Characteristics of Texas Catfish Anglers and their Catch and Management Preferences

Prepared for the

Texas Parks & Wildlife Department
Inland Fisheries Division
Austin, Texas

by

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Executive Summary

Inland waters in Texas support abundant populations of channel, blue, and flathead catfish and the percentage of Texas anglers that pursue catfishes (56%) is double that of anglers elsewhere in the nation (USDI 2006b). Additionally, Texas anglers spent 11.6 million days pursuing catfish in 2006. Recognizing the large interest in catfishing and the need to address the apparent growing diversity of catfish anglers, the Texas Parks and Wildlife Department (TPWD) has initiated development of a comprehensive plan to guide management and research activities for catfish in Texas' inland waters. The primary goal of this plan will be to guide development of a diversity of high-quality catfish angling opportunities which can be feasibly provided through management. TPWD commissioned a survey of Texas freshwater catfish anglers to assist them with better incorporating catfish anglers' needs and preferences into the comprehensive catfish management plan. Specifically, they wanted this study to:

1) Document Texas catfish angler characteristics, participation patterns, species preferences, attitudes, and site preferences related specifically to catfish angling in Texas,

2) Determine Texas catfish anglers' current satisfaction with catfishing in Texas and the places they go catfishing,

3) Use stated choice modeling to explain how catfish angler's choices of hypothetical fishing trips are influenced by trip attributes (catch expectations, amenities, and travel distance) and their individual characteristics and catch-related attitudes, and

4) Provide a market segmentation of catfish anglers based on their catch-related attitudes if the stated choice model indicated that catch-related attitudes significantly influenced angler choices of hypothetical fishing trips.

Sample Frame, Response Rate, and Questionnaire Design

- The sample for the mail survey consisted of 1,078 individuals that had responded to the *2009 Survey of Texas Anglers* and indicated that they had either fished for catfish

in the previous year or listed "catfish" or a particular catfish species as one their three most preferred species to catch while freshwater fishing in Texas. Anglers were asked questions about their demographics, their catfishing activity, their catch-related attitudes, their satisfaction with catfishing in Texas, and were presented a series of hypothetical multi-attribute choice sets involving catfishing trips in Texas in order to fit a stated choice model (SCM) to estimate angler utility and preferences for various catfishing trip scenarios and attributes. We received returned questionnaires from 587 individuals. When adjusted for 38 non-deliverable and 15 non-eligible responses (refusals, deceased, or indicated they did not fish) the final adjusted response rate was 57.3%. Ninety-seven of the 587 individuals who provided useable responses indicated that they had neither fished for nor caught a catfish in the previous two years, giving an effective sample size of 490 individuals for most of the variables used in the data analyses. Based on non-response bias analysis this study under-represented young, low income, and minority anglers.

General Characteristics of Freshwater Catfish Anglers in Texas

- Most respondents to this survey were males (85%) of Anglo origins (91%). Females comprised nearly 15% of respondents, and about 9% of respondents were of Hispanic/Latino origins. The median household income of respondents was $60,000-$79,999. About 69% had attended at least some college, 37% had graduated college and 10% had post-baccalaureate degrees. Consistent with the majority of Texans most resided in or around the major population centers of Dallas, Houston, San Antonio as well as smaller cities along the I-35 corridor.

- About 51% of respondents preferred to fish for channel catfish, 35% preferred blue catfish, and 12% preferred flathead catfish. Only 2% did not have a preference or indicated another catfish species such as bullhead catfish.

- Overall, respondents indicated that they had been fishing an average of nearly 35 years and about 29 years fishing for catfish. They fished an average of 28 days overall and about 20 days fishing for catfish. Approximately 65% of catfishing trips were spent fishing from a boat, and 35% were spent fishing from shore. Respondents reported that about one-third of their catfishing trips included fishing during nighttime hours.

- Respondents indicated that an eating-size catfish had to be a minimum of 14-17 inches depending on species, and that a catfish had to be at least 30 inches long to be considered a trophy-sized catfish.

- On a typical catfishing trip respondents indicated they caught an average of 9 catfish and harvested an average of two-thirds (6) of the fish they caught. About 81% of respondents indicated they used a rod and reel most often; 9% used trotlines, 7% used jug lines, and about 3% fished with limb lines.

- Most respondents agreed that it is important "To go fishing at an area that is free of litter" (92%), "To go fishing where you cannot hear or see busy traffic" (70%), "To go fishing at waters close to home" (70%).

Texas Catfish Angler Satisfaction

- Sixty-two percent of respondents indicated that they were either very or extremely satisfied with catfishing in Texas. Most respondents were also very to extremely satisfied with the number of catfish they were allowed to harvest (77%), the size of catfish they were allowed to harvest (66%), and with the number of eating-size catfish they caught (56%). A plurality of respondents was very to extremely satisfied with the average size of the catfish they caught (49%). Only 32% of respondents were very to extremely satisfied with the number of trophy catfish they caught.

- Overall satisfaction with catfishing was strongly correlated (rho > 0.6) with angler satisfaction concerning the number of eating-size catfish caught, and the average size of catfish caught indicating that these items had the strongest influence on overall satisfaction.

- Sixty-one percent of respondents indicated that they were either very or extremely satisfied with the places they go catfishing in Texas, and a majority (57%) were very or extremely satisfied with the availability of catfishing sites in their area. Most respondents were slightly to moderately satisfied with the services available in the areas they fished for catfish (61%), the number of people in the areas they fished for catfish (60%), the amenities available where they fished (55%), the availability of other activities in the areas they fished for catfish (54%), and the cleanliness of the areas they fished for catfish (52%).

- Our results suggest that catch-related aspects of the fishing experience best explain angler satisfaction with a particular resource, regardless of what else they find at the area.

Stated Choice Model of Catfish Angler Trip Preferences

- State choice modeling (SCM) was used to examine catfish angler preferences for various catch and non-catch related fishing trip attributes. Respondents were presented with six pairs of hypothetical fishing trip scenarios, and asked to either choose the scenario from each pair that they most preferred or indicate that they would choose neither scenario. Scenarios varied over six attributes: relative number of catfish caught, relative number of catfish harvested, relative size of catfish caught, type of water fished, level of fishing site development, and distance travelled to site. With individual choice serving as the dependent variable, and the scenario attributes serving as the independent variables in the analysis, we determined how much each attribute influenced trip choice, and in turn which attribute levels anglers most preferred, or provided them with the greatest utility.

- In addition to scenario attributes, respondent demographic characteristics, and measurements of their catch-related attitudes were included in the final SCM model to determine how these variables affected trip choice. Respondent's catch-related attitudes were measured on a 16-item scale designed to measure attitudes towards catching something, catching numbers of fish, catching large fish, and retaining fish. Demographic variables and catch-related attitude scores were included in the SCM model by interacting them with appropriate attribute variables within the model.

- The SCM indicated that older individuals with high incomes were more likely to choose a fishing trip over the "neither" option while non-white respondents were more likely to choose the "neither" option.

- Distance traveled was the greatest determinate of choice for all three models. Respondents had approximately 1.8 times the odds of choosing a fishing trip within 10 miles of home than one 11-100 miles from home, and 0.4 times the odds of choosing a trip over 100 miles from home. This means anglers were willing to forgo larger fish, higher catches, or larger harvests, but not necessarily all three, if they could fish waters close to home. This was true of all market segments.

- Catch-related attributes were all significant predictors of choice indicating that decreases in catch, harvest, and size of catfish caught had a significantly negative effect on angler utility while increases in catch-related attributes had the opposite effect. Size of catfish caught was the second best predictor of respondent choice behind distance travelled followed by the relative number of catfish caught and harvested. This means anglers were willing to forgo higher catches and larger harvests if they could catch larger fish. This was true across all market segments.

- Individuals that scored high on catch-related attitude scales involving number and size of fish caught, and retaining fish received greater utility from trip scenarios involving increases in catch, harvest, and size of catfish caught. Respondents that scored low on retaining fish attitude scale were less affected by a reduction in the number of catfish harvested. However, all respondents were equally affected by reductions in the number of catfish caught, and the size of catfish caught regardless of their catch-related attitudes.

- Type of water body fished and the level of site development had the least impact on respondent choice. There was a significant negative relationship between trip choice and fishing on a small reservoir indicating that anglers preferred to fish on large reservoirs or rivers and streams. There was a significant negative relationship between trip choice and having an undeveloped site with no boat launch suggesting that the average catfish angler feels their needs are adequately meet as long as a boat launch and basic amenities are present.

Market Segmentation of Texas Catfish Anglers

- Because SCM indicated that trip choice was influenced by respondent's catch-related attitudes, we used cluster analysis to divide respondents into market segments based on their catch-related attitude scale scores. Cluster analysis identified four segments of respondents that made up between 18 to 34% of the total sample. These segments were labeled *Casual Anglers* (24%), *Number and Size Anglers* (18%), *Numbers and Harvest Anglers* (34%), and *Size Anglers* (24%).

- "*Casual Anglers*" had relatively low scores on each of the four catch-related constructs. Overall, *Casual Anglers* likely are the most leisurely angler group and they fish away from home often with family on private waters or at resources with park like settings. They also are less disturbed by having other people or activity around when fishing. Additionally, this group rates their satisfaction with settings based more so on the quality of amenities than their catch.

- *Casual Anglers* rated the importance of fishing compared to their other activities, and the importance of catfishing relatively low compared to other groups. Only 45% indicated that fishing was their most important outdoor activity and 21% indicated that catfishing was their most important type of fishing.

- *Casual Anglers* agreed more than other clusters with the statement "It is important for me to go fishing where there are other recreational opportunities for the rest of the family to enjoy" and were less likely to agree with the statements "It is important to me to fish waters close to home" and "It is important for me to go fishing where you do not have to walk more than 15 minutes".

- In terms of the percentage of anglers responding that they were very to extremely satisfied *Casual Anglers* were least likely to be satisfied than other groups with "The amenities in the areas you fished for catfish" (33%), "The cleanliness of the areas you fished for catfish" (37%), "The availability of other activities where you fished for catfish" (40%), and "The services in the areas you fished for catfish" in the previous year (30%).

- "*Numbers and Size Anglers*" exhibited the highest scores on these two attitude constructs. They appear to want action, and the more fish they catch and the bigger those fish are, the better. Although not evident in their average years of participation, the low reported self-knowledge level of many anglers in this group may indicate that there are more "newer recruits" in this group.

- *Numbers and Size Anglers* had a higher percentage of anglers (46%) in lower income categories (<$60,000) than the other groups. With the exception of the *Size Anglers* they also contained more minority anglers than other groups (11%).

- *Numbers and Size Anglers* agreed more than any other group with the statements "It is important for me to go fishing where you cannot hear or see busy traffic", "It is

important for me to go fishing where you don't have to see too many other people", and "It is important for me to go fishing where you feel far away from other people and cities".

- *Numbers and Size Anglers* agreed more than any other group with the statements "It is important for me to fish waters close to home", and "It is important for me to go fishing where you don't have to walk more than 15 minutes"

- In terms of the percentage of anglers responding that they were very to extremely satisfied, *Numbers and Size Anglers* were least satisfied with "The availability of catfish fishing spots in your area" (50%), and "The number of people in the areas you fished for catfish" (32%).

- "*Numbers and Harvest Anglers*" exhibited the second highest scores on the "catching numbers" construct, and scored significantly higher than other groups on the "retaining fish" construct. This is the largest group making up 34% of the catfish angler population.

- Overall, *Numbers and Harvest Anglers* are likely more driven by harvest of eating-sized catfish than others, and likely scored lower on the "catching large fish" construct because they aren't as good table fare. They are the most experienced catfish anglers in Texas and catch and harvest more fish than other groups. They employ a variety of methods while catfishing including jug lines, limb lines, and trot lines and are the most satisfied catfish anglers in the state in terms of the number and size of fish they catch and the current places they go catfishing.

