maturation over time involving increased importance on fishing methods and conservation/management of fisheries resources, and a stable or decreased interest in number of fish caught or kept. Similar developmental patterns have been observed among trout anglers in Idaho and Montana (Bryan 1977) and boating anglers on Lake Michigan (Absher and Collins 1987). Lake Ontario anglers who stayed involved in fishing over many years appeared to develop a broad set of personal incentives to remain involved in this activity. Anglers who did not get highly involved in salmonid fishing appeared to have different recreation goals than avid salmonid anglers and were likely to see this activity as a means to fulfill only a narrow set of their recreation goals.

Our results also suggest that subgroups of anglers exist within the population of Lake Ontario boaters and these subgroups have characteristic motivation profiles as well as distinct fishing and boating behavior patterns. We believe that personal investment theory holds promise as a tool for assessing the motivational differences that distinguish anglers in different

market segments, fishing activities, and levels of fishing involvement. Our results indicate that simple criteria (e.g., number of days fished per year) can be used to segregate anglers at different levels of personal investment, and use of measurement scales briefer than those in this study could result in useful motivational profiles for a wide array of angler types. Continued use and refinement of the scales developed for this study may provide valuable insights that lead to better understanding of the recreation experiences that anglers seek from Lake Ontario, and the ways that fisheries managers and community planners can proactively address these preferences and their impacts.

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LIST OF APPENDICES

APPENDIX A

Mail Questionnaire

LAKE ONTARIO BOATING AND FISHING SURVEY

Conducted by the
Department of Natural Resources
in the State College of
Agriculture and Life Sciences
Cornell University

As part of an effort to learn more about the fishing and boating experiences sought by users of Lake Ontario, the Department of Natural Resources at Cornell University is collecting information from New York boaters. Because your boat is registered for use in a county bordering Lake Ontario, we are asking you to complete a survey on this topic.

This survey is funded by the New York State Sea Grant Program, a Cooperative Extension program dedicated to enhancing the use, knowledge, and appreciation of New York's coastal resources. This is your opportunity to help the New York Sea Grant Institute facilitate public policy decisions and programs that accurately reflect your interests, needs, and concerns as a boater. The information you supply will give a clear picture of the experiences you seek from Lake Ontario and what you believe is needed (e.g., access, services, or information) to make those experiences most enjoyable.

Even if you do not currently boat on Lake Ontario, please complete this survey as soon as possible, place it in the enclosed, self-addressed envelope, and drop it in the mail; postage has been provided. Your answers will remain strictly confidential and your name and address will never be made available to anyone.

THANK YOU FOR YOUR ASSISTANCE

APPENDIX A (continued)

Section 1: YOUR PARTICIPATION IN LAKE ONTARIO BOATING

1. **Did you operate a boat that you own in the open waters, near shore or protected bays of Lake Ontario in 1988?**

   No ⟶ SKIP TO QUESTION 13
   ___ Yes

2. **How many years have you gone boating in any boat on Lake Ontario at least 1 time?**

   ____ Years

3. **Please indicate (✓) the approximate number of days you went boating on Lake Ontario in 1988. (Count any part of a day as a whole day.)**

   ___ 1 to 10 days
   ___ 11 to 20 days
   ___ 21 to 30 days
   ___ 31 or more days

NOTE: In this survey the boat you <u>owned and operated most often on Lake Ontario in 1988</u> will be referred to as your "primary boat". Questions 4 thru 9 refer to your primary boat. Now please continue...

4. **Please indicate (✓) the type of boat you owned and operated <u>most often</u> on Lake Ontario in 1988. Also, please indicate the length of this boat in feet and the number of years it has been in your ownership.**

Type of Boat (check one)	Boat Length	Number of Years Owned
	_____ Feet	_____ Years
___ Inboard motorboat		
___ Outboard motorboat		
___ In/outboard motorboat		
___ Sailboat		

5. **Please indicate (✓) <u>all</u> of the activities for which you used your primary boat in 1988, and circle the activity for which it was used most frequently.**

   ___ Pleasure cruising trips
   ___ Sport fishing
   ___ Charter boat business
   ___ Business entertainment
   ___ Water skiing
   ___ Racing
   ___ Other (please explain _____)

Remember, CIRCLE the activity that your boat was used for most often.

