

FEATURE: HUMAN DIMENSIONS



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Constraints on Recreational Fishing Participation in Queensland, Australia

ABSTRACT: In response to a sharp decline in recreational fishing participation in Queensland, Australia, I sought to identify constraints experienced by fishers in Queensland and understand how demographic variables, fishing participation variables, and fishing motivations influence the amount and type of constraints experienced. In a survey of Queensland recreational fishers, 70% reported experiencing constraints—predominantly lack of time, crowding, unavailability of facilities, and costs associated with fishing. Fishers with higher incomes, fishers with higher centrality of fishing to lifestyle, fishers who placed higher importance on motivations related to catching fish and relaxation, and fishers who were male were more likely to experience constraints. With the exception of gender, variables found to have a significant effect on the presence of constraints also had a significant influence on the types of constraints experienced. Results provide insight into factors affecting recreational fishing participation in Queensland; however, additional research—particularly with recent fishing drop-outs—is needed to fully understand recent declines in fishing participation.

Restriciones en la Participación de Actividades de Pesca Recreativa en Queensland, Australia

RESUMEN: El presente estudio investigó la disminución en la participación de la actividad de pesca recreativa en Queensland, Australia. El objetivo del estudio fue la identificación de las limitaciones confrontadas por los pescadores de Queensland y medir la influencia de las variables demográficas, que afectaban la motivación de la participación en las actividades de pesca. En la encuesta un 70% de los pescadores respondieron que las limitaciones para participar en actividades de pesca recreativa eran predominantemente, falta de tiempo, número reducido de sitios públicos de pesca y costos asociados con la actividad de pesca. Los pescadores recreativos, varones, con entradas económicas mas altas, con un estilo de vida mas centrado en actividades pesqueras o que asociaban la pesca con relajamiento fueron los pescadores mas inclinados a experimentar limitaciones. Con la excepción de género -sexo todas la s variables que se identificadas como factores limitantes para la participación tambien se incluían como elementos significativos de tipo restrictivo para los pescadores. Los resultados de este estudio proveen información en el tipo de factores que afectan la falta de participación en las actividades de pesca recreacional en Queensland. Si embargo se necesita investigación adicional para comprender la disminución en la actividad pesquera.



INTRODUCTION

In 1996, the Queensland Department of Primary Industries and Fisheries began collecting information on recreational fishing participation in Queensland, Australia. Between 1996 and 2004, the recreational fishing participation rate (i.e., the percent of the Queensland population aged five or over that participates) declined from 28.1% to 20.6%, and the number of active recreational fishers in the state declined from 882,200 to 733,400 (Higgs and McInnes 2003; J. Higgs, Queensland Department of Primary Industries and Fisheries, pers. comm.). These statistics indicate that people are being displaced from recreational fishing in Queensland and are not being replaced with new recruits to the activity. This decline in participation is of concern for a number of reasons. First, a dwindling fishing constituency will likely result in reduced public, financial, and political support for fisheries management and conservation efforts. Second, there are potential economic impacts on businesses and communities that support recreational fishing when displaced fishers spend their leisure dollars elsewhere. Finally, there may be quality-of-life implications if displaced fishers are not able to replace fishing with another leisure activity that provides them with the same level of benefits. Consequently, there is a great deal of interest in understanding the factors that shape fishing participation patterns in Queensland.

LEISURE CONSTRAINTS

Leisure constraints (i.e., factors that interfere with individuals' ability and/or desire to participate or their ability to achieve the satisfactions or benefits they seek) can be an important influence on leisure participation patterns. Previous research has classified leisure constraints into three groups: intrapersonal, interpersonal, and structural (Crawford and Godbey 1987). Intrapersonal constraints involve the individual's internal psychological processes that affect preferences toward activities (e.g., perceptions of skill or appropriateness of the activity). Interpersonal constraints are the result of interactions with other individuals (e.g., not having a social group with whom to participate). Structural constraints are factors that directly interfere with participation (e.g., lack of time, money,

access, or equipment; Crawford et al. 1991). Most people probably experience at least some constraints on their leisure activity (Iso-Ahola and Mannell 1985).

Some individuals may be able to negotiate through the constraints they face and maintain participation in an activity, albeit in a way that may differ from how they would participate if constraints were absent (e.g., by changing the timing or frequency of participation; Jackson et al. 1993). However, if constraints are perceived as ongoing and non-negotiable, individuals may drop out of the activity (Backman 1991).

Numerous factors constrain people's abilities to participate in recreation activities including: work and family commitments, lack of access to facilities, lack of money, lack of time, physical disabilities, lack of awareness of opportunities, poor facilities, crowding and pollution of sites, and lack of partners with whom to participate (Jackson 1988). However, only a few studies have examined constraints on recreational fishing participation. Results of those studies indicate that structural constraints such as lack of time, lack of money, and inadequate facilities appear to be the most important factors inhibiting fishing participation. However, interpersonal constraints such as lack of fishing companions, and intrapersonal constraints such as lack/loss of interest (due to a variety of factors), have also been found to affect fishing participation (Ritter et al. 1992; Fedler and Ditton 2001).

What variables might influence the amount and type of constraints experienced?

Results from previous studies suggest that demographic variables influence recreational fishers' perceptions of constraints. For example, fishers with higher incomes might be affected less by constraints related to the costs associated with fishing. Likewise, age and gender have been found to relate to how constraints influence leisure behavior (Godbey 1985; Thomas and Peterson 1993; Fedler and Ditton 2001).

Variables that relate to the amount and nature of participation in fishing also influence fishers' perceptions of constraints. For example, committed fishers (i.e., those whose lifestyle and social networks are strongly connected to their participation in fishing; Kim et al. 1997) may have learned to negotiate some con-

straints (and therefore no longer perceive their effects) in order to maintain their fishing participation at the desired level. Conversely, highly committed fishers may be more constrained by other factors such as the time and cost necessary to maintain participation at the level and intensity they desire. Other variables such as type of environment fished (e.g., freshwater vs. saltwater), boat ownership, or membership in fishing clubs may also influence the amount and type of constraints experienced if these variables influence individuals' access to resources or people with whom to participate.

