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Fishing in the Neighborhood: Understanding Motivations and Constraints for Angling Among Minneapolis-St.Paul, Minnesota Metro Residents

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Abstract.—Fishing license sales are stagnant in Minnesota and declining in many states. It is important to understand what motivates and constrains people's fishing participation. In 2005, we mailed surveys to 900 male and 900 female residents of the Minneapolis–St. Paul, Minnesota (USA) metropolitan area to determine attitudes and beliefs about outdoor recreation and fishing. Based on survey responses from 39.3% of the sample, we examined factors that motivate and constrain fishing among urban and suburban residents. Five factors motivated outdoor recreation: (a) achievement, (b) appreciation, (c) personal development, (d) affiliation, and (e) health. Appreciation and health were the most important motivators for outdoor recreation. Fishing was seen as a way to satisfy appreciation and affiliation motivations, and less likely to satisfy other motivations. Seven factors constrained outdoor recreation: (a) costs/regulations/crowding, (b) discomfort/dislike, (c) concerns about safety or discrimination, (d) planning required, (e) physical ability, (f) access, and (g) family/work commitments. Family/work commitments and cost most limited outdoor recreation. Constraints related to family/work commitments, cost, and lack of interest most limited fishing participation. We examined how perceived benefits and constraints predicted intention to fish. About 55% of respondents indicated that they would likely fish in the future, and about 50% of respondents said that they would likely fish in Minnesota in the next year. Appreciation, affiliation, and health motivations and constraints related to discomfort, discrimination/safety, and physical ability predicted future fishing. About 27% of respondents indicated that fishing was a "favorite" activity. Appreciation, comfort, and reduced access to angling opportunities

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predicted whether fishing was a favorite activity. We suggest that managers emphasize the multiple benefits of fishing including nature appreciation, social connection, and stress reduction, and develop programs and facilities to address discomfort and discrimination associated with fishing.

Introduction

Recreational fishing is popular and economically important in the United States. During 2001, 34.1 million Americans over 16 years of age fished a total of 557 million days and spent $35.6 billion on fishing-related expenses (U.S. Department of the Interior, Fish and Wildlife Service 2002). Natural resource management agencies rely on hunting and angling license revenue to support wildlife management programs (Backman and Wright 1993), and Minnesota is first nationally in the sale of fishing licenses per capita (MDNR 2004a). Fishing and hunting licenses made up 21% of the Minnesota Department of Natural Resources' (MDNR) budget for fiscal years 2002 and 2003 (MDNR 2004b). Hunting and fishing contribute an additional 5.4% of the MDNR budget through the federal tax levied on manufacturers of hunting and fishing equipment (MDNR 2004b).

In Minnesota, angler license sales have remained stable, despite rapid population growth over the last 30 years (Kelly 2004). In urbanized environments however, participation in angling and other outdoor recreational activities has been decreasing (Kelly 2004). Sociodemographic changes, including an aging populace, growing immigrant populations, and busy urban lifestyles, are reasons cited for decreased angling participation generally, and specifically in these urban centers (Bissell et al. 1998). The MDNR has implemented programs to cultivate angler opportunities in the state and specifically in the seven-county metropolitan area of Minneapolis-Saint Paul (Figure 1). In order to improve the effectiveness of such programs, managers wanted to better understand the metropolitan population's attitudes and beliefs about, and participation in, angling.

Driver et al. (1991) developed and refined a list of recreation motivations and corresponding scale items, the recreation experience preference scales. Motivations for recreation (e.g., fishing) reflect desired ends (e.g., relaxation, food), and numerous research studies have documented multiple motivations for recreation participation (Driver et al. 1991; Manning 1999). Manning (1999) describes general recreation motivations including achievement, learning, enjoying nature, introspection, physical fitness, and many more.

Angler motivations include: food, sport, trophies, companionship, nature, and relaxation (Moeller and Engelken 1972; Finn and Loomis 2001; Hunt et al. 2002). There are different motivations for different types of fishing. For instance, Manning (1999) reported that motivations related to affiliation were rated substantially lower by stream trout anglers than by lake and bank anglers. Motivations also differ depending on the demographic background of the angler (Witter et al. 1982; Toth and Brown 1997; Schroeder et al. 2006a). For example, Schroeder et al. (2006a) found that catching fish for food was more important to female anglers than to male anglers.

Research on motivations for fishing has emphasized the relative importance

Figure 1. State of Minnesota showing the seven-county Minneapolis–St. Paul metropolitan area.

of noncatch motives compared to catch motives (Moeller and Engelken 1972; Fedler and Ditton 1994). Catch motives vary depending on fishing mode or species sought, whereas noncatch motives appear to be "almost universal to recreational fishing" (Ditton 2004). However, both catch and noncatch motives remain important and relate to angler satisfaction (Fedler and Ditton 1994; Finn and Loomis 2001), and recent research has worked to better understand anglers' consumptive orientations (Anderson et al. 2007; Kyle et al. 2007). Kyle et al. (2007) found that anglers with higher consumption orientations rated activity-related motives (e.g., catching fish) higher than general motives (e.g., experiencing nature). Respondents with low consumption orientations emphasize general motives (Kyle et al. 2007).