APPENDIX A (continued)

6. **In 1988 did you also use your primary boat on bodies of water other than Lake Ontario?**

___ No
___ Yes

7. **How did you usually berth your primary boat during the 1988 boating season?**

___ On a trailer
___ At a mooring or anchor
___ At a seasonal boat dock
___ Other (please explain _____)

8. **Please indicate (✓) the type of facility you used <u>most frequently</u> to launch or dock your boat in 1988 and identify the location (county and closest city) of this facility.** (For example, if you usually trailered your boat, indicate the location of the boat launch you used most often.)

Facility Used Most Frequently (Check One)	Location of Most-Frequently-Used Facility	
	County	Nearest City/Village
___ Boat Launch	_____	_____
___ Marina		
___ Other		

9. **Please indicate the approximate number of day trips and overnight trips you took on Lake Ontario in your primary boat in 1988.** (Overnight trips are those where you spent more than 1 day on board your boat.)

Total Number of Day Trips = _____

Total Number of Overnight Trips = _____

10. **Please indicate the approximate number of day and overnight boating trips you took on Lake Ontario in your primary boat in 1988 that occurred within the round-trip travel distance categories below.** (NOTE: Round-trip travel distance is the distance from where you berth or launch your boat, to the farthest point away from your berth, and back.)

Day Trips		Overnight Trips	
Round Trip Travel Distance by Boat	Number of Trips	Round Trip Travel Distance by Boat	Number of Trips
Less than 10 miles	_____	Less than 50 miles	_____
10 - 25 miles	_____	50 - 100 miles	_____
26 - 50 miles	_____	101 - 150 miles	_____
More than 50 miles	_____	More than 150 miles	_____

APPENDIX A (continued)

11. **Do you have a seasonal or summer home in New York that is used in connection with your boating activities on Lake Ontario?**

    ___ No
    ___ Yes

12. **How far from your home (or seasonal residence) is the launching ramp or marina you use most frequently on Lake Ontario?** (If your residence and marina or boat launch are in the same place, write in zero.)

    _____ Miles

13. **Please indicate (✓) all the boating facilities you believe are needed on Lake Ontario. Next, if you believe a certain facility is needed, indicate the area where that facility is most needed. Finally, circle the facilities you would use if provided in the area that you suggested.**

Types of Facilities Needed	City/Village Nearest to Area Where You Believe This Facility is Most Needed
___ Seasonal docking	_____
___ Transient docking space	_____
___ Harbor of refuge	_____
___ Boat trailer launch	_____
___ Boat hoist launch	_____
___ Pump out waste disposal facility	_____
___ Boat fuel station	_____
___ Full service marina	_____
___ Other (specify)	_____

Remember, CIRCLE those facilities above that you would use if provided in the area that you suggested.

14. **What additional boating facilities or services would you use if provided on Lake Ontario in the area of your choice (e.g., winter boat storage buildings, boat repair services, boat supply stores)?**

_____

_____

Section 2: YOUR INVOLVEMENT IN FISHING

15. **During how many years have you fished for some kind of fish at least 1 time?**

    _____ Years

APPENDIX A (continued)

NOTE: Many of the following questions refer to "trout and salmon fishing on Lake Ontario." For our purposes this involves fishing <u>from a boat</u> on the river mouths, bays, or open water of Lake Ontario for any of the following: lake, brown, or rainbow (steelhead) trout, or landlocked (Atlantic), pink, coho (silver), or chinook (king) salmon. Now please continue...