- *Numbers and Harvest Anglers* were older on average (50 years) than any other group and contained the most female anglers (19%). This group also had the highest percentage of anglers (38%) who didn't attend college. Although this group contained more white anglers than any other group (93%), it also contained the most African American anglers (3.3%).

- *Numbers and Harvest Anglers* reported that they caught on average more catfish than any other group on a typical outing (10), and they harvested a higher percentage of their catch on those outings (77%). They indicated that an eating-sized channel catfish was slightly smaller than other groups.

- With the varied methods used most by this group it was not surprising that *Numbers and Harvest Anglers* were as or more supportive than other segments of allowing the currently legal methods of using trot lines (82%), jug lines (81%), and limb lines (70%) while fishing. Along with *Size and Numbers Anglers* and *Size Anglers*, a slight plurality of this group was also in favor of allowing the currently illegal methods of hand-grabbling (40%) and bow fishing for catfish (38%)

- *Numbers and Harvest Anglers* were most satisfied with freshwater fishing and catfishing in Texas, the number of eating-sized catfish they caught, and the average size of catfish they caught in Texas.

- *Size Anglers* exhibited significantly lower scores than any other group on the "retaining fish" construct. *Size Anglers* likely contains at least two subgroups: 1) true "trophy" anglers whose primary concern is catching large catfish, and 2) anglers who are primarily interested in catching bigger fish for either the better fight or perhaps to eat. Despite their low scores on the retaining fish attitude scale they still keep over 50% of their catch. *Size Anglers* are the least satisfied group of catfish anglers in the state.

- *Size Anglers* had the lowest percentage of female anglers (11%), but the highest percentage of non-white anglers (14%) who were primarily of Hispanic origins.

- *Size Anglers* had the highest percentage of anglers with a preference for channel catfish (57%), and they indicated that an eating-sized catfish was almost two inches longer (16") than any other group. When asked what a trophy-sized fish channel, blue, and flathead catfish was, this group assigned a larger length than any other group for all three species.

- *Size Anglers* had lower satisfaction than other groups with fishing in freshwater (59%), catfishing (57%), the number of eating-sized fish they catch (48%), the number of trophy-sized fish they catch (40%), and the average size of catfish caught (40%).

- Separate SCM were fit for each of the four catfish angler clusters to identify differences in trip preferences between the four clusters. Each of the clusters had a strong preference for sites closer to home. *Casual Anglers* were slightly less influenced by trips promising larger than usual catfish then the other clusters. *Casual Anglers* and *Numbers and Harvest Angler* were only slightly influenced by changes in the level of catch compared to the other clusters, while *Size Anglers* were indifferent towards the number of catfish harvested.

Discussion

- Typical response rates to statewide angler surveys around the country have fallen from ~70% in the 1980s to ~40% currently. That means that occasional anglers do not respond at the level they once did, and research has consistently shown that Hispanics and African-American anglers do not respond at the same level as Anglos to statewide angler surveys. TPWD should investigate other mechanisms for obtaining information from catfish anglers in Texas that this study may have missed.

- More attention will likely need to be paid to shore-based fishing opportunities and associated amenities and upkeep. That said, although this study was targeted at catfish anglers, it is important to reiterate that catfishing was the most important type

of fishing to only 21% of anglers in this study. Any management strategies developed for particular resources that would focus primarily on catfish to the exclusion of other species would likely meet with some resistance.

- Increased marketing of these resources may ease some of the burden of the realization that TPWD needs to bring fish to the people (rather than vice-versa) more so today than in the past. TPWD should take a close look at how they market their catfish fisheries and see if there are additional ways to get this information into anglers' minds.

- The size and number of catfish caught are foremost on catfish anglers' minds when determining their choice of fishing locations and satisfaction. While the importance of retaining fish appeared to vary across anglers, all anglers uniformly were concerned with the number and size of catfish caught.

- Few changes in the composition of a catfish angler's catch can have a greater negative impact on utility than a reduction in the number of catfish harvested. Only a reduction in the typical size of catfish caught could have a greater negative impact on utility. Managers looking to improve the size and number of catfish caught will have to find ways of accomplishing these tasks without making significant cuts in the number of catfish most anglers keep. This may be a difficult task on high-use urban resources. However, managers should also keep in mind that the average number of catfish typically harvested by catfish anglers is little more than one-fourth of the current statewide bag limit.

- In addition to catch-related aspects of a fishing trip, most catfish anglers preferred that locations shouldn't be too crowded, should give them the feeling of being away from other people and cities, should provide recreational opportunities aside from fishing, and be free from litter.

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Introduction

Recreational fishing for catfishes *Ictalurus spp.* is an activity pursued by numerous anglers in the United States. According to the most recent Survey of Fishing, Hunting and Wildlife-associated Recreation conducted by the United States Fish and Wildlife Service (USDI 2006a), catfish were pursued by 28% of all anglers in the United States. Historically thought of as a food fish, fisheries managers around the country are observing that catfish anglers are seeking catfishes not only for consumption, but also for resources that provide them with diverse recreational experiences in terms of settings, species, and numbers and size of catfishes they catch.

Inland waters in Texas support abundant populations of channel, blue, and flathead catfish and the percentage of Texas anglers that pursue catfishes (56%) is double that of anglers elsewhere in the nation (USDI 2006b). Additionally, Texas anglers spent 11.6 million days pursuing catfish in 2006. Recognizing the large interest in catfishing and the need to address the apparent growing diversity of catfish anglers, the Texas Parks and Wildlife Department (TPWD) has initiated development of a comprehensive plan to guide management and research activities for catfish in Texas' inland waters. The primary goal of this plan will be to guide development of a diversity of high-quality catfish angling opportunities which can be feasibly provided through management. This plan will be relevant to all "fishable" populations of catfish in Texas' public waters including large river-reservoir systems, small streams, and small impoundments which include intensively-managed urban fisheries. Such a plan will emphasize a comprehensive approach to catfish management in Texas and will be based to a large extent on the needs and preferences of Texas catfish anglers.

What is currently known about Texas catfish anglers and their needs and preferences only touches on what is needed for the development of a comprehensive plan that addresses the future of catfish management in Texas. Two previous studies of Texas catfish anglers have examined angler demographics, fishing motivations, and catch-related attitudes. Wilde and Riechers (1994) found Texas catfish anglers to be predominantly low-income males who fished an average of 26 to 42 days in the previous year, were dependent on their preferred species, and with the exception of flathead catfish anglers, primarily fished on lakes. Wilde and Riechers (1994) also found that over one-half of catfish anglers supported minimum length limits and daily creel limits despite exhibiting moderate to high scores on a scale instrument designed to measure their attitudes toward harvesting catfish. Wilde and Ditton (1999) followed up on this first study by examining catfish angler motivations, and an extended list of catch-related attitudes. They found that compared to other angler groups, catfish anglers were less interested in catching trophy fish and more interested in obtaining fish to eat. Both of these studies attempted to divide catfish anglers based on the species of catfish (channel, blue, or flathead) they most preferred to pursue; however, the vast majority (87% and 86%, respectively) of respondents in both studies indicated that they preferred to pursue catfish in general without distinguishing a specific species of catfish as their most preferred.

While these studies were able to generate insights into the relative importance of different aspects of the angling experience to catfish anglers, the species approach to segmenting catfish anglers in previous studies has shed little light on the characteristic diversity within the catfish

angler population and their preferences for management. Additionally, previous studies were not designed to illustrate how factors such as catch expectations and fishery characteristics affect angler's decisions on where to fish for catfish. Because of these shortcomings, TPWD commissioned a study to assist them with better incorporating catfish anglers' needs and preferences into the comprehensive catfish management plan. Specifically, they wanted this study to:

1) Document Texas catfish angler characteristics, participation patterns, species preferences, attitudes, and site preferences related specifically to catfish angling in Texas,

2) Determine Texas catfish anglers' current satisfaction with catfishing in Texas and the places they go catfishing,

3) Use stated choice modeling to explain how catfish angler's choices of hypothetical fishing trips are influenced by trip attributes (catch expectations, amenities, and travel distance) and their individual characteristics and catch-related attitudes, and

4) Provide a market segmentation of catfish anglers based on their catch-related attitudes if the stated choice model indicated that catch-related attitudes significantly influenced angler choices of hypothetical fishing trips.

The purpose of this report is to present results of the Survey of Texas Freshwater Catfish Anglers and to address these four directives. After a brief presentation of the survey methodology used for this study and the response rates to the survey, the report is divided into four stand-alone sections: 1) Texas Catfish Angler Characteristics, 2) Texas Catfish Angler Satisfaction, 3) Stated Choice Model, and 4) Market Segmentation. These are then followed with a Discussion Points section that addresses the Principal Investigators' observations from the results of the data analysis.

General Survey Methodology and Response Rate

Questionnaire Design and Implementation

An 11-page self-administered mail questionnaire (APPENDIX A) was developed to collect the necessary data for this study. The first 5 pages the questionnaire collected data on general angling behavior (i.e., years of general fishing and catfishing experience; frequency of catfishing trips on different types of waters; the typical number and size of catfish caught and harvested; seasons fished; catfishing methods used; and investment in fishing equipment), their opinions on what constituted eating-sizes and trophy sizes of three common catfish species (i.e., channel, blue, and flathead catfish), their opinion on what fishing methods should be legal for taking catfish, their catch-related attitudes, their preferences for select fishing site attributes, and their satisfaction with catfishing and catfishing sites in Texas. The next 4 pages of the questionnaires were composed of the questions needed for the stated choice model and their associated instructions. The questions used to collect the data needed to estimate the SCM consisted of 6 paired hypothetical choice scenarios that were varied over 6 attributes of the fishing trip related to catch, harvest, size of catfish caught, type of water fished, level of site development, and distance traveled to the fishing site. Respondents were asked to examine each pair of trip scenarios and indicate which of the two catfishing trips they would most prefer to take or whether they would choose to take neither. Finally, the last two pages of the questionnaire consisted of several demographic questions, and provided space for anglers to provide voluntary open-ended comments to the question "Is there anything else you would like to share with us about catfishing in Texas?" Open-ended comments are provided in APPENDIX F this report.

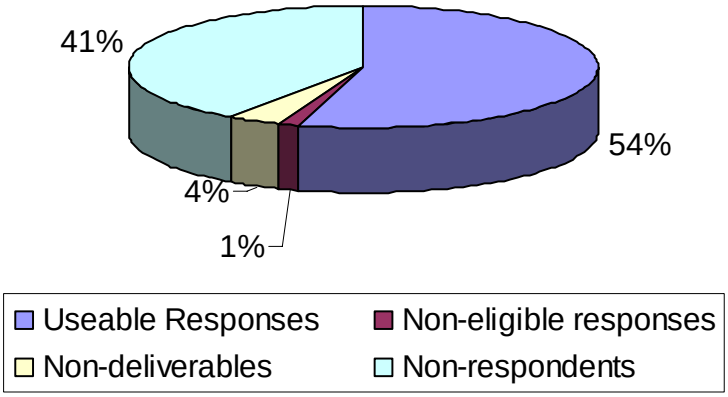
The sample for the mail survey consisted of 1,078 individuals that had responded to the *2009 Survey of Texas Anglers* and indicated that they had either fished for catfish in the previous year or listed "catfish" or a particular catfish species as one their three most preferred species to catch while freshwater fishing in Texas. Survey implementation used Dillman's Tailored Design Method (2007) to increase response rate. Specifically, on Day 1 of the study, individuals were sent a personalized pre-letter from the Chief of Management and Research for Inland Fisheries Division of the TPWD explaining the purpose of the study and how they were selected for the study. On Day 8 of the study, all individuals were sent a questionnaire, pre-paid business reply envelope, and a personalized cover letter (e.g., a complete packet) from the Principal Investigator at Mississippi State University (MSU) providing instructions for completing and returning the questionnaire. On Day 18 of the study, all individuals were sent a follow-up reminder/thank you note. To increase response rate individuals that did not initially respond to the first questionnaire mailing were sent a second complete packet on day 28 and a third complete packet on day 42 if necessary. All procedures were approved by the MSU Institutional Review Board for the Protection of Human Subjects (IRB Docket 10-102).