Researchers have conducted numerous studies of leisure constraints (Shaw et al. 1991; Jackson 2005; Shores et al.

2007). Constraints have been categorized in various ways. Crawford et al. (1991) introduced a hierarchical model of leisure constraints including intrapersonal, interpersonal, and structural aspects. The hierarchical nature of this model begins with intrapersonal constraints, which affect recreation preferences, and leads to structural constraints, which affect participation (Crawford et al. 1991; Burns and Graefe 2007). Shaw et al. (1991) examined internal (e.g., personal skills, abilities, health) versus external (e.g., time, money, transportation) constraints. Similarly, Miller and Vaske (2003) described constraints to hunting as personal (e.g., lack of time and health problems), which are largely beyond management control, or situational (e.g., regulations and season length), which may be subject to management intervention. Stodolska (1998) divided constraints into 'static' factors like discrimination or access, which remain relatively stable over time, and 'dynamic' factors like weather and childcare responsibilities, which change over time. Walker and Virden (2005) introduced a revised constraints model incorporating intrapersonal, interpersonal, and structural constraints, motivations, negotiation, along with macrolevel (i.e., sociodemographic) and microlevel (i.e., attitudinal) factors to predict recreation participation. They also classified structural constraints to outdoor recreation into: (a) natural environment structural constraints, (b) social environment structural constraints, (c) territorial structural constraints, and (d) institutional structural constraints.

Leisure constraints have been examined based on a variety of sociodemographic characteristics, including age, gender, family situation, race/ethnicity, socioeconomic status, and physical disability (Scott and Munson 1994; Shaw 1994; Stodolska 1998; Brown et al. 2001; Wang et al. 2005; Burns and Graefe 2007). Research has shown that leisure constraints are dynamic and vary with the life cycle (Miller and Vaske 2003). For example, when people become parents they may face additional time constraints on their recreation participation, but when they retire they may faced decreased time constraints. The research has also found that people from nondominant groups, like women and individuals from communities of color, face greater leisure constraints (Shores et al. 2007). However, people who face constraints do not necessarily report reduced recreation participation. Therefore, in an effort to explain the relationship between recreation constraints and participation, research has emphasized constraint negotiation, which is one explanation for why increased constraints do not necessarily lead to reduced participation (Jackson et al. 1993; Hubbard and Mannell 2001; Son et al. in press).

Research has examined the factors, including sociodemographic characteristics, motivations, and constraints, that relate to recreation participation. Due to declining participation, much recent research has focused on fishing and hunting participation (Barro and Manfredo 1996; Fedler and Ditton 2001; Hunt and Ditton 2002). Gender, race, and age have been found to relate to fishing participation with females, older individuals, Chicano-Latinos, and African Americans significantly less likely to participate (Fedler and Ditton 2001; Floyd and Lee 2002; Floyd et al. 2006). Sociodemographic characteristics may predict leisure participation, including fishing, but they generally have less predictive power than psychological constructs like motivations and constraints (Miller and Vaske 2003).

Despite the extensive literature on recreation motivations and participation, little research has tested the assumption that recreation motivations relate to participation (Fedler 2000; Kyle et al. 2006). The limited research examining how motivations relate to fishing participation has found involvement with family and friends to be a consistent predictor of participation (Fedler 2000). Kyle et al. (2006) recently found that motivation was an antecedent of enduring involvement among campers and that different motivations predicted different dimensions of involvement. They emphasized the need to examine the relationships between motivations and involvement for other activity types and modes of experience.

Fishing participation may be more constrained than other leisure activities (Fedler 2000). Because fishing requires preparing, assembling, and storing equipment and supplies, and travel to and from fishing destinations, people may be more deterred from angling than visiting a local park or fitness center. Therefore, fishing participation requires negotiation of constraints. Research on fishing constraints has emphasized structural constraints because fisheries managers have been interested in examining factors that they could address through policy and management activities (Fedler 2000).

With an increasingly urban population in the United States and observed declines in outdoor recreation participation among urban residents, we need to better understand how motivations, constraints, and sociodemographic factors relate to participation in outdoor activities like fishing in urban populations. The study objectives were to: (a) describe urban residents' motivations for participation in outdoor recreation generally and fishing in particular, (b) describe constraints to urban residents' participation in outdoor recreation and fishing, and (c) examine how fishing motivations, constraints, and sociodemographic characteristics predict intention to fish in the future.

Methods

This study extends the research on how motivations, constraints, and sociodemographic characteristics predict intended fishing participation. The study population included Minnesota residents from the seven-county Minneapolis/St. Paul, Minnesota metropolitan area. (This area includes Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington counties). Random samples of 900 female residents and 900 male residents from this area were purchased from a commercial vendor.