16. Have you ever fished <u>for trout or salmon from a boat on Lake Ontario</u>?

___ No ⟶ SKIP TO QUESTION 28
___ Yes

17. In what year did you <u>first</u> fish for trout or salmon on Lake Ontario?

19 ___

18. How many years have you fished <u>at least once</u> for trout or salmon from a boat on Lake Ontario?

____ Years

19. Please indicate (✓) how your personal fishing attitudes and practices <u>have changed</u> since you first started fishing for trout or salmon from a boat on Lake Ontario.

	DECREASED GREATLY	DECREASED	STAYED THE SAME	INCREASED	INCREASED GREATLY	DON'T KNOW
a. Importance of catching fish	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
b. Importance of "limiting out"	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
c. Importance of catching larger (trophy) trout or salmon	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
d. Interest in catching fish to eat	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
e. Tendency to specialize for certain species	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
f. Importance of fishing method	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
g. Interest in learning about the habits of trout and salmon	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
h. Using lighter tackle and equipment	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
i. Desire to teach others my fishing knowledge	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
j. Importance of surroundings while fishing	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
k. Interest in maintenance of the fisheries resource	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
l. Interest in catch-and-release of fish	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
n. Enjoyment of nature while fishing	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

20. **Listed below are descriptions of 3 general groups of satisfactions that a person could seek from fishing. Please read each description carefully, then, indicate (✓) how important those particular kinds of satisfactions are to you as a motivation to go trout or salmon fishing from a boat on Lake Ontario.**

	NOT IMPORTANT	SLIGHTLY IMPORTANT	MODERATELY IMPORTANT	VERY IMPORTANT	EXTREMELY IMPORTANT	DON'T KNOW
Satisfactions Group 1						
Catching the limit of fish, catching large fish, landing hard-to-catch fish, showing catch to family or friends, being thought of as a skilled angler, or using particular kinds of equipment	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Satisfactions Group 2						
Sharing a fishing activity with family or friends, sharing stories of fishing with companions, maintaining traditions of fishing with companions, or simply being on the water with other people I like	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Satisfactions Group 3						
Appreciating or learning about the natural environment, reflecting on my personal life, or getting away from everyday problems and surroundings through fishing....	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

21. **Which ONE of the 3 groups of satisfactions described in question 20 is most important to you overall as a reason to fish for trout or salmon?** (Mark one only.)

___ Satisfactions Group 1

___ Satisfactions Group 2

___ Satisfactions Group 3

22. **The next set of questions deal with: (1) your personal interests in recreation generally, and (2) your personal reasons for becoming involved specifically in trout or salmon fishing on Lake Ontario. For each item and both columns below, please circle the response that best reflects your personal opinion.**

Please answer all items on your general recreation interests first. Then, answer all items on your specific interests in Lake Ontario trout or salmon fishing.

	I like to get involved in recreational activities that allow me to:					I enjoy trout and salmon fishing specifically because it gives me a chance to:				
	STRONGLY AGREE	AGREE	NO OPINION	DISAGREE	STRONGLY DISAGREE	STRONGLY AGREE	AGREE	NO OPINION	DISAGREE	STRONGLY DISAGREE
Challenge my knowledge and skills ...	SA	A	NO	D	SD	SA	A	NO	D	SD
Excel at something	SA	A	NO	D	SD	SA	A	NO	D	SD
Compete with myself	SA	A	NO	D	SD	SA	A	NO	D	SD
Learn what I am capable of	SA	A	NO	D	SD	SA	A	NO	D	SD
Test myself against other people	SA	A	NO	D	SD	SA	A	NO	D	SD
Test myself against the environment .	SA	A	NO	D	SD	SA	A	NO	D	SD
Show others I can accomplish things .	SA	A	NO	D	SD	SA	A	NO	D	SD
Be recognized for my efforts	SA	A	NO	D	SD	SA	A	NO	D	SD
Have some thrills and excitement	SA	A	NO	D	SD	SA	A	NO	D	SD
Have new and different experiences ..	SA	A	NO	D	SD	SA	A	NO	D	SD
Get involved in interesting tasks ...	SA	A	NO	D	SD	SA	A	NO	D	SD
Spend time with friends	SA	A	NO	D	SD	SA	A	NO	D	SD
Spend time with family	SA	A	NO	D	SD	SA	A	NO	D	SD
Be with one particular person	SA	A	NO	D	SD	SA	A	NO	D	SD
Meet new people	SA	A	NO	D	SD	SA	A	NO	D	SD
Reflect on my personal life	SA	A	NO	D	SD	SA	A	NO	D	SD
Get a change of scenery	SA	A	NO	D	SD	SA	A	NO	D	SD
Release tension and relax	SA	A	NO	D	SD	SA	A	NO	D	SD
Experience and appreciate nature	SA	A	NO	D	SD	SA	A	NO	D	SD

