

## SMALLMOUTH AND LARGEMOUTH BASS ANGLERS: HOW DIFFERENT ARE THEY?

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### Abstract

In 2009, SUNY ESF completed a survey of 7,000 property owners in the seven counties bordering Lake Ontario in New York in order to examine the motivations, constraints, and facilitators of resident bass anglers. A total of 1,303 surveys were returned; 681 anglers completed the full survey, 165 of whom prefer to fish for either largemouth or smallmouth bass. Two factor analyses (i.e., for motivations and facilitators/constraints) confirmed eight motivations and twelve constraints/facilitators. Significant differences were identified between smallmouth and largemouth bass anglers for the motivations of nature appreciation and satisfaction with the experience only.

### 1.0 Introduction

Bass fishing has long been popular with anglers fishing Lake Ontario, its tributaries, and embayments. In 2007, 21% of all Lake Ontario region angler days were spent fishing for smallmouth and largemouth bass, the most angler days spent on any one type of fish (Connelly & Brown, 2009). Although bass fishing activity in the region is high, most tourism marketing in the past has focused on non-resident salmonid anglers. Recent declines in non-resident angler activity (likely due to increases in fuel costs and poor national economy) have made it necessary for businesses to depend more on resident anglers for business income.

While both smallmouth and largemouth bass anglers fish the Lake Ontario Region, little is known about the motivations, constraints, and facilitators influencing these two groups of anglers. The goal of this study is to identify differences and similarities in the motivations, constraints, and facilitators of resident smallmouth and largemouth bass anglers in order to inform sport fishing marketing and management efforts in the Lake Ontario Region. Residential property owners of the seven counties bordering Lake Ontario (i.e., Jefferson, Oswego, Cayuga, Wayne, Monroe, Orleans, and Niagara counties) are the focus of the study. Residential property owners were sampled (instead of sport fishing club members or fishing license buyers) in order to obtain data that are representative of Lake Ontario residents overall and, thus, more useful for county and regional marketing purposes.

### 2.0 Literature Review

Motivations have been defined in the literature as the “cognitive forces that drive people to achieve particular goal states” (Decker, Brown, & Siemer, 2001, p.47). Many motivations have been identified for recreational activities, some specific to fishing. For example, Siemer, Brown, and Decker (1989) identified four main motivations for salmonid fishing: affiliation, relaxation/escape, achievement, and nature appreciation. Kuehn, Dawson, and Hoffman (2006) identified additional motivations such as enjoyment, nurturing others into the sport, and the expectations of others.

Constraints have been defined as factors that influence leisure preferences and/or intervene between preferences and participation (Crawford & Godbey, 1987; Henderson, Stalnaker, & Taylor, 1988). Crawford and Godbey (1987) proposed three basic types of constraints: structural (i.e., constraints that intervene between leisure preferences and participation such as limited access or a lack of equipment); intrapersonal (i.e., constraints imposed by a person on him/herself which interact with leisure preferences); and interpersonal (i.e., constraints imposed on a person by other individuals or society). Constraints identified in fishing-related studies include fisheries management and regulations (Ritter, Ditton, & Riechers, 1992), poor health, lack of a fishing mate, lack of time due to work or education, childcare obligations, lack of equipment, expenses associated with fishing (Aas, 1995), interest in other recreational activities (Duda et al., 1999), lack of opportunity, lack of commitment or interest, and lack of support from family and friends (Kuehn, Dawson, & Hoffman, 2006).

In contrast to constraints is the concept of “facilitators” (i.e., “factors perceived by individuals to enable or promote the formation of leisure preferences and encourage participation;” Raymore, 2002). While constraints create barriers to leisure preferences and/or limit recreational participation, facilitators enable participation. Elements such as opportunity, time, and economics can be considered as both facilitators and constraints, depending on the situation of an individual. For example, Bryan (1977) suggests that the amount of time anglers spend fishing is likely related to the amount of time their jobs allow. Thus, having a short work week could be a facilitator while have a long work week could be a constraint. Including the concept of facilitators is important to future research on constraints and motivations since it completes the framework for understanding influences on involvement in leisure activities.