Survey design and implementation

A mail-back survey was conducted generally following the procedures described by Dillman (2000). The survey included questions addressing: (a) participation in and favored outdoor activities, (b) motivations for participation in outdoor recreation, (c) constraints to outdoor recreation, (d) environmental values, (e) attitudes, norms, emotions, motivations, constraints, and future intentions related to fishing, (f) knowledge of and past participation in fishing, and (g) demographics. We implemented four mailings between July and October of 2005. In December 2005, a fifth mailing of a postcard follow-up survey was mailed to individuals who had not responded in order to examine nonresponse bias.

Data analysis

Data were weighted to reflect expected gender proportions and past fishing participation in the population. Weights were based on comparison to census data and differences between respondents to the main survey and the postcard follow-up survey. All statistical analyses, including frequencies, means, analysis of variance (ANOVA), bivariate correlations, principal components analysis, linear regression analysis, and logistic regression analysis, were conducted in SPSS 15.0 for Windows. For ANOVA calculations, when Mauchly's tests indicated that the assumption of sphericity had been violated, degrees of freedom were corrected using Huynh-Feldt ($\varepsilon > 0.75$) or Greenhouse-Geisser ($\varepsilon < 0.75$) estimates of sphericity.

Recreation and angler motivations and constraints

Respondents were asked to rate 24 motivations for outdoor recreation and for fishing on a 5-point scale. Similarly, respondents were asked to indicate how much 24 constraints limited their participation in outdoor recreation and fishing. Principal components analysis with varimax rotation extracted five factors underlying outdoor recreation motivations and seven factors underlying recreation constraints. Based on Nunnally and Bernstein's (1994) definition of variables salient to a factor, variables with loadings greater than 0.5 on one factor without loading heavily on other factors were included in the analysis.

Importance-performance analysis

We compared the importance of the five recreation motivation factors and performance of fishing on these factors using an importance-performance grid (Figure 2). The four-quadrant grid provides the basis for importance-performance analysis (Martilla and James 1977; Van Ryzin and Immerwahr 2007). As suggested by Van Ryzin and Immerwahr (2007), we use grand means to define the four quadrants in the grid. Quadrant 1 represents success areas, which in our case represents where fishing is likely to meet the desired importance of the recreation outcome. Quadrant 2 is perhaps the most critical quadrant, as it contains the outcomes that respondents value but which fishing is perceived as being not likely to meet. This is where urban fisheries managers would look to direct management efforts. Quadrant 3 contains outcomes with both low importance and low expected performance by fishing. These are low-priority outcomes. Quadrant 4 contains low-importance outcomes where fishing is perceived as providing strong performance.

Constraints for recreation and fishing were examined in a similar manner. In the case of constraints, quadrant 1 represents factors that are high for both outdoor recreation and for fishing. Quadrant 2 represents factors that are perceived as more limiting for recreation in general than they are for fishing. For the constraints, quadrant 3 contains factors that are not limiting for either recreation in general or for fishing specifically. These are the factors that should receive a lower priority. Among the constraints, quadrant 4 is perhaps the most critical quadrant as it contains the factors that are perceived as more limiting for fishing than they are for recreation in general. This is the area where managers would look for indications of which constraints to concentrate on.

Regression analyses of fishing participation

We used multiple linear regression analysis to model expected future fishing participation and logistic regression analysis to examine fishing as a favored form of outdoor recreation. Five motivation factors, seven constraint factors, and six demographic characteristics (gender, age, income, percentage of life in Minnesota, married woman, married man) served as predictor variables.

Study limitations

It is important to note that the sample of names and addresses for this mail survey was drawn from listed phone numbers in the seven-county metropolitan area. Although nearly 99% of Minnesotans have phones, approximately 30% of state residents have unlisted phone numbers. Therefore, these results may not be reflective of people with unlisted phone numbers. The median age of respondents to this survey (52.0 years) is significantly higher than the median age of residents of the metropolitan area (33.7 years). Other research has found age bias in mail surveys of hunters and anglers (Filion 1975; Schroeder et al. 2006a; Schroeder et al. 2006b).

The survey subject matter and framing effects may have influenced response. Responses may have been framed by the question order; questions early in the survey addressed participation in and motivations for outdoor recreation. Because this survey dealt with outdoor recreation and fishing, respondents likely over-represent people who are active in these activities (compared to nonrespondents). Nearly 9 of 10 respondents (87%) had fished at some time in their lives, compared to 69.7% of Minnesota residents (USFWS 2002).

Results

Survey response rate

Of 1,800 questionnaires, 224 were undeliverable or otherwise invalid, and 530 were completed and returned for an initial response rate of 33.6%. An additional 90 postcard follow-up surveys, which were used to gauge nonresponse bias, were returned resulting in an overall response rate of 39.3%. The overall response rate was higher for the male stratum (41.2%) than for the female stratum (37.4%). The main group of respondents did not differ from late respondents in age or gender, but late respondents reported lower rates of past participation in fishing and a smaller proportion of those

	Low Importance	**High importance**
High performance	**4** Potential overkill, slack resources	**1** Keep up the good work
Low performance	**3** Low priority	**2** Critical problem area, concentrate here

Figure 2. The basic importance-performance grid.

who had fished had fished in Minnesota. Data were weighted to reflect expected gender proportions and past fishing participation in the population.