Response Rate

We received returned questionnaires from 587 individuals. The raw response rate was 54% (Figure 1). When adjusted for 38 non-deliverable and 15 non-eligible responses (refusals, deceased, or indicated they did not fish) the final adjusted response rate was 57.3%. Ninety-seven of the 587 individuals who provided useable responses indicated that they had neither

fished for nor caught a catfish in the previous two years, giving an effective sample size of 490 individuals for most of the variables used in the data analyses. All 587 respondents completed the demographic questions and were eligible to provide open-ended comments.

Figure 1. Response Rate for the 2010 Survey of Texas Freshwater Catfish Anglers



Non-response analysis and adjustment

To determine if population estimates needed to be adjusted for non-response bias, logistic regression was used to determine if age, gender, or residence location had a significant effect on individual response probabilities (Fisher 1996). These variables are included in the TPWD electronic database of licensed anglers and are the only variables known for both respondents and non-respondents to the *2009 Texas Statewide Angler Survey* and the follow-up *2010 Survey of Texas Freshwater Catfish Anglers*. For the logistic regression analysis, response status (1 = respondent, 0 = non-respondent) served as the dependent variable and gender (1 = female, 0 = male), age (years), and whether they lived in a coastal or inland county served as the dependent variables.

The logistic regression analysis indicated that age, gender, and coastal county status were all significant predictors of non-response to the original statewide survey, but only age significantly predicted non-response probability to the follow-up survey of catfish anglers (Table 1; APPENDIX C). Respondents had a higher average age than non-respondents for both surveys while females and inland county residents had a greater likelihood of responding to the original statewide survey (Table 2; APPENDIX C).

Two separate response probabilities, one for the statewide survey and one for the follow-up, were then calculated for each individual based on the results of the respective analyses. These probabilities were then inverted to serve as the sampling weights for each survey. These weights were then summed for each individual in the final sample. Respondent sampling weights were

then used to adjust all frequencies, sample means, proportions, and statistical analyses in this report to correct for non-response bias.

Factor analysis

We conducted separate principle components factor analyses with Varimax rotation on two scale instruments designed to measure catfish angler's 1) catch-related attitudes, and 2) preferences for catfishing site amenities to group individual scale items into underlying factors for ease in interpreting data (Tables 3-6; APPENDIX C). Items in both scale instruments were measured using a 5-point Likert-type scale with the following response format: 1=strongly disagree; 2=disagree; 3=neutral; 4=agree, and 5=strongly agree. Final factors were required to have a minimum Eigenvalue of 1.0, and scale items needed a minimum factor loading of 0.6 to be included within a given factor. Cronbach's alpha, a measure of internal consistency, was calculated to measure inter-factor reliability. If scales items within each factor had a Cronbach's alpha >0.60, items within that factor were summed to produce a factor score and the factor score was used for analysis purposes.

Section 1: Texas Catfish Angler Characteristics

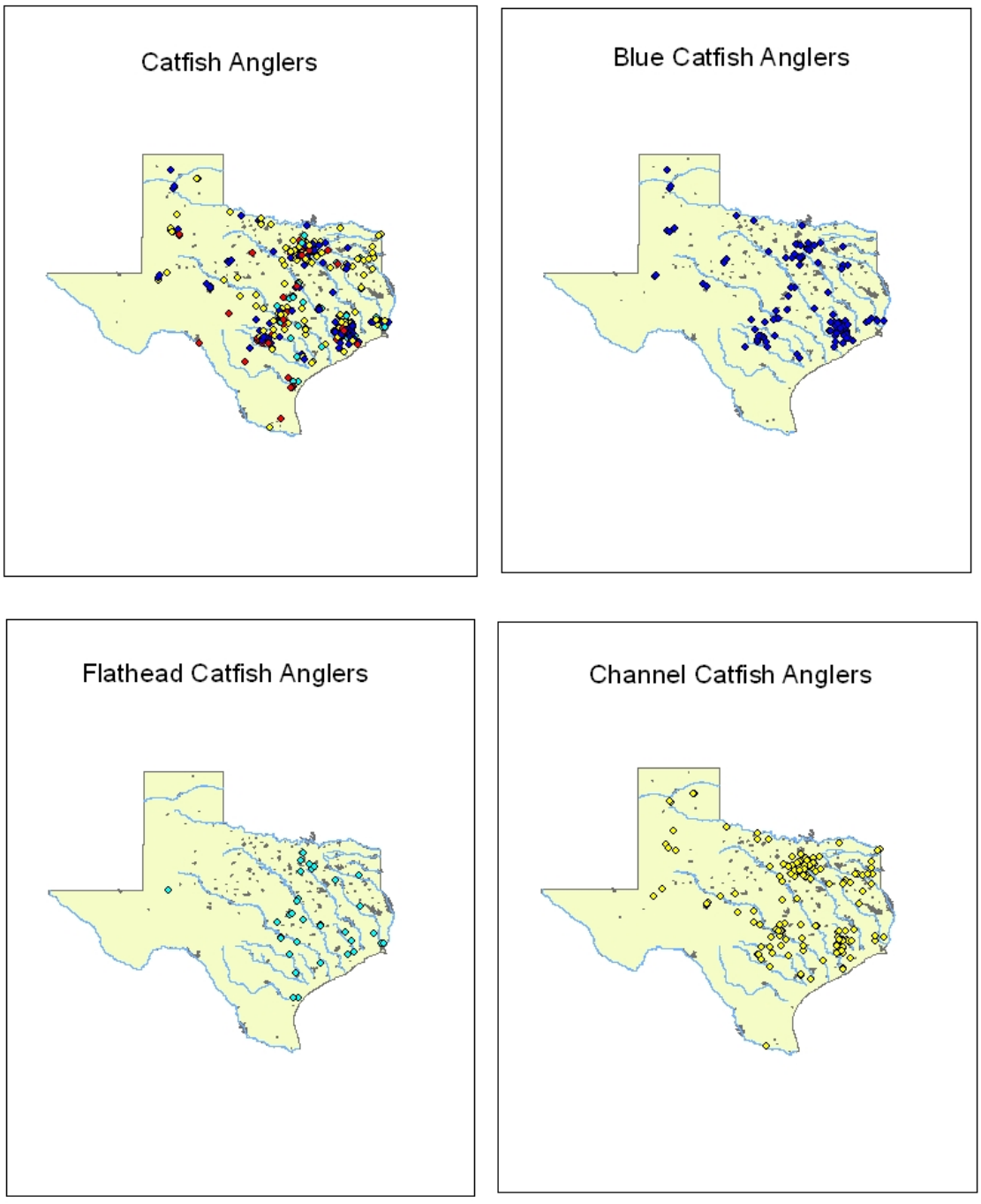
In addition to the Stated Choice Modeling questions which are covered in-depth in Section 3, information that would help characterize Texas catfish anglers in terms of their demographics, participation patterns, catfish species preferences, typical catfish catch and harvest behavior, catch-related attitudes, and preferences for site attributes were gathered from both the original statewide survey and the follow-up survey of Texas catfish anglers. This section summarizes these questions to paint a general picture of the Texas catfish angler population. The reader is reminded that the "average" catfish angler likely exists only in research reports. As such, frequency tables for most of the information covered in this section are available in APPENDIX D if the reader wishes to investigate in more detail the characteristic diversity present in the Texas catfish angler population. Also, the market segmentation in Section 4 attempts to distinguish catfish anglers into groups based on their orientations toward catching and keeping fish.

- Most respondents to this survey were males (85%) of Anglo origins (91%). Females comprised nearly 15% of respondents, and about 9% of respondents were of Hispanic/Latino origins. The median household income of respondents was $60,000-$79,999. About 69% had attended at least some college, 37% had graduated college and 10% had post-baccalaureate degrees.

- Respondents were geographical dispersed throughout the state, but consistent with the majority of Texans most resided in or around the major population centers of Dallas, Houston, San Antonio as well as smaller cities along the I-35 corridor (Figure 2).

- When asked how confident they were in their ability to identify the primary catfish species available in Texas waters, over 72%,70%, and 66% of respondents indicated they were "very confident" in their ability to identify channel catfish, blue catfish, and flathead catfish, respectively.

Figure 2. Geographic Distribution of Texas Catfish Anglers; Overall and by Species Preference.



- About 51% of respondents preferred to fish for channel catfish, 35% preferred blue catfish, and 12% preferred flathead catfish. Only 2% did not have a preference or indicated another catfish species such as bullhead catfish.

- A significant relationship was found between species preference and residence location. About 22% of anglers in the Dallas/Ft. Worth area indicated a preference for channel catfish compared to 16% of Houston area anglers. Conversely, 24% of Houston area anglers indicated a preference for blue catfish compared to 14% of Dallas area anglers. Most anglers with a preference for flathead catfish lived in the central and eastern portions of the state (Figure 2).

- When asked to rate the importance of fishing compared to their other outdoor activities, about 45% of respondents indicated that fishing was their most important outdoor activity; 33% and 15% indicated it was their second and third most important activity, respectively.

- When asked to rate the importance of catfishing to their fishing for other species, only 21% indicated it was their most important type of fishing; 42% and 28% indicated it was their second and third most important type of fishing.

- When asked to rate how their level of fishing knowledge compared to other anglers, about 62% of respondents indicated they were "equally" knowledgeable, 21% felt they were "more" knowledgeable, and about 18% believed they were "less" knowledgeable.

- When asked to rate how their level of skill compared to other anglers, about 66% of respondents indicated they were "equally" skilled, 17% felt they were "more" skilled and 17% believed they were "less" skilled.

- When asked to indicate their replacement costs for all of the equipment they used for catfishing, anglers' indicated it would cost an average of $294 to replace their rods and reels, $120 to replace their tackle, $226 to replace their electronic equipment, and $6,686 to replace their boat, motor and trailer.

- Overall, respondents indicated that they had been fishing an average of nearly 35 years and about 29 years fishing for catfish.

- During the previous 12 months, respondents indicated they fished an average of 28 days overall and about 20 days fishing for catfish. They spent an average of 8 days fishing lakes/reservoirs from a boat, 5 days fishing in lakes/reservoirs from shore or piers, and an average of 1-2 days fishing in rivers/streams and farm ponds/stock tanks from boat or shore. Respondents reported that about one-third of their catfishing trips included fishing during nighttime hours.

- When asked what they considered an eating-sized and trophy-sized catfish to be for the three main catfish species, respondents indicated that an eating-sized channel catfish was about 14" and a trophy-sized channel catfish was over 28"; they indicated that an eating-sized blue catfish was about 16" and a trophy was over 30"; they indicated that an eating-sized flathead catfish was about 17" and a trophy around 33".

- On a typical catfishing trip respondents indicated they caught an average of 9 catfish and harvested an average of two-thirds (6) of the fish they caught. These fish were caught using a plethora of methods. About 81% of respondents indicated they used a rod and reel most often; 9% used trotlines, 7% used jug lines, and about 3% fished with limb lines most often.

- Most respondents agreed with the statements: "A fishing trip can be successful even if no fish are caught" (78%), "The more fish I catch, the happier I am" (71%), "I usually eat the fish I catch" (70%), "I am just as happy if I don't keep the fish I catch" (64%), and "I am just as happy if I release the fish I catch" (61%).

- Most respondents agreed that it is important "To go fishing at an area that is free of litter" (92%), "To go fishing where you cannot hear or see busy traffic" (70%), "To go fishing at waters close to home" (70%), "To go fishing where you don't have to see too many other people" (64%), "To go fishing where there are other recreational opportunities available for the rest of the family to enjoy" (62%), "To go fishing where boat launches are available" (62%), "To go fishing where you feel far away from other people and cities" (61%), and "To go fishing where restrooms are available" (54%).