In order to create a framework that incorporates motivations, constraints, and facilitators, we utilized three theoretical frameworks as the basis for this study: the wildlife-related recreation involvement model (Decker, Brown, Driver, & Brown, 1987); the hierarchical leisure constraints model (Crawford, Jackson, & Godbey, 1991); and the ecological approach to understanding influences (i.e., facilitators and constraints) on participation (Raymore, 2002; Table 1). The wildlife-related recreation involvement model identifies two domains: a psychological domain that includes goals and internal influences (e.g., an individual's beliefs and abilities), and a social domain that includes external influences (e.g., the expectations of others). The hierarchical leisure constraints model (Crawford, Jackson, & Godbey, 1991) identifies interpersonal, intrapersonal, and structural constraints, but does not include specific types of motivations (e.g., internal versus external) or facilitators (Raymore, 2002). The ecological approach to understanding influences on participation proposed by Raymore (2002) expands the three types of constraints (i.e., structural, interpersonal, intrapersonal; Crawford & Godbey, 1987) to include facilitators. The motivations and constraints/facilitators used in this study were identified from previous leisure and fishing studies (e.g., Siemer, Brown, & Decker, 1989; Kuehn, Dawson, & Hoffman, 2006) and incorporated into this new framework (Table 1).

Table 1. Constructs and domains operationalized for this study.

Domain	Category of construct	Construct	Source of construct
Psychological <sup>a</sup>	Internal motivations <sup>a</sup>	Enjoyment	Kuehn, Dawson, & Hoffman (2006)
		Nature appreciation	Siemer, Brown, & Decker (1989)
		Affiliation	Siemer, Brown, & Decker (1989)
		Personal achievement	Siemer, Brown, & Decker (1989)
		Competition	Williams, 1984; Falk, Graefe, & Ditton (1989)
		Food	Matlock, Saul, & Bryan (1988)
		Success at catching fish	Finn & Loomis (2001); Loomis & Ditton (1987)
		Nurture	Kuehn, Dawson, & Hoffman (2006)
	Intrapersonal constraints/facilitators <sup>bc</sup>	Escape	Siemer, Brown, & Decker (1989)
		Past experience	Kuehn, Dawson, & Hoffman (2006)
		Level of knowledge	Jackson & Scott (1999); Alexandris, Tsorbatzoudis, & Grouios (2002)
		Level of commitment	Decker, Brown, Driver, & Brown (1987)
		Level of interest	Ritter, Ditton, & Riechers (1992)
		Perceptions of the environment	Ritter, Ditton, & Riechers (1992)
Social <sup>a</sup>	External motivations <sup>a</sup>	Expectations of others	Decker, Brown, Driver, & Brown (1987)
	Interpersonal constraints/facilitators <sup>bc</sup>	Social support	Jackson & Scott (1999); Decker, Brown, Driver, & Brown (1987)
Situational <sup>b</sup>	Structural constraints/facilitators <sup>bc</sup>	Weather	Ritter, Ditton, & Riechers (1992)
		Economic costs	Ritter, Ditton, & Riechers (1992)
		Amount of time	Jackson & Henderson (1995); Jackson & Scott (1999); Ritter, Ditton, & Riechers (1992)
		Health/Well-being	Jackson & Scott (1999); Aas (1995)
		Access and equipment	Ritter, Ditton, & Riechers (1992); Decker, Brown, Driver, & Brown (1987)

<sup>a</sup>Decker, Brown, Driver, & Brown (1987).

<sup>b</sup>Crawford, Jackson, & Godbey (1991).

<sup>c</sup>Raymore (2002).

