

CONSTRAINTS AND MOTIVATIONS RELATED TO FISHING ALONG THE LAKE ONTARIO COAST

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Abstract.—The number of nonresident anglers along the Lake Ontario coast has decreased over the past 15 years. Therefore, in order to sustain a strong sport fishing industry, local businesses and tourism promoters might want to tap into the large resident angler market group. This study examines resident anglers' social, environmental, and economic constraints/facilitators and motivations related to fishing on Lake Ontario and its tributaries. A survey was sent to 7,000 resident landowners in the seven New York counties bordering Lake Ontario (1,000 surveys per county). Two separate exploratory factor analyses (on motivations and constraints/facilitators) were conducted on the responses in order to better understand fishing by resident anglers. The analyses found eight motivational factors including family-orientation, escape, and nature appreciation. Four constraints/facilitators factors were also identified, including perception of the Lake Ontario environment and level of knowledge. Management implications of the findings are discussed.

1.0 INTRODUCTION

Many local businesses, boat and tour charter companies, and tourism agencies have been built around annual salmonid runs in Lake Ontario's tributaries that attract anglers from all over the world (Connelly et al. 1997). However, the number of

nonresident anglers fishing along Lake Ontario has decreased in the past 15 years, and this decline is expected to intensify as fuel prices continue to rise (Jackson 2008). In order to offset the declining market of visiting anglers, Lake Ontario businesses may want to focus more on the somewhat overlooked market of resident anglers.

In 1996, local resident anglers fishing on Lake Ontario outnumbered nonresident anglers 144,610 to 43,600, respectively (Connelly et al. 1997). This large group of resident anglers may be the best target market for local businesses that wish to recover revenues lost to the declining nonresident angler population.

The main objective of this study was to identify the internal motivations and constraints/facilitators of local residents who fish along Lake Ontario. The results from this study will be provided to local businesses that wish to promote environmentally sustainable and economically stable tourism markets in the Lake Ontario region.

1.1 Theoretical/Conceptual Background

Motivations are commonly defined as "cognitive forces that drive people to achieve particular goal states" (Decker et al. 2001, p. 47). People choose and participate in different recreational activities in order to accomplish goals or satisfy individual needs. Meta-analysis of research on leisure motivations has identified 19 motivational areas (Manfredo et al. 1996). A few of these concepts are applicable to fishing, such as enjoying nature and achievement. Other studies have examined some of the motivations specifically related to fishing such as escape and achievement (Siemer et al. 1989) and the expectations of others (Kuehn et al. 2006).

Constraints are commonly defined as aspects of leisure that influence preferences and can prevent participation (Crawford and Godbey 1987, Henderson

et al. 1988). Facilitators are factors that individuals perceive as encouraging participation and enabling or promoting the formation of leisure preferences (Raymore 2002). Factors like time, opportunity, and economics can be both constraints and facilitators; whether they are a hindrance or catalyst to leisure participation varies by individual.

Researchers have identified three types of constraints that an individual can experience: structural, intrapersonal, and interpersonal. Structural constraints like lack of equipment or limited access to a site tend to hinder physical participation; intrapersonal constraints are imposed by an individual on him/herself; interpersonal constraints are imposed on an individual by society or other individuals (Crawford and Godbey 1987).

2.0 METHODS

Multiple steps were used to create and distribute a mail survey for this study. Motivations and constraints/facilitators identified in previous studies were the foundation for the survey. The Lake Ontario Fisheries Coalition (LOFC) participated in a brainstorming exercise to identify possible motivations and constraints/facilitators specifically associated with fishing along Lake Ontario.

While previous studies had used fishing license sales to target anglers, this study used mailing addresses from geographical information system (GIS) property tax records in order to understand the resident fishing population as a whole. Addresses were obtained for the seven counties in New York State bordering Lake Ontario (Niagara, Orleans, Monroe, Wayne, Cayuga, Oswego and Jefferson). Because most of Cayuga County is adjacent to two of the Finger Lakes rather than Lake Ontario, only Cayuga addresses that were located within 30 miles of Lake Ontario were used. In order to create a feasible sample, 1,000 addresses were extracted in systematic design from each of the seven counties. These addresses were extracted by looking at the total number of property parcels, then dividing this number by the desired amount of addresses (1000). Duplicate owners and businesses were not included in the sample.