Motivations for fishing reflect the expected outcomes or satisfactions derived from fishing participation (Knopf 1983; Fedler and Ditton 1994). A substantial body of research has demonstrated that motivations for fishing include both catch-related and non-catch-related elements, and that motivations vary among fishers (Knopf et al. 1973; Driver and Knopf 1976; Fedler and Ditton 1994). Motivations for fishing should have an influence on the amount and type of constraints experienced because all possible desired outcomes from fishing will not be equally achievable—i.e., the amount and type of constraints experienced should depend on what outcomes and satisfactions are sought. For example, fishers who place high importance on catching fish would be constrained by factors that interfere with their ability to catch fish (e.g., lack of access to areas with high catch rates), whereas fishers who place more importance on the family recreation aspects of fishing would be more constrained by lack of access to family-friendly facilities or areas.

Understanding the constraints experienced by active recreational fishers will provide insight into the factors that influence and shape fishing participation patterns, and should also provide some understanding of the factors that cause fishers to drop out of fishing. Accordingly, I investigated the constraints experienced by active recreational fishers in Queensland, Australia with the specific aims of: (1) identifying the constraints experienced most often by recreational fishers in Queensland, and (2) understanding how demographic variables, fishing participation variables, and motivations for fishing influence the amount and type of constraints experienced.



A boat is required to access many popular fishing locations in Queensland.

S. SUTTON

METHODS

The target population for the study was recreational fishers aged 15 years or over residing in Queensland, Australia. Data were collected using a combination of telephone and mail survey methods. For sampling purposes, the state was divided into two areas: (1) the Great Barrier Reef area (GBR; defined as the area encompassing all postal codes that lie within 50 kilometres of Queensland's east coast from the tip of Cape York to Bundaberg); and (2) the remainder of the state (non-GBR; approximately 80% of the Queensland population resides within the non-GBR region). A stratified random sample of residential telephone numbers was selected from the electronic telephone directory for each area. Duplicate numbers and mobile numbers were excluded from the sampling frame prior to sample selection. Up to six attempts were made to contact each sampled household.

The individual who answered the telephone in each household was asked if anyone in the household had done any recreational fishing (including angling, spear fishing, crabbing, and prawning) in Queensland during the previous 12

months. When more than one fisher lived in the household, one fisher was randomly selected for interviewing. When the selected fisher was not available, an appointment was made and the fisher was called back at the appointed time.

Fishers were administered a short survey about their fishing activity that included questions on avidity, experience, importance of fishing as an outdoor activity, and skill level. At the conclusion of the telephone survey, respondents were asked if they would be willing to participate in a follow-up mail survey. Names and addresses were collected from those who agreed.

In total, 13,390 households were contacted resulting in 9,754 interviews (73%) in which the respondent answered the question about whether anyone in the household had fished in the previous 12 months. This resulted in 2,733 full telephone interviews with active recreational fishers and a sample of 2,355 fishers who agreed to participate in the follow-up mail survey (1,372 GBR; 983 non-GBR).

The follow-up mail survey, an 11-page self-administered questionnaire, was used to collect further data from active fishers. Survey procedures were similar to those

recommended by Salant and Dillman (1994; with the exception that an introductory letter was not sent to fishers prior to the first survey). A total of 1,385 completed mail surveys were returned (793 GBR; 592 non-GBR). Excluding non-deliverable surveys ($n = 32$), an effective response rate of 60% was achieved for the mail survey.

Non-response bias in the mail survey was evaluated using data from the telephone survey. Significant differences between mail survey respondents and non-respondents were tested on the following variables measured in the telephone survey: (1) importance of fishing as an outdoor activity, (2) number of days recreationally fished during the previous 12 months, (3) number of years fishing experience, (4) gender, and (5) age. T-tests were used for continuous variables, Kruskal-Wallis tests were used for ordinal variables, and chi-square tests were used for binary variables. Level of statistical significance was set at $\alpha = 0.05$.

Results of the non-response bias check revealed that non-respondents were significantly younger (37 years vs. 44 years), had significantly fewer years fishing experience

(25 years vs. 30 years), and were less likely to rate fishing as their most important outdoor activity (32% vs. 40%) compared to respondents. These differences suggest that older, more experienced, and committed fishers may be somewhat overrepresented in the mail survey.

To identify and measure constraints on fishing participation, fishers were asked "Are there factors that keep you from fishing as often as you would like?" Fishers who answered affirmatively were then asked to rate their level of agreement (on a 5-point scale ranging from 1 = strongly disagree to 5 = strongly agree) with 12 statements about possible reasons why they do not fish more often. To aid interpretation, responses for each of the 12 items were collapsed into a 3-point scale (with categories "agree" [scale scores 4–5], "neutral" [scale score 3], "disagree" [scale scores 1–2]), adjusted for over-sampling of GBR area fishers (strata weights were 0.2 for the GBR area and 0.8 for the non-GBR-area; Scheaffer et al. 1996), and ranked according to the percentage of fishers who agreed with each statement.

The presence/absence of factors constraining fishing participation was modelled as a function of a set of demographic, fishing participation, and fishing motivation variables using binary logistic regression (Agresti 1996). Demographic variables included in the analysis were age, gender, and income (measured on an 11-point scale ranging from <AU\$10,000 to >AU\$100,000). Fishing participation variables included in the analysis were number of years fishing experience, membership in one or more fishing clubs or conservation organizations (classified as member or non-member), household boat ownership (classified as yes or no), type of

environments fished during the previous 12 months (classified as freshwater only, saltwater only, or both freshwater and saltwater), and centrality of fishing to the fisher's lifestyle.

Centrality to lifestyle was measured using the scale developed by Kim et al. (1997) to measure centrality to lifestyle of birders and adapted to recreational fishing by Sutton (2003). Respondents were asked to rate their level of agreement (on a 5-point scale ranging from 1 = strongly disagree to 5 = strongly agree) with 9 statements about the personal importance of fishing. The 9 variables were averaged to calculate the centrality-to-lifestyle index. Cronbach's alpha of 0.88 indicated an acceptable level of reliability for the centrality-to-lifestyle index (Table 1).

