# A COMPARISON OF THE DEMOGRAPHIC CHARACTERISTICS, MOTIVATIONS FOR FISHING, AND CONSUMPTIVE ORIENTATION OF TEXAS URBAN AND RURAL ANGLERS

A Thesis

by

NATHAN WOLBER

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

December 2008

Major Subject: Wildlife and Fisheries Science

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Approved by:

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# ABSTRACT

A Comparison of the Demographic Characteristics, Motivations for Fishing, and Consumptive Orientation of Texas Urban and Rural Anglers. (December 2008)

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Chair of Advisory Committee: Dr. Robert Ditton

Sales of Texas fishing licenses have declined since 1988. Several authors have suggested that this decline is related to changes in the demographic characteristics of the Texas population, including increasing urbanization. As urban residents have been shown to participate in fishing less frequently than rural residents, the population of Texas residents most likely to engage in angling has declined accordingly. Based on these population trends, urban resident anglers (urban anglers) may represent the future of fishing. Information on urban anglers' demographic characteristics, motivations for fishing and consumptive orientation may be used to tailor and modify programs and policies targeting urban anglers.

The purpose of this thesis was to identify differences between urban and rural anglers and to determine if the two groups were distinct from so-called average anglers. The thesis utilized data from the 2002 Statewide Survey of Texas Anglers. The independent variable, residency, was determined on the basis of United States Census Bureau criteria. Dependent variables included demographic variables (e.g., gender, age, race/ethnicity, and income), motivations for fishing, and consumptive orientation.

Analysis of variance (ANOVA) and Kruskal-Wallis tests were used to compare mean scores among the three groups. The study found differences among urban anglers, rural anglers, and anglers in general in terms of their demographic variables, motivations for fishing, and consumptive orientation. The thesis also shows that by managing resources for average anglers, agencies may be ignoring important (and growing) constituencies.

# DEDICATION

For my wife.

# ACKNOWLEDGEMENTS

I would like to thank my committee chair, Dr. Robert Ditton, for his tireless help with my thesis and his invaluable input. I would not have a thesis without him. I would also like to thank my committee members, Dr. Michael Schuett, and Dr. Clark Adams, for their guidance and constructive criticism throughout the course of this research. Their helpful advice throughout this long and challenging process is much appreciated. Completing this thesis would not have been possible without the help of my fellow students in Dr. Ditton's Human Dimensions Lab. I have also relied on the efforts of past members of the Human Dimensions Lab; without their work crafting statewide surveys and compiling data, I would not have had a dataset to work with.

I would like to thank my friends and acquaintances at Texas A&M University for their comments and suggestions. Besides helping me with my thesis directly, they have offered encouragement and moral support. I must also express my gratitude to Shirley Konecny and Jennifer Baker for their patience and help.

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# CHAPTER I

## INTRODUCTION: THE FUTURE OF FISHING IN TEXAS

Although fishing remains a popular outdoor activity in Texas, changes in the state's demographic characteristics may lead to large declines in the angler population. In 2007, the United States Fish and Wildlife Service's National Survey of Fishing, Hunting, and Wildlife-Associated Recreation reported that 10% of Texas residents, or about 2.5 million individuals, participated in fishing during the previous year (United States Fish and Wildlife Service, 2007). However, as Tseng, Wolber, and Ditton (2006) noted, over 100,000 fewer Texas resident fishing licenses were purchased during the 2004 fiscal year than during the 2002 fiscal year. Declines were also observed over the preceding 13-year period (Figure 1). The Texas Parks and Wildlife Department (TPWD) has experienced a simultaneous decline in user-fee generated revenue as a result of the downward trend in fishing participation and subsequent loss of revenue from license sales (Murdock et al., 1996).

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This thesis follows the style and format of *Human Dimensions of Wildlife*.

Of course, the popularity of many activities declines over time (e.g., contract bridge [Scott & Godbey, 1994]). While the passing of many activities might go unmourned, a special urgency is associated with outdoor activities because they offer unique opportunities to interact with the natural world (Louv, 2005). Additionally, understanding how participation is affected by demographic trends aids in our understanding of the social context of leisure.

All persons between 16 and 65 years of age were required to possess a license while fishing in Texas public waters during 2002, the only conclusion that can reasonably be drawn from this downward trend in sales is that fewer people are purchasing fishing licenses in order to fish. These declines in license sales appear to be driven by changes in the composition of the state's population (Murdock et al., 1996). The Texas population has grown by approximately 3 million since 1990 (United States Census, 2001). Much of this growth has occurred in the Hispanic, Black, and Asian populations, groups typically underrepresented in fishing and other outdoor activities (Hunt & Ditton, 2002). Urban populations (also underrepresented in the fishing population) have grown as well (Murdock et al., 1992; Murdock et al., 1996). Projections suggest this growth will continue in the future (Murdock et al., 1992; Murdock et al., 1996).

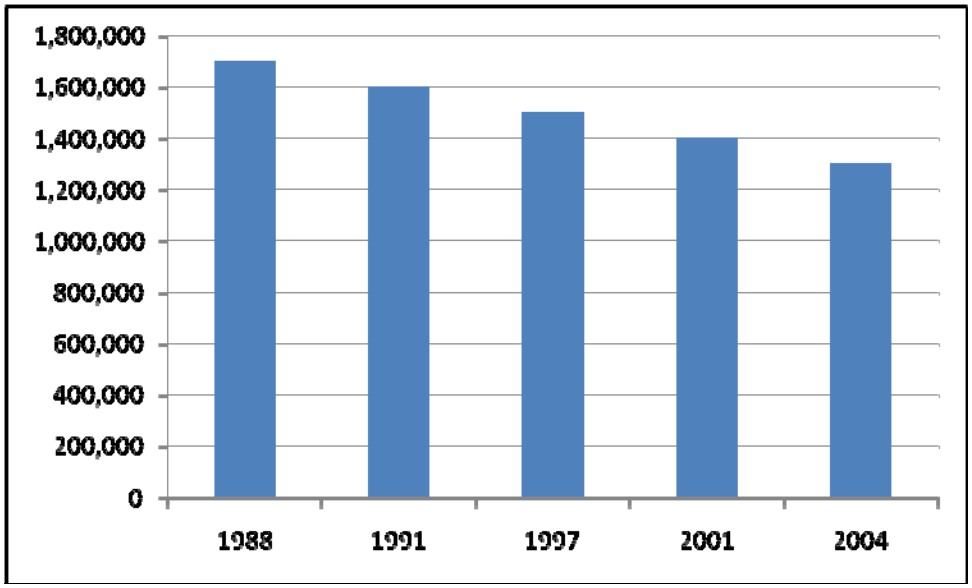


**Figure 1**
Declining sales of fishing licenses in Texas, 1988 – 2004

The TPWD and agencies in other states have responded to this trend by developing and promoting programs designed to increase urban residents' participation in fishing. Hunt (2000) suggested resource management agencies have implemented these programs for four reasons:

1. Agencies are seeking constituency support from newly-empowered urban populations.
2. Rural residents have historically had more access to fisheries resources; by providing opportunities to urban residents, resource management agencies are fulfilling their mandate to distribute resources equitably.
3. By introducing urban residents to fishing, agencies are cultivating urban residents' appreciation for natural resources.
4. By introducing urban residents to fishing, agencies generate revenue through license sales.

Although creating opportunities for fishing in urban areas represents an important first step towards a goal of increasing fishing participation among urban residents, such programs are not likely to be successful if they do not provide what urban residents expect from the fishing experience. Resource management agencies appear to have demonstrated limited understanding of the implications of demographic changes to participation in fishing (Hunt, 2000). By locating urban fishing sites in suburban areas, agencies cater to wealthier, White residents instead of lower-income, non-White residents who already enjoy fishing opportunities. When urban fishing sites are located in inner-city areas, they are often managed under the assumption that users of the facilities resemble supposed average (e.g., White) anglers (Hunt, 2000). To an extent, this is due to the relative lack of information about non-White anglers. National studies indicate most anglers nationwide are White (92%) (FWS, 2007), and non-White participants tend to be severely under-represented in angler surveys (Hunt, 2000). Additionally, agencies may choose to cater to their traditional or average clientele in the assumption that maintaining the status quo is less expensive and more predictable in the long run than re-designing programs for non-traditional angler groups.

As population projections show most Americans residing in large urban areas in coming decades (United States Census, 2007), understanding how urban anglers differ from rural anglers and anglers in general is essential for the equitable allocation of fishery resources. Equitable distribution of resources is necessary to fulfill the mandate of the TPWD: “To manage and conserve the natural and cultural resources of Texas and to provide hunting, fishing and outdoor recreation opportunities for the use and

enjoyment of present and future generations" (Texas Parks and Wildlife Department, 2007). More broadly, the consequences of failure to understand urban anglers include loss of constituent backing, loss of revenue from license sales, and potential conflicts between user groups (Hunt, 2000).

A greater understanding of the effects of residency on angling behavior would also provide a framework for understanding patterns in other activities. Americans are becoming increasingly aware of the need for public services to reflect (and cater to) the diversity of the population. Research into the effects of urbanization-associated variables bridges the gap between theory and practice by enabling managers to create effective programs based on established and tested theories.

## Statement of the Problem and Objectives

The purpose of this study was to provide a foundation for understanding the needs and expectations of urban anglers for planning and managing urban fishing opportunities, as well as to provide insight into theoretical questions regarding participation in fishing (and by extension, other outdoor activities). Data from the 2002 Statewide Survey of Texas Anglers (Anderson & Ditton, 2004) were divided into two discreet groups on the basis of urban or rural residency. The third group, anglers in general, was comprised of the entire sample of anglers. This group, which included both urban and rural anglers, was used to test for differences between urban and rural anglers and so-called average anglers. Residency was the primary independent variable of the study. Dependent variables included anglers' demographic characteristics (age, gender, race, and household income). A second group of variables included anglers' motivations

for engaging in fishing and anglers' consumptive orientation.

The following questions were examined in this study:

1. Do the demographic characteristics of urban anglers and rural anglers differ and how do they differ from anglers in general (the average angler)?
2. Do anglers in general, urban anglers, and rural anglers differ in their motivations for participating in fishing?
3. Do anglers in general, urban anglers, and rural anglers differ in their consumptive orientation?

## Justification for the Study

This thesis is expected to provide a foundation for understanding the needs and expectations of urban anglers for the purposes of planning and managing urban fishing opportunities, as well as providing insight into theoretical questions regarding participation in fishing and other outdoor activities. By providing profiles of urban and rural anglers and showing how these groups of anglers differ from each other and from anglers in general, the study will assist managers in evaluating current urban fishing programs and catering to urban anglers. At the same time, it is hoped the thesis provides insight into theoretical questions regarding the role of residency in determining participation in fishing and other outdoor activities. As the Texas population becomes increasingly urbanized, urban anglers should become a larger consideration in the TPWD's decision-making process. As urban anglers comprise less than one-third of Texas anglers overall, their voices may be overwhelmed by the greater influence of anglers residing in less urbanized areas.

## Definition of Terms

In the context of this study, “angler” refers to all individuals who purchased one or more of the following licenses: resident fishing licenses (type 201); combination resident hunting and fishing licenses (type 200); or Super Combo licenses (type 111), which consist of a resident hunting and fishing license and seven stamps (waterfowl, turkey, white-winged dove, archery, muzzleloader, saltwater fishing and freshwater trout). A percentage of fishing license purchasers who responded to the 2002 statewide survey reported never engaging in fishing (Table 1); although these non-fishing license purchasers are not technically anglers, they are included in the analysis because the majority of them probably purchase licenses with the intention of using them but do not go fishing for a variety of reasons.

**Table 1**
Statewide survey respondents who purchased a fishing license but did not report engaging in fishing during the previous 12 months.

| Year | Initial sample size | Number of respondents | Number of non-fishing license purchasers |
|---|---|---|---|
| 1991 | 10,000 | 5,341 | 294 |
| 1996 | 10,000 | 4,888 | 1,186 |
| 1999 | 10,000 | 4,052 | 648 |
| 2002 | 10,000 | 3,124 | 500 |
| 2006 | 3,554 | 1,136 | 207 |

This study will use the United States Census Bureau's definitions of urban and rural areas. The United States Census Bureau defines urban areas based on persons per square mile (United States Census, 2007). Census tracts with more than 500 persons per square mile are coded urban or urbanized areas (United States Census, 2007). Rural areas are defined as those census tracts outside of urban areas or urban clusters. In other words, rural areas are those areas that have not been designated urban areas (United States Census, 2007).

An index of urbanization with more components might enable more subtlety in classifying areas; however, population density appears to capture most of the widely perceived attributes of urban areas, especially as regards participation in outdoor areas. Population density itself, for example, would seem to impede participation in fishing and other outdoor activities nearby one's place of residence. For example, heavily populated areas are characterized by extensive networks of roads, parking lots, and other expanses of impervious surface cover (Adams, Lindsey, & Ash, 2006). Additionally, watercourses in populous areas are often channelized and other bodies of water are often too polluted for fishing or access to the water body is restricted (Adams, Lindsey, & Ash, 2006).

These factors compel urban anglers to travel outside of their city's limits, increasing the travel costs associated with fishing (Lawrence, 2008).

## Organization of Thesis

This thesis is divided into five chapters. Chapter I, The Future of Fishing in Texas, provides context for the study. The chapter includes a statement of the problem and objectives of the study, a list of study questions, justification of the study, and a definition of terms. Chapter II, The Influence of Urbanization on Angler Behavior, presents a discussion of previous research on the role of residency and demographic variables in determining participation in fishing, as well as a discussion of the relationship of residency and demographic variables with motivations for fishing and consumptive orientation. Chapter III, Methods, provides a description of the data, the survey methodology, and the data analysis used to answer the research questions. Chapter IV, Results, presents profiles of each angler group and answers to the research questions. Chapter V, Discussion and Implications for Management, concludes the thesis with a discussion of the implications of the research for management, policy recommendations, and suggested directions for further research.

# CHAPTER II

# LITERATURE REVIEW: THE INFLUENCE OF URBANIZATION ON ANGLER BEHAVIOR

This section summarizes the literature related to the influence of urbanization and other demographic characteristics on fishing participation and makes the case for connecting changes in urbanization-associated demographics with probable changes in fishing participation. As noted previously, a large body of literature has investigated the role of demographic characteristics in shaping an individuals' pursuit of their favored leisure activities. This literature provides insight into the variety of variables associated with urbanization that appear to shape participation in fishing and other outdoor recreational activities.

## Urbanization

Urbanization has been defined by the United Nations as the movement of people from rural to urban areas (The United Nations, 2005). The net result of this phenomenon is an increase in the area and population of urban areas. The effects of urbanization extend beyond simple increases in population: Urbanization shapes the political, economic, and social structures of a region (University of Michigan, 2006). Research has shown that individuals' recreation behavior is also affected by urbanization (Hendee, 1969). In addition to affecting fishing behavior (Arlinghaus & Mehner 2004), urbanization has been shown to affect perceptions of wildlife (Heberlein & Ericsson

2005) and other forms of recreation (Hendee, 1969).

Urbanization shapes behavior in two inter-related ways. First, the demographic characteristics of a region change with urbanization (Guest & Brown, 2005). For example, proportions of non-White residents increase along with urbanization (Guest & Brown, 2005). Additionally, average income at the regional level increases with urbanization (of course, many urban residents remain poor, but incomes overall tend to rise) (Guest & Brown, 2005). Finally, age and gender ratios are affected to an extent by urbanization (Guest & Brown, 2005). This last pattern is much more pronounced in China and other parts of the developing world: The construction industry attracts many younger, unmarried men from the countryside. Rapidly-growing regions in the U. S. (for example, the Sunbelt) would be more affected by this phenomenon than more slowly-growing regions. Research has consistently shown that sub-groups' (defined by gender, age, income, or race/ethnicity) fishing behavior differs from White males' in several aspects, notably motivations for fishing (Hunt 2000; Hunt & Ditton, 2001; and Hunt & Ditton, 2002). As the proportions of these sub-groups change with urbanization, the fishing patterns of the overall population should change accordingly.