The survey was distributed using a modified Tailored Design Method (Dillman 2007). An online version of the survey, identical to the paper version, was also made available to residents. Following completion of the mail/Internet survey, a nonresponse survey containing a short, one-page version of the original survey was sent to all individuals who did not participate in the full survey.

The questionnaire requested information on household composition, fish species preference, fishing participation, motivations, constraints/facilitators, and demographics. A screening question was asked to determine whether at least one adult member of respondents' households had fished since 2005. Respondents who answered "yes" were asked to complete the remainder of the survey. Motivational statements began with a generalized statement, "I go fishing..." followed by a specific motivation (i.e., to relax). Respondents were then asked to answer on a five-point scale of importance (-2 = very unimportant, -1 = unimportant, 0 = neutral, 1 = important, 2 = very important; based on Manfredo et al. 1996). For constraints/facilitators, respondents were asked, "Does this factor limit or enable your participation in fishing?" From this, respondents were given a series of factors (e.g., My fishing skills and/or abilities) that they ranked on a five-point scale as follows: -2 = greatly limits participation, -1 = limits participation, 0 = neither limits nor enables participation, 1 = enables participation, 2 = greatly enables participation.

Basic demographics included age, gender, income, education level, participation, fish species preference, location of residence, and amount of free time. Location of residence was defined as (1) rural: under 5,000 resident; (2) suburban: 5,000 to 24,999 residents; (3) medium city: 25,000 to 99,999 residents; and (4) large city: over 100,000 residents (Connelly et al. 1997). Free time was defined as leisure time that does not include activities necessary for your health (i.e., eating), taking care of children or relatives, working for paid or volunteer job, maintaining a home or motor vehicle, attending college or vocational training.

Data was put into SPSS. Exploratory factor analyses (conducted separately for motivations and constraints/facilitators) and descriptive statistics were calculated. The reliability of each factor was checked using Cronbach's alpha; an alpha level of 0.7 or greater was used to identify factors suitable for further analysis. Basic descriptive statistics were conducted for each factor to identify the mean score and standard error of mean. Descriptive statistics were also calculated for the number of anglers and the percent of time spent fishing for each identified species of fish.

3.0 RESULTS

Of the 7000 surveys sent out, 1405 were deemed undeliverable due to incomplete addresses or address changes, leaving a qualified sample size of 5595 surveys. Of these, 1320 were returned for a 23.5 percent response rate. Of the 1320 respondents, 691 indicated that at least one adult in their household had fished since 2005.

3.1 Demographics

The basic demographic overview of the responding anglers shows a somewhat diverse population. The gender distribution of the sample of responding anglers was 575 males and 75 females, with a mean age of 57 years (range of 20 to 90 years). The mean education was 14 years, meaning that the average responding angler had had 2 years of college education or vocational training (N=642). About 10 percent reported an annual income of \$0 to \$25,000, 21 percent reported making \$26,000 to \$50,000, 30 percent reported making \$51,000 to \$75,000, 17 percent reported making \$76,000 to \$100,000, 11 percent reported making \$101,000 to \$125,000, 5 percent reported making \$126,000 to \$150,000 and 6 percent reported making over \$150,000 (N=529). The area of residency was 70 percent rural, 17 percent suburban, 9 percent medium city, and 4 percent large city (N=640). The average free time per week was roughly 22.3 hours (N=589).

3.2 Species Preference

The two largest categories of species preferences among resident anglers were bass (133 anglers; 21.69 percent of angler trips) and no preference (143 anglers; 43.81 percent of angler trips). Other species that resident anglers fished for were: panfish (40 anglers; 10 percent of angler trips), walleye (37 anglers; 5.83 percent of angler trips), rainbow trout/steelhead (30 anglers; 4.73 percent of angler trips), Coho and Chinook salmon (18 anglers; 4.62 percent of angler trips), brown trout (9 anglers; 3.29 percent of angler trips), and other species such as Northern pike and bullhead (15 anglers; 4.9 percent of angler trips).