NOTE: Some of the following questions refer to a "fishing license year." This term means the period of time during which an annual fishing license is effective. Typically, the license year is from October 1st of one year to September 30th of the following year. For example, the 1986-1987 fishing license year was the period from October 1, 1986 to September 30, 1987. Now please continue ...

23. **Please indicate (✓) whether you participated in any of the following activities during the last 2 fishing license years.**

	Fishing Licence Year	
Type of Activity	1986-87	1987 88
Fly fishing on streams	Yes	Yes
Salmon snagging on streams	Yes	Yes
Trout or salmon fishing derbies (on lakes or streams)	Yes	Yes

24. **Please indicate (✓) the approximate number of days you went trout or salmon fishing on Lake Ontario in the last 2 fishing license years** (Count any part of a day as a whole day).

Number of Days in 1986-87	Number of Days in 1987-88
1 to 10 days	1 to 10 days
11 to 20 days	11 to 20 days
21 to 30 days	21 to 30 days
31 or more days	31 or more days

25. **Please indicate (✓) the approximate number of days you went fishing for fish other than Lake Ontario trout or salmon in the last 2 fishing license years.** (Count any part of a day as a whole day, and include all your fishing.)

Number of Days in 1986-87	Number of Days in 1987-88
0 days	0 days
1 to 10 days	1 to 10 days
11 to 20 days	11 to 20 days
21 to 30 days	21 to 30 days
31 or more days	31 or more days

26. **How much TIME do you devote to fishing <u>on Lake Ontario for trout or salmon</u> in relation to your other types of recreation, including other types of fishing?** (Please check <u>one</u>.)

___ More time than on all other recreational activities
___ More time than on most other recreational activities
___ Some time, but less time than I spend on several other recreational activities
___ Very little time

27. **How IMPORTANT to you is fishing for trout or salmon on Lake Ontario in relation to <u>all</u> your other types of recreation, including other types of fishing?** (Please check <u>one</u>.)

___ Most important recreational activity
___ More important than most other recreational activities
___ Somewhat important, but several other recreational activities are more important
___ Not very important

28. **In the 1989-90 fishing license year do you believe your participation in trout and salmon fishing on Lake Ontario will increase or decrease?**

___ Increase
___ Remain about the same
___ Decrease
___ Stop completely
___ Unsure

Section 3: YOUR GENERAL BACKGROUND

To better understand your earlier answers, we need some background information. All information you provide will be kept strictly confidential, and will <u>not</u> be associated with your name.

29. **What is your sex:**

___ Male
___ Female

30. **What is your marital status?**

___ Married
Single/divorced/separated

31. **In what year were you born?** 19 ___

32. **What is your primary occupation?** _____

APPENDIX A (continued)

33. **Please indicate the highest grade or year of school you have completed** (Please circle one.)

Elementary school	1	2	3	4	5	6	7	8
High/vocational school	9	10	11	12				
College/technical school	13	14	15	16				
Graduate school	17	18	19	20	21	22		

34. **Which one of the following statements most accurately describes your household?**

No children.
No children living at home.
Children living at home -- youngest is less than 6 years old.
Children living at home -- youngest is 6 or more years old.