These urbanization-associated affects have also been associated with constraints to participation (Murdock et al., 1996). Race and ethnicity are associated with interpersonal constraints to fishing (e.g., racism). Income constrains participation in fishing: Lower-income individuals do not have the disposable income necessary to participate in many forms of fishing (Arnold & Shinew, 1998). Other demographic factors associated with constraints to fishing are age (Floyd et al., 2006) and gender

(Bialeshki, 2005).

A final result of urbanization is a shift in the relationship of urban residents to rural areas. Richard Louv has written extensively about the way urban residency disconnects individuals from the natural world (Louv, 2005). This disconnection leads to changes in residents' attitudes towards wilderness areas, animals, and outdoor recreation (Heberlein & Ericsson, 2005). Within the context of fishing, urbanization affects the relationship of the angler to the resource. Urban anglers compensate for urbanization by emphasizing different aspects of the sport (Arlinghaus & Mehner, 2004). For example, some urban anglers appear to prefer fishing experiences in rural, less developed areas as a means of escaping the stress associated with urban life (Arlinghaus & Mehner, 2004). In comparison with rural anglers, urban anglers appear to de-emphasize catching and keeping fish for consumption (Arlinghaus & Mehner, 2004). Changes in anglers' motivations and consumptive orientation are also associated with demographic changes. Compared to White anglers, non-White anglers tend to emphasize companionship and family recreation (Hunt & Ditton, 2002).

Although these behavioral/attitudinal effects of urbanization within the U. S. are probably tempered by several factors, the constraints associated with urbanization should persist. For example, many urban residents are likely recent migrants from rural areas. These residents may retain rural attitudes towards natural resources (Heberlein & Ericsson, 2005). Additionally, urban residents with strong ties to the countryside (e.g., land-owning relatives or friends, or residents with sufficient income to frequently visit rural areas) are able to develop stronger relationships than residents without such ties

(Heberlein & Ericsson, 2005). However, sub-groups are still sub-groups, regardless of individuals' history of urban residency. The participation of blacks will be affected by constraints regardless of residency (Floyd et al., 2006); however, these differences should become pronounced with urbanization as population characteristics change (Murdock et al., 1992; Murdock et al., 1992b; Murdock et al., 1996).

## Constraints

A major factor affecting participation in fishing and other recreational activities are the various constraints all individuals face in pursuing recreational activities (Jackson, 2005). Constraints are those "…factors that are assumed by researchers and/or perceived or experienced by individuals to limit the formation of leisure preferences and/or to limit the formation of leisure preferences and/or to inhibit or prohibit participation in nature" (Jackson, 2005; p. 62). The magnitude of these constraints appears to be determined by the characteristics of the individual (e.g., the individual's demographic characteristics and personal experiences) (Jackson, 2005). In other words, different groups of people (whether defined by gender, age, race, income, or other factors) experience different constraints to participation (Hunt & Ditton,1996; Jackson, 2005). A review of the literature suggests that the key urbanization-related constraints are age, gender, income, and race/ethnicity.

### *Age*

Several studies suggest urban anglers may be older on average than rural anglers. In a mail survey of Texas urban anglers, Hunt & Ditton(1996) found that most urban

anglers were over 40 years of age. The mean age for urban anglers was 47 years, older than the mean age for anglers overall (42 years). Several factors account for this disparity. Age tends to constrain activity, and many people likely give up relatively strenuous outdoor activities like fishing for less stressful activities (McGuire & Norman, 2005; McGuire, Dottavio, & O'Leary, 1986). Additionally, as people age the size of their cohort group shrinks. Shrinking cohorts leave aging anglers with fewer fishing partners with which to participate. Finally, researchers have called attention to the significance of ageism within our society. Ageism is the widespread tendency to think of older individuals as less valuable or capable (Gross, Gross & Seldman, 1978). As with other intrapersonal constraints, ageism (both external and internal) discourages older people from participating in outdoor activities, including fishing. As the Baby Boom generations ages, retires, and becomes less active, age-related constraints will probably become more problematic (Murdock, 1992; Murdock 1992b; Murdock 1996). This trend is widely expected to affect participation in outdoor recreational activities negatively (Loomis, 1991).

*Gender*

Gender is apparently "…the most consistently significant predictor of fishing participation" (Floyd et al. 2006; p. 362). Most anglers in Texas and nationwide are male; fewer than one in four anglers are female (United States Fish and Wildlife Service 2006). Hunt (1996) found that about 85% of Texas urban anglers were male. Most Texas freshwater anglers (85%) and saltwater anglers (86%) are also male (Tseng, Wolber, and Ditton, 2006). The Texas urban angler population is as male-dominated as the Texas

angler population in general.

Disproportionate male representation in fishing is explained by several factors. The maleness of fishing, resulting from the activity's historical dominance by males, probably discourages females from participating (Kuehn, Dawson, & Hoffman 2006, Schroeder et al. 2006). Urban female anglers, particularly those who were born and reared in urban environments, appear to be even less likely than urban males to have been socialized into the activity (Dargitz, 1988).

In addition to constraints associated with socialization into fishing, female anglers are constrained by lack of time (Henderson & Bialeshki, 1993) and concerns about safety (Bialeshki, 2005). In the American culture, women are often expected to look after children (Henderson & Bialeshki, 1993). As a result of this expectation, female anglers in charge of young children may be reluctant to expose their children to drowning and other risks associated with fishing (Shaw & Henderson, 2000).

Several authors (e.g., Henderson & Bialeschki, 1993; Green & Hebron, 1988) have suggested that a lack of perceived entitlement to leisure is another factor limitation female fishing participation. Henderson and Bialeschki (1993) reported that women felt that recreation was last on a long list of other priorities, with family and work taking precedence. This last factor is related to both lack of socialization and time-related constraints; the effect of which create an atmosphere in which females face real and perceived opposition to ever participating in fishing.

*Income*

Previous research has also established that lower-income individuals are often discouraged by lack of financial resources from participation in outdoor activities (Arnold & Shinew, 1998). Although fishing may be less expensive than other outdoor activities (e.g., downhill skiing and power boating) anglers nevertheless face a variety of costs when pursuing their activity. License fees, park entrance fees, tackle, bait, and transportation are among the costs anglers may face during each fishing trip. Additionally, as Tseng, Wolber, and Ditton (2006) report, fishing in Texas is primarily boat-based. More than half (57%) of Texas anglers own boats. As most land in Texas is privately owned, many waterways are inaccessible to shore anglers. This lack of access to resources leads to a situation where boat ownership is effectively required. Such costs associated with access appear to constrain lower-income anglers from fishing more frequently (Floyd et al., 2006).

Generally speaking, rural residents have lower incomes than urban residents (Arnold & Shinew, 1998). Accordingly, one might assume that rural residents participate in fishing less frequently than urban residents. However, the income constraints felt by rural residents may be compensated for by increased access to fishing resources: Rural residents may be closer to water bodies or have greater access (via social networks) to fishing areas on private land.

*Race/Ethnicity*

The U. S. angler population is predominantly White (Floyd et al., 2006), as is the population of Texas anglers. Based on the characteristics of the greater Texas population, non-Whites should represent about 1/3 of the angler population (United States Census, 2007). Studies have shown that the actual rate of non-White fishing participation in Texas is considerably lower. Tseng, Wolber, and Ditton (2006) found that about 85% of anglers self-identify themselves as White.

Many Blacks and other non-Whites have never had opportunities to fish. Dargitz (1988) noted that "…being Black has a negative effect on having the opportunity to have ever gone fishing (p. 198). From a 1998 study of Texas anglers, Floyd et al. (2006) concluded that many of the race-based differences in fishing participation are based on differing opportunities to fish, with many non-Whites living in areas lacking in fishing resources. For those non-Whites able to travel to fishing areas, interpersonal constraints, including concerns about discrimination, may constrain fishing participation.

Several researchers (e.g. Bixler, Floyd, & Hammitt 2002; Bixler & Floyd 1997) have suggested non-White under-participation is due to fear of touching fish, different orientation towards nature, and other interpersonal constraints. However, Floyd et al. (2006) concluded that Whites and non-Whites were equally interested in fishing and that both groups were equally likely to self-identify as anglers. Several studies (e.g., Hunt & Ditton 2002; Washburne, 1978) have also shown that Whites and non-Whites participate in fishing at similar rates. As both groups are interested in fishing and would prefer to participate at similar rates, differences in participation between the two groups are likely

due to the influences of constraints.

*Residency*

Participation in fishing is also affected by residency, as smaller percentages of urban residents appear to participate in fishing than rural residents (Arlinghaus & Mehner, 2004; Aas, 1996; Hendee, 1969). This observation is supported by data at the national level (United States Fish and Wildlife Service, 2007). The US population is transitioning from nation where most of the population resided in rural areas (around 1900) to one in which 8 of every 10 residents live in urban areas with populations over 50,000 (Lindsey, 2003). Apparently, these shifts in residency have also lead to decreases in participation in fishing.

Differing rates of participation in fishing among urban and rural populations appears to be due to several factors related to urban/rural residency, including several constraints to participation uniquely experienced by urban anglers (Dargitz, 1988). Urban populations appear to have fewer opportunities to participate in fishing than rural populations. Although most Texas cities are situated near coasts or bodies of water, and many contain numerous reservoirs or ornamental bodies of water, these urban water bodies are often polluted (or perceived by residents as polluted) (Adams, Lindsey, & Ash, 2006). Concerns about health hazards may discourage urban anglers from utilizing urban water bodies. Urban anglers desiring fishing opportunities are thus compelled to seek opportunities outside of the urban area, incurring additional, and potentially prohibitive, travel costs (Lawrence, 2008).

## Motivations for Fishing and Consumptive Orientation

Urban residents who engage in outdoor recreation, especially so-called wild land recreation, appear to prefer experiences not available within urban areas (Hendee, 1969). Hendee concluded that these experiences or conditions include limiting contact with other people and reducing the stress associated with urban life (1969). In a study of Berlin metropolitan anglers, Arlinghaus and Mehner (2004) concluded that these escape motivations were dominant among Berlin anglers. When Berlin anglers were segmented into groups of anglers fishing within the Berlin metropolitan area and anglers fishing outside the metropolitan area, the authors found that those anglers fishing outside of Berlin indicated preference for fishing in remote areas. Several authors (e.g., Schramm & Dennis, 1993; Sutton and Ditton, 2001) have concluded that urban anglers' motivations for fishing are dictated by their environments, with urban anglers preferring experiences available within the urban area.

Although individuals' choice of, and frequency of participation in, a recreation activity is influenced by their demographic characteristics, these characteristics do not appear to influence an angler's motivations or preferred psychological outcomes of participation (Driver & Cooksey, 1977). Driver and Cooksey (1977) failed to find any age, gender, or race-based differences in anglers' preferred psychological outcome of the fishing experience. From this, the authors concluded that demographic characteristics should not be viewed separately. Although age-based differences in preferred psychological outcomes may not exist, when viewed in conjunction with other characteristics, age-based differences become significant. Older, more affluent anglers,

for example, prefer different experiences than younger, less-wealthy anglers. Similarly, Bohnsack (2002) failed to find any gender-based differences between anglers with the same level of fishing specialization (determined by commitment to fishing, frequency of participation, or preferred fishing location or method, among other measures). From this he concluded that gender-based differences are based more on constraints than motivations for fishing.

Research has revealed a potential relationship between race and motivations for participation in fishing. Hispanic American anglers have been shown to be motivated by different aspects and desired outcomes of the fishing experience than White anglers (Hunt 2000; Hunt & Ditton, 2001; and Hunt & Ditton, 2002). In a comparative study of White and Hispanic American anglers, Hunt and Ditton (2001) found that the motivations of anglers who self-identify as Hispanic American are different from those of non-Hispanic American anglers. The authors conclude that the primary motivation of Hispanic American anglers is spending time with family outdoors. Additionally, for Hispanic American anglers the wildness or natural aspects of fishing locations are less important than the location's accessibility and safety (Hunt & Ditton, 2001). Research suggests that the same patterns shaping Hispanic-American anglers also apply to anglers in other racial groups. Asians, Blacks, and American Indians all appear to be motivated by different aspects of the fishing experience than Whites to a greater or lesser extent (e.g., Dunn & Feather, 1998; Floyd et al., 2006; Hunt & Ditton, 2002).

A variety of demographic and esthetic factors have been shown to affect an individuals' pursuit of their favored leisure activities. Demographic characteristics in particular influence participation in fishing, both directly through constraints and indirectly through subtle shifts in anglers' consumptive orientation and motivations for fishing. As the U. S. population becomes more urbanized and the demographic characteristics of urban areas change, the characteristics of the average angler will change accordingly. This section summarized the literature related to the role of demographic characteristics on fishing participation and made the case for connecting changes in demographics associated with urbanization with probable changes in fishing participation.

# CHAPTER III

# METHODS

This chapter provides a comprehensive view of the various methods used to complete the thesis. The first section describes the statewide survey utilized in the survey and briefly summarizes the sampling methodology and response rates of the survey. The second section presents and discusses the dependent and independent variables used, and the final section discusses the data analysis used to explore group differences.

## Data

This study utilized secondary data obtained from the 2002 Statewide Survey of Texas Anglers (Anderson & Ditton, 2004) conducted by the TAMU Human Dimensions Lab for the TPWD (Table 2). The TAMU Human Dimensions Lab has conducted these surveys of Texas anglers' demographics, participation, motivations, and management preferences for the past two decades. The most recent survey was conducted in 2006 (Tseng, Wolber, & Ditton, 2006). As the most recent (2006) survey did not yield sufficient numbers of rural anglers for comparison, the previous survey was used. The slight temporal bias resulting from using data collected six years previously should be taken into consideration when interpreting the results.

*Sampling Design*

The methodology used in the 2002 statewide survey is described in greater detail in the report completed for the TPWD (Anderson & Ditton, 2004). For the survey, a stratified random sample of Texas resident fishing license holders was selected from resident fishing license files maintained by the TPWD. The sample size of resident fishing license holders for the survey is displayed in Table 2. The sample was drawn electronically and included individuals who purchased a resident fishing license (type 201), a combination resident hunting and fishing license (type 200), or a Super Combo license (type 111), which consists of a resident hunting and fishing license and seven stamps (waterfowl, turkey, white-winged dove, archery, muzzleloader, saltwater fishing and freshwater trout).

The survey used the method described by Salant & Dillman (1994) This procedure involves four mailings (as necessary) of the questionnaire. Each mailing of the questionnaire included a personalized letter on TPWD letterhead. A reminder/ thank you postcard was sent to each potential respondent about one week after the initial mailing. A final copy of the questionnaire with personalized letter was mailed approximately seven weeks after the first mailing. The final cut-off day for returned surveys was generally about four months after the initial mailing. Responses were logged into a database and processed upon receipt by TAMU Human Dimensions lab staff. Non-deliverables were investigated immediately and re-mailed to the corrected address if possible.

**Table 2**
Year, sampling frame, initial sample size, response rate, and authors of 2002 survey.

| Year | Sampling Frame (Fiscal Year) | Initial sample size | Number of respondents | Response rate (percent) | Authors |
|---|---|---|---|---|---|
| 2004 | 2001 | 10,000 | 3,124 | 40 | Anderson & Ditton, 2004 |

*Questionnaire Design*

Questionnaire items were developed in conjunction with TPWD Coastal and Inland Fisheries Divisions personnel and assessed anglers' behaviors, consumptive orientations, and fisheries management preferences. A combination of close-ended and open-ended questions were used in the questionnaire. Close-ended questions included several Likert scale items to assess the importance of a series of motivations for fishing and the importance of a number of attitudinal statements dealing with the catch-related aspects of fishing. About one-quarter of the questionnaire was devoted to freshwater fishing, about one-quarter to saltwater fishing, and the remainder dealt with general fishing behaviors and demographics. A copy of the questionnaire is included in the appendix.