Respondent characteristics

Respondents averaged 54 years of age and $60,325 in annual household income before taxes. On average, respondents had lived in Minnesota for 78% of their lives. The large majority (92%) were White. A large majority (87%) of respondents had fished in the past, and of those, 73% first fished at less than 10 years of age, 69% had fished in the past 10 years, and 94% had fished in Minnesota. Of those who had fished in Minnesota, 89% had fished in Minnesota outside of the Minneapolis/St. Paul metropolitan area and 63% had fished in the metropolitan area.

Motivations for outdoor recreation and fishing

Based on the 24 items measuring motivations, we identified five motivation factors for participation in outdoor recreation: (a) achievement (i.e., challenge, skill development), (b) appreciation (i.e., enjoying nature and the outdoors), (c) values and development (i.e., developing or maintaining personal values), (d) affiliation (i.e., spending time with family or friends), and (e) health (i.e., physical fitness and stress reduction) (Table 1). On average, based on a five-point scale ranging from 1 (not at all important) to 5 (extremely important), respondents rated the personal health motivation factor ($\bar{x} = 3.39$) and the appreciation factor ($\bar{x} = 3.31$) the highest; affiliation ($\bar{x} = 3.04$) fell at the midpoint of the scale, and personal values and development ($\bar{x} = 2.36$) and achievement ($\bar{x} = 2.35$) were lowest ($F = 286.48$; df = 3.62; 1888.39[1]; $p < 0.001$). Based on a five-point scale from 1 (very unlikely) to 5 (very likely), fishing was seen as a likely way to achieve appreciation ($\bar{x} = 3.88$) and social ($\bar{x} = 3.35$) motivations, neither likely nor unlikely to meet health ($\bar{x} = 3.04$) and achievement ($\bar{x} = 2.99$) motivations, and unlikely to meet values and development ($\bar{x} = 2.65$) motivations.

The importance of recreation outcomes (i.e., motivations) and performance of fishing for these outcomes is displayed in Figure 3. Based on the grand means for the importance and performance scales, the health factor falls into the 'concentrate here' quadrant (i.e., quadrant 2), while the social and appreciation factors fall into the 'keep up the good work' quadrant (i.e., quadrant 1), and the achievement and values factors fall into the 'low priority' quadrant (i.e., quadrant 3). It is important to note that the health factor, which fell into the 'concentrate here' quadrant included two items: (a) to reduce tension and stress and (b) for physical fitness. Both of these items were rated as important outcomes for the selection of outdoor recreation activities: (a) to reduce tension and stress ($\bar{x} = 3.45$), (b) for physical fitness ($\bar{x} = 3.34$). Fishing was seen as a likely activity to reduce tension and stress ($\bar{x} = 3.77$), but an unlikely way to get physically fit ($\bar{x} = 2.30$). Fishing may be perceived as contributing to mental health given the restorative aspects of the sport, but perhaps it is not seen as contributing a great deal to physical fitness.

[1]Mauchly's test indicated that the assumption of sphericity had been violated ($\chi^2 = 113.65$; df = 9; $p < 0.001$), therefore degrees of freedom were corrected using Huynh-Feldt estimates of sphericity ($\varepsilon = 0.904$).

Table 1. Mean survey ratings of motivations for outdoor recreation and likely experience outcomes from fishing. Ratings are displayed by factor from most important to least important in selection of outdoor recreation activities.

Factor - items	Mean Outdoor recreation[a]	Fishing[b]
Health	3.39	3.03
- To reduce stress and tension	3.45	3.77
- For physical fitness	3.34	2.30
Appreciation	3.31	3.85
- To enjoy nature	3.86	4.02
- To rest and relax	3.76	3.93
- To view scenery	3.53	4.09
- To escape crowds/noise	3.39	3.92
- To escape daily routine	3.14	3.82
- To learn about the outdoors	2.81	3.69
- To share my outdoor/recreational values	2.57	3.52
Affiliation	3.04	3.34
- To spend time with family	3.62	3.68
- To spend time with friends	3.32	3.57
- To meet new people	2.14	2.78
Personal values & development	2.36	2.65
- To think about personal values	2.65	3.14
- To develop spiritual values	2.53	2.64
- To maintain my cultural roots	1.94	2.39
- To lead others	1.86	2.44
Achievement	2.35	2.98
- To be on my own	2.84	3.17
- To feel independent	2.67	3.03
- To develop skills and abilities	2.40	3.30
- To gain self confidence	2.40	2.89
- To challenge myself	2.56	3.16
- To get food	1.83	3.01
- To take risks	1.56	2.20
Items that did not fit factors		
- To be creative	2.25	2.63

[a] Mean is based on a scale of 1 = not at all important, 2 = somewhat important, 3 = important, 4 = very important, and 5 = extremely important.
[b] Mean is based on a scale of 1 = very unlikely, 2 = unlikely, 3 = neither, 4 = likely, and 5 = very likely.