3.3 Motivations and Constraints/Facilitators

The results of the first exploratory factor analysis revealed eight motivational factors (Table 1) for resident anglers. These motivations (and examples) are:

1. **Family/Friend Oriented:** Spending time with family and/or friends; Sharing experiences with family and/or friends;
2. **Trying Something New:** Learning new skills and techniques; Exploring new fishing locations;
3. **Nurturing Others:** Passing knowledge to younger generations; Teaching others (youth and adult) how to fish;
4. **Success:** Success of catching a big fish; Success of catching many fish; Because I expect to catch many fish;
5. **Escape:** To be alone; To escape from daily obligations (work, errands, etc); For peace and quiet;
6. **Nature Appreciation:** To be surrounded by nature; Because I appreciate the beauty of the fish/nature;
7. **Enjoyment:** Because I enjoy the experience of fishing; Because I enjoy the excitement of fishing;
8. **Satisfaction of Experience:** Satisfied with the number of fish I normally catch; Satisfied with the quality of fishing.

Table 1.—Motivations for Lake Ontario fishing

Motivation	N	Standard Error	Mean Score	Cronbach's alpha
Enjoyment	634	0.021	1.34	0.783
Family	637	0.026	1.22	0.831
Nature Appreciation	633	0.024	1.21	0.807
Trying New	634	0.029	0.85	0.841
Nurture	629	0.036	0.69	0.902
Escape	632	0.035	0.64	0.748
Satisfaction	633	0.032	0.53	0.786
Success	631	0.029	0.49	0.700

Note: Motivations were measured on a 5-point scale of importance (-2 = very unimportant, -1 = unimportant, 0 = neutral, 1 = important, 2 = very important; based on Manfredo et al. 1996).

All motivation factors showed a positive mean score, meaning anglers agree that these eight factors motivate them to fish in Lake Ontario's waters. Family oriented, nature appreciation, and enjoyment were the factors with the highest mean scores at 1.22, 1.21, and 1.34, respectively, indicating that, on average anglers, find these motivations important in influencing their participation.

The results of the second exploratory factor analysis revealed that there are four constraints/facilitators (Table 2). The four constraints/facilitator factors of fishing experience (and examples) were:

1. **Level of Knowledge:** Knowledge of fishing techniques; Knowledge of access and/or shoreline fishing sites;
2. **Level of Commitment:** Dedication to the sport of fishing; Participation in other recreational activities;

3. **Perceptions of Environment:** Lake Ontario's water quality; Eating fish from Lake Ontario;
4. **Perceptions of Other Anglers:** Number of anglers normally at my fishing spots; Behavior of other anglers.

Two factors showed a negative mean score: perceptions of the environment (-0.35) and perceptions of other anglers (-0.22). The negative means suggest that these factors may limit participation. The other two factors, level of knowledge and level of commitment, had positive mean scores of 0.42 and 0.41 respectively, indicating that they likely enable participation.

4.0 DISCUSSION

Some motivations such as family/friend oriented, nature appreciation, and enjoyment were more important in influencing an individual's participation. Enjoyment had the highest mean score, suggesting that even when anglers are motivated by other factors, they are more motivated to seek an enjoyable experience. Nature appreciation and the family/friend-oriented factor means also suggest that these factors have a higher motivational value in an individual's participation. Research by Kuehn et al. (2006) also found that enjoyment is an important motivational factor in fishing, and Manfredo et al. (1996) found that nature appreciation is an important motivational factor.

Angler respondents indicated that their level of knowledge and overall commitment acted more like facilitators than constraints; however these factors were not strong compared to others. This suggests

Table 2.—Constraints/Facilitators behind Lake Ontario fishing

Constraint/Facilitator	N	Standard Error	Mean Score	Cronbach's alpha
Level of Knowledge	599	0.026	0.42	0.849
Level of Commitment	596	0.025	0.41	0.837
Perceptions of other anglers	595	0.027	-0.28	0.782
Perceptions of Environment	598	0.03	-0.35	0.917

Note: Motivations were measured on a 5-point scale as follows: -2 = greatly limits participation, -1 = limits participation, 0 = neither limits nor enables participation, 1 = enables participation, 2 = greatly enables participation.

that individuals are committed to fishing in the sense that they intend to come back and fish more and they have enough knowledge about how and where to fish. Respondents indicated that their perceptions of the Lake Ontario environment and perceptions of other anglers acted more as constraints than as facilitators, but they were not statistically strong constraints. An individual's important motivations (e.g., nature appreciation) could outweigh weak constraints through a series of coping mechanisms, allowing the individual to continue to fish but perhaps at a cost to overall satisfaction.