Anglers' motivations for fishing and demographic characteristics were measured using the aforementioned Likert scale items, categorical items, and ordinal items, respectively. These questions assessed both non-catch motivations (that can be experienced in a wide range of outdoor recreation activities besides fishing) and catch-related motivations (that can only be experienced by participating in fishing). The questionnaire also included a number of demographic questions including age, gender,

income, ethnicity, and race to enable comparisons of the angler population and the overall population using United States Census data.

## Independent Variable

Residency of respondents was determined using United States Census Bureau criteria and respondents' 5-digit ZIP codes. Responses from urban and rural anglers were identified and sorted from the data using a filter function. The third group, anglers in general, was comprised of the entire sample of anglers. Although the names and addresses of survey respondents were destroyed by the original investigators to ensure confidentiality, their ZIP codes were retained for follow-up research purposes. Using data available from the Missouri Census Data Center, anglers' ZIP codes were matched with their corresponding Zip Code Tabulation Area (ZCTA) (Missouri Census Data Center, 2008). As United States Census data on ZCTAs includes urban/rural classification, the residential characteristics of anglers can thus be identified. Because this data set was accessible to the researcher, there was no need for a new, large-scale survey of licensed Texas anglers for the present study.

The urban or rural classification of a ZIP Code Tabulation Area (ZCTA) is based on the percentage of urban census tracts within the ZCTA. For the 2000 census, the United States Census Bureau introduced the ZCTA, a survey unit roughly corresponding to the US Postal Service's ZIP Code. The ZCTA category is an attempt to link ZIP codes with United States Census data for marketing purposes (United States Census, 2001). ZCTAs are named according to the ZIP code they correspond to (e.g., ZCTA 77840 is the ZCTA corresponding to ZIP Code 77840). As ZIP codes and ZCTAs were created

for different purposes, the two units are not equivalent (United States Census, 2001). ZCTAs tend to resemble gerrymandered administrative districts (United States Census, 2001). Although imperfect, using ZCTAs is a practical means of identifying the residency of survey respondents (Grubesic, 2008).

## Dependent Variables

The primary dependent variables investigated were anglers' motivations for participation in fishing, anglers' consumptive orientation, and several demographic variables (including age, gender, income, and race). The independent and dependent variables and how they are operationalized are presented in Table 3 below.

## Analysis

SPSS statistical software was used to create profiles of urban anglers, rural anglers, and anglers in general (SPSS Inc., 2008). The software was also used to perform one-way analysis of variance, or ANOVA, and Kruskal-Wallis tests. Angler profiles were generated using frequencies and other descriptive statistics. Research questions were answered using one-way ANOVA and Kruskal-Wallis tests. One-way ANOVA tests with Tukey and Bonferroni post-hoc tests enabled the author to determine if and how angler groups differed in terms of the independent variables. ANOVA tests are commonly used to determine differences in the means of one or more independent variables between multiple groups defined by dependent variables (Ott & Longnecker, 2001). For motivations and consumptive items, Kruskal-Wallis tests were used. The Kruskal-Wallis test is a nonparametric alternative to the ANOVA test and is more

suitable for Likert scales and other ordinal dependent variables (Ott & Longnecker, 2001). ANOVA and Kruskal-Wallis tests both assume homogeneity of variance between groups. In other words, there should be a minimal number of outliers for each variable in each group. Additionally, the tests assume adequate sample size (with larger sample sizes resulting in more robust results), random sampling, and similar sample sizes. For both tests, significance was set at $p \leq 0.05$. This level of significance is commonly understood to prove that between-groups differences are real and not due to chance (Ott & Longnecker, 2001). Profiles of urban and rural anglers and results of the ANOVA test are presented in the next chapter.

**Table 3**

Description and operationalization of independent and dependent variables.

| | Variable | Description | Operationalization |
|---|---|---|---|
| *Independent Variables* | | | |
| | Residency | Urban residency[1] | Binary |
| | | Rural residency[2] | Binary |
| *Dependent Variables* | | | |
| | Gender | Self-identified gender[3] | Categorical |
| | Age | Age[4] | Ordinal |
| | Age category | Age category[5] | Categorical |
| | Race | Self-identified race[6] | Categorical |
| | Income | Income category[7] | Categorical |
| | Motivations | Motivations for participating[8] | 5-item Likert scale |
| | Consumptive orientation | Attitudes regarding activity-general and activity-specific aspects of fishing[9] | 5-item Likert scale |

[1]Includes anglers residing in ZCTAs coded 100% urban.
[2]Includes anglers residing in ZCTAs coded 0% urban.
[3]Male or female.
[4]In years.
[5]19 years or younger, 20-29 years, 30-39 years, 40-49 years, 50-59 years, 60-65 years, 5 years or older.
[6]White, Black, Hispanic, Asian or American Indian, and Other/Mixed Race.
[7]In 11 increments of $10,000, ranging from less than $10,000 to more than $100,000.
[8]Anglers were asked to indicate how important each item was on a scale ranging from 1 (Not at all important) to 5 (Extremely important)
[9]Anglers were asked to indicate agreement or disagreement with each item on a scale ranging from 1 (Strongly disagree) to 5 (Strongly agree)

# CHAPTER IV

# RESULTS

This chapter presents the quantitative analyses relative to the study's research questions. The following questions were examined in this study: Do the demographic characteristics of urban anglers and rural anglers differ from each other and from anglers in general; do anglers in general, urban anglers, and rural anglers differ in their motivations for participating in fishing; and do anglers in general (so-called average anglers), urban anglers, and rural anglers differ in their consumptive orientation? Profiles of anglers in general, rural anglers, and urban anglers are presented first. The angler profiles are followed by the results of tests for differences among the groups in terms of demographic and participation variables. Finally, a summary of the results is presented at the end of the chapter.

## Anglers in General

This group included all anglers who responded to the 2002 Statewide Survey of Texas Anglers (n = 3,215). The profile presented below is a summary of the overall characteristics of these anglers. This profile was used later in the thesis for comparison purposes (to identify differences between urban anglers, rural anglers, and so-called average anglers).

Most (64%) Texas anglers resided in ZCTAs that were not coded 100% urban or 100% rural (Figure 2). The United States Census Bureau does not have a separate

category for these more variable ZCTAs. Anglers that reside in these particular ZCTAs were not able to be classified into residency-based groups, since the group includes anglers ranging from less than 1% urban to greater than 99% urban.

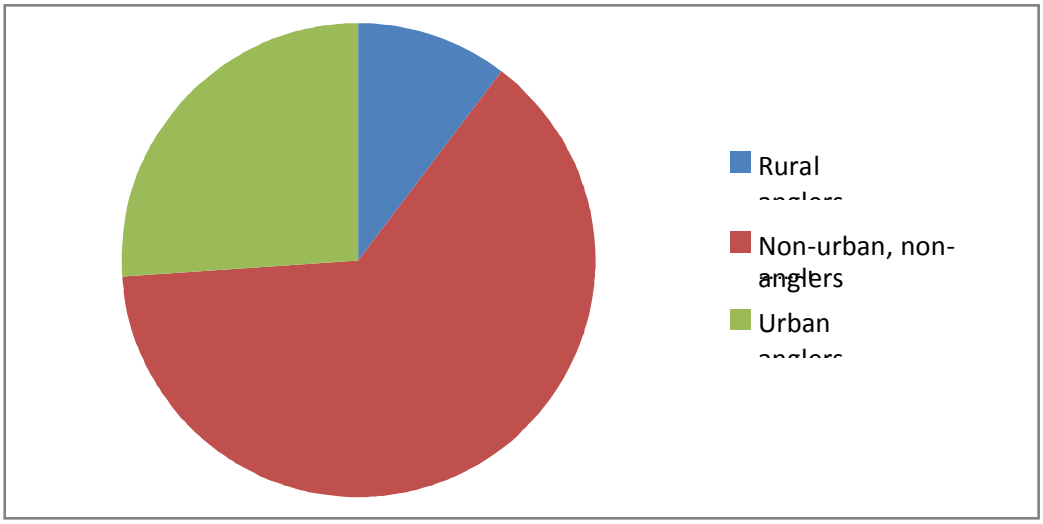


**Figure 2**
Residential characteristics of anglers in general (n = 3,215).

*Demographic Characteristics*

Most anglers in general were middle-aged males between 40 and 49 years of age (Tables 4 and 5). Few anglers in general were older than 65 years. As anglers older than 65 are eligible for a special, discounted license in Texas, few older anglers may have purchased regular fishing licenses. Most Texas anglers in general self-identified as White non-Hispanics with small percentages for other ethnic or racial groups (<15%).

The average household income of anglers in general in 2002 was between $60,000 and $69,999 (Table 4). Six percent of anglers in general reported combined household incomes of less than $20,000, while about two-fifths reported combined household incomes of more than $70,000.

*Motivations for Fishing*

The top three activity-general items rated by anglers in general as either very important or extremely important were: “To be outdoors” (86%), “For relaxation” (85%), and “To get away from the regular routine” (77%) (Table 6). Overall, eight activity-general reasons for fishing were considered very important or extremely important by a majority of anglers in general. Majorities of anglers in general considered two activity-specific items very important to extremely important: “For the experience of the catch” (73%), and “For the challenge or sport” (55%). A majority of anglers felt that three activity-specific items (“To test my equipment” [56%], “To obtain a ‘trophy’ fish” [63%], and “To win a trophy or prize” [83%]) were not at all important to slightly important.

**Table 4**
Gender, cohort, self-identified race/ethnicity, and income group of anglers in general (n = 3,215).

| Variable | Category | Number of anglers | Percentage of Sample (%) |
|---|---|---|---|
| Gender (Std. dev. 0.38) | | | |
| | Male | 2,594 | 80.70 |
| | Female | 546 | 17.00 |
| Age (Std. dev. 1.18) | | | |
| | 18-29 years | 295 | 9.40 |
| | 30-39 years | 584 | 18.60 |
| | 40-49 years* | 943 | 30.00 |
| | 50-59 years | 872 | 27.80 |
| | 60-65 years | 438 | 13.90 |
| | 65 or more years | 9 | 0.30 |
| Race (Std. dev. 0.76) | | | |
| | White | 2,632 | 85.20 |
| | Black | 86 | 2.80 |
| | Hispanic | 312 | 10.10 |
| | Asian and American Indian | 37 | 1.20 |
| | Other/Mixed Race | 23 | 0.70 |
| Income (Std. dev. 2.98) | | | |
| | Less than 9,999 | 76 | 2.60 |
| | 10,000 – 19,999 | 111 | 3.80 |
| | 20,000 – 29,999 | 227 | 7.80 |
| | 30,000 – 39,999 | 303 | 10.40 |
| | 40,000 – 49,999 | 326 | 11.20 |
| | 50,000 – 59,999 | 333 | 11.40 |
| | 60,000 – 69,999* | 284 | 9.70 |
| | 70,000 – 79,999 | 277 | 9.50 |
| | 80,000 – 89,999 | 207 | 7.10 |
| | 90,000 – 99,999 | 161 | 5.50 |
| | 100,000 and above | 617 | 21.10 |

*Indicates median for variable

**Table 5**
Average and median age of anglers in general (n = 3,215).

| Variable | St. dev. | Average | Median |
|---|---|---|---|
| Average age | 11.51 | 46.18 | 47 |

*Consumptive Orientation of Anglers*

Majorities of anglers in general agreed or strongly agreed with a total of five statements. The top three most agreed with statements were: “A fishing trip can be successful even if no fish are caught” (74%), “I usually eat the fish I catch” (67%), and “The more fish I catch, the happier I am” (59%) (Table 7). A majority of anglers in general disagreed or strongly disagreed with the statement “I want to keep all the fish I catch” (73%).

## Urban Anglers

This group includes all anglers sampled who resided in ZCTAs classified as 100% urban (N = 840). The following profile presents the characteristics of urban anglers in 2002.

*Demographic Characteristics*

The average urban angler was a 47 year-old male (Tables 8 and 9). Most urban anglers self-identified as White non-Hispanics. The average combined household income of urban anglers was between $60,000 and $69,000. Ten percent of urban anglers reported combined household incomes of less than $10,000, while about one quarter reported combined household incomes of more than $50,000.

*Motivations for Fishing*

The top three activity-general items rated by urban anglers as either very important or extremely important were: “To be outdoors” (87%), “For relaxation” (85%), and “To get away from the regular routine” (77%) (Table 10). Overall, nine activity-general reasons for fishing were considered very important or extremely important by a majority of urban anglers. Only one activity-general motivation, “To experience new and different things” (44%), was not viewed by the majority of urban anglers as very important or extremely important. Majorities of urban anglers viewed three activity-specific items as very important or extremely important: “For the fun of catching fish” (84%), “For the experience of the catch” (75%), and “For the challenge or sport” (56%). A majority of urban anglers felt that three activity-specific items (“To test my equipment” [56%], “To obtain a ‘trophy’ fish” [65%], and “To win a trophy or prize” [85%]) were not at all important to slightly important.

**Table 6**

Activity-general and activity-specific motivations for participating in recreational fishing of anglers in general (n = 3,215)*.

| Variable | Description | Number of anglers | Std. deviation | Not at all important | Slightly important | Moderately important | Very important | Extremely important | Mean response |
|---|---|---|---|---|---|---|---|---|---|
| Activity-general items | | | | | Percentage of sample (%) | | | | |
| | For relaxation | 2675 | 0.83 | 0.90 | 2.40 | 11.30 | 39.10 | 46.20 | 4.27 |
| | To be outdoors | 2708 | 0.79 | 0.70 | 2.00 | 11.80 | 45.00 | 40.50 | 4.22 |
| | To get away from the regular routine | 2669 | 0.98 | 2.90 | 4.30 | 15.80 | 40.00 | 37.10 | 4.04 |
| | To experience unpolluted natural surroundings | 2670 | 1.05 | 3.90 | 5.50 | 19.00 | 36.70 | 34.90 | 3.93 |
| | For family recreation | 2678 | 1.06 | 4.40 | 7.30 | 19.90 | 40.90 | 27.50 | 3.80 |
| | To get away from the demands of other people | 2683 | 1.25 | 8.10 | 8.70 | 18.90 | 28.90 | 35.30 | 3.75 |
| | To experience adventure and excitement | 2696 | 1.04 | 3.40 | 7.50 | 23.70 | 37.20 | 28.30 | 3.79 |
| | To be close to the water | 2663 | 1.10 | 4.60 | 9.40 | 25.10 | 34.70 | 26.30 | 3.69 |
| | To be with friends | 2683 | 1.11 | 6.40 | 9.90 | 25.90 | 37.50 | 20.20 | 3.55 |
| | To experience new and different things | 2649 | 1.13 | 8.10 | 15.20 | 33.30 | 28.40 | 15.00 | 3.27 |
| Activity-specific items | | | | | Percentage of sample (%) | | | | |
| | For the fun of catching fish | 2696 | 0.85 | 0.90 | 2.50 | 14.70 | 39.90 | 41.90 | 4.19 |
| | For the experience of the catch | 2688 | 0.98 | 2.20 | 5.30 | 19.90 | 37.20 | 35.40 | 3.98 |
| | For the challenge or sport | 2688 | 1.20 | 9.40 | 10.80 | 24.90 | 34.00 | 20.90 | 3.46 |
| | To obtain fish for eating | 2689 | 1.26 | 16.10 | 22.30 | 30.70 | 17.00 | 13.90 | 2.90 |
| | To develop my skills | 2681 | 1.25 | 18.20 | 20.30 | 29.70 | 20.80 | 11.00 | 2.86 |
| | To test my equipment | 2668 | 1.12 | 27.00 | 28.70 | 29.00 | 10.70 | 4.60 | 2.37 |
| | To obtain a “trophy” fish | 2667 | 1.29 | 42.90 | 20.10 | 20.20 | 9.00 | 7.80 | 2.19 |
| | To win a trophy or prize | 2679 | 1.01 | 66.50 | 16.20 | 11.10 | 3.20 | 3.00 | 1.60 |

*Anglers were asked to indicate how important each item was on a scale ranging from 1 (“Not at all important) to 5 (“Extremely important”).