Section 2: Texas Catfish Angler Satisfaction

Satisfaction analysis

Satisfaction with recreational fishing and the places anglers' fish plays a critical role in retaining anglers in the activity. Two sets of questions were posed to anglers to gauge their satisfaction with catfishing in Texas and with the places they went catfishing in Texas in the previous year using a five-point Likert type scale (i.e., not at all satisfied to extremely satisfied). The first set of questions asked respondents to rate their overall level of satisfaction with catfishing in Texas, and with five catch-related aspects of catfishing (i.e., number of eating and trophy size catfish caught, average size caught, number allowed to harvest, and size allowed to harvest). The second set of satisfaction questions asked respondents to rate their overall level of satisfaction with the places they had gone catfishing in the previous year, and six aspects of those fishing sites (i.e., availability, number of people present, amenities, cleanliness, availability of other activities, and services). This approach assumes that an angler's overall satisfaction with fishing is shaped by their satisfaction with the individual components of the angling experience (Connelly and Brown 2000; Arlinghaus 2006; Brunke and Hunt 2007). This approach allows the researcher to obtain a better understanding of overall angler satisfaction by indicating the respondent's satisfaction or dissatisfaction with individual components of the angling

experience. Correlation analyses were used to measure the relative importance of each element of the fishing experience to overall satisfaction with catfishing and catfishing sites to ascertain which aspects of the angling experience had the greatest effect on overall satisfaction. We used the one-tailed Spearman's rho correlation test because the data being analyzed was ordinal and all satisfaction items were measured in the same direction (Schlotzhauer and Littrell 1997).

Sixty-two percent of respondents indicated that they were either very or extremely satisfied with catfishing in Texas (Table 32; APPENDIX D). Most respondents were also very to extremely satisfied with the number of catfish they were allowed to harvest (77%), the size of catfish they were allowed to harvest (66%), and with the number of eating-size catfish they caught (56%). A plurality of respondents was very to extremely satisfied with the average size of the catfish they caught (49%). Only 32% of respondents were very to extremely satisfied with the number of trophy catfish they caught. Based on the correlation analysis, overall satisfaction with catfishing in Texas was significantly correlated with satisfaction with all five individual components of the catfishing experience that were measured in the survey (Table 1). Overall satisfaction with catfishing was strongly correlated ($rho > 0.6$) with angler satisfaction concerning the number of eating-size catfish caught, and the average size of catfish caught indicating that these items had the strongest influence on overall satisfaction. Overall satisfaction was moderately correlated ($0.3 \geq rho \geq 0.6$) with the size and number of catfish respondents were allowed to harvest, and the number of trophy size catfish caught.

Sixty-one percent of respondents indicated that they were either very or extremely satisfied with the places they go catfishing in Texas, and a majority (57%) were very or extremely satisfied with the availability of catfishing sites in their area (Table 33; Appendix D). Overall satisfaction with catfishing sites was found to be significantly correlated with satisfaction for all but one of the individual items measured in the survey (Table 1). Most respondents were slightly to moderately satisfied with the services available in the areas they fished for catfish (61%), the number of people in the areas they fished for catfish (60%), the amenities available where they fished (55%), the availability of other activities in the areas they fished for catfish (54%), and the cleanliness of the areas they fished for catfish (52%). Overall satisfaction with catfishing sites was not significantly correlated with respondents satisfaction with amenities found at the site. Overall satisfaction with catfishing sites was moderately correlated ($rho = 0.334$) with the services provided at the site, but only weakly correlated ($rho < 0.3$) with the rest of the items measured. As with previous satisfaction and fishing quality research, this result suggests that catch-related aspects of the fishing experience explain their level of satisfaction with a particular resource, regardless of what else they find at the area.

Table 1. The results of individual satisfaction items correlated with overall satisfaction with catfishing in Texas, and overall satisfaction with catfishing sites in Texas; ranked by Spearman's rho.

Satisfaction item	Mean Rating[a]	Standard Deviation	Spearman's rho	p-value
Satisfaction with catfishing	3.68	0.79		
The number of eating size catfish I catch	3.52	0.88	0.679	< .001
The average size of the catfish I caught	3.42	0.84	0.619	< .001
The size of catfish I am allowed to harvest	3.71	0.82	0.492	< .001
The number of trophy size catfish I catch	2.99	1.04	0.479	< .001
The number of catfish I am allowed to harvest	3.71	0.80	0.430	< .001
Satisfaction with places I go catfishing	3.61	0.96		
The services in the areas you fished for catfish	3.54	0.99	0.334	< .001
The cleanliness of the areas you fished for catfish	2.76	0.91	0.264	< .001
The number of people in the areas you fished for catfish	3.08	0.91	0.197	< .001
The availability of other activities where you fished for catfish	3.69	1.05	0.195	< .001
The availability of catfish fishing spots in your area	3.86	0.90	0.146	.002
The amenities in the areas you fished for catfish	3.71	0.87	-0.038	.420

[a] mean rating based on the following response format: 1=not at all satisfied; 2=slightly satisfied; 3=moderately satisfied; 4=very satisfied; 5=extremely satisfied.

Section 3: Stated Choice Model

Stated Choice Model Background & Development

The third purpose of this study was to evaluate the catch and management preferences of catfish anglers in Texas. One recent econometric method that has been used to answer such questions related to recreational fisheries is a stated choice model (SCM) (Aas Haider, and Hunt 2000; Gillis and Ditton 2002; Oh, Ditton, Gentner, and Riechers 2005). Stated choice modeling involves presenting individuals with a series of paired hypothetical, multi-attribute scenarios representing two products (i.e., fishing trips) that the individual must either choose between or choose neither (Louviere et al. 1990). Each scenario consists of multiple attributes which make up the primary characteristics of the fishing trip, and are varied along several levels which are varied from one scenario to the next. The individual is asked to examine the hypothetical scenarios presented in each pair, and to indicate which of the two fishing trips they would be most likely to take. To come to this conclusion the individual must consider all the attributes within the scenarios simultaneously, determine what trade-offs they are willing to make, and make a decision that best suits their needs and preferences. SCM is based on economic random utility theory which posits that individuals are rational decision makers that make choices based on what they believe will provide them with the greatest utility, or benefit (Oh et al. 2005). With individual choice serving as the dependent variable, and the scenario attributes serving as the independent variables in the analysis, the researcher is able to determine how much each attribute influences trip choice, and in turn which attribute levels are most preferred by anglers. Finally, coefficients generated by the model can be used to estimate the probability of an angler choosing a given hypothetical scenario using equations found in Blamey, Gordon, and Chapman (1990).

In addition to trip related attributes, data on individual characteristics can also be included into SCMs to examine how those characteristics influence choice (Blamey, Gordon, and Chapman 1990; Dellaert and Lindberg 2003; Morey, Thacher, and Breffle 2006). These individual characteristics can include socio-economic variables (i.e., education, income, age, and race), and data on individual attitudes and preferences that are relevant to study at hand. Of particular relevance to the current study are an angler's catch-related attitudes, or consumptive orientation. Consumptive orientation in regards to recreational anglers has been defined as an individual's "disposition to catch fish, attitudes towards retaining or releasing fish caught, and the importance of the number and size of fish caught" (Anderson, Ditton, and Hunt 2007, p. 181). An angler's attitudes to these catch-related aspects of fishing will greatly influence their opinions regarding management goals, regulations, and their choice of fishing trips. Researchers have developed and refined an attitudinal scale designed to measure the consumptive orientations of anglers (Graefe 1980; Sutton 2003; Anderson et al. 2007). Designed to measure four distinct attitudinal constructs (catching something, catching numbers of fish, catching big fish, and retaining fish) regarding an angler's consumptive orientation, the scale has individuals rate their level of agreement with 16 statements, four for each construct, designed to measure their orientation towards each of the four constructs. Summated scores for each construct can then be used to categorize individuals as being low, medium, or high on the scale (Anderson et al. 2007). These attitude scores and socio-economic data can be included in the SCM to serve as measures of individual characteristics that may influence fishing trip choice. Given the variety of catfish

species found in Texas, and the differences in the size and abundance of those species, it is reasonable to assume that anglers with different catch and harvest-related attitudes would exhibit different choice patterns. Previous studies by Wilde and Riechers (1994) and Wilde and Ditton (1999) have found significant differences in management preferences, and catch related attitudes in catfish anglers with different species preferences. It is therefore reasonable to assume that incorporating catch and harvest related attitude data into the SCM would help explain additional variation in individual choice.

We identified the attributes and levels used in the SCMs based on discussions with fisheries biologists and researchers from the Texas Parks and Wildlife Department (Table 2). The attributes related to the number of catfish caught during the fishing trip, number harvested, the average size of catfish caught, the type of water on which the trip took place, the level of site development at the fishing site, and the distance traveled to the site. The number of levels per attribute was limited to three to reduce the number of choice sets that would have to be generated to fit the models so as to reduce respondent burden and minimize costs (Oh et al. 2005). We chose attributes and levels that we felt were within the control of fisheries managers and likely to influence angler utility as the goal of this study was to identify scenarios a manager could

Table 2. Attribute levels used in the stated choice experiment. Level 2 represents a "status quo scenario" which is needed as a reference point for variations.

Attributes	Level 1	Level 2	Level 3
Catch	Half as many caught as usual	Same as usual	Three times as many caught as usual
Harvest	None harvested	Same as usual	Twice as many fish harvested as usual
Size	Smaller than usual, many sub-legal	Same as usual	Larger than usual, some of trophy size
Type of water body	Large reservoir (over 100 acres)	River or stream	Small pond or reservoir (under 100 acres)
Level of site development	Undeveloped site (Rustic shoreline access with no boat ramps, restrooms, or picnic tables)	Basic site development (Gravel shoreline trails with a boat launch, portable restroom facilities, and picnic tables)	Well developed site (Well maintained trails, some paved, with fishing piers, marinas, permanent restroom facilities, and sheltered picnic areas)
Distance	Located within 10 miles of home	Located 11 - 100 miles of home	Located over 100 miles from home

provide to maximize angler utility. While distance traveled may appear to be out of the site manager's control, knowledge of how it influences customer utility may be helpful in determining the optimal location of catfishing sites in relation to potential angler populations.

A fractional factorial design was used to develop a tractable number of choice sets for fitting the SCMs. While the use of a full factorial design would insure perfect orthogonality of the choice set design by providing every possible combination of attribute levels, it would also generate far too many choice sets to be feasibly executed in a study (Louviere 1988). A fractional factorial design will generate a reasonable number of choice sets while still maximizing orthogonality in a way that will allow the researcher to fit the necessary models (Bennett and Adamowicz 2001). However, even when using a fractional factorial design the number of choice sets is still usually too many to present all of them to a single individual without placing undue burden on the individual. This necessitates the need for blocking the choice sets into groups, or blocks thus reducing the number of choice sets presented to any one individual while allowing for the collection of the needed data (Bennett and Adamowicz, 2001). We used the SAS macros *%mktex* and *%mktblock* to generate a fractional factorial design of 54 choice sets divided into 9 blocks of 6 paired trip comparisons (Kuhfeld 2005). We used the chosen 54 choice set design because SAS calculated it to be the most efficient design for fitting the intended model. Scenarios were also restricted from including both the decreased catch, and increased harvest attribute levels as this was identified as being unrealistic. Separate versions of the questionnaire were then designed for each block of paired trip comparisons, and 120 individuals were assigned to receive each version.