Motivations for fishing were measured using scale items developed and refined by Driver (1977) and Driver and Cooksey (1977) to understand the benefits fishers expect to receive from recreational fishing. Fishers were asked to rate the importance of fishing (on a 5-point scale ranging from 1 = not at all important to 5 = extremely important) placed on 22 possible reasons for participating in fishing. Related items were grouped to measure the importance placed on 5 separate motivation domains: (1) catching fish, (2) relaxation, (3) excitement, (4) socializing, and (5) experiencing nature. Items in each of the domains were summed to calculate a separate index for each domain. Cronbach's alpha reliability coefficients for each of the domains indicated an acceptable level of reliability for each (Table 2).

To identify predictors of constraints from each group of variables, separate logistic models were fit for the demographic, fishing participation, and motivation vari-

ables. For each model, non-significant variables (i.e., $P > 0.05$) were deleted and the model re-fit.

Variables found to have a significant effect on the presence/absence of constraints were tested further to determine if these variables also affected fishers' level of agreement with each of the 12 statements about possible reasons why they do not fish more often. For this purpose, the 5-point agree/disagree scale used to measure the importance of each of the 12 specific constraints was collapsed into a binary variable with categories "agree" (scale scores 4–5, agree and strongly agree) and "do not agree" (scale categories 1–3, neutral, disagree, and strongly disagree). Independent variables measured on a five-point response scale (i.e., centrality to lifestyle and motivations) were collapsed into categories "low" (scale scores 1–2, not at all important and slightly important), "medium" (scale score 3, moderately important), and "high" (scale scores 4–5, very important and extremely important). Chi-square tests were then used to test for independence between the level of agreement with each of the 12 specific constraints and each of the variables identified as significant predictors of constraints from the logistic regression analyses. Significant relationships ($P < 0.05$) are presented graphically.

RESULTS

Most (70%) fishers reported that there are factors (i.e., constraints) that prevent them from fishing as often as they would like. Compared to fishers who reported not experiencing constraints, constrained fishers reported fishing significantly fewer days during the previous 12 months (mean_{constrained} = 18.4 days; mean_{non-constrained} = 23.2 days;

Table 1. Descriptive statistics and reliability analysis for the centrality-to-lifestyle scale for Queensland recreational fishers.

Centrality-to-lifestyle scale items ($\alpha = 0.88$)	Mean ^a	SD	Item-total correlation	α if item deleted
If I stopped fishing, I would probably lose touch with a lot of my friends.	2.1	0.9	0.49	0.88
If I couldn't go fishing, I am not sure what I would do.	2.4	1.1	0.66	0.86
Because of fishing, I don't have time to spend participating in other leisure activities.	2.0	0.8	0.52	0.88
Most of my friends are in some way connected with fishing.	2.7	1.1	0.55	0.87
I consider myself to be somewhat expert at fishing.	2.4	1.0	0.54	0.87
I find that a lot of my life is organized around fishing.	2.3	1.0	0.75	0.86
Others would probably say I spend too much time fishing.	2.1	1.0	0.67	0.86
I would rather go fishing than do most anything else.	2.7	1.2	0.75	0.86
Other leisure activities don't interest me as much as fishing.	2.6	1.2	0.69	0.86

^a Measured on a 5-point scale with response categories ranging from (1) strongly disagree to (5) strongly agree.

Table 2. Descriptive statistics and reliability analysis for the five fishing motivations for Queensland recreational fishers.

Motivation dimensions and items	Mean ^a	SD	Item-total correlation	α if item deleted
Catching fish ($\alpha = 0.75$)				
To catch fish for eating	3.1	1.2	0.28	0.78
For the experience of the catch	3.6	1.2	0.58	0.67
To catch a "record" or "trophy" fish	2.1	1.3	0.54	0.69
For the fun of catching fish	3.8	1.0	0.58	0.68
For the challenge or sport of fishing	3.0	1.4	0.61	0.66
Relaxation ($\alpha = 0.82$)				
To get away from the regular routine	3.6	1.2	0.70	0.76
For relaxation	4.1	0.9	0.48	0.82
To experience solitude or tranquility	3.4	1.3	0.58	0.80
To get away from the demands of other people	3.2	1.4	0.64	0.78
To get away from crowds of people	3.4	1.3	0.70	0.76
Excitement ($\alpha = 0.74$)				
To experience new and different things	3.0	1.2	0.47	0.77
To experience adventure and excitement	3.0	1.3	0.68	0.53
To have thrills	2.8	1.3	0.57	0.66
Socializing ($\alpha = 0.78$)				
To do something with your family	3.6	1.2	0.59	0.73
To bring your family closer together	3.3	1.3	0.68	0.68
To be with friends	3.4	1.2	0.48	0.78
To be with others who enjoy the same things you do	3.5	1.1	0.62	0.72
Experiencing nature ($\alpha = 0.82$)				
To be outdoors	3.8	1.0	0.51	0.81
To be close to the water	3.6	1.2	0.54	0.80
To experience unpolluted natural surroundings	3.8	1.2	0.62	0.78
To learn more about nature	2.9	1.2	0.65	0.77
To be close to nature	3.3	1.2	0.74	0.74

^a Measured on a 5-point scale with response categories ranging from (1) strongly disagree to (5) strongly agree.

$F = 4.5$; $P = 0.03$), and reported significantly lower satisfaction with fishing in Queensland (measured on a 5-point scale where 1 = not at all satisfied and 5 = extremely satisfied; mean constrained = 2.9; mean non-constrained = 3.2; $F = 13.3$; $P = 0.0003$).

When constrained fishers were asked to rate their level of agreement with several possible statements about why they do not fish more often, statements relating to lack of time ("I have too many work/family commitments" [75%]; "Other leisure activities take up my time" [45%]) received the highest level of agreement, followed by statements related to crowding and proximity of fishing areas ("Fishing areas are too crowded" [26%]; "I don't have access to fishing opportunities close to home" [24%]) and statements about the costs associated with fishing ("I can't afford to fish more often" [22%]; "The cost of fishing equipment and supplies is too expensive" [21%]; Table 3). Statements about facilities quality, inability to catch enough fish, fishing regulations, lack of fishing partners, and lack of skills received agreement from less than 20% of constrained fishers (Table 3).