**Table 7**

Attitudes of anglers in general toward statements regarding the catch-related aspects of recreational fishing (n = 3,215)*

| Description | Number of anglers | Std. deviation | Strongly disagree | Disagree | Neutral | Agree | Strongly Agree | Mean response |
|---|---|---|---|---|---|---|---|---|
| | | | Percentage of sample (%) | | | | | |
| The more fish I catch, the happier I am | 2690 | 1.04 | 4.10 | 12.30 | 24.50 | 41.80 | 17.30 | 3.56 |
| A fishing trip can be successful even if no fish are caught | 2689 | 0.98 | 3.10 | 8.40 | 15.00 | 50.80 | 22.70 | 3.82 |
| I usually eat the fish I catch | 2687 | 1.21 | 6.70 | 10.90 | 15.40 | 35.00 | 32.00 | 3.75 |
| A successful fishing trip is one in which many fish are caught | 2670 | 1.09 | 6.90 | 26.40 | 30.10 | 27.50 | 9.20 | 3.06 |
| I would rather catch 1 or 2 big fish than 10 smaller fish | 2672 | 1.08 | 6.50 | 25.50 | 33.00 | 24.60 | 10.40 | 3.07 |
| When I go fishing, I'm just as happy if I don't catch any fish | 2679 | 1.11 | 7.40 | 29.40 | 27.80 | 26.10 | 9.30 | 3.01 |
| The bigger the fish I catch, the better the fishing trip | 2692 | 1.08 | 6.00 | 28.90 | 27.00 | 29.20 | 8.90 | 3.06 |
| I'm just as happy if I don't keep the fish I catch | 2686 | 1.13 | 5.80 | 16.90 | 20.50 | 39.60 | 17.20 | 3.46 |
| I want to keep all the fish I catch | 2658 | 1.01 | 29.10 | 43.90 | 16.20 | 7.80 | 3.00 | 2.12 |
| I'm just as happy if I release the fish I catch | 2653 | 1.09 | 4.40 | 15.00 | 22.50 | 39.30 | 18.80 | 3.53 |
| I like to fish where I know I have a chance to catch a "trophy" fish | 2679 | 1.11 | 9.70 | 27.70 | 28.40 | 26.50 | 7.70 | 2.95 |

*Anglers were asked to indicate agreement or disagreement with each item on a scale ranging from 1 ("Strongly disagree") to 5 ("Strongly agree").

**Table 8**
Gender, cohort, self-identified race/ethnicity, and income group of urban anglers (n = 840)

| Variable | Category | Number of anglers | Percentage of Sample (%) |
|---|---|---|---|
| Gender (Std. dev. 0.36) | | | |
| | Male | 699 | 84.80 |
| | Female | 125 | 15.20 |
| Cohort (Std. dev. 1.14) | | | |
| | 18-29 years | 66 | 8.00 |
| | 30-39 years | 154 | 18.70 |
| | 40-49 years* | 251 | 30.50 |
| | 50-59 years | 240 | 29.20 |
| | 60-65 years | 110 | 13.40 |
| | 65 or more years | 1 | 0.10 |
| Race (Std. dev. 0.82) | | | |
| | White | 644 | 80.20 |
| | Black | 46 | 5.70 |
| | Hispanic | 93 | 11.60 |
| | Asian and American Indian | 13 | 1.60 |
| | Other/Mixed Race | 7 | 0.90 |
| Income (Std. dev. 3.04) | | | |
| | Less than 9,999 | 17 | 2.20 |
| | 10,000 – 19,999 | 18 | 2.30 |
| | 20,000 – 29,999 | 56 | 7.30 |
| | 30,000 – 39,999 | 80 | 10.40 |
| | 40,000 – 49,999 | 84 | 10.90 |
| | 50,000 – 59,999 | 79 | 10.30 |
| | 60,000 – 69,999* | 54 | 7.00 |
| | 70,000 – 79,999 | 74 | 9.60 |
| | 80,000 – 89,999 | 51 | 6.60 |
| | 90,000 – 99,999 | 40 | 5.20 |
| | 100,000 and above | 216 | 28.1 |

**Indicates median for variable*

**Table 9**
Average and median age of urban anglers (n = 840).

| Variable | St. deviation | Average | Median |
|---|---|---|---|
| Average age | 11.00 | 46.57 | 47 |

*Consumptive Orientation of Anglers*

Majorities of urban anglers agreed or strongly agreed with a total of five statements. The top three most agreed with statements were “A fishing trip can be successful even if no fish are caught” (74%), “I usually eat the fish I catch” (60%), “The more fish I catch, the happier I am” (60%) (Table 11). A majority of anglers in general disagreed or strongly disagreed with the statement “I want to keep all the fish I catch” (74%).

## Rural Anglers

This group includes all anglers (n = 328) who resided in ZCTAs classified 0% urban. The profile presents the characteristics of rural anglers in 2002.

*Demographic Characteristics*

The average rural angler was a 46 year-old male (Tables 12 and 13). Most rural anglers self-identified as White non-Hispanics. The average combined household income of rural anglers was between $50,000 and $59,000. Twelve percent of rural anglers reported combined household incomes of less than $20,000, while about one-third reported combined household incomes of more than $60,000.

**Table 10**

Urban anglers' assessment of activity-general and activity-specific motivations for participating in recreational fishing (n = 840)*.

| Variable | Description | Number of anglers | Std. deviation | Not at all important | Slightly important | Moderately important | Very important | Extremely important | Mean response |
|---|---|---|---|---|---|---|---|---|---|
| Activity-general items | | | | | Percentage of sample (%) | | | | |
| | For relaxation | 701 | 0.82 | 0.90 | 2.30 | 11.60 | 39.90 | 45.20 | 4.27 |
| | To be outdoors | 708 | 0.76 | 0.60 | 1.70 | 10.60 | 43.90 | 43.20 | 4.28 |
| | To get away from the regular routine | 700 | 0.97 | 3.10 | 3.40 | 16.60 | 41.40 | 35.40 | 4.03 |
| | To experience unpolluted natural surroundings | 699 | 0.99 | 3.00 | 4.00 | 17.00 | 38.60 | 37.30 | 4.03 |
| | For family recreation | 699 | 1.12 | 5.60 | 9.00 | 20.60 | 38.80 | 26.00 | 3.71 |
| | To get away from the demands of other people | 704 | 1.29 | 10.10 | 8.70 | 21.20 | 28.00 | 32.10 | 3.63 |
| | To experience adventure and excitement | 708 | 1.02 | 2.80 | 7.80 | 21.90 | 39.30 | 28.20 | 3.82 |
| | To be close to the water | 699 | 1.03 | 3.10 | 8.40 | 22.50 | 40.10 | 25.90 | 3.77 |
| | To be with friends | 704 | 1.11 | 6.00 | 9.90 | 23.20 | 39.50 | 21.40 | 3.61 |
| | To experience new and different things | 696 | 1.08 | 7.30 | 12.80 | 35.60 | 31.50 | 12.80 | 3.30 |
| Activity-specific items | | | | | Percentage of sample (%) | | | | |
| | For the fun of catching fish | 707 | 0.81 | 0.79 | 0.70 | 2.00 | 11.80 | 45.00 | 4.22 |
| | For the experience of the catch | 702 | 0.97 | 1.90 | 5.70 | 17.20 | 38.50 | 36.80 | 4.03 |
| | For the challenge or sport | 704 | 1.20 | 8.80 | 11.20 | 24.00 | 34.40 | 21.60 | 3.49 |
| | To obtain fish for eating | 706 | 1.23 | 17.30 | 26.10 | 30.30 | 14.90 | 11.50 | 2.77 |
| | To develop my skills | 705 | 1.24 | 16.20 | 22.00 | 28.50 | 21.80 | 11.50 | 2.90 |
| | To test my equipment | 703 | 1.12 | 25.60 | 30.00 | 29.40 | 10.00 | 5.00 | 2.39 |
| | To obtain a "trophy" fish | 697 | 1.32 | 43.00 | 21.50 | 17.40 | 9.20 | 8.90 | 2.19 |
| | To win a trophy or prize | 702 | 0.95 | 68.40 | 16.80 | 9.00 | 3.70 | 2.10 | 1.54 |

*Anglers were asked to indicate how important each item was on a scale ranging from 1 ("Not at all important) to 5 ("Extremely important").

**Table 11**

Urban anglers' attitudes toward statements regarding the catch-related aspects of recreational fishing (n = 840)*

| Description | Number of anglers | Std. deviation | Strongly disagree | Disagree | Neutral | Agree | Strongly Agree | Mean response |
|---|---|---|---|---|---|---|---|---|
| | | | Percentage of sample (%) | | | | | |
| The more fish I catch, the happier I am | 702 | 1.03 | 3.40 | 12.30 | 24.10 | 42.50 | 17.80 | 3.59 |
| A fishing trip can be successful even if no fish are caught | 703 | 0.97 | 3.00 | 8.10 | 14.90 | 51.90 | 22.00 | 3.82 |
| I usually eat the fish I catch | 702 | 1.21 | 6.60 | 12.10 | 15.50 | 34.50 | 31.30 | 3.72 |
| A successful fishing trip is one in which many fish are caught | 692 | 1.09 | 6.40 | 27.00 | 29.30 | 27.30 | 10.00 | 3.08 |
| I would rather catch 1 or 2 big fish than 10 smaller fish | 699 | 1.09 | 5.20 | 23.50 | 30.30 | 28.60 | 12.40 | 3.20 |
| When I go fishing, I'm just as happy if I don't catch any fish | 702 | 1.08 | 6.60 | 29.30 | 29.50 | 25.80 | 8.80 | 3.01 |
| The bigger the fish I catch, the better the fishing trip | 704 | 1.11 | 6.10 | 28.00 | 23.40 | 32.70 | 9.80 | 3.12 |
| I'm just as happy if I don't keep the fish I catch | 701 | 1.10 | 5.30 | 15.30 | 21.00 | 42.20 | 16.30 | 3.49 |
| I want to keep all the fish I catch | 691 | 1.01 | 31.30 | 43.00 | 15.50 | 7.50 | 2.70 | 2.08 |
| I'm just as happy if I release the fish I catch | 698 | 1.07 | 4.40 | 12.60 | 22.60 | 41.10 | 19.20 | 2.98 |
| I like to fish where I know I have a chance to catch a "trophy" fish | 699 | 1.11 | 8.30 | 28.60 | 28.20 | 26.20 | 8.70 | 2.98 |

*Anglers were asked to indicate agreement or disagreement with each item on a scale ranging from 1 ("Strongly disagree") to 5 ("Strongly agree").

**Table 12**
Gender, cohort, self-identified race/ethnicity, and income group of rural anglers (n = 328)

| Variable | Category | Number of anglers | Percentage of Sample (%) |
|---|---|---|---|
| Gender (Std. dev. 0.45) | | | |
| | Male | 233 | 72.80 |
| | Female | 87 | 27.20 |
| Cohort (Std. dev. 1.25) | | | |
| | 18-29 years | 34 | 10.60 |
| | 30-39 years | 60 | 18.80 |
| | 40-49 years* | 86 | 26.90 |
| | 50-59 years | 81 | 25.30 |
| | 60-65 years | 59 | 18.40 |
| | 65 or more years | 0 | 0.00 |
| Race (Std. dev. 0.60) | | | |
| | White | 293 | 92.10 |
| | Black | 4 | 1.30 |
| | Hispanic | 17 | 5.30 |
| | Asian and American Indian | 2 | 0.60 |
| | Other/Mixed Race | 2 | 0.60 |
| Income (Std. dev. 2.83) | | | |
| | Less than 9,999 | 16 | 5.40 |
| | 10,000 – 19,999 | 19 | 6.40 |
| | 20,000 – 29,999 | 30 | 10.00 |
| | 30,000 – 39,999 | 37 | 12.40 |
| | 40,000 – 49,999 | 44 | 14.70 |
| | 50,000 – 59,999* | 42 | 14.00 |
| | 60,000 – 69,999 | 27 | 9.00 |
| | 70,000 – 79,999 | 27 | 9.00 |
| | 80,000 – 89,999 | 14 | 4.70 |
| | 90,000 – 99,999 | 12 | 4.00 |
| | 100,000 and above | 31 | 10.40 |

**Indicates median for group*

**Table 13**
Average and median age of rural anglers (n = 328)

| Variable | St. deviation | Average | Median |
|---|---|---|---|
| Average age | 12.28 | 46.36 | 48 |

*Motivations for Fishing*

The top three activity-general items rated by rural anglers as either very important or extremely important were: “To be outdoors” (87%), “For relaxation” (85%), and “For family recreation” (80%) (Table 14). Overall, nine activity-general reasons for fishing were considered very important or extremely important by a majority of rural anglers. Only one activity-general motivation, “To experience new and different things” (42%), was not viewed by the majority of rural anglers as very important or extremely important. Majorities of rural anglers viewed three activity-specific items as very important to extremely important: “For the fun of catching fish” (82%), “For the experience of the catch” (67%), and “For the challenge or sport” (52%). A majority of

**Table 14**

Rural anglers' assessment of activity-general and activity-specific motivations for participating in recreational fishing (n = 328)*.

| Variable | Description | Number of anglers | Std. deviation | Not at all important | Slightly important | Moderately important | Very important | Extremely important | Mean response |
|---|---|---|---|---|---|---|---|---|---|
| Activity-general items | | | | | | Percentage of sample (%) | | | |
| | For relaxation | 261 | 0.81 | 0.40 | 2.70 | 11.90 | 35.60 | 49.40 | 4.31 |
| | To be outdoors | 266 | 0.75 | 0.80 | 0.80 | 11.30 | 46.20 | 41.00 | 4.26 |
| | To get away from the regular routine | 262 | 1.04 | 3.80 | 4.20 | 15.60 | 36.30 | 40.10 | 4.05 |
| | To experience unpolluted natural surroundings | 263 | 1.04 | 3.00 | 6.10 | 15.60 | 35.00 | 40.30 | 4.03 |
| | For family recreation | 262 | 0.90 | 1.50 | 5.00 | 13.40 | 45.80 | 34.40 | 4.06 |
| | To get away from the demands of other people | 263 | 1.28 | 9.90 | 6.10 | 14.40 | 30.40 | 39.20 | 3.83 |
| | To experience adventure and excitement | 265 | 1.13 | 5.30 | 7.90 | 25.30 | 30.90 | 30.60 | 3.74 |
| | To be close to the water | 260 | 1.14 | 5.40 | 11.50 | 26.90 | 31.50 | 24.60 | 3.58 |
| | To be with friends | 264 | 1.14 | 8.00 | 8.30 | 25.80 | 37.90 | 20.10 | 3.54 |
| | To experience new and different things | 257 | 1.13 | 6.60 | 16.70 | 34.60 | 24.90 | 17.10 | 3.29 |
| Activity-specific items | | | | | | Percentage of sample (%) | | | |
| | For the fun of catching fish | 264 | 0.89 | 1.90 | 1.90 | 14.00 | 38.30 | 43.90 | 4.20 |
| | For the experience of the catch | 265 | 1.04 | 2.60 | 7.50 | 22.60 | 34.00 | 33.20 | 3.88 |
| | For the challenge or sport | 264 | 1.26 | 13.30 | 9.10 | 26.10 | 33.00 | 18.60 | 3.34 |
| | To obtain fish for eating | 263 | 1.28 | 13.30 | 25.50 | 25.90 | 18.60 | 16.70 | 3.00 |
| | To develop my skills | 262 | 1.27 | 21.40 | 20.20 | 31.70 | 15.30 | 11.50 | 2.75 |
| | To test my equipment | 259 | 1.17 | 32.40 | 23.90 | 29.70 | 8.10 | 5.80 | 2.31 |
| | To obtain a "trophy" fish | 262 | 1.35 | 48.10 | 16.00 | 18.70 | 7.60 | 9.50 | 2.15 |
| | To win a trophy or prize | 262 | 1.05 | 66.40 | 15.60 | 11.10 | 3.10 | 3.80 | 1.62 |

*Anglers were asked to indicate how important each item was on a scale ranging from 1 ("Not at all important) to 5 ("Extremely important").

rural anglers felt three activity-specific items ("To test my equipment" [56%], "To obtain a 'trophy' fish" [64%], and "To win a trophy or prize" [82%]) were not at all important to slightly important.