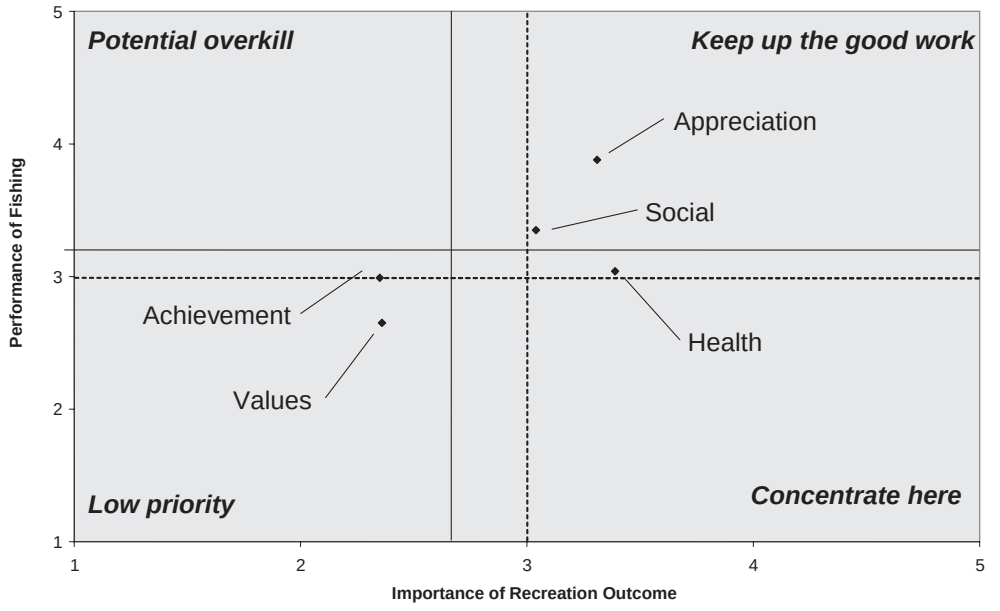

Figure 3. Importance-performance grid showing importance of recreation outcomes and performance of fishing on those outcomes.

Constraints to Outdoor Recreation and Fishing

Based on the 24 constraint items, we identified seven constraint factors limiting participation in outdoor recreation: (a) cost/regulations/crowding (i.e., cost of licenses and equipment, unclear or restrictive regulations), (b) discomfort outdoors (i.e., don't like to be outside, weather conditions), (c) discrimination (i.e., people of my gender or ethnic background are discriminated against, safety concerns), (d) planning required (i.e., planning required to go, availability of people to go with), (e) physical ability (i.e., health problems, inadequate skills), (f) access (i.e., no good opportunities near my home, limited access), and (g) work and family commitments (Table 2). On average, respondents rated work and family commitments ($\bar{x}$ = 2.64) as the most limiting. Cost/regulations/crowding ($\bar{x}$ = 2.28), planning required ($\bar{x}$ = 1.99), ability ($\bar{x}$ = 1.88), and discomfort outdoors ($\bar{x}$ = 1.64) were rated somewhat limiting. On average, access ($\bar{x}$ = 1.46) and discrimination ($\bar{x}$ = 1.26) were not perceived to strongly limit recreation participation (F = 230.49; df = 4.33; 2073.11[2]; $p < 0.001$). Results were similar for constraints to fishing participation. Respondents rated work and family commitments ($\bar{x}$ = 2.44) as the most limiting to participation in fishing. Cost/regulations/crowding ($\bar{x}$ = 1.98), planning required ($\bar{x}$ = 1.89), ability ($\bar{x}$ = 1.78), and discomfort outdoors ($\bar{x}$ =

[2]Mauchly's test indicated that the assumption of sphericity had been violated (χ^2 = 460.83; df = 20; $p < 0.001$), therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity (ε = 0.721).

Table 2. Mean survey ratings of constraints to outdoor recreation and fishing. Ratings are displayed by factor from most limiting to least limiting to outdoor recreation participation.

	Mean	
	Outdoor recreation[a]	Fishing[a]
Family & work commitments	2.64	2.44
- Work commitments	3.02	2.63
- Family commitments	2.27	2.24
Costs, regulations & crowding	2.28	1.98
- Travel costs and entrance fees	2.54	2.14
- Crowding at recreation areas	2.45	2.05
- Cost of equipment	2.44	2.02
- Cost of permits and licenses	2.17	1.92
- Regulations too restrictive or unclear	1.75	1.72
Planning	1.99	1.89
- Availability of people to go with	2.11	2.00
- The amount of effort required to go	2.02	1.90
- The amount of planning required to go	1.78	1.74
Physical ability	1.88	1.78
- Health problems	1.92	1.69
- Age	1.81	1.63
- Inadequate skills	1.73	1.84
Discomfort outdoors	1.64	1.77
- Weather conditions	2.22	2.08
- Interest in indoor activities	1.74	1.69
- No desire to participate	1.54	2.05
- Being outdoors is uncomfortable	1.30	1.33
- Don't like to be outside	1.23	1.27
Access	1.46	1.49
- Limited access to good places to go	1.72	1.67
- No good opportunities near my home	1.56	1.56
- The other people who participate are not friendly	1.34	1.20
Discrimination & fear	1.26	1.17
- Fear or safety concerns	1.54	1.37
- People of my gender or ethnic background are discriminated against by other participants	1.30	1.17
- People of my gender or ethnic background are discriminated against by outdoor recreation managers	1.18	1.18

[a] Mean is based on a scale of 1 = not at all limiting, 2 = somewhat limiting, 3 = limiting, 4 = very limiting, and 5 = extremely limiting

1.77) were rated somewhat limiting. On average, access ($\bar{x}$ = 1.49) and discrimination ($\bar{x}$ = 1.17) were not perceived to strongly limit fishing participation.