Once data collection was completed, the SCM was fitted into SAS using the Transreg and Phreg procedures (Kuhfeld 2005). The Transreg procedure was used to code the attribute data using effects coding. In effects coding the attribute level that is expected to be least preferred is assigned a code of -1, the level hypothesized to be the most preferred level is given a code of 1, and the status quo scenario is given a code of 0. Following coding of the attribute levels, the choice model was fitted using the Phreg procedure which fits a multinomial logit model. In a multinomial logit model the dependent variable, in this case choice, is binary coded depending on whether the given scenario was chosen or not, and the independent variables are the coded scenario attributes. Coefficients are calculated for attribute levels coded as either a -1 or 1, and represent the change in utility over the status quo level. The calculated coefficients represent the part-worth utilities of the individual attribute levels, and are used to calculate choice probabilities for individual scenarios.

Three models were fitted for the SCM. Model 1 consisted of the trip scenario attributes only. Model 2 consisted of the trip scenario attributes, and individual demographic variables interacted with the alternative specific constant (ASC). The ASC is the coefficient representing the choice of one of the hypothetical catfishing trips (both coded 1) over the 'stay at home' or neither option (coded 0). A significant and positive ASC coefficient would indicate that respondents were more likely to choose a trip over the neither option. Thus by interacting the ASC with demographic variables, we can determine whether an individual's demographic characteristics made them more or less likely to have selected a fishing trip option. Model 2 was also used to calculate angler choice probabilities for 50 hypothetical fishing trip scenarios using the equations described by Blamey, Gordon, and Chapman (1990). Model 3 consisted of the trip scenario

attributes, significant interactions between demographic variables and the ASC, and interactions between catch-related attitude scales and relevant attributes within the SCM. In the questionnaire, individuals were asked to rate their level of agreement with 16 items regarding their attitudes towards four aspects of catching fishing on a 5-point Likert scale (Table 3; APPENDIX C). The four constructs of catch measured in the scale were the importance of catching something, catching numbers of fish, catching large or trophy size fish, and harvesting fish. Individuals were asked to answer these questions as they pertained to their attitudes towards catching and harvesting catfish. Each of the four constructs was measured by four items within the scale. The individual's scores for each of the four items within each construct were summed to provide a score for each individual on each of the four constructs. Select items were worded such that they had to be reverse coded before construct scores were calculated. In Model 3, the individual's score on the catching numbers construct was interacted with the catch attribute, their score on the size construct was interacted with the size attribute, and their score of the retain fish construct was interacted with the harvest attribute. These interactions were calculated to determine how catch-related attitudes influence angler choice of hypothetical fishing trips.

Stated Choice Model Results

Three SCM models were fit to the data (Table 3 & 4). Respondents chose one of the two hypothetical fishing trips over the neither option in 86% of the choice scenarios for which data was collected. This is reflected in the positive sign for the ASC coefficient in all three models, and odds ratios ranging from 3.03 to 8.66 across the three models. Model 2 and 3 added interactions between the ASC and five demographic variables to determine if these variables had a significant effect on choice between a fishing trip option and the neither option. In Model 2 it was determined that both age and income ($p < .001$) had a significant effect on whether a respondent choose a fishing trip over the neither option. As individuals increased in age their odds of choosing a fishing trip decreased by 0.97 (Table 4). As their income increased, respondent's odds of choosing a fishing trip increased by 1.18 (Table 4). Model 2 indicated that non-white respondents had significantly lower odds of choosing a fishing trip, but this interaction became insignificant in Model 3 (Table 4). Model 2 found that gender and Hispanic origin did not significantly affect choice, and these variables were removed from Model 3 (Table 4).

Among the trip related attributes, distance travelled was the greatest determinate of choice for all three models. Respondents had approximately 1.8 times the odds of choosing a fishing trip within 10 miles of home than one 11-100 miles from home, and 0.4 times the odds of choosing a trip over 100 miles from home. Of the 49 considered scenarios that offered greater utility to the average respondent than the status quo scenario, only three involved trips more than 100 miles from home and 32 involved trips that required the respondent to travel less than 10 miles from home (Table 5).

In Model 1 and 2 the catch-related coefficients were all significant at the $p < .001$ level with signs in the expected directions indicating that decreases in catch, harvest, and size of catfish caught had a significantly negative effect on angler utility while increases in catch-related attributes had the opposite effect (Table 3). Size of catfish caught was the second best predictor of respondent choice behind distance travelled. Respondents had 1.57 times greater odds of

choosing a trip where they would catch larger than normal catfish, and 0.61 times the odds of choosing a trip where they would catch smaller than normal catfish (Table 4). A plurality (43%) of respondents reported that most of the catfish they caught were in the 10 to 15 inch size range with 39% reporting a typical size range of 16 to 20 inches. After reduced size the no harvest level had the next greatest negative impact on trip choice with respondents having only 0.7 times the odds of choosing a trip in which they would harvest no catfish compared to the reduced catch level which only reduced the choice odds by 0.8 (Table 3 & 4). While the reduced harvest level had a greater effect on choice than the reduced catch level the opposite was true for the increased catch and harvest levels. Tripling catch increased the odds of choice by 1.33 compared to the doubling harvest level which had 1.25 greater odds of being chosen over the status quo scenario (Table 4). The median number of catfish caught or harvested on a typical trip was reported to be 6 and 5 catfish per day, respectively.

In Model 3 catch-related attitude scores (Table 3; APPENDIX C) were interacted with associated catch-related attribute levels in the model. Attitude scores on the catching numbers (CATNUM) construct were interacted with the catch attribute levels, scores on the catching large fish (CATLAR) construct were interacted with the size attribute levels, and scores on the retaining fish (RETFISH) construct were interacted with the harvest attribute levels. The interactions between RETFISH scores and the two harvest attribute levels were both significant in the expected direction indicating that harvest oriented individuals were less likely to choose a reduced harvest scenario and more likely to choose an increased harvest scenario (Table 3). The interaction between CATNUM scores and the increased catch level were significant and positive as was the interaction between CATLAR scores and the increased size level suggesting individuals that scored higher on these constructs were more likely to choose scenarios involving increased catch or size of catfish, respectively (Table 3). However, interactions between CATNUM/ CATLAR scores and the reduced catch/size levels were not significant indicating that no matter what individuals scored on these catch-related attitude constructs no one was more likely to except a scenario involving a reduction in the size or number of catfish caught (Table 3). It should be noted that after including the interaction effects for the CATNUM and CATLAR construct scores in Model 3 the coefficients for the catch and size attributes became insignificant. This suggests that respondent's catch-related attitudes towards the number and size of fish caught were significant predictors of their preferences for these attributes.

The final two attributes included in the SCM were the type of water body and the level of site development. These attributes had the least impact on respondent choice. The status quo scenario for these attributes involved a trip on a river or stream with basic access site develop (i.e., a boat launch and minimal amenities; Table 2). No significant difference in angler utility was found between trips on rivers or streams and those taken on large reservoirs indicating anglers were indifferent towards fishing on one or the other (Table 3). However, there was a significant negative relationship between trip choice and fishing on a small reservoir (Table 3). These relationships were maintained across all three models. The SCM also indicated that there was no significant difference in angler utility between fishing a site with a basic level of development and a well developed site (Table 3). However, there was a significant negative relationship between choice and having an undeveloped site with no boat launch. This suggests that the average catfish angler feels their needs are adequately met as long as a boat launch and basic amenities are present. These relationships were also maintained across all three models.

Table 3. Results of three multinomial logit models fit to the stated choice data. Model 1 consists of the attribute levels only; model 2 included the attribute levels and socio-economic variables; and model 3 consists of the attribute levels, significant socio-economic variables, and interactions between catch-related attitude construct scores and related attribute levels.

Variable	Model 1	Model 2	Model 3
ASC (Trip A or B)	1.1084***	2.1310***	2.1590***
Catch half	-0.2647***	-0.2765***	-0.0059
Catch triple	0.2854***	0.2912***	-0.1127
Harvest none	-0.4169***	-0.4171***	0.4805**
Harvest twice	0.2205***	0.2117***	-0.4576**
Size smaller	-0.5029***	-0.5201***	-0.1885
Size larger	0.4477***	0.4425***	-0.3206
Large reservoir	0.0386	0.0534	0.0774
Small reservoir	-0.1128**	-0.1348**	-0.1346**
Undeveloped site	-0.1291**	-0.1315**	-0.1442**
Well developed site	0.0556	0.0449	0.0452
Distance < 10	0.5829***	0.5855***	0.5990***
Distance 100+	-0.8678***	-0.8798***	-0.9013***
age*asc		-0.0289***	-0.0299***
income*asc		0.1682***	0.1400**
race*asc		-0.4880*	-0.2613
gender*asc		-0.1808	
Hispanic*asc		0.5321	
CATNUM*Catch half			-0.0237
CATNUM*Catch triple			0.0331**
RETFISH* Harvest none			-0.0818***
RETFISH* Harvest twice			0.0600***
CATLAR* Size smaller			-0.0271
CATLAR* Size larger			0.0616***
-2 logL (initial)	6016.00	5345.85	5398.58
-2 logL (final)	4776.98 (n = 8,216)	4159.49 (n = 7,302)	4148.46 (n = 7,374)

Notes: * indicates statistical significance at the p = 0.05 level, ** indicates significance at the p = 0.01 level, and *** indicates significance at the p < 0.001 level. Socio-economic variables were coded as follows: age = age in years; income = household income in units of US$20,000; race = 1 if non-White, 0 if White; gender = 1 if female, 0 male; Hispanic = 1 if individual is of Hispanic origin, 0 if not. The alternative-specific constant (ASC) is coded 1 for trips A and B in the choice set, and 0 for the neither option. CATNUM, RETFISH, and CATLAR are summated scores on three scales measuring catch-related attitudes. Sample size for each model is based on the number of trip scenarios (3 per choice set) included in each model. Sample sizes decline across models due to missing data for interaction variables from some respondents.

Table 4. Odds ratios produced by three multinomial logit models fit to the stated choice data. Model 1 consists of the attribute levels only; model 2 included the attribute levels and socio-economic variables; and model 3 consists of the attribute levels, significant socio-economic variables, and interactions between catch-related attitude construct scores and related attribute levels. Odds ratios are calculated by dividing the odds of a respondent choosing a scenario with the listed attribute level by the odds of a respondent choosing a scenario with the status quo level. Odds are calculated by dividing the probability (p) of a respondent choosing a scenario with a given attribute level by the probability of them not choosing it (1-p).

Variable	Model 1	Model 2	Model 3
ASC (Trip A or B)	3.030***	8.423***	8.663***
Catch half	0.767***	0.758***	0.994
Catch triple	1.330***	1.338***	0.893
Harvest none	0.659***	0.659***	1.617**
Harvest twice	1.247***	1.236***	0.633**
Size smaller	0.605***	0.594***	0.828
Size larger	1.565***	1.557***	0.726
Large reservoir	1.039	1.055	1.081
Small reservoir	0.893**	0.874**	0.874**
Undeveloped site	0.879**	0.877**	0.866**
Well developed site	1.057	1.046	1.046
Distance < 10	1.791***	1.796***	1.820***
Distance 100+	0.420***	0.415***	0.406***
age*asc		0.972***	0.971***
income*asc		1.183***	1.150**
race*asc		0.614*	0.770
gender*asc		0.835	
Hispanic*asc		1.702	
CATNUM*Catch half			0.977
CATNUM*Catch triple			1.034**
RETFISH* Harvest none			0.921***
RETFISH* Harvest twice			1.062***
CATLAR* Size smaller			0.973
CATLAR* Size larger			1.063***
-2 logL (initial)	6016.00	5345.85	5398.58
-2 logL (final)	4776.98 (n = 8,216)	4159.49 (n = 7,302)	4148.46 (n = 7,374)

Notes: * indicates statistical significance at the p = 0.05 level, ** indicates significance at the p = 0.01 level, and *** indicates significance at the p < 0.001 level. Socio-economic variables were coded as follows: age = age in years; income = household income in units of US$20,000; race = 1 if non-White, 0 if White; gender = 1 if female, 0 male; Hispanic = 1 if individual is of Hispanic origin, 0 if not. The alternative-specific constant (ASC) is coded 1 for trips A and B in the choice set, and 0 for the neither option. CATNUM, RETFISH, and CATLAR are summated scores on three scales measuring catch-related attitudes.