35. **In 1988 what was your total household income before taxes:**

$ 19,999 or less	$ 50,000 to 59,999
$ 20,000 to 29,999	$ 60,000 to 69,999
$ 30,000 to 39,999	$ 70,000 to 79,999
$ 40,000 to 49,999	$ 80,000 or more

Please use this space for additional comments that you may have.

THANK YOU FOR YOUR ASSISTANCE!

TO RETURN THIS QUESTIONNAIRE, PLACE IT IN THE ENCLOSED ENVELOPE AND DROP IT IN THE NEAREST MAILBOX (return postage has been provided).

APPENDIX B . Mail questionnaire used in the follow-up study of nonrespondents.

1988 LAKE ONTARIO BOATER NONRESPONDENT FOLLOW-UP INTERVIEW

Name: _____ I.D. #: Sex: ____

Phone: _____ Interviewer: _____

County of Residence: _____

County of boat use: _____

	Date	Day	Time	Result
Initial call:				
1st call back:				
2nd call back:				
3rd call back:				

Good (Morning, Afternoon, Evening):

My name is _____. I work for the Dept. of Natural Resources at Cornell University. May I speak to _____?

(IF RESPONDENT IS UNAVAILABLE, FIND OUT WHEN IT WOULD BE CONVENIENT TO CALL AGAIN AND ENTER ON COVER SHEET.)

Hello Mr./Ms. _____. I'm calling you in regard to the Lake Ontario Boating and Fishing Questionnaire we mailed you recently. We realize that you may have been too busy to fill out the questionnaire, but we hope we can include your input on a few key questions so our study accurately represents the boaters in your area.

Would you be willing to spend about 5 minutes now answering a few questions?

___ NO . . . . May I call back later at a time that would be more convenient?

___ YES (Enter call back time in space above)

___ NO Thank you anyway (*Terminate interview*).

___ YES. . . . Go to next question

1. **Did you operate a boat that you own in the open waters, near shore or protected bays of Lake Ontario in 1988?**

___ NO ----- THANK YOU FOR YOUR TIME (*Terminate interview*)

___ YES

2. **How long is the boat you operated most frequently on Lake Ontario in 1988?**

____ Feet

3. **About how many days did you go boating on Lake Ontario in 1988?**
(*Any part of a day counts as a whole day.*)

less than 10 days ___
11 to 20 days
21 to 30 days
31 to 40 days ___
41 to 50 days
51 or more days

4. **During the 1988 boating season did you usually access Lake Ontario from a boat launch, marina, or some other facility?**

___ Boat launch
___ Marina
___ Other (please explain _____)

5. **In 1988 did you use your boat to go fishing on Lake Ontario?**

___ NO . . . **Have you ever fished <u>for trout or salmon from a boat on Lake Ontario</u>?**

___ NO . . . . THANK YOU FOR ANSWERING MY QUESTIONS (*Terminate*)

___ YES

___ Yes . . . **Did you use your boat to fish for trout and salmon on Lake Ontario in 1988?**

___ NO . . . . SKIP TO QUESTION 8

___ YES. . . . Was trout and salmon fishing the primary purpose for which you used your boat in 1988?

___ NO

___ YES

6. **About how many days did you fish for <u>trout or salmon from a boat on Lake Ontario</u> in the 1987-88 fishing licence year?** (*The 1987-1988 fishing license year was the period from October 1, 1987 to September 30, 1988. Any part of a day counts as a whole day.*)

None ___
less than 10 days ___
11 to 20 days ___
21 to 30 days ___
31 to 40 days ___
41 to 50 days ___
51 or more days ___

7. **In the current fishing license year, do you believe your participation in trout and salmon fishing on Lake Ontario will increase, stay about the same, decrease, or stop completely?**

___ Increase
___ Stay about the same
___ Decrease
___ Stop completely
___ Unsure

8. **About how many years have you fished <u>at least once</u> for trout or salmon from a boat on Lake Ontario?**

   ____ Years (IF RESPONDENT HAS NOT FISHED FOR TROUT OR SALMON, TERMINATE INTERVIEW HERE)

9. **In relation to all the other types of recreation you participate in, is fishing on Lake Ontario for trout or salmon your most important recreational activity?**

   ___ YES

   ___ NO. . . . **Is it more important than <u>most</u> of your other recreation?**

   ___ YES

   ___ NO. . . . **Is it somewhat important to you, or not important at all?**

   ___ Somewhat important

   ___ Not important at all

THANK YOU FOR TAKING THE TIME TO ANSWER MY QUESTIONS.