*Consumptive Orientation of Anglers*

Majorities of rural anglers agreed or strongly agreed with five statements. The top three most agreed with statements were "A fishing trip can be successful even if no fish are caught" (73%), "I usually eat the fish I catch" (66%), and "The more fish I catch, the happier I am" (59%) (Table 15). A majority of rural anglers disagreed or strongly disagreed with the statement "I want to keep all the fish I catch" (70%).

## Comparison of Urban Anglers, Rural Anglers, and Anglers in General

Results from ANOVA and Kruskal-Wallis tests for differences in the demographic characteristics, motivations for fishing, and consumptive orientation of urban anglers, rural anglers, and anglers in general are presented in the following section.

**Table 15**

Rural anglers' attitudes toward statements regarding the catch-related aspects of recreational fishing (n = 328)*

| Variable | Number of anglers | Std. deviation | Strongly disagree | Disagree | Neutral | Agree | Strongly Agree | Mean response |
|---|---|---|---|---|---|---|---|---|
| | | | Percentage of sample (%) | | | | | |
| The more fish I catch, the happier I am | 264 | 1.01 | 2.70 | 14.00 | 24.20 | 42.80 | 16.30 | 3.56 |
| A fishing trip can be successful even if no fish are caught | 263 | 1.02 | 5.70 | 4.60 | 16.70 | 51.00 | 22.10 | 3.79 |
| I usually eat the fish I catch | 262 | 1.21 | 6.90 | 11.10 | 16.40 | 35.10 | 30.50 | 3.71 |
| A successful fishing trip is one in which many fish are caught | 263 | 1.14 | 9.50 | 29.70 | 29.30 | 21.30 | 10.30 | 2.93 |
| I would rather catch 1 or 2 big fish than 10 smaller fish | 261 | 1.16 | 8.00 | 30.30 | 27.60 | 20.50 | 12.60 | 3.00 |
| When I go fishing, I'm just as happy if I don't catch any fish | 264 | 1.13 | 9.10 | 29.50 | 26.10 | 26.50 | 8.70 | 2.96 |
| The bigger the fish I catch, the better the fishing trip | 264 | 1.14 | 7.20 | 29.50 | 24.60 | 28.00 | 10.60 | 3.05 |
| I'm just as happy if I don't keep the fish I catch | 263 | 1.21 | 8.70 | 15.60 | 23.20 | 33.50 | 19.00 | 3.38 |
| I want to keep all the fish I catch | 261 | 1.03 | 25.70 | 44.40 | 18.00 | 8.40 | 3.40 | 2.20 |
| I'm just as happy if I release the fish I catch | 263 | 1.15 | 6.10 | 16.70 | 19.80 | 38.80 | 18.60 | 3.47 |
| I like to fish where I know I have a chance to catch a "trophy" fish | 262 | 1.19 | 10.70 | 30.50 | 24.00 | 23.30 | 11.50 | 2.94 |

*Anglers were asked to indicate agreement or disagreement with each item on a scale ranging from 1 ("Strongly disagree") to 5 ("Strongly agree").

*Demographic Characteristics*

When gender composition, age structure, and race/ethnicity of urban anglers, rural anglers, and anglers in general were compared using a one-way ANOVA test, several differences were observed ($p \leq 0.05$) (Table 16). Urban anglers, rural anglers, and anglers in general differed in terms of gender, self-identified race/ethnicity, and income. More females were observed among rural anglers (27%) than both urban anglers (15%) and anglers in general (17%) ($p \leq 0.005$). More White anglers were observed among rural anglers (92%) than both urban anglers (80%) and anglers in general (85%) ($p \leq 0.005$). More Black anglers were observed among urban anglers (6%) than both rural anglers (1%) and anglers in general (3%) ($p \leq 0.005$). The distribution of Hispanic anglers throughout the three groups was slightly different. More Hispanic anglers were observed among urban anglers (12%) and anglers in general (10%) than among rural anglers (5%) ($p \leq 0.005$). No differences in the distribution among the groups of Asian anglers or self-identified mixed race/ethnicity anglers were observed. Greater numbers of rural anglers reported incomes in the less than $10,000 and $10,001 to $19,999 categories (5% and 6%, respectively) than urban anglers (2% and 2%, respectively) or anglers in general (3% and 4%, respectively) ($p \leq 0.005$). On the other hand, more urban anglers reported incomes in the more-than-$100,000 category (28%) than anglers in general (21%) or rural anglers (10%) ($P \leq 0.005$).

**Table 16**

Results of analysis of variance tests for differences in gender, average age, age category, self-identified race/ethnicity, and income category of rural anglers (n = 328), urban anglers (n = 840), and anglers in general (n = 3,215)

| | Percentages for angler groups | | | |
|---|---|---|---|---|
| Variable | Anglers in general | Rural anglers | Urban anglers | F-value |
| *Age* | | | | |
| Mean | 46.18 | 46.36 | 46.57 | 0.78 |
| *Cohort* | | | | |
| Less than 19 years | 9.40 | 10.60 | 8.00 | 1.34 |
| 20-29 years | 18.60 | 18.80 | 18.70 | 0.01 |
| 30-39 years | 30.00 | 26.90 | 30.50 | |
| 40-49 years | 27.80 | 25.30 | 29.20 | 0.92 |
| 50-59 years | $13.90_{a}$ | $18.40_{b}$ | $13.40_{a}$ | *3.00 |
| More than 60 years | 0.30 | 0.00 | 0.10 | 1.30 |
| *Gender* | | | | |
| Male | $82.60_{a}$ | $72.80_{b}$ | $84.80_{b}$ | **12.49 |
| Female | $17.40_{a}$ | $27.20_{b}$ | $15.20_{b}$ | **12.49 |
| *Race/Ethnicity* | | | | |
| White | $85.20_{a}$ | $92.10_{b}$ | $80.20_{c}$ | 14.75 |
| Black | $2.80_{a}$ | $1.30_{a}$ | $5.70_{b}$ | 17.74 |
| Hispanic | $10.10_{a}$ | $5.30_{b}$ | $11.60_{ab}$ | 4.97 |
| Asian/American Indian | 1.20 | 0.60 | 1.60 | 4.97 |
| Other | 0.70 | 0.60 | 0.90 | 0.13 |
| *Income* | | | | |
| Less than $10,000 | $2.60_{a}$ | $5.40_{b}$ | $2.20_{\mathbf{b}}$ | *4.99 |
| $10,001 to $19,999 | $3.80_{\mathbf{a}}$ | $6.40_{\mathbf{a}}$ | $2.30_{\mathbf{ab}}$ | *5.01 |
| $20,000 to $29,999 | 7.80 | 10.00 | 7.30 | 1.23 |
| $30,000 to $39,999 | 10.40 | 12.40 | 10.40 | 0.76 |
| $40,000 to $49,999 | 11.20 | 14.70 | 10.90 | 2.15 |
| $50,000 to $59,999 | 11.40 | 14.00 | 10.30 | 1.52 |
| $60,000 to $69,999 | $9.70_{\mathbf{a}}$ | $9.00_{\mathbf{ab}}$ | $7.00_{\mathbf{ac}}$ | *4.88 |
| $70,000 to $79,999 | 9.50 | 9.00 | 9.60 | 0.05 |
| $80,000 to $89,999 | 7.10 | 4.70 | 6.60 | 1.90 |
| $90,000 to $99,999 | 5.50 | 4.00 | 5.20 | 0.96 |
| More than $100,000 | $21.10_{\mathbf{a}}$ | $10.40_{\mathbf{b}}$ | $28.10_{\mathbf{c}}$ | 22.66 |

$_{abc}$ Groups with different subscripts are different at .05 level of confidence.

** Denotes significance at $p \leq 0.005$

* Denotes significance at $p \leq 0.05$

*Motivations for Fishing*

When motivations for fishing among three groups were compared using a Kruskal-Wallis test, five differences were observed (Table 17). The mean response for the item "For family recreation" was lower among urban anglers (3.71) than both anglers in general (3.8) and rural anglers (3.7) ($p \leq 0.005$). For the item "To be close to the water", urban anglers' average response (3.8) was higher than both anglers in general (3.6) and rural anglers (3.5) ($p \leq 0.05$). Urban anglers' mean response for the item "To get away from the demands of other people" was lower than the response of anglers in general (3.8) and rural anglers ($p \leq 0.05$). The mean response for the item "To experience unpolluted natural surroundings" was higher among both urban anglers (4.0) and rural anglers (4.0) than anglers in general (3.9) ($p \leq 0.05$). Finally, rural anglers' mean response for the item "To obtain fish for eating" (3.0) was lower than both urban anglers (2.8) and anglers in general (2.9).

*Consumptive Orientation*

When consumptive orientations among the three groups were compared using a Kruskal-Wallis test, one difference was observed (Table 18). The mean response of urban anglers for the statement "I would rather catch 1 or 2 big fish than 10 smaller fish" (3.2) was higher than that of anglers in general (3.1) and rural anglers (3.0) ($p \leq 0.005$).

**Table 17**

Results of analysis of variance tests for differences in assessment of activity-general and activity-specific motivations for fishing between urban anglers (n = 840), rural anglers, (n = 328), and anglers in general (n = 3,215)[1, 2]

| | Mean scores for angler groups | | | |
|---|---|---|---|---|
| Description | Anglers in general | Rural anglers | Urban anglers | Chi-square |
| Activity-general motivations | | | | |
| *To be outdoors* | | | | |
| Mean | 4.22 | 4.26 | 4.28 | 2.37 |
| *For family recreation* | | | | |
| Mean | $3.80_{a}$ | $4.06_{b}$ | 3.71*bc* | 19.84** |
| *To experience new and different things* | | | | |
| Mean | 3.27 | 3.29 | 3.30 | 0.31 |
| *For relaxation* | | | | |
| Mean | 4.27 | 4.31 | 4.27 | 0.78 |
| *To be close to the water* | | | | |
| Mean | 3.69 | 3.58 | 3.77 | 5.23* |
| *To get away from the demands of other people* | | | | |
| Mean | $3.75_{a}$ | $3.83_{a}$ | $3.63_{ab}$ | 7.16* |
| *To be with friends* | | | | |
| Mean | 3.55 | 3.54 | 3.61 | 1.62 |
| *To experience unpolluted natural surroundings* | | | | |
| Mean | $3.93_{abc}$ | $4.03_{ab}$ | $4.03_{ac}$ | 6.54* |
| *To get away from the regular routine* | | | | |
| Mean | 4.04 | 4.05 | 4.03 | 0.62 |
| *To experience adventure and excitement* | | | | |
| Mean | 3.79 | 3.74 | 3.82 | 0.71 |
| Activity-specific motivations | | | | |
| *To obtain fish for eating* | | | | |
| Mean | $2.90_{a}$ | $3.00_{a}$ | $2.77_{b}$ | 8.30* |
| *For the experience of the catch* | | | | |
| Mean | 3.98 | 3.88 | 4.03 | 4.01 |
| *To test my equipment* | | | | |
| Mean | 2.37 | 2.31 | 2.39 | 1.30 |
| *To win a trophy or a prize* | | | | |
| Mean | 1.60 | 1.62 | 1.54 | 1.42 |
| *To develop my skills* | | | | |
| Mean | 2.86 | 2.75 | 2.90 | 3.03 |
| *To obtain a "trophy" fish* | | | | |
| Mean | 2.19 | 2.15 | 2.19 | 0.89 |
| *For the challenge or sport* | | | | |
| Mean | 3.46 | 3.34 | 3.49 | 2.27 |
| *For the fun of catching fish* | | | | |
| Mean | 4.19 | 4.20 | 4.22 | 0.34 |

[1]Anglers were asked to indicate how important each item was on a scale ranging from 1 ("Not at all important) to 5 ("Extremely important").

[2]Distribution of responses across the 5 categories can be found in Tables 6, 10, and 14 above.

$_{abc}$ Groups with different subscripts are significantly different at .05 level of confidence.

* Denotes significance at $p \leq 0.05$

** Denotes significance at $p \leq 0.005$

## Summary of the Results

This section highlights the major themes that emerged from the data analysis and evaluates results in light of the study questions presented in the introductory chapter. The section also summarizes the results of the analysis in light of previous research.

As expected, all angler groups were comprised primarily of middle-aged, middle-income White males. Relaxation, being outdoors, and escaping the regular routine were strong motivations for all anglers. Compared to anglers in general and urban anglers, rural anglers were more strongly motivated by fishing as a form of family recreation, a way of escaping the demands of other people, and obtaining fish for eating. On the other hand, urban anglers were more strongly motivated by being close to the water. Experiencing unpolluted natural surroundings was a strong motivation for both urban and rural anglers. Finally, compared to rural anglers and anglers in general, urban anglers indicated a stronger preference for catching 1 or 2 big fish instead of 10 smaller fish, suggesting an emphasis on “trophy” fish.

The demographic characteristics of anglers reported in the profiles are generally consistent with previous studies of urban and rural anglers. Anglers’ motivations for fishing and consumptive orientation were also consistent with previous studies. When tested, observed differences between the groups in terms of demographic characteristics, motivations for fishing and consumptive orientation were found to be significant as well.

**Table 18**

Results of analysis of variance tests for differences in attitudes regarding the catch-related aspects of recreational fishing of urban anglers (n = 840), rural anglers (n = 328), and anglers in general (n = 3,215)[1, 2]

| | Mean scores for angler groups | | | |
|---|---|---|---|---|
| Description | Anglers in general | Rural anglers | Urban anglers | F-value |
| *The more fish I catch, the happier I am* | | | | |
| Mean | 3.56 | 3.56 | 3.59 | 0.43 |
| *A fishing trip can be successful even if no fish are caught* | | | | |
| Mean | 3.82 | 3.79 | 3.82 | 0.06 |
| *I usually eat the fish I catch* | | | | |
| Mean | 3.75 | 3.71 | 3.72 | 0.46 |
| *A successful fishing trip is one in which many fish are caught* | | | | |
| Mean | 3.06 | 2.93 | 3.08 | 3.80 |
| *I would rather catch 1 or 2 big fish than 10 smaller fish* | | | | |
| Mean | $3.07_a$ | $3.00_a$ | $3.20_b$ | 9.88* |
| *When I go fishing, I'm just as happy if I don't catch fish* | | | | |
| Mean | 3.01 | 2.96 | 3.01 | 0.35 |
| *The bigger the fish I catch, the better the fishing trip* | | | | |
| Mean | 3.06 | 3.05 | 3.12 | 1.95 |
| *I'm just as happy if I don't keep the fish I catch* | | | | |
| Mean | 3.46 | 3.38 | 3.49 | 1.15 |
| *I want to keep all the fish I catch* | | | | |
| Mean | 2.12 | 2.20 | 2.08 | 3.23 |
| *I'm just as happy if I release the fish I catch* | | | | |
| Mean | 3.53 | 3.47 | 3.58 | 1.63 |
| *I like to fish where I have a chance to catch a "trophy" fish* | | | | |
| Mean | 2.95 | 2.94 | 2.98 | 0.53 |

[1]Anglers were asked to indicate agreement or disagreement with each item on a scale ranging from 1 ("Strongly disagree") to 5 ("Strongly agree").
[2]Distribution of responses across the 5 categories can be found in Tables 7, 11, and 15 above.
$_{abc}$ Groups with different subscripts are significantly different at .05 level of confidence.
** Denotes significance at $p \leq 0.005$
* Denotes significance at $p \leq 0.05$

Urban anglers differed from rural anglers and anglers in general in terms of both demographic and participation-related characteristics:

1. When compared to both urban anglers and anglers in general, fewer females were observed among urban anglers.
2. When compared to both urban anglers and anglers in general, fewer urban anglers reported incomes in the less than $10,000 and $10,000 to $19,999 categories, while more urban anglers reported incomes in the greater than $100,000 category.
3. White anglers comprised a smaller proportion of the urban angler population.