Results of the logistic regression analyses testing the effects of demographic, motivation, and fishing participation variables on the presence of fishing constraints are presented in Tables 4–6. Of the three demographic variables tested, males and fishers with higher incomes were more likely to experience constraints than females and lower income individuals (Table 4). Age had no effect on the presence of constraints ($\chi^2 = 1.2$; $df = 1$; $P = 0.25$). Of the five experience preference variables tested, fishers who placed higher importance on "relaxation" and "catching fish" were more likely to experience constraints than fishers who placed lower importance on these experiences (Table 5); however, level of importance placed on "excitement" ($\chi^2 = 0.6$; $df = 1$; $P = 0.43$), "experiencing nature" ($\chi^2 = 0.006$; $df = 1$; $P = 0.93$), or "socializing" ($\chi^2 = 0.05$; $df = 1$; $P = 0.82$) had no effect on the presence of constraints. Of the five fishing participation variables tested, high-centrality-to-lifestyle fishers were more likely to experience constraints than their low-centrality counterparts (Table 6). There was no effect of years of fishing experience ($\chi^2 = 0.04$; $df = 1$; $P = 0.83$), boat ownership ($\chi^2 = 0.43$; $df = 1$; $P = 0.50$), membership in fish-

ing-related organizations ($\chi^2 = 0.06$; $df = 1$; $P = 0.80$), or environment fished in during the previous 12 months ($\chi^2 = 2.1$; $df = 2$; $P = 0.35$).

With the exception of gender, variables found to have a significant effect on the presence of constraints also had a significant influence on fishers' level of agreement with statements about specific constraints on their fishing activity. High-centrality-to-lifestyle fishers were less likely than their low-centrality counterparts to report participation in other activities as constraints on their fishing activity, but were more likely to report the cost of fishing and fishing supplies, confusing regulations, inadequate facilities, and crowded fishing areas as reasons they do not fish more often (Figure 1). Fishers with higher incomes were less likely than low-income fishers to report the cost of fishing and fishing supplies and poor facilities as constraints, but were more likely than low-income fishers to report work and family commitments as reasons for not fishing more often (Figure 2). Compared to fishers who placed low importance on the relaxation motivation, fishers who placed high importance on relaxation were more likely

Table 3. Queensland recreational fishers' level of agreement with statements about factors that constrain fishing participation.

Reason for not fishing more often	Level of agreement		
	Disagree	Neutral	Agree
I have too many work/family commitments.	16	9	75
Other leisure activities take up my time.	33	22	45
Fishing areas are too crowded.	51	23	26
I don't have access to fishing opportunities close to home.	62	14	24
I can't afford (\$) to fish more often.	62	16	22
The cost of fishing equipment and supplies is too expensive.	57	22	21
Fishing facilities (boat ramps, jetties, etc.) are poorly developed and/or maintained.	61	23	16
I can't catch enough fish to suit me.	75	11	14
Fishing regulations are too confusing.	74	14	12
It is difficult to find others to fish with.	77	13	10
Fishing regulations are too restrictive.	73	19	8
I don't have the necessary fishing skills.	77	15	8

Table 4. Results of the logistic regression analysis testing the effects of demographic variables on Queensland recreational fishers' likelihood of experiencing constraints. Only significant variables have been included in the final model. Model $\chi^2 = 29.3$; $df = 2$; $P < 0.0001$, % concordance = 56.7, $N = 1,180$ (843 experience constraints; 337 do not experience constraints).

Parameter	df	Estimate	SE	χ^2	P	Odds Ratio
Intercept	1	-0.0005	0.19	0.0	0.99	
Gender (M vs. F)	1	0.37	0.16	5.2	0.02	1.44
Income	1	0.11	0.02	22.9	<0.0001	1.12 ^a

^a Odds ratio for a one-unit increase. Odds ratio for an χ unit increase = $e^{\chi(\text{Parameter estimate})}$.

Table 5. Results of the logistic regression analysis testing the effects of motivations on Queensland recreational fishers' likelihood of experiencing constraints. Only significant variables have been included in the final model. Model $\chi^2 = 37.0$; $df = 2$; $P < 0.0001$, % concordance = 60.0, $N = 1,266$ (898 experience constraints; 368 do not experience constraints).

Parameter	df	Estimate	SE	χ^2	P	Odds Ratio
Intercept	1	-0.76	0.28	7.3	0.007	
Relaxation	1	0.30	0.07	18.0	<0.0001	1.35 ^a
Catching fish	1	0.20	0.08	6.3	0.01	1.22 ^a

^a Odds ratio for a one-unit increase. Odds ratio for an χ unit increase = $e^{\chi(\text{Parameter estimate})}$.

Table 6. Results of the logistic regression analysis testing the effects of recreational fishing participation variables on Queensland fishers' likelihood of experiencing constraints. Only significant variables have been included in the final model. Model $\chi^2 = 18.0$; $df = 1$; $P < 0.0001$, % concordance = 54.8, $N = 1,276$ (907 experience constraints; 369 do not experience constraints).

Parameter	df	Estimate	SE	χ^2	P	Odds Ratio
Intercept	1	0.06	0.21	0.08	0.77	
Centrality to lifestyle 1		0.36	0.09	17.4	<0.0001	1.44a ^a

^a Odds ratio for a one-unit increase. Odds ratio for an χ unit increase = $e^{\chi(\text{Parameter estimate})}$.

to report work/family commitments, poor facilities, and crowded fishing areas as constraints on their fishing activity (Figure 3). Fishers who placed low importance on relaxation were more likely to report lack of fishing skills as a reason for not fishing more often. Compared to fishers who placed low importance on catching fish, fishers who placed high importance on catching fish were more likely to report crowded fishing areas and poor facilities, and less likely to report other leisure activities and lack of skills as reasons for not fishing more often (Figure 4).