Work and family commitments, along with cost/regulations/crowding, planning, and ability, were seen as limiting both general recreation participation and fishing (Figure 4). Access and discrimination were not seen as limiting for either recreation or fishing. Discomfort outdoors was seen as being slightly more limiting to fishing participation than recreation participation in general.

Association between recreation motivations and constraints

Two recreation constraint factors, cost and work/family commitments, were positively correlated to each of the five recreation motivation factors (Table 3). While the appreciation motivation factor was positively correlated with cost and work/family constraints, it was negatively correlated with the constraints related to discomfort outdoors, discrimination, and ability. The health motivation was negatively correlated to the ability constraint. The values motivation factor was positively correlated to each of the seven constraint factors. According to Cohen's (1988) guidelines, all observed correlations represent small to medium effect sizes.

Future fishing

About 60% of respondents indicated that they would fish in the future, with 52.4% indicating that they would likely fish in Minnesota in the next year. Nearly one-third (29.4%) of the respondents indicated that fishing was a favorite activ-

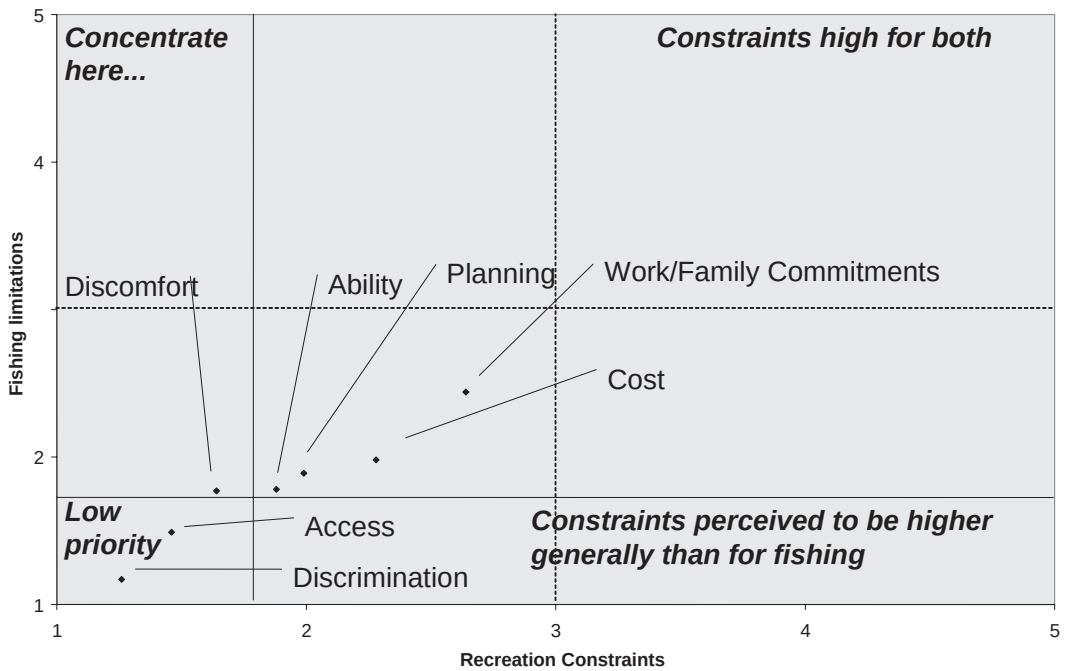

Figure 4. Importance-performance grid showing constraints to participation in outdoor recreation generally and to fishing in particular.

Table 3. Bivariate correlations between outdoor recreation motivation and constraint factors. Asterisks denote level of significance (* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$).

Constraint factors	Motivation factors				
	Achievement	Appreciation	Values	Affiliation	Health
Cost	0.282***	0.254***	0.212***	0.272***	0.143**
Discomfort	0.072	–0.124**	0.113*	–0.036	–0.008
Discrimination	0.146**	–0.120*	0.169***	0.039	–0.011
Planning	0.165***	0.037	0.198***	0.122*	0.104*
Ability	0.061	–0.151**	0.140**	0.081	–0.125**
Access	0.139**	–0.048	0.146**	0.039	–0.091
Work/family	0.102*	0.213***	0.170***	0.127**	0.233***

ity. Stronger appreciation, affiliation, and health motivations for fishing, greater access constraints to fishing, and being married were positively related to future fishing participation (Table 4). Age, along with constraints related to discrimination and discomfort in the outdoors, were negatively related to fishing anytime in the future. Similarly, we found that higher appreciation, affiliation, and health motivations, greater limitations related to cost, and being a married male or married female positively predicted intended fishing participation in the next year, while age, discrimination, and discomfort outdoors were again negative predictors. Finally, we found that greater appreciation motivation and access constraints positively predicted whether fishing was a favorite activity, while discomfort was a negative predictor.