Table 5. The predicted choice probabilities of 50 proposed scenarios based on Model 2. Scenario 50 represented the 'status quo' scenario for analysis purposes.

Scenario	Catch	Harvest	Size	Water Type	Level of Site Development	Distance (miles)	Choice Probability
Scenario1	Triple	Twice	Larger	Large reservoir	Well developed	Less than 10	0.050
Scenario2	Triple	Twice	Larger	River or stream	Well developed	Less than 10	0.048
Scenario3	Triple	Twice	Larger	River or stream	Basic	Less than 10	0.046
Scenario4	Triple	Twice	Larger	Small reservoir	Well developed	Less than 10	0.042
Scenario5	Triple	Same	Larger	Large reservoir	Well developed	Less than 10	0.041
Scenario6	Triple	Same	Larger	Small reservoir	Basic	Less than 10	0.032
Scenario7	Same	Twice	Larger	Small reservoir	Well developed	Less than 10	0.031
Scenario8	Same	Twice	Larger	River or stream	Undeveloped	Less than 10	0.030
Scenario9	Same	Twice	Larger	Small reservoir	Basic	Less than 10	0.030
Scenario10	Triple	Twice	Same	River or stream	Basic	Less than 10	0.029
Scenario11	Triple	Twice	Same	Large reservoir	Undeveloped	Less than 10	0.027
Scenario12	Triple	None	Larger	River or stream	Well developed	Less than 10	0.026
Scenario13	Triple	Same	Same	River or stream	Basic	Less than 10	0.024
Scenario14	Half	Same	Larger	Large reservoir	Well developed	Less than 10	0.023
Scenario15	Same	Twice	Same	River or stream	Well developed	Less than 10	0.023
Scenario16	Half	Same	Larger	River or stream	Basic	Less than 10	0.021
Scenario17	Half	Same	Larger	Large reservoir	Undeveloped	Less than 10	0.019
Scenario18	Triple	Twice	Smaller	Large reservoir	Well developed	Less than 10	0.019
Scenario19	Same	Twice	Same	River or stream	Undeveloped	Less than 10	0.019
Scenario20	Triple	Same	Larger	Large reservoir	Undeveloped	11-100	0.019
Scenario21	Triple	None	Larger	Small reservoir	Undeveloped	Less than 10	0.019
Scenario22	Triple	Same	Larger	Small reservoir	Basic	11-100	0.018
Scenario23	Same	Twice	Larger	Small reservoir	Well developed	11-100	0.017
Scenario24	Triple	Twice	Same	Large reservoir	Basic	11-100	0.017
Scenario26	Same	Same	Same	Small reservoir	Well developed	Less than 10	0.016
Scenario27	Triple	Twice	Smaller	Small reservoir	Basic	Less than 10	0.015
Scenario28	Half	Same	Same	Large reservoir	Well developed	Less than 10	0.015
Scenario29	Half	None	Larger	Large reservoir	Basic	Less than 10	0.015
Scenario30	Triple	None	Same	Large reservoir	Undeveloped	Less than 10	0.014
Scenario31	Same	Same	Larger	Large reservoir	Undeveloped	11-100	0.014
Scenario32	Triple	None	Larger	River or stream	Well developed	11-100	0.014
Scenario33	Triple	Same	Same	River or stream	Well developed	11-100	0.014
Scenario34	Same	Twice	Smaller	Large reservoir	Basic	Less than 10	0.014
Scenario35	Same	Twice	Smaller	River or stream	Well developed	Less than 10	0.014
Scenario36	Triple	Twice	Smaller	Small reservoir	Undeveloped	Less than 10	0.013
Scenario37	Half	Same	Larger	River or stream	Well developed	11-100	0.012
Scenario38	Half	None	Larger	River or stream	Undeveloped	Less than 10	0.012
Scenario39	Same	Twice	Smaller	Large reservoir	Undeveloped	Less than 10	0.012

Table 5. Continued

Scenario40	Triple	None	Larger	Small reservoir	Basic	11-100	0.012
Scenario41	Triple	Twice	Larger	Large reservoir	Well developed	100 plus	0.012
Scenario42	Triple	Twice	Larger	River or stream	Well developed	100 plus	0.011
Scenario43	Half	Same	Larger	Large reservoir	Undeveloped	11-100	0.011
Scenario44	Triple	Twice	Larger	River or stream	Basic	100 plus	0.011
Scenario45	Same	Same	Same	River or stream	Well developed	11-100	0.010
Scenario46	Half	Same	Same	Small reservoir	Undeveloped	Less than 10	0.010
Scenario47	Half	Same	Larger	River or stream	Undeveloped	11-100	0.010
Scenario48	Same	None	Same	Small reservoir	Basic	Less than 10	0.010
Scenario49	Same	None	Larger	River or stream	Basic	11-100	0.010
Scenario50	Same	Same	Same	River or stream	Basic	11-100	0.010

Section 4: Market Segmentation

Market segmentation is the process of partitioning clients into groups with similar characteristics and that are likely to exhibit similar behaviors (Backman 1994). Whereas there are various approaches to segmentation, emphasis should be on measurement simplicity and on partitioning groups that are identifiable and accessible for management purposes (Kotler 1980). Since the stated choice modeling indicated that catch-related attitudes significantly influenced angler choices of hypothetical fishing trips, we proceeded to address TPWD's fourth request of developing market segments based on angler's attitudes toward catching and retaining fish. Rather than focusing solely on the "average" angler responses found in Section 1, segmenting by catch-related attitudes groups can give the agency a better feel for the different types of catfish anglers using Texas' inland waters and their characteristics, behaviors, and preferences.

To determine the different groups of catfish anglers based on their scores on the four catch-related constructs, a hierarchical cluster analysis was conducted using Ward's method, and squared Euclidean distance (Hair et al. 2010). The final number of clusters was determined by comparing the degree of change in the clustering coefficient by number clusters (Figure 3). The clustering coefficient is a measure of the between cluster variation given the number of clusters in the selected solution. The point at which the decrease in the clustering coefficient begins to taper off is considered a good stopping rule for determining the number of clusters (Aldenderfer and Blashfield 1984). A 10% reduction in the between cluster variation serves as a good stopping rule. Based on the analysis, four attitude clusters were identified from the data (Table 6).

Figure 3. Graph of the cluster analysis coefficient by the number of clusters per clustering iteration.

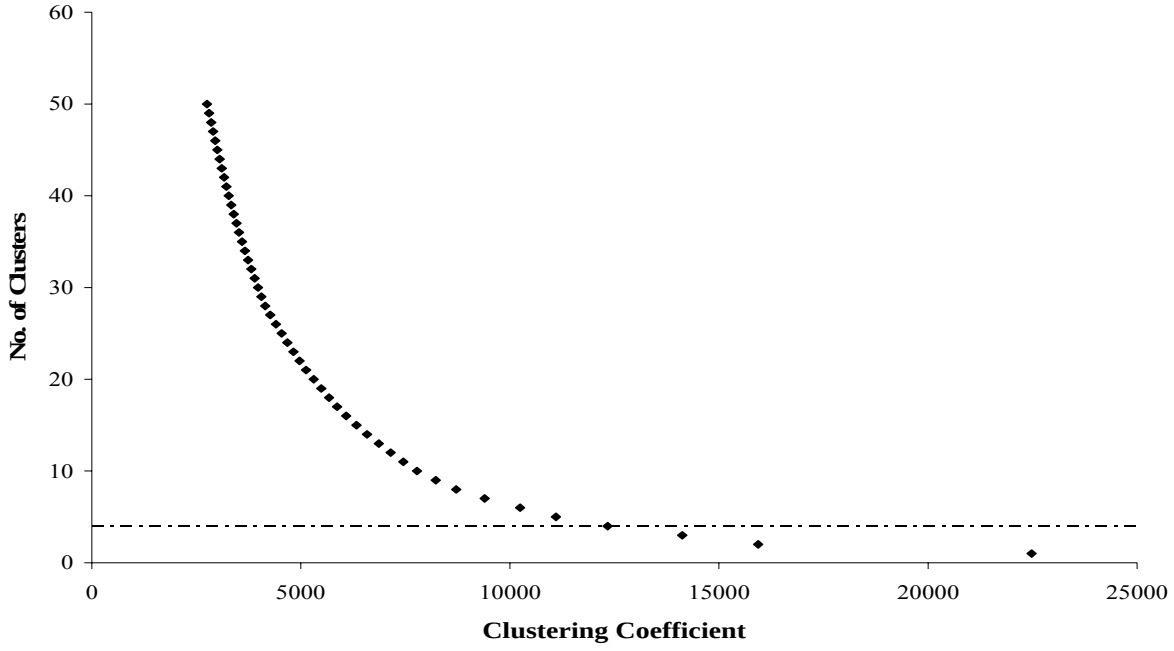


Table 6. Catfish angler market segments as determined by cluster analysis of respondent's summated scores on the four catch-related attitude scales listed in Table 3; APPENDIX C. Mean (median) summated scores are reported for each cluster. ANOVA tests were conducted on clustering variables as a validity test to assure the generated clusters were statistically different. Clusters with different superscripts are significantly different from each other at the p = .05 level.

	Attitude Clusters					
	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Overall	p-value
Name	Casual Anglers	Numbers & Size Anglers	Numbers & Harvest Anglers	Size Anglers		
N	112	81	159	110	462	
Average catch-related attitude construct scores						
CATSOM	7.6 (8) [a]	14.9 (14) [b]	11.4 (11) [c]	7.9 (8) [a]	10.3 (10)	<.001
CATNUM	9.7 (10) [a]	15.5 (16) [b]	13.8 (14) [c]	12.3 (12) [d]	12.7 (13)	<.001
CATLAR	10.2 (10) [a]	15.6 (16) [b]	11.9 (12) [c]	14.7 (14) [d]	12.9 (13)	<.001
RETFISH	10.0 (10) [a]	11.1 (11) [b]	13.4 (13) [c]	8.4 (8) [d]	10.8 (11)	<.001

The lowest average score any group could have for CATSOM, CATNUM, CATLAR, and RETFISH was a "4"; the highest score one could have on any of the four constructs was a "20". We named the four clusters based on the combination of their average scores to the four constructs. A profile of each of these groups based on their responses to questions asked in the *2010 Survey of Texas Freshwater Catfish Anglers* is presented in the remainder of this section, followed by a re-analysis of the SCM by cluster. For more in-depth information on each of these groups, the reader is encouraged to investigate the tables in APPENDIX E which present means and frequency distributions for survey questions. These tables also contain an "overall" column which are the means and frequencies for all respondents to ease in interpretation.

The profiles in this section primarily focus on discernable group differences found on survey variables. Normally, the significance level in scientific research is set at the alpha=0.05 level or below because the cost of making a Type I error (e.g., finding false differences) is a serious matter. However, in less serious situations such as this subjective market segmentation, following this stringent requirement can be a detriment. Many social science researchers believe that setting the significance levels too low can lead to the loss of a promising line of research, and have suggested it be set as high as 0.30 (Kirk 1982, Gregorie and Driver 1987). Because we were concerned more with making a Type II error (failing to find group differences if they exist) and our statistical power was good because of large sample sizes, we took a liberal approach to interpreting significant differences. The tables in APPENDIX E also present the significance levels for alpha if the reader is interested in seeing where scientific protocols on significance levels for Type I errors were violated.

Cluster 1 Profile: Casual Anglers

Cluster 1 was named "*Casual Anglers*" based on their relatively low scores on each of the four catch-related constructs. With the exception of "retaining fish", this group was least oriented to the constructs dealing with the actual catching of fish. This group makes up about 24% of the Texas catfish angler population.