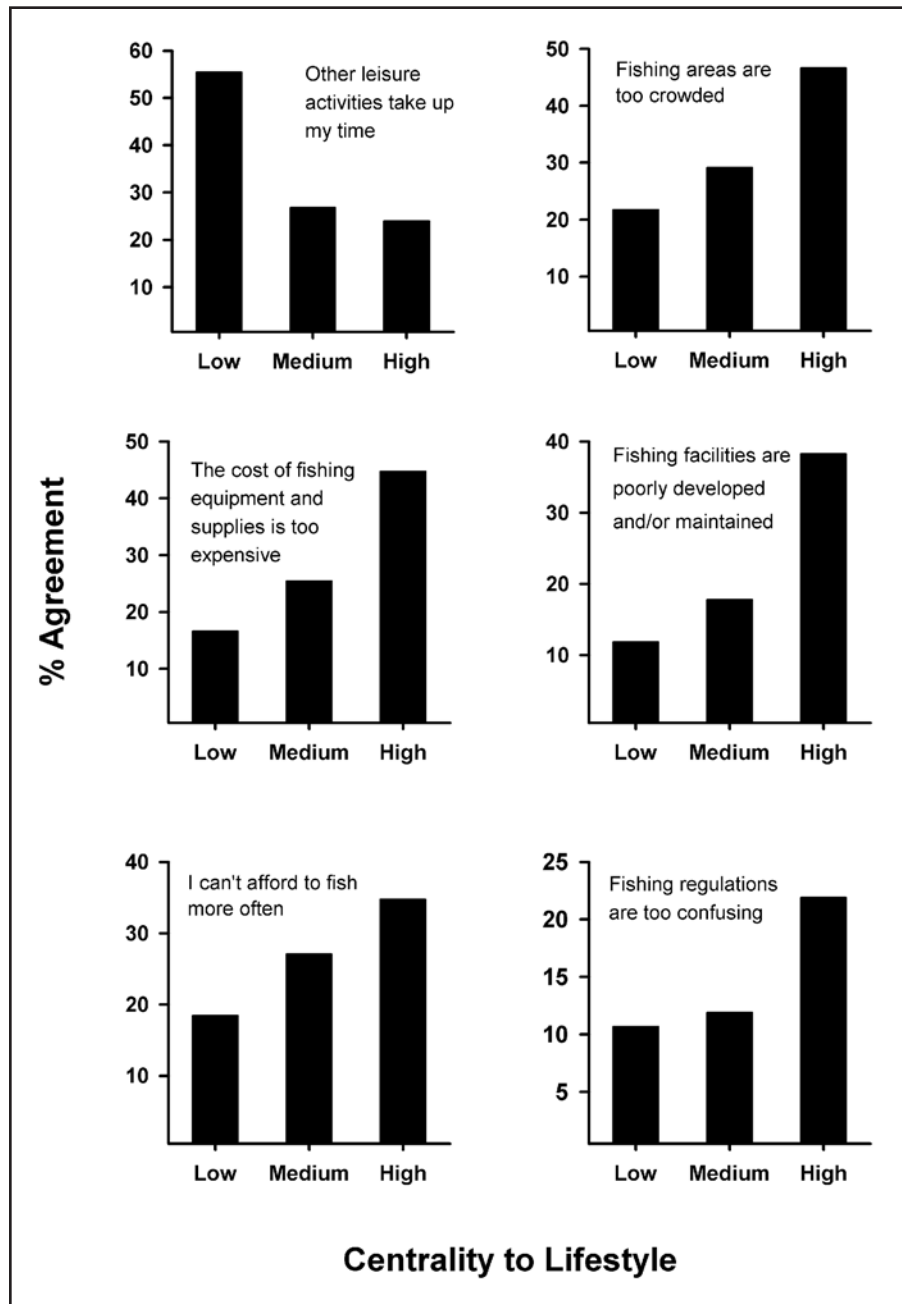
DISCUSSION

Constraints that intervene between fishers' desire to participate in fishing and their ability to participate at the desired frequency are encountered by a majority (70%) of active fishers in Queensland. Previous studies of constraints on fishing activity have suggested that a high prevalence of constraints is common (Ritter et al. 1992). For example, a series of surveys conducted in Texas have consistently found that approximately 75%–80% of Texas fishers report that there are factors that prevent them from fishing as often as they would like (Ditton and Hunt 1996; Anderson and Ditton 2004).

That such a high proportion of fishers perceive constraints on their fishing activity raises the question of how constraints affect fishing participation patterns and the benefits derived from fishing. This study found that fishers who report encountering constraints also report lower frequency of participation and lower satisfaction with fishing. However, given the nature of the data, it was not possible to determine whether reduced participation and lower satisfaction were a direct result of experiencing constraints. Additional work is needed to explore these relationships further and to understand how other variables (such as choice of fishing locations, target species, participation in other activities, etc.) are affected by perceived constraints. Further work will also be necessary to identify and understand fishers' strategies for overcoming or negotiating constraints, and how fishing participation patterns are affected by the ways in which constraints are negotiated (Jackson et al. 1993).

The constraints found to be most prevalent in this study were lack of time (due to other commitments), inadequate facilities (lack of facilities, or facilities too crowded),

Figure 1. Significant ($P < 0.05$ for all) relationships between centrality to lifestyle and fishing constraints for Queensland recreational fishers.



and costs associated with fishing. These results are largely consistent with the results of previous studies from North America that have investigated constraints on fishing (Ritter et al. 1992; Fedler and Ditton 2001) and other leisure activities (Jackson 1988). It should be noted, however, that respondents in this study were presented with a limited set of constraints from which to choose, and that most of the constraints presented to fishers were of the structural type (i.e., factors that directly interfere with participation). Previous studies covering a range of leisure activities

have identified well over 100 distinct leisure constraints (Jackson 1988). Moreover, in addition to structural constraints, intrapersonal constraints (i.e., factors that involve individuals' internal psychological processes that affect preferences toward activities), and interpersonal constraints (i.e., factors that result from interactions with other individuals) will likely also affect fishing participation (Crawford and Godbey 1987; Crawford et al. 1991; Fedler and Ditton 2001). Whereas the results of this study provide insight into some of the constraints experi-

Figure 2. Significant ($P < 0.05$ for all) relationships between income and fishing constraints for Queensland recreational fishers.

enced by Queensland fishers, the constraints identified here should not be taken as the only factors that affect fishing participation in Queensland. More work is needed to identify the full range of structural, intrapersonal, and interpersonal constraints experienced by Queensland fishers.