### 3.0 Methods

This study uses a survey of property owners within the seven Lake Ontario counties in New York State (i.e., Jefferson, Oswego, Cayuga, Wayne, Monroe, Orleans, Niagara) to identify the motivations and constraints/facilitators affecting the involvement of resident bass anglers in fishing. A random sample of 7,000 property owners (1,000 from each county) was compiled from the online property tax records for each Lake Ontario county; businesses were removed from the sample. A mail survey of the property owners was conducted in fall, 2009 using a modified Tailored Design Method (Dillman, 2000). A qualifying question of "Have you or another member of your household participated in fishing at least once between 2004 and 2008?" was used to

identify households containing an angler. An adult angler within the household was then asked to complete the questionnaire, and to identify his/her preference for fish species (i.e., smallmouth bass, largemouth bass, Coho and Chinook salmon, rainbow trout/steelhead, lake/brown trout, perch, walleye, no species preference, other; Wilde & Ditton, 1994).

The survey instrument included questions on demographics (i.e., age, gender, presence/absence of children, years of education, level of income, location of residence (rural, suburban/small city, medium city, large city; Connelly, Brown, and Knuth, 1990), number of adults in the respondent's household, number of adult anglers in the respondent's household, if the respondent fishes with children, and proximity of residence to the Lake Ontario shoreline); number of fishing trips taken each year from 2005 through 2009; fish species respondent prefers to catch; and constraint/facilitator and motivation statements related to sportfishing. Statements related to motivations and constraints/facilitators were based on previous studies (Table 1). A five-point agreement scale (i.e., -2 = strongly disagree, -1 = disagree, 0 = neutral, 1 = agree, 2 = strongly agree) was used to identify the importance of motivation statements to the respondents' fishing participation. For constraint/facilitator statements, respondents were asked: "How important are the following in either limiting or enabling your participation in fishing?" A five-point scale was used for constraint/facilitator statements: -2 = greatly limits participation, -1 = limits participation, 0 = neither limits nor enables participation, 1 = enables participation, 2 = greatly enables participation.

Data were entered into SPSS. Bass anglers were separated from other anglers in the data file and, based on respondent species preferences, coded as either smallmouth or largemouth bass anglers. Motivation and constraint/facilitator factors were based on previous studies and adapted to sportfishing (Table 1). The reliability of each factor was checked using Cronbach's alpha (a coefficient used to check for the internal consistency of a factor); an alpha of 0.70 or greater was used to identify factors suitable for further analysis (Hair, Anderson, Tatham, & Black, 1998). Confirmatory factor analyses (conducted separately for motivations and constraints/facilitators) were used to validate the factors shown in Tables 2 and 3. Suitable fit in the confirmatory factor analysis was determined by a Comparative Fit Index (CFI) of "close to 0.95" (Byrne, 2006, p. 97), and a Root Mean Square Error of Approximation (RMSEA) of 0.05 or less (Byrne, 2006, p. 100). Following confirmation of the factors, means were calculated by averaging the variables comprising each factor (Hair, et al., 1998). Two-independent-sample t-tests were used to identify significant differences between the means of factors and demographic variables for smallmouth and largemouth bass anglers; two-independent-sample z-tests were used to identify differences in proportions of respondents in the two angler groups for variables related to fishing characteristics ( $p \leq 0.05$ ).

## 4.0 Results

### 4.1 Response and non-response.

Of the 7,000 questionnaires mailed to Lake Ontario households, 1,303 were completed and returned by 723 anglers and 504 non-anglers; 76 respondents did not wish to participate. Following the removal of undeliverable addresses and non-Lake-Ontario property owners, the qualified sample totaled 5,580 households, resulting in a response rate of 23%. Of the 681 anglers who completed the full questionnaire (42 of the 723 anglers who returned the questionnaire completed only the household questions on the first page), 103 were smallmouth and 62 were largemouth bass anglers.

A one-page survey was sent to all property owners who did not respond to the original survey (4,277 owners); 608 individuals responded. The proportion of angler households in the original sample (55%) was compared to the proportion of angler households for respondents to the one-page survey (55%); no significant difference was found, indicating that the original sample is representative of the proportion of angler households in the Lake Ontario counties. In addition, comparisons using two-independent-sample t-tests were made for other variables. No significant differences ( $p \leq 0.05$ ) were identified for number of Lake Ontario fishing trips in 2009, age, level of income, or location of residence.