Urban anglers also differed from rural anglers and anglers in general in terms of motivations for fishing and consumptive orientation:

1. Urban anglers were more motivated by being close to the water than both rural anglers and anglers in general.
2. Urban anglers were less likely to indicate they usually ate the fish they caught than both urban anglers and anglers in general.
3. Urban anglers were less likely to view fishing as a form of family recreation.
4. Urban anglers were less likely to view fishing as a means of escaping the demands of other people.
5. Urban anglers indicated a stronger preference for catching 1 or 2 big fish instead of 10 smaller fish

This section presented profiles of anglers in general, urban anglers, and rural anglers. The section also presented results of the ANOVA and Kruskal-Wallis tests for differences in means scores among the three groups. The following section concludes the thesis with a discussion of the results, recommendations for managers, suggestions for future research, and limitations of the study.

# CHAPTER V

# CONCLUSIONS AND IMPLICATIONS FOR MANAGERS

The purpose of this study was twofold: In addition to profiling urban and rural anglers, the study sought to identify differences between urban anglers, rural anglers, and anglers in general in support of management decision-making. Based on residency location, anglers were divided into urban and rural residents, with all anglers (anglers in general, or so-called average anglers) forming the third group. The following section seeks to interpret the results of the present study in light of previous literature, place the findings in the larger context of fisheries resource management, and make suggestions to fisheries resource managers.

## Discussion and Implications

Urbanization is an increasing trend in the U.S. The physical spaces occupied by urban areas are growing along with their population, and smaller, formerly rural areas are being overwhelmed by urban areas (Guest & Brown, 2005). As urban populations grow, rural populations are shrinking as residents move to cities and suburbs are incorporated into metropolitan areas (Guest & Brown, 2005). Concurrent with this trend are other demographic changes in the state's population (e.g., increasing racial and ethnic diversity, increasing age, and increasing wealth among some segments of the population). All of these variables interact to affect participation in fishing. In the future,

anglers overall will more closely resemble the urban anglers profiled in this thesis. Management programs directed towards the supposed average anglers of today will fail if managers do not recognize the changing nature of their clientele (Murdock et al., 1996).

*Demographic Variables*

Urban anglers, rural anglers, and anglers in general differed in terms of several urbanization-associated demographic variables. Whereas rural anglers were primarily white, more racial and ethnic diversity was observed among urban anglers. Additionally, urban anglers had higher household incomes than rural anglers on average and were more likely to be male. Gender, income, and racial/ethnic-based differences in participation are particularly important in the context of demographic changes and the future of fishing (Murdock et al., 1992a, Murdock et al., 1992b, Murdock et al., 1996).

Although more female anglers were observed among rural anglers, the findings do not necessarily contradict the assertions of other researchers that fishing is a male-dominated activity (e.g., Johnson, Bowker & Cordell 2001; Bohnsack, 2002; Floyd et al., 2006; Kuehn, Dawson, & Hoffman 2006; and Schroeder et al., 2006). Female anglers represent less than one-fifth of the population of both rural and urban anglers. This gender-based disparity is also evident at the national level, with female participation less than half that of male participation (8% and 16%, respectively) (United States Fish and Wildlife Service, 2007). Fishing, hunting, and many other so-called traditional outdoor activities are similarly dominated by male participants. Research

indicates that this male dominance is the result of cultural prejudices against female participation (Adams & Steen, 1997; Kuehn, Dawson, & Hoffman 2006; Schroeder et al., 2006).

Gender-based differences between urban and rural anglers may indicate that rural females are more likely to be socialized into fishing than urban females (Adams & Steen, 1997; Kuehn, Dawson, & Hoffman 2006; Schroeder et al., 2006). Rural resident females are probably more likely to have been raised in an environment where fishing was taken for granted. Children who remember their mothers or fathers going fishing with older siblings or by themselves may have a greater interest in the activity than urban resident children without those experiences. If this were true, urban resident anglers should indicate having been introduced to fishing at an older age than rural anglers. Urban resident females, lacking early socialization into fishing and facing multiple gender-based roadblocks (Bialeschki, 2005; Kuehn, Dawson, & Hoffman 2006; Schroeder et al., 2006), are much less likely to ever take up the activity.

Female under participation in fishing is also related to the different ways men and women pursue leisure time, with the high travel costs associated with urban residency exacerbating this difference. The relatively few urban female anglers who have been socialized into fishing by a family member, spouse, or acquaintance (or simply chose to take up the activity) may be unwilling or unable to travel to rural fishing locations due to travel costs. Of course, men are also affected by high travel costs (Lawrence, 2008). However, men have the option of going fishing with friends and thus sharing travel costs. Women are more interested in fostering relationships with their

families or friends (in other words, women are affiliatively oriented) and are less likely to spend extended periods of time with non-family members. Additionally, women appear to be more interested in leisure activities involving social interaction, rather than goal achievement (Green, 1998). In other words, women may go fishing, but with the intention of furthering their friendships or relationships. This leads to a situation where urban resident female anglers may have trouble finding fishing partners with which to share travel costs.

These gender differences may have lasting consequences for resource managers. Directing programs towards female anglers would encourage participation in the activity in two ways. First, women are in many ways an untapped resource for management agencies. The popularity of programs aimed at encouraging women to participate in traditionally male activities (e.g., Becoming an Outdoors Woman) (Patterson, 1998) shows that managers are at least aware of the issue, even if the programs have been determined to be ineffective at recruiting and retaining female participants (Welsh, 2005). Encouraging female participation through effective programs targeted at women would probably bring a number of people into the activity. Secondly, female anglers have the potential to introduce the next generation of anglers to the activity. As women are often expected to spend a considerable amount of their free time with their children (Bialeshki, 2005), the end result of effective female angler education would be the introduction of more young people to the activity. Previous research into gender-based constraints to participation in fishing and other outdoor activities has revealed that concerns about violence, lack of time, and social stigma discourage women from

participating. Therefore, programs directed at urban females should emphasize three points. In any given urban area, there are probably several safe, well-lit and crime-free fishing locations, and that by participating in groups consisting of female friends the risk of crime can be minimized. Secondly, by participating with female friends women anglers will not face disapproval from male anglers. Finally, provided children are properly supervised, fishing is a low-risk and educational way for children to experience nature and outdoor activity.

*Motivations for Fishing*

Urban anglers, rural anglers, and anglers in general also differed in terms of motivations for fishing. Urban anglers appeared to be more interested in being close to the water than the other groups. Conversely, urban anglers were less likely to view fishing as a form of family recreation or a means of escape. These differences in motivations are probably caused by a several inter-related demographic differences. First, urban anglers are wealthier. Wealth enables anglers to better pursue their favorite activity by facilitating travel to distant fishing locations. In light of contemporary fuel costs, the ability to afford gas probably enables wealthier people to participate more frequently (Lawrence, 2008). Wealthy urban residents are able to seek fishing experiences that fulfill their experience preferences, rather than having to settle for locations close to home. Poorer rural anglers, on the other hand, may be adapting their motivations for fishing in order to suit nearby venues. Secondly, urban anglers may have a genuine need to escape urban areas. Most fishing locations, including urban fishing

locations, resemble natural areas in that they are not excessively developed. Even man-made reservoirs generally have undeveloped shorelines, and being on a lake probably fosters a sense of wildness or freedom from the built environment. By traveling to rural fishing locations, urban anglers are able to escape temporarily the air and noise pollution, traffic, and real or perceived physiological stress of urban life (Adams, Lindsey, & Ash, 2006). Although study results indicated urban anglers were less likely to view fishing as a means of escaping the demands of other people, their emphasis on being close to the water implies that they view fishing as a means of recharging or escaping stressors. In addition to the universal motivations related to pursuing a favorite outdoor activity, these urban anglers appear to be seeking relief from urban life.

Other variables affecting urban anglers' motivations are gender and race. Differences in motivations for fishing have been observed among racial/ethnic groups. Generally speaking, non-White anglers prefer activity-general, escape-oriented motivations for fishing (Hunt & Ditton, 2002). As mentioned previously, women are more affiliatively oriented than men. Based on this difference, women should de-emphasize the consumptive and accomplishment-related aspects of fishing. Because women are underrepresented in the sample, their influence on the motivations of urban anglers should be correspondingly slight. These group differences suggest managers will have to adopt a different marketing strategy in order to cope with the changing demands and expectations of their clientele.

Interestingly, urban residents' mean scores for several items regarding activity-specific motivations for fishing were higher than those of rural residents. Urban anglers

were more interested in some of the challenge or sport-related aspects of fishing than rural anglers were. This may be due to the higher incomes of urban anglers: As they have more disposable income, urban anglers should be able to experiment with different kinds of tackle and different fishing venues, leading to greater specialization. This was demonstrated in a study of Texas anglers by Alan Graefe (1980), who showed that highly-specialized anglers owned more rod and reel combinations. Based on this, specialization should be positively correlated with income. Rural anglers' greater emphasis on fishing for family recreation, as opposed to goal achievement, also seems to support this interpretation.

Programs aimed at increasing participation among urban residents should attempt to provide the experiences preferred by urban anglers. Although any urban water body will be more artificial-appearing than a rural lake in an undeveloped area, urban fishing areas can still offer a degree of wildness and proximity to clean water. Managers can provide natural experiences by leaving a percentage of the water body's shore undeveloped and providing sufficient cover and other habitat near the water body to attract wildlife. This would not preclude the provision of adequate lighting and other safety measures designed to attract female anglers and children, and would offer natural experiences within a reasonable distance (or within) an urban area.

Urban anglers' desire to be close to the water, combined with their higher incomes, suggests that these anglers would be able to travel considerable distances from home. Urban anglers may be willing to travel great distances and spend a large portion of their household incomes in order to pursue their preferred fishing experiences. With

soaring gas prices and decreasing leisure time, fishing-related travel is becoming more difficult (Lawrence, 2008; Arnold & Shinew, 1998). By providing suitable fishing locations within or at least close to urban areas, managers can counteract these structural constraints to fishing and encourage participation. Of course, any proposals must take into consideration the budget of the agencies responsible for urban fishing programs. Although creating new fishing lakes and ponds within urban areas would be impractical and expensive, existing water bodies could be renovated with the goal of providing fishing opportunities and increased green space.

*Consumptive Orientation*

Based on the results of this study, urban anglers appear to be less interested in obtaining fish for eating than rural anglers. Previous research has established that although anglers across the economic spectrum tend to fish for similar reasons (Kyle et al., 2007), certain groups of anglers (i.e., poorer anglers, rural anglers, and non-white anglers) have stronger consumptive orientations (Burger, 2004; Hendee, 1969; Hunt 2000). Rural anglers' greater interest in obtaining fish for eating may stem from lower income (Burger, 2004). Alternatively, differing levels of consumptive orientation may stem from cultural differences between urban and rural populations (Hendee, 1969). While it is true that, generally speaking, urban anglers are less consumptive than rural anglers, it is probable that subgroups of urban anglers (i.e., non-White groups) are actually more consumptive than urban anglers overall. In the same way that managing for anglers in general results in overlooking important differences in urban and rural

anglers, assuming that all urban anglers are less consumptive would result in overlooking subgroups with potentially more consumptive orientations (e.g., the urban poor and certain racial/ethnic groups). This phenomenon has important consequences, for due to a) their proximity to polluted areas and b) their consumptive behavior, poor anglers are at higher risk of heavy-metal absorption as a result of fish consumption (Roberts, Silbergeld, & Graczyk, 2007; Laurence & Chapman, 2007).

Urban and rural anglers' differing consumptive orientation is of importance to managers. Programs directed at increasing participation among urban anglers should incorporate the needs of their target audience. As urban anglers appear to emphasize the sport and challenge aspects of the activity over obtaining fish for eating, urban fishing programs should reflect these preferences. Urban fishing programs typically offer relatively few species of fish, with an emphasis on food fishes (e.g., channel catfish, rainbow trout, and various sunfishes) (Arizona Game and Fish Department, 2006). These fishes have proven to be hardy, easily mass-produced, and suitable for stocking in small urban ponds. Rainbow trout are even stocked in swimming pools in some areas (Adams, Lindsey, & Ash 2006). In other words, urban fisheries managers have had to strike a balance between practicality (hardy, inexpensive fishes) and desirability (large, challenging fishes) in selecting fishes for urban programs (Bates, 1993). The results of this study indicate that urban anglers overall prefer to fish for challenging game fishes, with edibility less important. There are probably sub-groups of urban anglers who emphasize catching fish to eat, but generally speaking urban fishing programs should attempt to offer more game fish in order to appeal to a broader range of urban anglers.

## Recommendations for Managers

As legal participation in fishing requires a license, and about 100,000 fewer Texas fishing licenses were purchased in 2004 than in 2001, fewer people appear to be fishing (Tseng, Wolber, & Ditton, 2006). Without price increases for fishing licenses, these declines in license sales will lead to losses of revenue for fisheries management programs (Murdock et al., 1996). Declines in angler numbers have been linked to changes in anglers' demographic characteristics (Murdock et al., 1996). As the characteristics of the state's population change, managers should remain aware of the roadblocks to participation faced by their clientele.

Perhaps the most cost-effective way to encourage participation would be to ease barriers to participation. Easing barriers allows managers to take advantage of pre-existing resources, rather than creating new, potentially expensive urban fishing sites. Travel costs and access to resources are two of the constraints that might be eased by appropriate management actions.

High travel costs probably discourage many urban anglers from visiting their preferred fishing locations. High gas prices have negatively affected rates of visitation to national parks and other vacation destinations nationwide (Lawrence, 2008). Because of this, many anglers are probably unwilling to fish anywhere, at any time, despite the proximity of urban fishing locations. Once an angler has decided to go fishing, he has to find a suitable location meeting his experience preferences (e.g., closeness to water and presence of large game fish). If nearby urban locations do not meet this criteria, he must travel outside of the urban area; in an era of $100/gallon crude oil, travel costs probably

discourage a great many urban anglers from participating. Unfortunately agencies are not in a position to offer free gas; they can, however, spread information about fishing opportunities close to urban areas. If these urban waterways are poor-quality (e.g., over-developed or polluted), efforts to improve these waterways can coincide with public-relations campaigns (emphasizing fishing opportunities for the future, or for current anglers' children).

Access issues also probably act to discourage urban residents from participating as much as they would prefer. Rural anglers probably have access to property through a network of land-owning friends and relatives, and they are more likely to be aware of other fishing locations along highway right-of-ways and bridges. Urban anglers may lack these networks and are probably less aware of appropriate fishing locations than their rural counterparts. To overcome this roadblock, agencies might implement programs encouraging rural landowners to allow anglers to fish on their property. In Texas, many landowners have discovered the profits associated with leasing their property to hunters. Currently, the TPWD maintains a website that allows landowners to contact potential leasers and vice-versa; perhaps a similar program could connect anglers with landowners (TPWD, 2008).