Discussion

Motivations for Fishing

Different motivations explained the different measures of fishing participation. The appreciation motivation was positively associated with all of the measures of fishing participation. So, appreciative motives clearly correlate with angling participation. Social and health motivations, which were also important outcomes for respondents, were predictive of both measures of future fishing but not of fishing as a favorite activity. Godbey (2005) described how people's time has become saturated, and how "the cult of efficiency that now pervades every aspect of American life may be said to have 'denatured' leisure." Individuals who attribute multiple valued outcomes like appreciative, social, and health benefits to angling are those who intend to fish in the future. People who attribute more limited benefits from fishing might opt for hiking, bicycling, or other forms of outdoor recreation to efficiently deliver desired benefits.

Constraints to Fishing

We identified seven types of constraints to outdoor recreation. According to the Crawford et al. (1991) hierarchical model, cost and access constraints would be considered more structural, while work/family commitments, planning, and discrimination might be considered

Table 4. Regression analyses showing motivation, constraint, and sociodemographic factors significantly associated with measures of fishing participation. Asterisks denote level of significance (* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$).

Dependent variable	Significant independent variables	Beta	Exp(B)	% effects	Adj. R^2
Fish anytime in the future	Appreciation motivation factor	0.180**			0.521
	Affiliation motivation factor	0.159**			
	Health motivation factor	0.131*			
	Discrimination constraint factor	–0.146**			
	Discomfort constraint factor	–0.223***			
	Access constraint factor	0.123**			
	Age	–0.231***			
	Married female	0.105*			
	Married male	0.117*			
Fish in MN in next year	Appreciation motivation factor	0.161*			0.491
	Affiliation motivation factor	0.201**			
	Health/fitness motivation factor	0.150*			
	Discrimination constraint factor	–0.146**			
	Discomfort constraint factor	–0.270***			
	Cost constraint factor	0.115*			
	Age	–0.120*			
	Married female	0.105*			
	Married male	0.141*			
Fishing a favorite activity	Appreciation motivation factor	0.884*	2.421	142.1%	0.400[a]
	Discomfort constraint factor	–0.742*	0.476	–52.4%	
	Access constraint factor	0.785**	2.193	119.3%	

[a] Nagelkerke R^2

more interpersonal, and ability and discomfort outdoors might be considered more intrapersonal. Jackson (2005) noted that time- and cost-related constraints most limit people's leisure activity, and our results support this premise. We found that work and family commitments, followed by cost, most limited respondents' participation in outdoor recreation and fishing.

The constraint of feeling uncomfortable in the outdoors was negatively related with all indicators of fishing participation. This strongly suggests that those people who perceive fishing to be uncomfortable will be less likely to participate. This intrapersonal, static constraint would likely be difficult for managers to reduce. However, some cities offer enclosed, heated fishing piers to make anglers more comfortable in adverse weather conditions (ODWC 2008). Urban fisheries managers might increase fishing participation with enclosed docks to protect anglers from sun and wind. In Minnesota and other cold weather states, they might also rent heated ice houses to encourage participation in ice fishing.

The discrimination and fear constraint to fishing was negatively related to both measures of intention to fish in the future. Because the survey questions addressed discrimination to "people of my gender or ethnic background," we

analyzed this factor by gender and race. There was no significant difference between the genders on the discrimination constraint, but there was a significant difference on this constraint between White ($\bar{x}$ = 1.08) and nonWhite ($\bar{x}$ = 2.32) respondents (t = 12.63; df = 450; p < 0.001). Our results suggest that fear of racial discrimination, rather than gender discrimination, negatively predicts future fishing participation. Although this interpersonal constraint would be difficult to address, urban fisheries managers could work to address concerns about selective enforcement reported by individuals of color (Schroeder and Fulton 2008) or support innovative programming that encourages equal-status recreation and fishing opportunities for all. Programming could include fishing and outdoor education courses at urban schools, churches, or cultural events such as Native American pow-wows, Cinco de Mayo celebrations, and Juneteenth Day events.

Interestingly, two constraints—access and cost/regulations/crowding—were positive predictors of fishing participation. Respondents who reported more limited access to fishing areas reported stronger intentions to fish in the future and were more likely to report that fishing was a favorite activity. This finding may reflect the desirability of fishing as a means for metropolitan residents to get away from the hustle and bustle of urban life. Perhaps a perception of fishing in Minnesota as something done 'in the north woods' makes it seem like an attractive escape for urban residents. Respondents who reported that cost was a greater constraint to fishing also reported that they would be more likely to fish in the next year. Perhaps respondents who perceived cost as a higher constraint to fishing also perceived fishing as a relatively good recreation value and as a means of providing financial benefits in terms of food. Respondents may have effective strategies to negotiate or counteract access and cost constraints to fishing. People actively respond to constraints, so constraints do not always reduce participation (Hubbard and Mannell 2001). People who are highly motivated to fish and perceive greater benefits from fishing may be more successful in negotiating cost and access constraints to participate. Alternatively, the positive relationship between perceived cost and access constraints to fishing and intended participation measures may simply suggest that people who are not interested in fishing do not perceive cost and access constraints to participation.