- Overall, *Casual Anglers* likely are the most leisurely angler group and they fish away from home often with family on private waters or at resources with park like settings. They also are less disturbed by having other people or activity around when fishing. Additionally, this group rates their satisfaction with settings based more so on the quality of amenities than their catch.

- *Casual Anglers* spent more days fishing for catfish in farm ponds/stock tanks (4 days), and more days fishing in lakes/reservoir from a boat (10 days) than any of the other groups.

- *Casual Anglers* were least confident in their ability to identify channel, blue, or flathead catfish. About one-third or more indicated they could not correctly identify the different catfish species. Anglers in this group were also least likely to indicate they were more knowledgeable about fishing (10%) or more skilled than other anglers (11%).

- *Casual Anglers* rated the importance of fishing compared to their other activities, and the importance of catfishing relatively low compared to other groups. Only 45% indicated that fishing was their most important outdoor activity and 21% indicated that catfishing was their most important type of fishing.

- *Casual Anglers* were less likely to agree with the statements "It is important for me to go fishing where you cannot hear or see busy traffic", "It is important to me to fishing where you don't have to see too many other people", and "It is important to me to go fishing where you feel far away from people and cities".

- *Casual Anglers* agreed more than other clusters with the statement "It is important for me to go fishing where there are other recreational opportunities for the rest of the family to enjoy" and were less likely to agree with the statements "It is important to me to fish waters close to home" and "It is important for me to go fishing where you do not have to walk more than 15 minutes".

- In terms of the percentage of anglers responding that they were very to extremely satisfied *Casual Anglers* were least likely to be satisfied than other groups with "The amenities in the areas you fished for catfish" (33%), "The cleanliness of the areas you fished for catfish" (37%), "The availability of other activities where you fished for catfish" (40%), and "The services in the areas you fished for catfish" in the previous year (30%).

Cluster 2: Numbers and Size Anglers

Cluster 2 was named "*Numbers and Size Anglers*" as they exhibited the highest scores on these two constructs. This group makes up about 18% of the catfish angler population. Additionally, they scored considerable higher on the "catching something" construct than any of the other groups.

- Overall, *Numbers and Size Anglers* may be interested in experiencing the thrill of the catch more so than other groups. Specifically, they appear to want action, and the more fish they catch and the bigger those fish are, the better. This may explain some of their affinity for blue and flathead catfish. Although not evident in their average years of participation, the low reported self-knowledge level of many anglers in this group may indicate that there are more "newer recruits" in this group. This may partly explain their strong orientation toward catching fish. This group also was most in favor of allowing hand-grabbling in Texas which indicates that this action-oriented activity which results in battling large fish intrigues them. Their satisfaction with fishing and resources appears to be strongly related to size and numbers of catfish they catch, and their ability to find a convenient place to fish close to home where they can escape other people.

- *Numbers and Size Anglers* had a higher percentage of anglers (46%) in lower income categories (<$60,000) than the other groups. With the exception of the *Size Anglers* they also contained more minority anglers than other groups (11%).

- *Numbers and Size Anglers* had the highest percentage of anglers (23%) who indicated they were less knowledgeable compared to other anglers.

- *Numbers and Size Anglers* had the highest percentage of anglers with a species preference for blue catfish (41%) and flathead catfish (14%). Along with *Size Anglers*, this group also reported that an eating-sized channel catfish was slightly bigger than the other two groups.

- *Numbers and Size Anglers* had the highest percentage of anglers (15%) who indicated they used jug lines most often while catfishing.

- *Numbers and Size Anglers* fished fewer days overall (23 days), but spent a higher percentage (80%) of their days fishing for catfish than any other group. About 51% of this group indicated that fishing was their most important outdoor activity, and 28% indicated that catfishing was their most important type of fishing. Both of these were the second highest percentages among groups.

- *Numbers and Size Anglers* agreed more than any other group with the statements "It is important for me to go fishing where you cannot hear or see busy traffic", "It is important for me to go fishing where you don't have to see too many other people", and "It is important for me to go fishing where you feel far away from other people and cities".

- *Numbers and Size Anglers* agreed more than any other group with the statements "It is important for me to fish waters close to home", and "It is important for me to go fishing where you don't have to walk more than 15 minutes".

- In terms of the percentage of anglers responding that they were very to extremely satisfied, along with *Size Anglers*, *Numbers and Size Anglers* were least satisfied with "The number of trophy size catfish caught" (29%), "The average size of catfish caught" (45%), and "The places you go freshwater fishing in Texas" (60%).

- In terms of the percentage of anglers responding that they were very to extremely satisfied, *Numbers and Size Anglers* were least satisfied with "The availability of catfish fishing spots in your area" (50%), and "The number of people in the areas you fished for catfish" (32%).

Cluster 3: Numbers and Harvest Anglers

Cluster 3 was named "*Numbers and Harvest Anglers*" because they exhibited the second highest scores on the "catching numbers" construct, and scored significantly higher than other groups on the "retaining fish" construct. This is the largest group making up 34% of the catfish angler population.

- Overall, *Numbers and Harvest Anglers* are likely more driven by harvest of eating-sized catfish than others, and likely scored lower on the "catching large fish" construct because they aren't as good table fare. They are the most experienced catfish anglers in Texas and catch and harvest more fish than other groups. They employ a variety of methods while catfishing including jug lines, limb lines, and trot lines and are the most satisfied catfish anglers in the state in terms of the number and size of fish they catch and the current places they go catfishing.

- *Numbers and Harvest Anglers* were older on average (50 years) than any other group and contained the most female anglers (19%). This group also had the highest percentage of anglers (38%) who didn't attend college. Although this group contained more white anglers than any other group (93%), it also contained the most African American anglers (3.3%).

- *Numbers and Harvest Anglers* had the highest average level of experience in terms of years fishing overall (38 years) and for catfish (32 years).

- *Numbers and Harvest Anglers* reported that they caught on average more catfish than any other group on a typical outing (10), and they harvested a higher percentage of their catch on those outings (77%). They indicated that an eating-sized channel catfish was slightly smaller than other groups.

- *Numbers and Harvest Anglers* were the group least likely to use a rod and reel most often when catfishing (73%) and most likely to use trot lines (13%) and limb lines (3%). They

also had the second highest percentage of anglers (10%) who used jug lines most often next to *Size and Numbers Anglers*.

- With the varied methods used most by this group it was not surprising that *Numbers and Harvest Anglers* were as or more supportive than other segments of allowing the currently legal methods of using trot lines (82%), jug lines (81%), and limb lines (70%) while fishing. Along with *Size and Numbers Anglers* and *Size Anglers*, a slight plurality of this group was also in favor of allowing the currently illegal methods of hand-grabbling (40%) and bow fishing for catfish (38%).

- *Numbers and Harvest Anglers* agreed slightly more so than other groups with the statements "It is important to me to go fishing where you can rent or buy fishing equipment", and "It is important to me to go fishing where boat rentals are available".

- In terms of the percentage of anglers responding that they were very to extremely satisfied *Numbers and Harvest Anglers* were most satisfied with freshwater fishing and catfishing in Texas, the number of eating-sized catfish they caught, and the average size of catfish they caught in Texas.

- In terms of the percentage of anglers responding that they were very to extremely satisfied *Numbers and Harvest Anglers* were most satisfied with the places they go freshwater fishing (67%), the places they go catfishing (66%), the number of people they encounter when fishing (43%), and the cleanliness of the areas they fished for catfish (50%).

Cluster 4: Size Anglers

Cluster 4 was named "*Size Anglers*". This group had the second highest scores on the "catching large fish" construct next to *Numbers and Size Anglers*, but they rated that considerably higher than the other three constructs. *Size Anglers* exhibited significantly lower scores than any other group on the "retaining fish" construct. This group makes up about 24% of the Texas catfish angler population.

- *Size Anglers* likely contains at least two subgroups: 1) true "trophy" anglers whose primary concern is catching large catfish, and 2) anglers who are primarily interested in catching bigger fish for either the better fight or perhaps to eat. However, these are not very discernable from the data at hand. The lower species preference rating also means that these anglers primarily fish for other species, but when they get the urge to catch something bigger, they go for catfish and/or they are opportunistic catfish anglers. Overall, this group's low scores on the "retaining fish" construct would seem to indicate that they are not as driven by harvesting catfish for consumptive reasons, but on average, they still keep over 50% of their catch. This harvest rate is less than other groups, but it still indicates that all of them are not trophy anglers who release their catch. *Size Anglers* are the least satisfied group of catfish anglers in the state.

- *Size Anglers* had the lowest percentage of female anglers (11%), but the highest percentage of non-white anglers (14%) who were primarily of Hispanic origins.

- About 57% of *Size Anglers* indicated that fishing was their most important outdoor activity, highest among all groups. However, they had the fewest anglers (19%) who indicated that catfishing was their most important fishing activity compared to other species fishing.

- *Size Anglers* had the highest percentage of anglers with a preference for channel catfish (57%), and they indicated that an eating-sized catfish was almost two inches longer (16") than any other group. When asked what a trophy-sized fish channel, blue, and flathead catfish was, this group assigned a larger length than any other group for all three species.

- *Size Anglers* reported catching the fewest catfish on a typical outing (8 fish) and harvesting the fewest catfish on a typical outing (4 fish) than any other group.

- Those in the *Size Anglers* group were most likely to report that they were more knowledgeable about catfishing (29%) and were more skilled than other anglers (22%).

- Like *Size and Numbers Anglers*, *Size Anglers* were most likely to agree than any other group with the statements "It is important for me to go fishing where you cannot hear or see busy traffic", "It is important for me to go fishing where you don't have to see too many other people", and "It is important for me to go fishing where you feel far away from other people and cities".

- In terms of the percentage of anglers responding that they were very to extremely satisfied, this group had lower satisfaction than other groups with fishing in freshwater (59%), catfishing (57%), the number of eating-sized fish they catch (48%), the number of trophy-sized fish they catch (40%), and the average size of catfish caught (40%).

- In terms of the percentage of anglers responding that they were very to extremely satisfied, Along with *Numbers and Size Anglers*, *Size Anglers* had lower satisfaction with the places they go freshwater fishing in Texas overall (58%) and for catfish (57%), and the number of people in the areas they fished (37%).

Stated Choice Model by Catfish Angler Cluster

Separate SCM were fit for each of the four catfish angler clusters to identify differences in trip preferences between the four clusters. Model 2 was fit for each cluster which included both the choice set attributes, and socio-economic variables. It was decided that it was unnecessary to include catch-related attitude interactions in the cluster SCMs because the angler clusters were determined using the catch-related attitude data. The results of these models should be interpreted with caution given their much lower sample sizes compared to the full sample model.

The individual cluster SCMs revealed both similarities and differences in cluster preferences (Table 7). Each of the clusters had a strong preference for sites closer to home. This was

expected as distance traveled represents the cost of a trip. Trip choice was also strongly influenced by catfish size for each of the clusters; however, cluster 1 (Casual Anglers) was slightly less influenced by trips promising larger than usual catfish then the other clusters. Where the clusters differed was in the influence of catch and harvest on their selection of trip scenarios. Clusters 1 and 3 were only slightly influenced by changes in the level of catch compared to the other clusters, while cluster 4 (size anglers) was indifferent towards the number of catfish harvested. Also of interest, cluster 1 (Casual Anglers) was the only cluster that was not significantly more likely to choose a fishing trip over the neither option suggesting they were indifferent about going catfishing versus staying at home. However, interactions between socio-economic variables and the ASC indicated that younger, high income White or Hispanic anglers within cluster 1 were more likely to choose a fishing trip over the neither option. These same socio-economic variables had no to little influence on angler choice among the other clusters. Finally, only minor differences existed between the clusters regarding their preferences for water types and level of site development.