One current approach to increasing participation in under-participating groups is the creation of urban fishing programs in inner-city areas. Many of these programs provide fishing opportunities to inner-city residents by creating new fishing areas or improving existing water bodies, while other programs partner with industry groups (e.g., the Recreational Boating and Fishing Foundation) (Recreational Boating and

Fishing Foundation, 2007) to provide inner-city residents with free tackle. Agency programs, including Arizona's urban fishing program, provide lower-priced fishing licenses (Arizona Game and Fish Department, 2006). TPWD's KidFish program seeks to educate anglers by offering hands-on classes at state parks (TPWD, 1998). These programs seek to provide a safe environment for families with young children in what might otherwise be considered a hostile urban environment (RBFF, 2007). The programs have two related goals; in addition to facilitating participation in fishing by easing constraints, they also seek to increase participation by introducing new people to the activity (Bates, 1993). These programs are undoubtedly well intentioned, but without long-term trends research, incorporating measures of recruitment and retention they may fail to meet their objectives.

The results of this study suggest another productive thing for resource managers to do would be to increase the appeal of urban fishing locations to anglers seeking closeness to the water or escape from urban stressors. One problem with urban fishing programs is that they do not provide ideal fishing experiences for escape-oriented urban anglers. Urban fishing programs cannot provide the fishing experience standards set by popular culture in the form of fishing magazines and television programs. Judging from urban anglers' emphasis on escape-oriented motivations for fishing, many urban anglers would not choose to fish in these areas. Given their relatively higher incomes, many urban anglers prefer to leave the urban area in search of more traditional fishing opportunities in rural areas (Arlinghaus & Mehner, 2004). As presently conceived, urban fishing programs consisting of small patches of water in inner cities would not increase

participation among these escape-oriented higher income urban anglers. Of course, managers must set realistic goals: Urban fishing programs will continue to make use of the resources available (e.g., small ponds and urban waterways), and many escape-oriented urban anglers will continue to seek fishing opportunities outside of the urban area.

The aforementioned educational programs represent another way of encouraging participation among urban residents. Although the goal of such programs has generally been to encourage participation in fishing among under-served groups, especially women, non-Whites, and young children (Bates, 1993), there is no reason why these programs must be restricted to these groups. Such programs should inform urban residents of traditional fishing possibilities in rural areas, for many of these anglers will probably prefer to accept high travel costs and continue to fish in familiar, natural settings (Arlinghaus & Mehner, 2004). These programs should also educate participants about non-traditional styles of fishing more compatible with urban environments (e.g., fishing for carp or other less popular fish). Such educational programs may have the potential to increase participation among urban residents unwilling or unable to travel outside the urban area in pursuit of fishing opportunities.

## Suggestions for Future Research

Determining if residency-based differences between groups of anglers exist is, at best, a first step in understanding why such differences exist. This research should be conceived of as part of a larger effort to understand the influence of urbanization on

recreational behavior. For example, research investigating fishing behavior should explore the causes of these residency-based differences using primary data obtained from on-site studies of urban anglers; investigate racially/ethnically defined subgroups within the urban angler group; explore the characteristics, motivations of wealthier urban residents who travel outside of the urban area to fish; and investigate trends over time. In addition to contributing to our understanding of urbanization's effects on recreation behavior, such research would aid managers in designing urban fishing programs by providing specific information about users, rather than assumptions based on the so-called average angler.

Future research should explore urban fishing program users' characteristics, motivations, and consumptive orientation directly. By surveying urban fishing program users directly, such studies would target anglers who either choose to fish in urban locations or are prevented from fishing elsewhere by constraints. Such studies have been conducted in New York (Dargitz, 1988), Texas (Hunt & Ditton, 1996), Maryland (Burger, 2004), and Germany (Arlinghaus & Mehner, 2004). Questionnaires including items related to constraints would provide more insight into the role of these urban-associated factors in shaping lower-income and lower-mobility anglers' urban fishing behavior. Such questionnaires should also include items regarding unique aspects of the urban fishing experience of particular importance to researchers. For example, anglers' awareness of environmental issues could be assessed in order to determine the role of health advisories on fishing activity. Regular assessments of fish consumption patterns could be used to shape legislation aimed at regulating this hazardous behavior (Laurence

& Chapman, 2007). Additionally, studies of this sort conducted in Texas would include anglers younger than 16 and older than 65 (the minimum and maximum required ages for resident fishing licenses (type 201), combination resident hunting and fishing licenses [type 200], and Super Combo licenses [type 111]). Younger and older anglers are certainly an important part of the fishing population and would be expected to be frequent users of urban fishing sites; state or city-wide surveys of anglers drawn from license files would fail to sample these important user groups. Additionally, on-site surveys of urban fishing behavior *may* provide more information about unlicensed anglers who do not purchase licenses, perhaps due to high cost or other reasons.

Further studies should also attempt to determine the characteristics, motivations, and consumptive behavior of sub-groups within the larger urban angler group. Most Texas anglers in the sample used in this study were White males. As a result, other groups of anglers have little influence on the characteristics of the group as a whole. By dividing the sample into subgroups (e.g., female anglers; Black, Hispanic, and Asian anglers; and lower-income anglers), the true diversity of the urban angler population is revealed. The film "Fishing in the City" (Sacks & Moore, 1990) demonstrates both the diversity of urban anglers and the different ways in which they participate in fishing. Studies of angler subgroups could be conducted in much the same way as the studies of urban fishing program users recommended above. Some fishing locations are disproportionately visited by members of the same racial/ethnic, gender, or income level (Tatum, 1999). This phenomenon has been observed by the author at fishing piers in the Galveston area. Piers represent a low-cost alternative to boat-based angling, and as such

tend to attract lower-income anglers in addition to pier-fishing specialists (Jones, 1992). Typical pier users include retirees, non-Whites, and families with small children. In order to survey Blacks and Hispanics, fishing locations visited disproportionately by Blacks or Hispanics could be identified using key informants; these locations could be targeted by on-site surveys of anglers. Such studies would result in a more thorough understanding of important subgroups of urban anglers and their fishing behavior. Fishing is a unique activity: Compared to other activities (e.g., hunting [Adams & Steen, 1997]), fishing is fairly racially heterogeneous, with angler subgroups contributing different modes and styles of participation (Hunt 2000; Hunt & Ditton, 2001; and Hunt & Ditton, 2002). As such, the activity provides managers with a window on future participation in outdoor recreation in the context of demographic change (Murdock, 1992; Murdock, 1992b; Murdock, 1996).

Urban anglers are not all poor non-Whites; certainly many urban residents are relatively wealthy. This study has shown that urban anglers are actually wealthier on average than both rural anglers and anglers in general. Another subgroup of urban anglers that future studies should investigate is wealthy urban residents who travel outside of the urban area to fish. These anglers appear to have the resources to engage in such behavior; based on the motivations of urban anglers generally, they do so in order to escape the stress of urban life. Unlike poorer urban residents, wealthier urban residents would not be encouraged to settle for urban fishing locations due to high travel costs. Future studies should explore the ways wealthier urban anglers negotiate travel cost-related constraints; related studies might also investigate anglers' decision-making

processes (e.g., how they decide where to fish, what social networks they utilize in making such decisions, and if they have negative perceptions of urban fishing locations). In addition to illuminating the characteristics and behavior of an important group of urban anglers, such studies would aid managers in presenting appealing fishing locations closer to the metropolitan area. Doing so may counteract rising gas prices and might encourage more frequent participation by urban anglers.

## Limitations of the Study

Study limitations prevent study findings from being generalized to urban anglers in other states or urban anglers generally. The characteristics, motives and consumptive orientation of urban anglers probably differ across regions. Urban anglers may differ from region to region. For example, long-time urban residents might have different attitudes about fishing than recently arrived urban residents. Some of these recently arrived urban residents were probably exposed to fishing when they lived in more rural areas and would be expected to feel differently about fishing. Based on this, anglers residing in urban areas experiencing rapid growth probably have different consumptive orientations and motivations for fishing. Additionally, other states (e.g., Arizona) have well-established urban fishing programs (Arizona Game and Fish Department, 2006). Urban anglers in these states may have more access to fishing locations. Better opportunities for fishing would be expected to result in wider participation. A study overcoming this weakness would contribute to our understanding of urbanization's effect on recreational behavior by showing how urban residency affects an individual's

behavior over time.

Another shortcoming is the study's lumping together of all urban anglers into one group based on only one variable (residency). In the same way that managing for the supposed average angler fails to provide for smaller subgroups of anglers, the study ignores distinctions between subgroups of urban anglers. As such, the characteristics, consumptive orientations, and motivations of urban anglers presented in this study are for the *average* urban angler. A stratified sample, where more anglers from important subgroups (e.g., non-White anglers, female anglers, lower income anglers, younger anglers, and older anglers) are included, would have better represented the diversity of urban anglers. Inter-segment differences in angler behavior will grow along with the increasing diversity of the Texas population (Murdock, 1992; Murdock, 1992b; Murdock, 1996). A study of angler subgroups would shed light on an important aspect of urbanization and would further our understanding of urbanization's effects.

As the sample for the study was drawn from license files, the sample did not include anglers or potential anglers who did not purchase licenses. Many of these potential anglers are prevented from fishing by one or more constraints. Fishing licenses are expensive, and the high cost of fishing licenses (about $25 for a Texas fishing license in 2008) probably prevents some people from fishing. Potential female anglers may be discouraged from purchasing licenses by cultural prejudices against female participation or the other gender-associated constraints (Bialeschki, 2005; Kuehn, Dawson, & Hoffman, 2006; Schroeder et al., 2006). Similarly, Black and Hispanic anglers may fail to purchase licenses due to fear of racism on the part of White anglers and older or less

mobile anglers due to lack of access to fishing sites. These potential anglers could be identified using a snowball-type sampling design. Alternatively, qualitative studies using focus groups could shed light on the extent to which potential anglers are discouraged by constraints from fishing. Based on the results of such studies, managers could implement programs that overcome some of these difficulties faced by potential anglers.

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# APPENDIX

# SURVEY INSTRUMENT

Demographics, Participation, Attitudes, and Management Preferences of Texas Anglers, 2002

# SURVEY *of* TEXAS ANGLERS

*Conducted for*

**TEXAS PARKS AND WILDLIFE**

*by*

**TEXAS A&M UNIVERSITY**
**DEPARTMENT OF WILDLIFE AND FISHERIES SCIENCES**
**COLLEGE STATION, TEXAS 77843-2258**

**2002 SURVEY OF TEXAS ANGLERS ..... PAGE 1**

***In the following questions, please tell us about your fishing activity and experience. The information you provide will remain strictly confidential and you will not be identified with your answers.***

**1.** Have you fished since this time last year?

1 YES
2 NO ***(If NO, please skip ahead to Question #41)***

**2.** What type of group do you fish with most often? ***(Please circle only one answer)***

1 BY YOURSELF
2 FAMILY
3 FRIENDS
4 FAMILY and FRIENDS TOGETHER
5 CLUB

**3.** Do you or someone in your household own a powerboat?

1 YES ***(If YES, please indicate the length of your longest powerboat: _____ feet)***
2 NO

**4.** ***Below is a list of reasons why people fish. Please circle the number that indicates how important each item is to you as a reason for fishing.***

| | | Not at all important | Slightly important | Moderately important | Very important | Extremely important |
|---|---|---|---|---|---|---|
| a) | To be outdoors | 1 | 2 | 3 | 4 | 5 |
| b) | For family recreation | 1 | 2 | 3 | 4 | 5 |
| c) | To experience new and different things | 1 | 2 | 3 | 4 | 5 |
| d) | For relaxation | 1 | 2 | 3 | 4 | 5 |
| e) | To be close to the water | 1 | 2 | 3 | 4 | 5 |
| f) | To obtain fish for eating | 1 | 2 | 3 | 4 | 5 |
| g) | To get away from the demands of other people | 1 | 2 | 3 | 4 | 5 |
| h) | For the experience of the catch | 1 | 2 | 3 | 4 | 5 |
| i) | To test my equipment | 1 | 2 | 3 | 4 | 5 |
| j) | To be with friends | 1 | 2 | 3 | 4 | 5 |
| k) | To experience unpolluted natural surroundings | 1 | 2 | 3 | 4 | 5 |
| l) | To win a trophy or prize | 1 | 2 | 3 | 4 | 5 |
| m) | To develop my skills | 1 | 2 | 3 | 4 | 5 |
| n) | To get away from the regular routine | 1 | 2 | 3 | 4 | 5 |
| o) | To obtain a "trophy" fish | 1 | 2 | 3 | 4 | 5 |
| p) | For the challenge or sport | 1 | 2 | 3 | 4 | 5 |
| q) | For the fun of catching fish | 1 | 2 | 3 | 4 | 5 |
| r) | To experience adventure and excitement | 1 | 2 | 3 | 4 | 5 |

**2002 SURVEY OF TEXAS ANGLERS ..... PAGE 2**

**5.** Are you a member of a fishing club or organization?

1 YES *(If YES, please identify:_____)*
2 NO

**6.** Have you paid to go fishing with a fishing guide since this time last year?

1 YES
2 NO *(If NO, please skip ahead to Question #7)*

If *YES*, how many *days* did you go fishing with a:

____ FRESHWATER FISHING GUIDE
____ SALTWATER FISHING GUIDE

**7.** ***Please indicate the extent to which you agree or disagree with each of the following statements.***

| | | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|---|
| a) | The more fish I catch, the happier I am | 1 | 2 | 3 | 4 | 5 |
| b) | A fishing trip can be successful even if no fish are caught | 1 | 2 | 3 | 4 | 5 |
| c) | I usually eat the fish I catch | 1 | 2 | 3 | 4 | 5 |
| d) | A successful fishing trip is one in which many fish are caught | 1 | 2 | 3 | 4 | 5 |
| e) | I would rather catch 1 or 2 big fish than 10 smaller fish | 1 | 2 | 3 | 4 | 5 |
| f) | When I go fishing, I'm just as happy if I don't catch fish | 1 | 2 | 3 | 4 | 5 |
| g) | A full stringer is the best indicator of a good fishing trip | 1 | 2 | 3 | 4 | 5 |
| h) | The bigger the fish I catch, the better the fishing trip | 1 | 2 | 3 | 4 | 5 |
| i) | I'm just as happy if I don't keep the fish I catch | 1 | 2 | 3 | 4 | 5 |
| j) | I'm happiest with a fishing trip if I catch at least the limit | 1 | 2 | 3 | 4 | 5 |
| k) | I want to keep all the fish I catch | 1 | 2 | 3 | 4 | 5 |
| l) | I'm happiest with the fishing trip if I catch a challenging game fish | 1 | 2 | 3 | 4 | 5 |
| m) | I'm just as happy if I release the fish I catch | 1 | 2 | 3 | 4 | 5 |
| n) | If I thought I wouldn't catch any fish, I wouldn't go fishing | 1 | 2 | 3 | 4 | 5 |
| o) | I like to fish where I know I have a chance to catch a "trophy" fish | 1 | 2 | 3 | 4 | 5 |
| p) | When I go fishing, I'm not satisfied unless I catch at least something | 1 | 2 | 3 | 4 | 5 |
| q) | Fishing tournaments are an appropriate use of the resource | 1 | 2 | 3 | 4 | 5 |

**8.** Have you fished in *fresh water* since this time last year?

1 YES
2 NO *(If NO, Please skip ahead to Question # 23)*

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***Questions 9-21 deal with your freshwater fishing experiences.***