Relationship between motivations and constraints

Our results suggest that cost and work/family constraints, which were the most limiting of the constraints measured, may be almost universal. People who feel stronger motivations to recreate perceive greater time and money limitations to their participation. People who were motivated by appreciative outcomes reported feeling less constrained by discomfort in the outdoors, discrimination, and limited ability. This is not surprising—people who appreciate the outdoors likely feel more comfortable and able there, and correspondingly people who feel comfortable and able in the outdoors likely appreciate it more. In the same way, it makes sense that our respondents who were more motivated by health outcomes reported lower constraints related to ability. It is interesting that when people's recreation was motivated more by values development that they reported being more limited by all

types of constraints. Perhaps people feel more constrained because they don't feel that outdoor recreation is the best means to fulfill this motivation.

Sociodemographic predictors of fishing participation

Consistent with other research (Fedler 2000; Floyd et al. 2006), age was negatively related to fishing participation. In contrast, we did not find that gender was related to intended future fishing activity or fishing as a favorite activity. However, married respondents of both genders reported stronger intentions of fishing in the future. Unfortunately we did not gather information on children in the household, which might have provided more insight into how family and marital status relate to fishing participation. Schramm and Gerard (2004) found that family recreation motivated fishing participation in households with children. A Roper (2002) study of 'minority' attitudes about and participation in fishing found that a key inducement to fishing would be "an invitation to fish from a child or friend."

Management Implications

Urban fisheries managers have little control over public motivations or personal constraints to outdoor recreation participation (Miller and Vaske 2003; Mangun et al. 2007). However, agencies can use information about recreation motivations and constraints to more effectively promote urban angling. Our results suggest that appreciative, social, and health motivations were associated with intended participation in fishing, so managers could emphasize these benefits to encourage participation. In addition, based on our results indicating that people who perceive higher access and cost constraints report greater intentions to fish in the future, managers might market fishing as a low-cost retreat from negative aspects of the urban environment.

In addition to stocking fish and providing fishing docks, urban fisheries managers might focus on structural constraints to angling. Our study found that potential discomfort and discrimination limited intended participation in fishing. As mentioned earlier, urban fisheries managers could offer comfortable structures for angling. Managers might also focus on regulations, access, license fees, and agency trust to increase urban angling participation. Mangun et al. (2007) assessed how stakeholder perceptions influenced hunter participation and described three areas of perceived situational constraints to hunting: quality of experience, regulatory environment, and trust. Similar factors likely affect urban fishing participation. Programs might work to adjust aspects of the regulatory environment (e.g., license fees and vendors). Free fishing days, reduced-price licenses exclusively for urban angling, and more convenient license vendors might increase participation. Programs affiliated with local community organizations or lead by diverse community members might increase agency trust and subsequently increase urban angling participation. Public or private fishing opportunities that provide equipment and do not require licenses might also increase interest and participation in angling among urban populations.

Conclusions

This research adds to extant knowledge on motivations for and constraints to fishing, but it is largely a base for fur-

ther study. Research on recreation motivations could further examine how multiple motivations relate to people's recreation choices. Because of time constraints, people may select activities that deliver multiple benefits. This research could also look at how people weigh different motivations as they make recreation choices—perhaps people choose day-to-day outdoor activities based more on health and social motivations and vacation activities based more on appreciative and achievement motivations. Research on angling motivations could also work to understand how different motivational factors relate to various dimensions of fishing involvement, including attraction, identity affirmation and expression, centrality, and social bonding (Kyle et al. 2006).

Future research could examine how people negotiate constraints to participate in fishing. Researchers have begun to explore how motivations, constraints, and negotiation predict leisure participation (Hubbard and Mannell 2001; Son et al. in press). However, research in this area is extremely limited, and no research has specifically examined constraint negotiation in fishing. Our results suggest that people intend to fish in the face of access and cost constraints. Research could look specifically at how people negotiate these constraints.

Finally, future research could further examine fishing as family recreation. Although the demographics of anglers vary dramatically depending on setting and style of fishing, our results suggest stronger intention to fish among married people. However, we did not gather information on children in the household. Fedler (2000) noted how fishing participation waxes and wanes through the life course. Research is needed to further clarify the role of fishing as recreation for couples and families. As Schroeder et al. (2006a) noted, some important research questions are: "How many days per year do people fish on work days, weekend days, holidays, or vacation days?" and "How many days per year do people fish with their spouse, children, friends, or alone?" Answering these questions will help us better understand how fishing fits into the lives of busy urban residents.

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