### 4.2 Demographic and fishing characteristics.

Descriptive statistics were calculated for demographic variables; results are shown in Table 2. Comparisons between smallmouth and largemouth anglers were made to identify significant differences in fishing trips per year, age, years of education, hours of free time per week, household size, type of fishing equipment, water body types, and location of fishing (i.e., boat versus shore). The only significant differences found were between the proportion of smallmouth bass and largemouth bass anglers fishing on tributaries (22% and 42%, respectively), and between the proportions fishing from a motorboat (77% and 61%, respectively; Table 2).

Table 2. T-test and z-test results for the demographic characteristics of smallmouth (SMB) and largemouth (LMB) bass anglers.

<b>Demographic</b>	<b>Mean for SMB anglers</b>	<b>Mean for LMB anglers</b>	<b>P-value</b>
Age	58 years	56 years	0.202
Years of education	15 years	14 years	0.084
Free time per week	24 hours	27 hours	0.291
Household size	2.8 people	2.9 people	0.501
Fishing trips/year on Lake Ontario	9.2 trips/year	10.9 trips/year	0.447
Fishing trips/year (all locations)	13.7 trips/year	16.4 trips/year	0.296
Proportion fishing with a spinning rod/reel	59%	64%	0.522
Proportion fishing on Lake Ontario	53%	38%	0.060
Proportion fishing on a bay of Lake Ontario	21%	25%	0.555
Proportion fishing on a tributary of Lake Ontario	22%	42%	0.002
Proportion fishing from a motorboat	77%	61%	0.032
Proportion fishing from shore	43%	56%	0.121

#### 4.3 Confirmatory factor analysis.

Two confirmatory factor analyses (one for motivations and one for constraints/facilitators) were carried out using EQS version 6.1 software (Multivariate Software, Inc.). The factor analysis for motivations achieved adequate fit (CFI = 0.940, RMSEA = 0.047). Two factors (enjoyment and fishing for food) had multiple variables cross-loading on them, and were removed from further analysis. “Expectations of others” was removed prior to the confirmatory factor analysis due to a low Cronbach’s alpha. The factor analysis for constraints/facilitators achieved adequate fit (CFI = 0.943, RMSEA = 0.041). The “perceptions of management” and “other anglers at site” factors were removed due to multiple crossloads.

#### 4.4 Motivations, constraints, and facilitators.

The factors that most motivated both bass groups to fish were nature appreciation, affiliation, and personal achievement (Table 3). One factor (competition) did not motivate either bass group to fish at all (this factor had a negative mean). Only two factors were significantly different between the bass groups: nature appreciation (mean for smallmouth bass anglers = 1.2; mean for largemouth bass anglers = 1.5) and satisfaction with the experience (mean for smallmouth bass anglers = 0.4; mean for largemouth bass anglers = 0.7).

Because statements for constraints and facilitators were based on a continuum (i.e., negative responses indicated that the factor was a constraint while positive responses indicated a facilitator), factor means were used to indicate if factors were either constraints (i.e., negative means) or facilitators (i.e., positive means) for the average respondent. Important constraints identified for the average smallmouth and largemouth bass respondent were poor weather and lack of time. Important facilitators were good weather, past experience, social support, access, and level of knowledge. No significant differences were identified between the two bass groups for constraints or facilitators.

Table 3. Motivations<sup>a</sup>, constraints<sup>b</sup>, and facilitators<sup>b</sup> of responding smallmouth bass (SMB) and largemouth bass (LMB) anglers.