**9.** Since this time last year, how many days did you go fishing in: ***(If none, please enter 0)***

_____ FARM PONDS or STOCK TANKS

_____ LAKES or RESERVOIRS FROM a BOAT (other than farm ponds or stock tanks)

_____ LAKES or RESERVOIRS FROM SHORE or PIERS (other than farm ponds or stock tanks)

_____ RIVERS and STREAMS FROM a BOAT

_____ RIVERS and STREAMS FROM SHORE or PIERS

_____ TOTAL DAYS FRESHWATER FISHING SINCE THIS TIME LAST YEAR ***(sum of above***

**10.** What ***public*** water bodies have you fished most often since this time last year? Please indicate below:

| | Name of lake or river | Total number of trips taken to this location since this time last year | Total number of days spent fishing at this location since this time last year |
|---|---|---|---|
| EXAMPLE | LAKE FORK | 2 | 4 |
| 1 | _____ | _____ | _____ |
| 2 | _____ | _____ | _____ |
| 3 | _____ | _____ | _____ |

**11.** Overall, how satisfied are you with ***freshwater*** fishing in Texas? ..... 1 2 3 4 5

**12.** Name the fish you prefer to catch in ***fresh water*** in Texas?

_____ FIRST CHOICE

_____ SECOND CHOICE

_____ THIRD CHOICE

**13.** How many years have you been fishing in fresh water?

_____ YEARS

**14.** Do you participate in ***black bass*** fishing tournaments?

1 YES
2 NO ***(If NO, please skip ahead to Question #15)***

If ***YES***, how many ***black bass*** fishing tournaments did you fish in since this time last year:

_____ BLACK BASS TOURNAMENTS

**15.** How do you compare your fishing ability to that of other ***freshwater*** anglers in general?

1 LESS SKILLED
2 EQUALLY SKILLED
3 MORE SKILLED

**16.** ***The following is a list of tools for managing recreational freshwater fisheries. Some are being used by Texas Parks and Wildlife, others are not. Please indicate whether you support or oppose these tools.***

| | Strongly Oppose | Oppose | Neutral | Support | Strongly Support |
|---|---|---|---|---|---|
| a) Releasing fish below a certain length (minimum size limit) | 1 | 2 | 3 | 4 | 5 |
| b) Releasing fish above a certain length limit (maximum size limit) | 1 | 2 | 3 | 4 | 5 |
| c) Releasing fish within a certain length range, but keeping fish above and below this range (slot limit) | 1 | 2 | 3 | 4 | 5 |
| d) "Catch and Release" for certain species of fish in certain freshwater lakes and rivers | 1 | 2 | 3 | 4 | 5 |

**17.** ***Some freshwater anglers tell us they favor fishing regulations that are customized to individual water bodies while others favor regulations that are standardized statewide by species. Please indicate whether you support or oppose:***

| | Strongly Oppose | Oppose | Neutral | Support | Strongly Support |
|---|---|---|---|---|---|
| a) An approach to fisheries management where fishing regulations are **customized** for certain species in an individual water body | 1 | 2 | 3 | 4 | 5 |
| b) An approach to fisheries management where fishing regulations are **standardized** statewide by species | 1 | 2 | 3 | 4 | 5 |

**18.** ***Please indicate the extent to which you agree or disagree with the following statement.***

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| a) TPW does a good job of communicating what I need to know about freshwater fishing | 1 | 2 | 3 | 4 | 5 |

**19.** Have you heard of the ShareLunker Program?

1 YES
2 NO *(If NO, please skip ahead to Question #20)*

If ***YES***, the ShareLunker Program is best described by which of the following?

1 A PROGRAM THAT SEEKS TO SHARE BIG BASS WITH OTHER RESERVOIRS IN THE STATE
2 A PROGRAM WHEREBY ANGLERS DONATE BIG BASS TO TPWD FOR SPAWNING AND RESEARCH PURPOSES
3 ANOTHER NAME FOR THE AGENCY'S CATCH AND RELEASE PROGRAM
4 A PROGRAM THAT PROVIDES BIG BASS TO PRIVATE LAND OWNERS FOR THEIR FARM PONDS/STOCK TANKS
5 DON'T KNOW

**20.** When considering your fishing in Texas, what is the minimum size you would consider a "TROPHY" largemouth bass?

_____ LBS

**21.** When considering your fishing in Texas, what is the minimum size you would consider an everyday "QUALITY" largemouth bass?

_____ LBS

**22.** Have you fished in *salt water* since this time last year?

1 YES
2 NO *(If NO, Please skip ahead to Question #33)*

***Questions 23-32 deal with your saltwater fishing experiences.***

**23.** Since this time last year, how many days did you go fishing in: *(If none, please enter 0)*

_____ SALTWATER BAYS FROM a BOAT
_____ SALTWATER BAYS FROM SHORE or PIERS
_____ SALTWATER GULF FROM a BOAT
_____ SALTWATER GULF FROM SHORE or PIERS

_____ TOTAL DAYS SALTWATER FISHING SINCE THIS TIME LAST YEAR *(sum of above)*

**24.** If you have spent one or more days fishing in saltwater bays in Texas (See Question 23), where have you fished most often since this time last year? **(Please circle only one answer)**

1 SABINE LAKE
2 GALVESTON BAY (EAST BAY, WEST BAY, TRINITY BAY, CHRISTMAS BAY, ETC.)
3 MATAGORDA BAY (LAVACA BAY, TRES PALACIOS BAY, ETC.)
4 SAN ANTONIO BAY (ESPIRITU SANTO BAY, HYNES BAY, ETC.)
5 ARANSAS BAY (COPANO BAY, REDFISH BAY, MESQUITE BAY, ETC.)
6 CORPUS CHRISTI BAY (PORT ARANSAS PASS, CORPUS CHRISTI PASS, NUECES BAY, REDFISH BAY, ETC.)
7 UPPER LAGUNA MADRE (BAFFIN BAY, ETC.)
8 LOWER LAGUNA MADRE (ALL BAYS SOUTH OF LAND CUT)

**25.** Overall, how satisfied are you with *saltwater* fishing in Texas? ..... 1 2 3 4 5

**26.** Name the fish you prefer to catch in *salt water* in Texas?

_____ FIRST CHOICE
_____ SECOND CHOICE
_____ THIRD CHOICE

**27.** How many years have you been fishing in *salt water*?

_____ YEARS

**28.** Do you participate in *saltwater* fishing tournaments?

1 YES
2 NO ***(If NO, please skip ahead to Question #29)***

If *YES*, how many tournaments did you fish in since this time last year:

_____ TOURNAMENTS

**29.** How do you compare your fishing ability to that of other *saltwater* anglers in general?

1 LESS SKILLED
2 EQUALLY SKILLED
3 MORE SKILLED

As a result of angler concerns regarding the perceived abundance of large spotted seatrout, Texas Parks and Wildlife is considering regulation changes for this species. Historically, size limits and bag limits are the tools used to manage fish populations like spotted seatrout. Minimum size limits are used to protect fish until they can reach spawning size or until they reach a size preferred by anglers. Maximum size limits are used to protect larger fish and, coupled with a daily bag limit of 1 fish over the maximum size, can also distribute the catch of larger fish among anglers. Bag limits are used to prevent overharvest and to distribute catch among more anglers. ***The current spotted seatrout regulations allow anglers to harvest 10 spotted seatrout per day and require the fish to be a minimum length of 15 inches. There is no maximum size limit. Please consider carefully your comments on the following regulation options for spotted seatrout.***

**30.** Please indicate whether you support or oppose the following spotted seatrout regulation packages.

| | Strongly Oppose | Oppose | Neutral | Support | Strongly Support |
|---|---|---|---|---|---|
| a) Minimum 17 inches, no maximum, and daily bag limit of 8 | 1 | 2 | 3 | 4 | 5 |
| b) Minimum 16 inches, no maximum, and daily bag limit of 6 | 1 | 2 | 3 | 4 | 5 |
| c) Minimum 16 inches, maximum 24 inches, daily bag limit of 8 (1 fish over 24 inches per day) | 1 | 2 | 3 | 4 | 5 |
| d) Minimum 16 inches, maximum 25 inches, daily bag limit of 10 (1 fish over 25 inches per day) | 1 | 2 | 3 | 4 | 5 |
| e) Minimum 17 inches, maximum 26 inches, and daily bag limit of 6 (1 fish over 26 inches per day) | 1 | 2 | 3 | 4 | 5 |
| f) Prohibiting guides from harvesting spotted seatrout when fishing with paying customers | 1 | 2 | 3 | 4 | 5 |
| g) Maintain the current regulations | 1 | 2 | 3 | 4 | 5 |

**31.** My most preferred size limit and bag limit combination would be:

Daily Bag _____ Minimum Size _____ Maximum Size _____ plus _____ fish over max. per day

**32.** ***The following is a list of tools for managing recreational saltwater fisheries. Some are being used by Texas Parks and Wildlife, others are not. Please indicate whether you support or oppose these tools.***

| | Strongly Oppose | Oppose | Neutral | Support | Strongly Support |
|---|---|---|---|---|---|
| a) Releasing fish below a certain length (minimum size limit) | 1 | 2 | 3 | 4 | 5 |
| b) Releasing fish above a certain length limit (maximum size limit) | 1 | 2 | 3 | 4 | 5 |
| c) Being allowed to keep only a certain number of fish you catch in one day (daily bag limit) | 1 | 2 | 3 | 4 | 5 |
| d) Prohibiting the use of certain types of bait | 1 | 2 | 3 | 4 | 5 |
| e) A tag to retain a "trophy" fish | 1 | 2 | 3 | 4 | 5 |

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***Questions 33-39 deal with your fishing expenditures for a typical fishing trip in Texas, and the value of your fishing equipment.***

***PLEASE TRY TO RECALL A SPECIFIC FISHING TRIP IN 2001 WHICH YOU CONSIDER A TYPICAL FISHING TRIP.***

**33.** In which month did this typical fishing trip occur? _____

**34.** How many miles one-way did you travel (over land) on this fishing trip? _____ ONE-WAY MILES

**35.** How many days did you spend on this fishing trip? _____ TOTAL DAYS

**36.** Was this trip in:

1 FRESH WATER. ***(Please identify water body:*** _____ ***)***
2 SALT WATER.

**37.** ***On this typical fishing trip during the 2001 fishing season, how much did you spend on each of the following items?***

a) Automobile transportation (fuel, rental car, etc.) ..... $ _____
b) Other transportation (airplane, etc.) ..... $ _____
c) Boat rental ..... $ _____
d) Boat operation (fuel, etc.) ..... $ _____
e) Boat launch fees ..... $ _____
f) Entrance/parking fees ..... $ _____
g) Lodging (hotel, condo rental, camping, etc.) ..... $ _____
h) Food, drinks, ice ..... $ _____
i) Bait, tackle ..... $ _____
j) Charter or guide fees ..... $ _____
k) Anything else for this trip ***(Please specify below)*** ..... $ _____

_____

l) **TOTAL COST FOR THIS FISHING TRIP** ***(Sum of above)*** ..... $ _____

**38.** If the prices of good and services were to increase so this typical trip cost $ _____ ***more*** than usual ***(refer to your total cost in Question #37)***, would you cancel the trip?

1 YES
2 NO

**39.** How much more would you have been willing to spend *(over your total trip cost in Question #37)* before you wouldn't have taken this trip?

$ _____ MORE PER TRIP

**40.** If you had to replace all of the fishing equipment you use to fish with similar equipment, how much would it cost to replace the following:

a) Reels ..... $ _____
b) Rods ..... $ _____
c) Tackle (hooks, lures, line, and other hardware) ..... $ _____
d) Electronic equipment (depth finder, fish locator) ..... $ _____
e) Boat, motor, and trailer ..... $ _____

**41.** Are there factors that constrain you from fishing as often as you would like?

1 YES
2 NO *(If NO, please skip ahead to Question #42)*

If *YES*, please indicate the extent you agree or disagree with the following statements as to why you don't fish more frequently.

| | | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|---|
| a) | Fishing regulations are too confusing | 1 | 2 | 3 | 4 | 5 |
| d) | License fees for fishing are too expensive | 1 | 2 | 3 | 4 | 5 |
| c) | I can't catch enough fish to suit me | 1 | 2 | 3 | 4 | 5 |
| d) | I don't have access to fishing opportunities close to home | 1 | 2 | 3 | 4 | 5 |
| e) | I have too many work/ family commitments | 1 | 2 | 3 | 4 | 5 |
| f) | Other leisure activities take up my time | 1 | 2 | 3 | 4 | 5 |
| g) | Fishing regulations are too restrictive | 1 | 2 | 3 | 4 | 5 |
| h) | The cost of fishing equipment and supplies is too high | 1 | 2 | 3 | 4 | 5 |
| i) | Fishing facilities and areas are too crowded | 1 | 2 | 3 | 4 | 5 |
| j) | I can't afford ($) to fish more often | 1 | 2 | 3 | 4 | 5 |
| k) | Fishing facilities (ramps, piers, etc.) need improvement | 1 | 2 | 3 | 4 | 5 |
| l) | I don't have the necessary fishing skills | 1 | 2 | 3 | 4 | 5 |
| m) | I don't really feel safe when I'm out fishing | 1 | 2 | 3 | 4 | 5 |

**42.** Do you have access to the Internet (e-mail and/or World Wide Web)?

1 YES
2 NO

**43.** Compared to your other outdoor recreation activities (such as hunting, camping, golfing, etc.) would you rate recreational fishing as: ***(Please circle only one answer)***

1 YOUR MOST IMPORTANT OUTDOOR ACTIVITY
2 YOUR SECOND MOST IMPORTANT OUTDOOR ACTIVITY
3 YOUR THIRD MOST IMPORTANT OUTDOOR ACTIVITY
4 ONLY ONE OF MANY OUTDOOR ACTIVITIES

***The following questions will help us to know more about anglers. The information you provide will remain strictly confidential and you will not be identified with your answers.***

**44.** What is your age? _____ YEARS

**45.** Are you:

1 MALE
2 FEMALE

**46.** What is your approximate annual household income before taxes?

| | | | |
|---|---|---|---|
| 1 | UNDER $10,000 | 7 | $60,000 - $69,999 |
| 2 | $10,000 - $19,999 | 8 | $70,000 - $79,999 |
| 3 | $20,000 - $29,999 | 9 | $80,000 - $89,999 |
| 4 | $30,000 - $39,999 | 10 | $90,000 - $99,999 |
| 5 | $40,000 - $49,999 | 11 | $100,000 and ABOVE |
| 6 | $50,000 - $59,999 | | |

**47.** Are you of Spanish/Hispanic origin?

1 NO, NOT SPANISH/HISPANIC
2 YES, MEXICAN, MEXICAN AMERICAN, CHICANO
3 YES, OTHER SPANISH/HISPANIC GROUP ***(Please specify group_____)***

**48.** What is your race? Please indicate one or more races for what you consider yourself to be.

1 WHITE
2 BLACK OR AFRICAN AMERICAN
3 AMERICAN INDIAN OR ALASKAN NATIVE
4 ASIAN OR PACIFIC ISLANDER
5 SOME OTHER RACE ***(Please specify_____ )***

**49.** Was this survey completed by the person to whom it was addressed?

1 YES
2 NO

***Is there anything else you would like to share with us?***

Would you like a summary of the results of this survey?

1 YES
2 NO

***Your contribution of time to this study is greatly appreciated. Please return your completed questionnaire in the business reply envelope as soon as possible. Thank You.***

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2/02

# VITA

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Selected Publications:

Wolber, N. R., & Ditton, R. B. (2007). *The Economic Impact of the Proposed Texas Clipper Reef on the South Padre Island Charter Fishing and Diving Industry: A Preliminary Economic Assessment*. Report prepared for the Texas Parks and Wildlife Department. Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station.

Tseng, Y. P., Wolber, N. R., & Ditton, R. B. (2006). *Demographics, participation, attitudes, and management preferences of Texas anglers* (HD-631). Report prepared for the Texas Parks and Wildlife Department. Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station.