Previous research has suggested that females face additional and/or different leisure constraints than males (Searle and Jackson 1985; Raymore et al. 1993; Thomas and Peterson 1993). Only a minority (19%) of fishers randomly sampled in this study were female. This low fishing participation rate by females suggests that females in Queensland do indeed face more or different constraints on participation in fishing than males. However, active female fishers (i.e., those who have negotiated constraints that inhibit participation) were found to be less likely than males to report constraints that prevent them from fishing as often as they would like (although a strong majority of both males and females did report experiencing constraints). Furthermore, there were no substantial differences between active male and female fishers in terms of the types of constraints experienced. These results may indicate lack of major gender differences in constraints for active fishers in Queensland. However, lack of observed gender differences in terms of the types of constraints experienced may also be due in part to the limited set of constraints examined in this study. Clark (1996) found that female fishers were more affected than males by intrapersonal constraints (e.g., belief that fishing more is bad for the resource; feeling uncomfortable or self-conscious while fishing), but that there were few major differences between males and females in structural constraints such as those examined in the current study. To better understand gender differences in fishing constraints, future studies will need to focus specifically on the types of constraints likely to be encountered by females

Figure 3. Significant ($P < 0.05$ for all) relationships between importance placed on relaxation and fishing constraints for Queensland recreational fishers.