5.0 CONCLUSION AND MANAGEMENT IMPLICATIONS

These findings suggest that managers and businesses can use multiple techniques to help create a positive experience for resident anglers. Two major constraints for residential anglers are their perceptions of the Lake Ontario environment and their perceptions of other anglers. One possible management strategy to address these constraints would be providing information to the public about proper fishing etiquette and environmental stewardship. This could be accomplished with educational signs, education programs, and/or flyer or brochure distribution. Another way to provide this information is through direct contact with New York State Department of Environmental Conservation officers or volunteers at popular fishing areas. Officers or volunteers could approach both anglers who are breaching proper etiquette and anglers whose behaviors meet etiquette standards.

One way to portray positive imagery of the Lake Ontario environment to the general public is through positive media reinforcement. Volunteer cleanup projects sponsored by local businesses and/or managers could help develop a positive image of Lake Ontario and help foster a stewardship ethic among local anglers. Successful cleanup or other stewardship events could also help spread information about angling etiquette and ultimately help create positive angling experiences for all.

One way to enhance an individual's angling experiences is to provide more opportunities that cater to important motivation factors. Organizing family-oriented fishing events, for example, could open up opportunities for parents to bring their children, allowing children to experience fishing. Fishing clinics could allow new anglers to learn about and experience fishing while experienced anglers could learn new techniques. Information in the form of brochures, emails, or local postings could be distributed during license sales or at the beginning of specific fishing seasons. This information could cover multiple topics catering to different audiences within the resident angler population such as a schedule of local angling events, lake-related volunteer opportunities, promotion of underused fishing locations to reduce crowding at popular spots, and promotion of proper fishing etiquette.

With this study, we were able to gather information about the intrapersonal motivations and constraints/facilitators of the local angler population. The findings provide a base of knowledge for tourism agencies, fisheries managers, local businesses, and others that want to provide more and improved angling opportunities for the local population, not only nonresident anglers. We also now have information about the entire residential angling population, not just those represented through fishing license sales.

6.0 ACKNOWLEDGMENTS

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7.0 LITERATURE CITED

- Connelly, N.A.; Brown, T.L.; Knuth, B.A. 1997. **New York Statewide Angler Survey. Report 1: Angler effort and expenditures.** 109 p. On file with: New York State Department of Environmental Conservation, Bureau of Fisheries, 625 Broadway, Albany, NY 12233.
- Crawford, D.W.; Godbey, G. 1987. **Reconceptualizing barriers to family leisure.** *Leisure Sciences*. 9: 119-127.

- Decker, D.T.; Brown, T.L.; Siemer, W.F. 2001. **Human dimensions of wildlife management in North America.** Bethesda, MD: The Wildlife Society.
- Dillman, D. 2007. **Mail and Internet surveys: the tailored design method 2nd ed.** New York: John Wiley.
- Henderson, K.A.; Stalnaker, D.; Taylor, G. 1988. **The relationship between barriers to recreation and gender-role personality traits for women.** *Journal of Leisure Research.* 20: 69-80.
- Kuehn, D.M.; Dawson, C.P.; Hoffman, R. 2006. **Exploring fishing socialization among male and female anglers in New York's eastern Lake Ontario area.** *Human Dimension of Wildlife.* 11: 115-127.
- Jackson, C. 2008. **The subprime summer vacation.** *The Wall Street Journal.* April 26; Sect. W: 1.
- Manfredo, M.J.; Driver, B.L.; Tarrant M.L. 1996. **Measuring leisure motivation: a meta-analysis of the recreation experiences preference scales.** *Journal of Leisure Research.* 28(3): 188-213.
- Raymore, L.A. 2002. **Facilitators to leisure.** *Journal of Leisure Research.* 34(1): 37-51.
- Siemer, W.F.; Brown, T.L.; Decker, D.J. 1989. **An exploratory study of Lake Ontario's boating salmonid anglers: implications for research on fishing involvement.** *Human Dimensions Research Unit Series No. 89-4.* Ithaca, NY: Cornell University.

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