APPENDIX C

A comparison of all nonrespondents and respondents for selected variables.

Variable	Nonrespondents Freq.	%	Respondents Freq.	%	x^2	df	P
Sex:							
Male	93	93.0	671	95.6	1.29	1	NS*
Female	7	7.0	31	4.4			
County-residence:							
Monroe	49	49.0	321	45.6	6.90	6	NS
Niagaa	14	14.0	95	13.7			
Orleans	2	2.0	29	4.2			
Oswego	12	12.0	78	11.2			
Wayne	5	5.0	69	9.9			
Other (NY)	18	18.0	90	12.9			
Out-of-state	0	0.0	12	1.7			
County-Use:							
Monroe	50	50.0	303	43.0	6.89	4	NS
Niagara	21	21.0	110	15.9			
Orleans	2	2.0	31	4.5			
Oswego	20	20.0	153	21.9			
Wayne	7	7.0	97	14.0			
Lake Ontario boater:							
NO	51	51.0	128	18.1	54.49	1	<0.001
YES	49	49.0	576	81.8			
Salmonid fishing:							
NO	74	74.0	261	37.1	47.96	1	<0.005
YES	26	26.0	436	62.5			

*Not significant.

APPENDIX D

A comparison of nonrespondents who boat on Lake Ontario and respondents who boat on Lake Ontario for select boating and fishing characteristics.

Variable	Nonrespondents Freq.	%	Respondents Freq.	%	x^2	df	P
Boat length:							
≤15 feet	1	2.0	5	1.0	3.03	3	NS*
16-25 feet	39	81.1	484	85.1			
26-34 feet	8	16.7	65	11.4			
≥35 feet	0	0.0	15	2.6			
Boating days:							
≤ 10 days	11	22.4	184	35.5	7.35	5	NS
11-20 days	8	16.3	101	19.5			
21-30 days	11	22.4	82	15.9			
31-40 days	7	14.3	56	10.8			
41-50 days	7	14.3	36	7.0			
≥51 days	5	10.2	58	11.2			
Access Point:							
Launch	17	34.7	285	51.1	11.72	2	<0.005
Marina	16	32.7	191	34.3			
Other	16	32.7	81	14.5			
Salmonid fishing - 1988:							
NO	7	7.0	17	4.3	19.02	1	<0.005
YES	23	23.0	379	95.7			
Salmonid fishing days - 1988:							
≤10 days	3	13.0	189	47.6	21.30	3	<0.005
11-20 days	11	47.8	61	15.4			
21-30 days	5	21.7	47	11.8			
≤31 days	4	17.4	100	25.2			
Salmonid fishing - Recreational importance:							
Most important	9	34.6	66	15.3	9.88	3	<0.025
Slightly important	5	19.2	98	22.7			
Somewhat important	11	42.3	169	39.1			
Not important	1	3.8	99	22.9			

APPENDIX D (continued)

Variable	Nonrespondents Freq.	%	Respondents Freq.	%	x^2	df	P
Salmonid fishing - Expected trend:							
Increase	10	43.5	219	35.0	3.62	3	NS
Stay the same	12	52.2	285	45.5			
Decrease, stop	1	4.4	57	5.6			
Unsure	0	0.0	65	3.5			
Years salmonid fishing:							
1-5 years	8	30.8	205	47.7	5.21	4	NS
6-10 years	10	38.5	137	31.9			
11-15 years	4	15.4	62	14.4			
16-20 years	3	11.5	18	4.2			
≥21 years	1	3.8	8	1.9			

*Not significant.