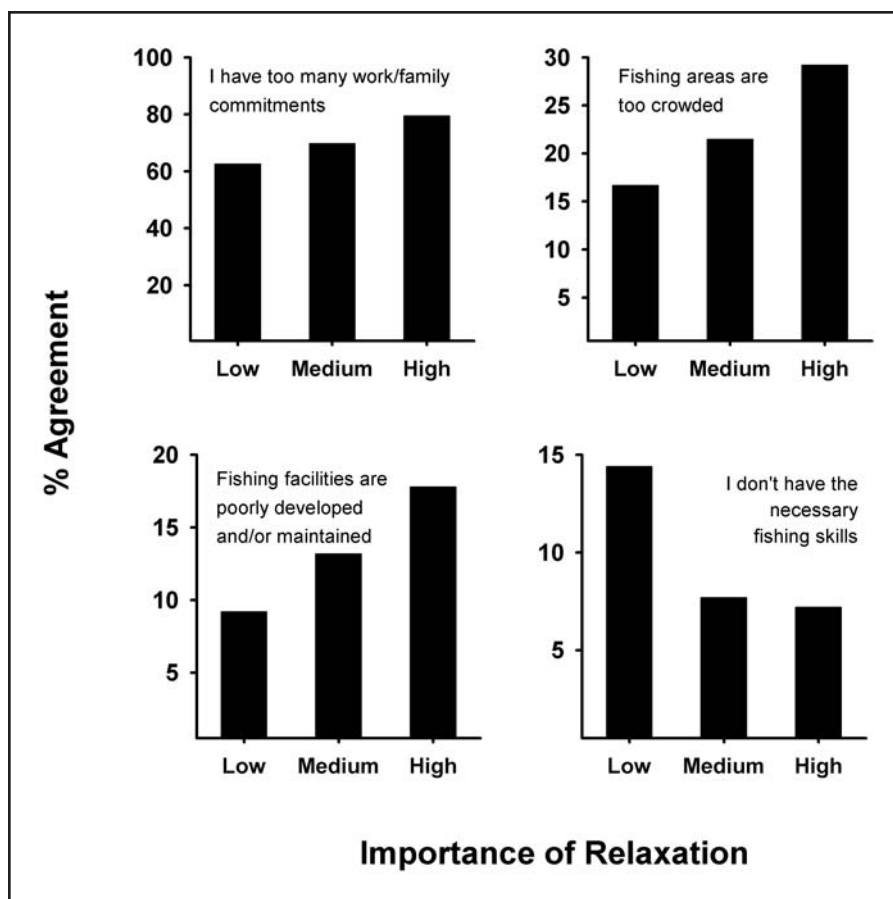
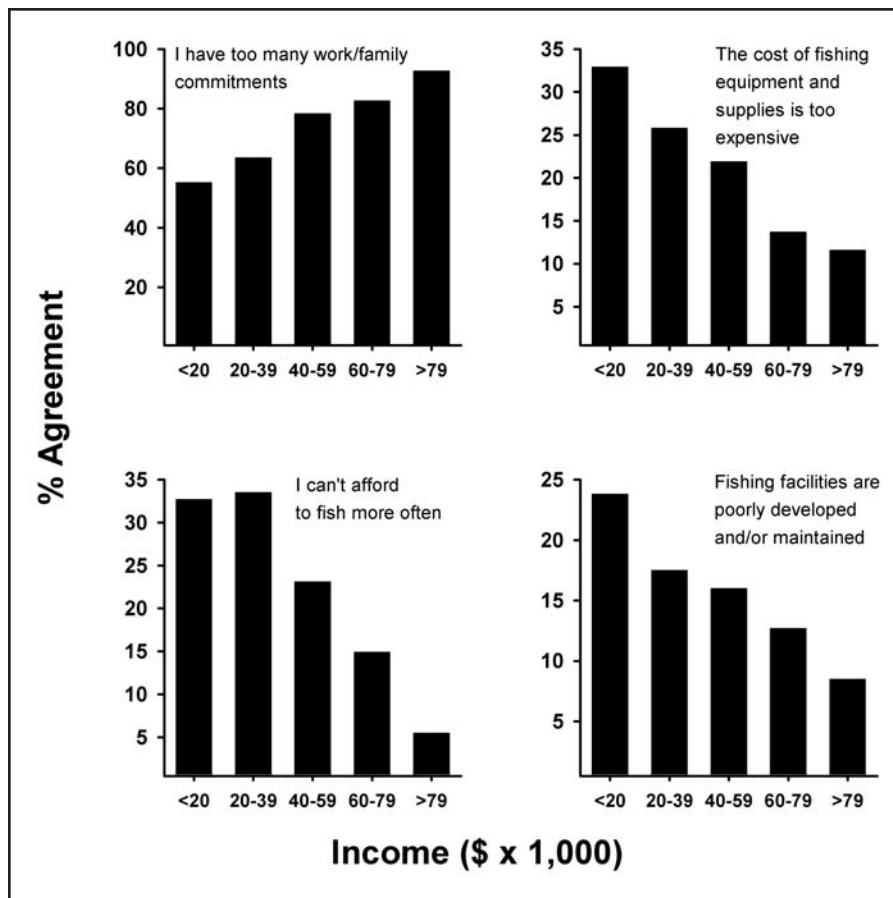
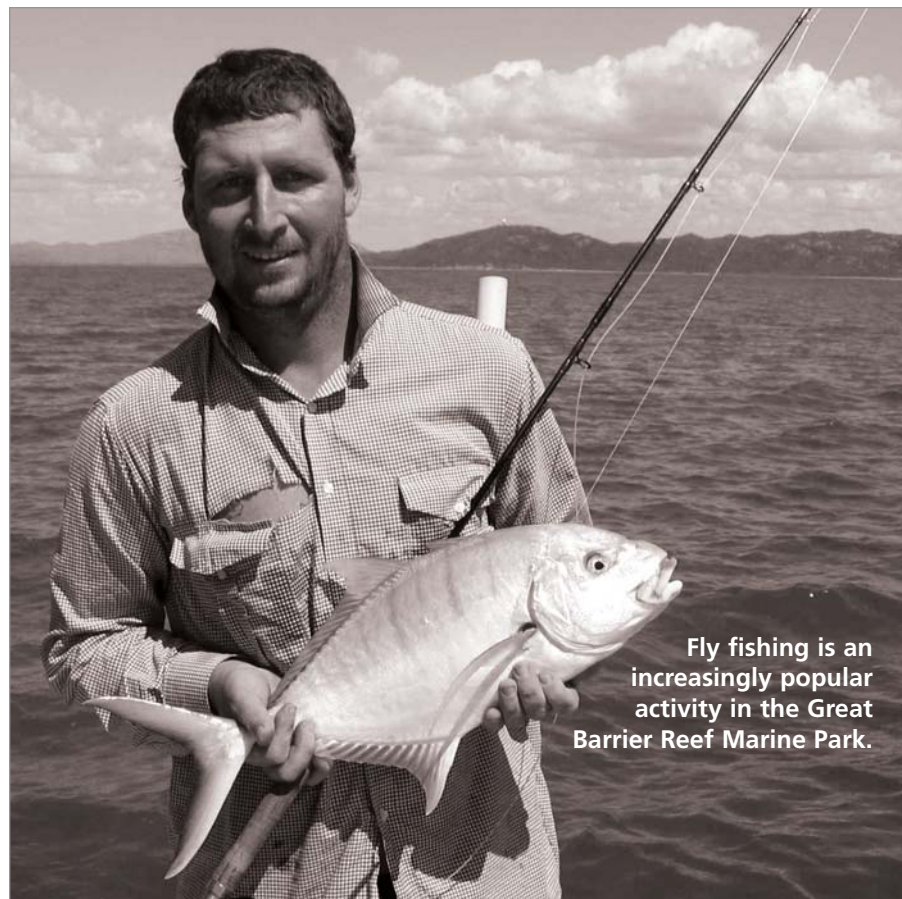
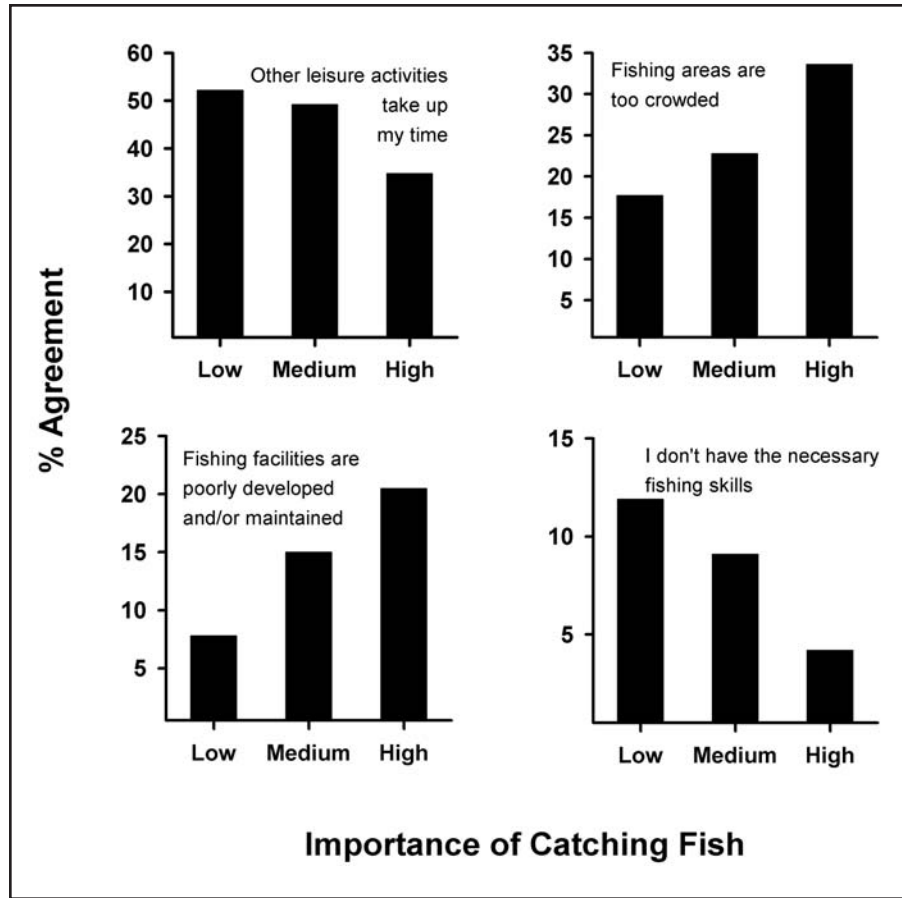


Figure 4. Significant ($P < 0.05$ for all) relationships between importance placed on catching fish and fishing constraints for Queensland recreational fishers.

(Henderson 1991; Henderson and Bialeschki 1991; Jackson and Henderson 1995).