Type of factor	Factor	Mean for SMB anglers	Mean for LMB anglers	P-value
Motivations	Nature appreciation	1.2	1.5	0.007
	Affiliation	1.2	1.2	0.614
	Personal achievement	0.9	1.1	0.285
	Nurture	0.7	0.7	0.915
	Escape	0.5	0.7	0.235
	Satisfaction with experience	0.4	0.7	0.022
	Success at catching fish	0.4	0.4	0.768
	Competition	-1.0	-0.8	0.303
Constraints	Poor weather	-0.8	-0.7	0.474
	Time	-0.5	-0.6	0.768
	Perceptions of environment	-0.3	-0.3	0.974
	Economic costs	-0.2	-0.2	0.658
Facilitators	Good weather	1.0	0.9	0.339
	Past experience	0.9	0.8	0.650
	Social support	0.7	0.6	0.292
	Access and equipment	0.6	0.7	0.292
	Level of knowledge	0.6	0.6	0.660
	Level of interest	0.5	0.5	0.982
	Level of commitment	0.4	0.4	0.902
	Health and well-being	0.3	0.3	0.679

<sup>a</sup> Motivations were based on the following scale: -2 = strongly disagree, -1 = disagree, 0 = neutral, 1 = agree, 2 = strongly agree.

<sup>b</sup> Constraints and facilitators were based on the following scale: -2 = greatly limits participation, -1 = limits participation, 0 = neutral, 1 = enables participation, 2 = greatly enables participation.

## 5.0 Discussion and Conclusion

Overall, few differences were identified between resident smallmouth and largemouth bass anglers in the Lake Ontario Region for demographics, fishing characteristics, motivations, and constraints/facilitators. The main differences found are related to where the anglers fish (i.e., tributaries vs. open lake water; from shoreline vs. from a motorboat), a consequence of where smallmouth and largemouth bass live. The only differences found in motivations are related to nature appreciation and satisfaction with the experience, both of which were higher for largemouth bass anglers.

Although the differences found between the two anglers groups are few, they indicate a possible connection between where an angler fishes (i.e., tributary vs. open water) and his/her satisfaction with the experience. For example, the closer proximity of shorelines to anglers fishing in a tributary may contribute to nature appreciation being a stronger motivation for responding largemouth bass anglers. In contrast, the open waters and longer distance from shore experienced by smallmouth bass anglers may contribute to their lower nature appreciation motivation. Nature appreciation likely contributes to satisfaction with the experience (among other factors such as catch), potentially leading to the higher satisfaction level indicated by resident largemouth bass anglers.

It is also important to note that many respondents do not always fish for their preferred species. For example, 48% of responding bass anglers with a preference for largemouth fished for smallmouth bass in 2009; 29% of bass anglers with a preference for smallmouth fished for largemouth bass. The average smallmouth bass angler in this study spent 43% of his/her fishing time on his/her preferred species (i.e., smallmouth bass), 8% fishing for largemouth bass, and the remainder of time fishing for diverse other species. Similarly, the average largemouth bass angler spent 44% of his/her fishing time seeking largemouth bass, and 9% fishing for smallmouth bass. These results suggest that substituting one type of bass fishing for the other does occur to a small degree (possibly due to factors such as the weather, changes in fishing access, and preferences of fishing partners), and likely contributes to the similarities found between smallmouth and largemouth bass anglers.

Understanding the differences and similarities between smallmouth and largemouth bass anglers is essential for marketing and management purposes in the Lake Ontario region. Due to the many similarities between these two bass angler groups, future marketing and management efforts for both groups should focus on attracting anglers based on the motivations of nature appreciation, affiliation, and personal achievement. Because many respondents substitute fishing for their preferred species with fishing for other species, efforts that can help anglers quickly find alternate fishing access sites for species other than their preferred species will likely encourage additional fishing participation in the Lake Ontario region. Promotional materials focusing on the scenic elements of Lake Ontario and its tributaries, the social aspects of fishing, and the skills and techniques needed for bass fishing would likely be effective for encouraging participation by both bass angler groups. Differences in fishing locations (e.g., shoreline vs. motorboat; open waters vs. tributary) will still need to be promoted to show both groups of anglers that the facilities and access they require to catch their preferred species of bass are available in the Lake Ontario region.

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