APPENDIX E. Instrument used to pretest questionnaire items to assess motivations to participate in recreation generally and fishing specifically.

1. **Listed below are descriptions of 3 general groups of satisfactions that a person could seek from fishing. Please read each description carefully, then, circle the appropriate number to indicate how important those particular kinds of satisfactions are to you as a motivation to participate in fishing.**

1=NOT IMPORTANT; 2=SLIGHTLY IMPORTANT; 3= MODERATELY IMPORTANT; 4=VERY IMPORTANT; 5=EXTREMELY IMPORTANT; 6= DON'T KNOW

	NOT IMPORTANT	SLIGHTLY IMPORTANT	MODERATELY IMPORTANT	VERY IMPORTANT	EXTREMELY IMPORTANT	DON'T KNOW
Satisfactions Group 1						
Catching the limit of fish, catching large fish, landing hard-to-catch fish, showing catch to family or friends, being thought of as a skilled angler, or using particular kinds of equipment	1	2	3	4	5	6
Satisfactions Group 2						
Sharing a fishing activity with family or friends, sharing stories of fishing with companions, maintaining traditions of fishing with companions, or simply being on the water with other people I like	1	2	3	4	5	6
Satisfactions Group 3						
Getting away from everyday problems and surroundings by going fishing, reflecting on my personal life, or appreciating, learning about, or feeling like part of the natural environment.....	1	2	3	4	5	6

2. **Which ONE of the 3 groups of satisfactions described in question 16 is most important to you overall as a reason to fish?** (mark one only)

___ Satisfactions Group 1
___ Satisfactions Group 2
___ Satisfactions Group 3

APPENDIX E (continued)

3. **The next set of questions deals with your personal interests in recreation generally, and your personal reasons for becoming involved in fishing specifically. For each item please circle the number that best reflects your personal opinion.**

1=STRONGLY AGREE; 2=AGREE; 3=NO OPINION; 4=DISAGREE; 5=STRONGLY DISAGREE

Please answer the questions below for <u>both</u> contexts described at right.

	I like to get involved in recreational activities that <u>allow me to</u>:					I go fishing because it gives <u>me a chance to</u>:				
	STRONGLY AGREE	AGREE	NO OPINION	DISAGREE	STRONGLY DISAGREE	STRONGLY AGREE	AGREE	NO OPINION	DISAGREE	STRONGLY DISAGREE
Challenge my knowledge and skills ...	1	2	3	4	5	1	2	3	4	5
Have some thrills and excitement	1	2	3	4	5	1	2	3	4	5
Have new and different experiences ..	1	2	3	4	5	1	2	3	4	5
Get involved in interesting tasks ...	1	2	3	4	5	1	2	3	4	5
Excel at something	1	2	3	4	5	1	2	3	4	5
Learn what I am capable of	1	2	3	4	5	1	2	3	4	5
Compete with myself	1	2	3	4	5	1	2	3	4	5
Test myself against the environment .	1	2	3	4	5	1	2	3	4	5
Test myself against other people	1	2	3	4	5	1	2	3	4	5
Show others I can accomplish things .	1	2	3	4	5	1	2	3	4	5
Be recognized for my efforts	1	2	3	4	5	1	2	3	4	5
Spend time with friends	1	2	3	4	5	1	2	3	4	5
Spend time with family	1	2	3	4	5	1	2	3	4	5
Be with people who enjoy what I do ..	1	2	3	4	5	1	2	3	4	5
Reflect on my personal life	1	2	3	4	5	1	2	3	4	5
Get a change of scenery	1	2	3	4	5	1	2	3	4	5
Release tension and relax	1	2	3	4	5	1	2	3	4	5
Work out some problems	1	2	3	4	5	1	2	3	4	5
Experience and appreciate nature	1	2	3	4	5	1	2	3	4	5
Get a better understanding of the natural world	1	2	3	4	5	1	2	3	4	5