Money is frequently identified as a leisure constraint (Jackson 2000). It is reasonable to expect that costs associated with fishing would be more of a constraint to low-income earners, which was clearly the case for fishers in this study (Figure 2). However, the overall relationship between income and the presence of constraints was positive (i.e., high-income earners were more likely to report experiencing constraints of any kind than low-income earners). Whereas high-income earners are not strongly affected by cost constraints, they do experience constraints unrelated to cost (e.g., lack of time due to other commitments). Results suggest that the constraints experienced by high-income earners have a stronger influence than the cost constraints experienced by low-income earners. At least one other study of leisure constraints found a positive relationship between income and the number of constraints experienced (Searle and Jackson 1985), suggesting that the relationship observed here may not be unique to recreational fishers in Queensland.

Committed fishers (i.e., those with higher centrality-to-lifestyle scores) were more likely to report experiencing constraints than their low-commitment counterparts. Highly committed fishers should be strongly dependent on fishing to meet their leisure needs (because other leisure activities have been rejected in favour of fishing; Buchanan 1985), and therefore desire a higher level of participation in fishing than less committed fishers (in the population studied here, low-centrality-to-lifestyle fishers fished an average of 19 days in the previous 12 months, compared to 36 days for high-centrality fishers). Not surprisingly, as commitment and avidity increase, so do the number of factors that prevent the desired high level of participation from being realized. High-centrality-to-lifestyle fishers were more affected by cost constraints than their low-centrality counterparts, probably because of high costs associated with maintaining a high level of participation and purchasing and maintaining the desired equipment. This study demonstrated a clear negative relationship



Fly fishing is an increasingly popular activity in the Great Barrier Reef Marine Park.

S. SUTTON



Shore-based fishers have access to a diversity of fishing opportunities in Queensland.

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between centrality to lifestyle and participation in other activities as a constraint on fishing, suggesting that more committed fishers do indeed have fewer leisure activities that compete with fishing.


Results of this study confirm the expectation that the amount and type of constraints experienced depends in part on the outcomes and satisfactions sought from the fishing experience. Fishers who placed high importance on catching fish and fishers who placed high importance on relaxing were more likely to experience constraints than fishers who placed lower importance on these motivations. Furthermore, fishers who placed high importance on these motivations were more likely to report experiencing some specific constraints (e.g., poor facilities and crowded fishing areas) that would prevent these desired outcomes from being achieved. A substantial body of research has demonstrated the existence of a wide range of motivations for fishing and variation in motivations among fishers and

between fisher populations (Knopf et al. 1973; Driver and Knopf 1976; Fedler and Ditton 1994). This is the first study, however, to address the question of how motivations influence the perception of constraints. Results suggest that a better understanding of the link between fishing motivations and constraints would be helpful for identifying important constraints for various sub-groups of fishers as well as helping find ways to aid the fishing public in negotiating the constraints they face.

This research was initiated in response to a sharp decline in recreational fishing participation in Queensland, and the corresponding need to gain a better understanding of the factors that influence fishing participation patterns. This study provided insight into the factors that constrain participation of active fishers, and identified various sub-groups within the Queensland fisher population that are likely to encounter constraints on their fishing activity. To fully understand how these and other constraints relate to the decline in

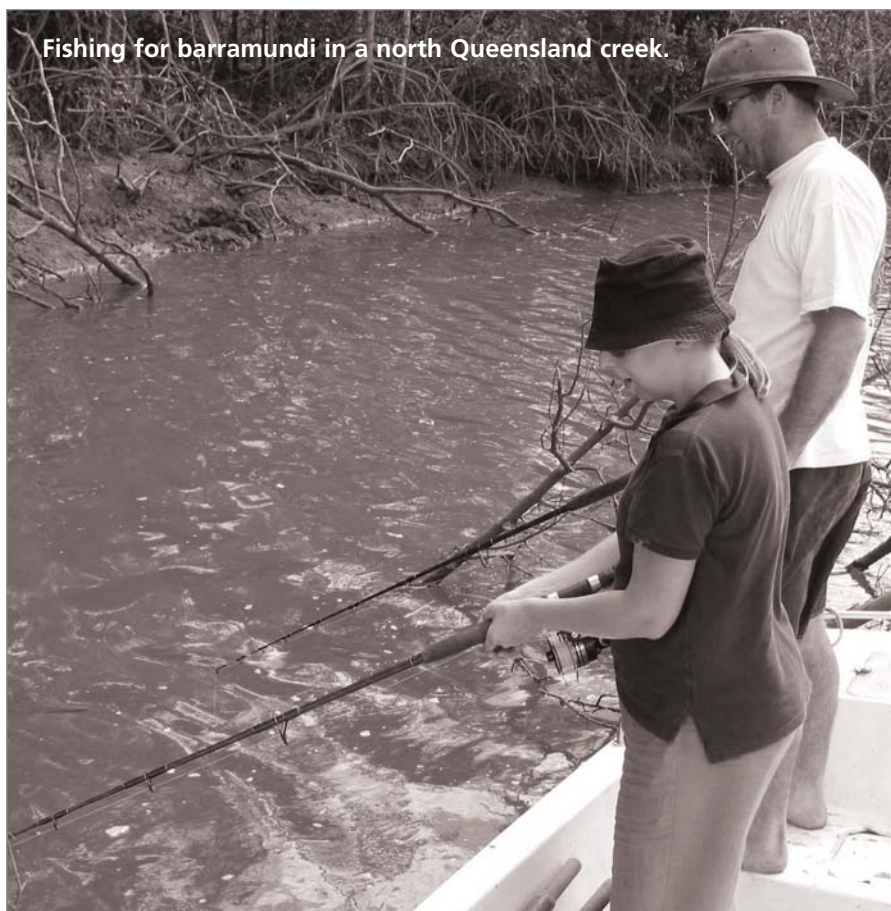
fishing participation state-wide, however, it will be necessary to identify and survey individuals who have recently discontinued participation in fishing. Such a study would provide an opportunity to query fishers directly about their reasons for dropping out of fishing, and to query former fishers about what, if anything, would encourage them to resume their fishing participation. Identifying fishing drop-outs is difficult, particularly in a jurisdiction like Queensland where fishing license information is not available to provide a sampling frame of fishers from previous years. However, the methodology used here—i.e., a random household telephone survey with a follow-up mail survey—could prove useful for identifying and surveying people who have fished previously but no longer do so.

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Fishing for barramundi in a north Queensland creek.

A. TOBIN