Table 7. Results of multinomial logit models fit to the stated choice data for each cluster of Texas freshwater catfish anglers. Each model included the SCM attribute levels and socio-economic variables making the models comparable to Model 2 in Table 5.

	Attitude Cluster			
Variable	Casual Anglers	Numbers & Size Anglers	Numbers & Harvest Anglers	Size Anglers
ASC (Trip A or B)	1.176	3.947***	1.861**	3.707***
Catch half	-0.325**	-0.665***	-0.107	-0.276*
Catch triple	0.155	0.618***	0.184*	0.448***
Harvest none	-0.420***	-0.604***	-0.577***	-0.176
Harvest twice	0.025	0.371*	0.339***	0.209
Size smaller	-0.518***	-0.611***	-0.390***	-0.836***
Size larger	0.284**	0.481***	0.317***	0.917***
Large reservoir	0.021	0.117	0.095	0.184
Small reservoir	-0.071	-0.258*	-0.102	-0.195*
Undeveloped site	-0.085	-0.335**	-0.094	-0.123
Well developed site	-0.088	0.235	0.049	0.012
Distance < 10	0.575***	0.617***	0.642***	0.654***
Distance 100+	-0.863***	-1.065***	-0.832***	-1.050***
age*asc	-0.035**	-0.038*	-0.027*	-0.032
income*asc	0.399***	0.082	0.120	0.130
race*asc	-2.273***	0.725	1.724	0.544
gender*asc	0.115	-1.469*	0.195	-1.145
Hispanic*asc	1.989***	0.941	14.794	-1.251*
-2 logL (initial)	1291.97	883.28	1770.96	1241.43
-2 logL (final)	995.18	606.63	1389.78	835.93
No. of choice sets	(n = 1,764)	(n = 1,206)	(n = 2,421)	(n = 1,695)

Notes: * indicates statistical significance at the p = 0.05 level, ** indicates significance at the p = 0.01 level, and *** indicates significance at the p < 0.001 level. Socio-economic variables were coded as follows: age = age in years; income = household income in units of US$20,000; race = 1 if non-White, 0 if White; gender = 1 if female, 0 male; Hispanic = 1 if individual is of Hispanic origin, 0 if not. The alternative-specific constant (ASC) is coded 1 for trips A and B in the choice set, and 0 for the neither option.

Discussion Points

- Whereas we extrapolated results from respondents to the Texas catfish angler population, this study is not as representative of that population as we or the Texas Parks and Wildlife Department would like to have seen. Typical response rates to statewide angler surveys around the country have fallen from ~70% in the 1980s to ~40% currently. That means that occasional anglers do not respond at the level they once did, and research has consistently shown that Hispanics and African-American anglers do not respond at the same level as Anglos to statewide angler surveys. This has resulted in respondents being an even more homogenous group than they once were and results are based on more avid anglers than exist in the true population. Correcting non-response bias statistically is not a cure-all for this problem. For example, we would rather have three female anglers from Dallas respond to a survey than extrapolate results from one of the three who did to the other two. That means the researcher has to make the assumption that the one female who responded has the exact same characteristics, attitudes, and preferences as the two non-respondents. This results in a loss of characteristic diversity in the sample. Couple that with the realization that this study was a follow-up study to a statewide survey where we lost an additional 33% to non-response and one begins to see the quandary that both social scientists and natural resource agencies are facing when trying to understand the nation's angler population. That said, surveys still are the best method of reaching the angler population and those who do respond are likely the ones who are invested in the activity, care, complain, and complement so results still provide useful information for TPWD researchers and managers seeking to implement strategies to improve catfishing and angler satisfaction.

- With the problems alluded to above with statewide surveys, TPWD should investigate other mechanisms for obtaining information from catfish anglers in Texas that this study may have missed. Focus groups can be set-up in areas around the state that are representative of the population in that area, or on-site surveys can be conducted at urban ponds or known catfishing sites on rivers and reservoirs to refute or verify the information provided in this report. If consistent, these would add both measures of reliability and validity to information used in the development of the Texas Catfish Management Plan.

- This study used an SCM approach to estimate the utility, or benefit, anglers received from various fishing trip attributes. The strength of this method is that it requires respondents to examine the trip scenarios presented to them, consider them in their totality, and determine

what trade-offs they are willing to make in selecting a fishing trip given a limited budget. While the SCM designed for this study did not overtly include a price attribute for the estimation of willingness-to-pay, the distance attribute indirectly served this function. Travel costs are usually the largest expenditure made by anglers on any given fishing trip, and this has never been truer given the increased fuel prices of the last decade. It is apparent from the results of the SCMs that anglers took the distance traveled attribute to represent the cost of the trip which explains why it had the greatest explanatory power on angler choice. However, managers should keep in mind that the results of the full SCM only reflect the average catfish angler, and with only 21% of catfish anglers indicating that catfishing is their most important fishing activity, the average catfish angler is only a sporadic catfish angler. Dedicated catfish anglers will likely be willing to travel far more than the SCM indicated. However, given the abundance of catfishing opportunities in the state, many anglers may find doing so to be unnecessary.

- While it may appear unrealistic to provide every catfish angler in the state with an exceptional quality fishery close to home with high numbers of large, harvestable catfish, it cannot be viewed as impossible or efforts will likely fail. Whereas this may seem like a daunting challenge, especially with the high levels of effort such resources would witness in urban areas, TPWD fisheries biologists and managers must continue to ask themselves "How can we do it?" This may mean thinking and acting "outside of the box". Historical management practices for small impoundments which contain bass-bluegill-catfish combinations may not be the ideal strategy for meeting the demand for different types of catfishing opportunities. Rather, channel catfish-threadfin fisheries, blue catfish-crappie-threadfin fisheries, or flathead-bluegill-gizzard shad fisheries, some of which that could be intensively managed using fertilizer, aerators, and supplemental feed need to be investigated as to their possibilities. Additionally, more attention will likely need to be paid to shore-based fishing opportunities and associated amenities and upkeep. That said, although this study was targeted at catfish anglers, it is important to reiterate that catfishing was the most important species to only 21% of anglers in this study. Any management strategies developed for particular resources that would focus primarily on catfish to the exclusion of other species would likely meet with some resistance. Any novel approaches to management would need to focus on particular resources where there is currently a preponderance of catfish anglers, and be accompanied by a public relations campaign to anglers in those areas.

- Texas already has some quality catfish opportunities at many larger reservoirs in rural areas of the state that anglers just don't know about. Increased marketing of these resources may ease some of the burden of the realization that TPWD needs to bring fish to the people (rather than vice-versa) more so today than in the past. There are still anglers who will travel for great fishing if they know where to go. If not already part of the Texas Catfish Management Plan, TPWD should take a close look at how they market their catfish fisheries and see if there are additional ways to get this information into anglers' minds (e.g., television, email, Twitter, Facebook, etc…).

- Based on the combined results of the angler satisfaction analysis, the SCM, and the market segmentation it is apparent the size and number of catfish caught are foremost on catfish

anglers' minds when determining their choice of fishing locations and satisfaction. While the importance of retaining fish appeared to vary across anglers, all anglers uniformly were concerned with the number and size of catfish caught. Even those anglers that scored low on the 'catching numbers' and 'catching large fish' attitude constructs were not willing to sacrifice reductions in the number and size of catfish they typically caught for other trip attributes. However, more consistent with their attitudes, the SCM did suggest that anglers with weaker attitudes towards catching numbers of catfish and larger catfish received less utility from increases in the number and size of catfish caught compared to other anglers.

- While increases in the size and numbers of catfish caught have the potential to offer the greatest increases in utility to anglers, few changes in the composition of a catfish angler's catch can have a greater negative impact on utility than a reduction in the number of catfish harvested. Only a reduction in the typical size of catfish caught could have a greater negative impact on utility, and this is likely in part due to anglers believing smaller than normal catfish wouldn't be worth harvesting. Managers looking to improve the size and number of catfish caught will have to find ways of accomplishing these tasks without making significant cuts in the number of catfish most anglers keep. This may be a difficult task on high-use urban resources. However, managers should also keep in mind that the average number of catfish typically harvested by catfish anglers is little more than one-fourth of the current statewide bag limit.

- Catfish anglers placed little importance on the type of water fished and the level of site development compared to distance traveled and the catch-related attributes of a fishing trip. This means that fisheries managers looking to promote a quality catfish fishery have a significant amount of leeway in choosing the setting of the fishery. While catfish anglers indicated a preference for large reservoirs and rivers over small reservoirs they also indicated that the distance they needed to travel and the quality of the fishing were of far greater importance to their selection of a fishing trip.

- Where the SCM analysis suggests that choice of a fishing location is dictated by being close to home, having basic amenities, and having good fishing, that is likely not the complete picture. Despite strong angler preference for the catch-related components associated with fishing locations, other information collected in this study suggests additional site attributes may further increase angler satisfaction. Specifically, most catfish anglers preferred that locations shouldn't be too crowded, should give them the feeling of being away from other people and cities, should provide recreational opportunities aside from fishing, and be free from litter. These suggest that social carrying capacity and quality of the settings surrounding waterbodies need to be considered as well. Also, with roughly one-third of respondents indicating that their fishing extends into the night-time hours, TPWD should investigate the operational hours at fishing sites and whether they are conducive to providing opportunities to the increasing number of Texans who work non-traditional hours.

- There was a relationship between species preference and residence location. Anglers in the Dallas/Ft. Worth area have a stronger preference for channel catfish; Houston area anglers have a stronger preference for blue catfish which are more prolific in its watersheds. This

needs to be investigated further. If this is indeed the case, any management strategies based on catch orientation in Dallas or Houston area could possibly focus more attention on these particular species to further enhance angler satisfaction.

- Whereas the market segmentation presented in the report based on catch-related attitudes offers a starting point to understanding the different types of catfish anglers that may be present in the angler population, the results presented here provide just a rudimentary effort at developing a sound typology. Further insight could be gained by additional analysis from the original statewide survey as well as combining data from previous statewide surveys for a larger meta-analysis. Additionally, Tapestry Software recently purchased by TPWD could further assist in the agency with identifying characteristics of anglers in these groups. Coupled with GIS the agency could also do a better job determining where these anglers are located geographically within the state and particular cities. This could help fine tune management and marketing strategies, particularly in urban areas where local park ponds are targeted for intensive management. Additionally, segmentation of the data by boat and shore-based anglers may also identify important differences between these groups in all analyses presented in this report. Some resources TPWD manages currently or in the future may be conducive to only one of these activities.

- TPWD also can address some of the shortcomings of statewide angler surveys in the future by re-thinking the sampling approaches employed for the past 25 years, e.g., stratification by coastal and inland counties only. Additionally, TPWD could stratify samples by census blocks or tracts as necessary to obtain necessary information from anglers in specific areas of the state or cities and weight results accordingly. Given the dramatic changes occurring in the Texas population, these sampling techniques could bolster sample sizes for non-traditional clientele. The agency should also consider adding a measure of race and ethnicity to their customer database which would allow for direct sampling of Hispanic-American, African-American, and Asian-American groups when necessary. This would obtain sufficient data for management and marketing strategies, including recruitment and retention initiatives. These alternative methods of collecting information are needed as TPWD will be increasingly managing resources in specific areas of the state and cities that are dominated by non-traditional clientele, and it will need to know more than it currently does about them to be relevant and successful. It is important to remember that today's non-traditional clientele will become the majority of the Texas population in the near future if U.S. Census Bureau projections are correct.

- Texas bass fisheries such as Lake Fork, Rayburn, Toledo Bend, and Falcon and Amistad reservoirs are well known fisheries and visited by a substantial number of out-of-state anglers. This study only focused on resident angler needs and preferences. There is no reason to believe that additional new monies wouldn't be attracted to Texas from exposure of Texas' quality catfishing opportunities to non-residents. To do this, understanding non-resident anglers' needs and preferences is critical if the agency is interested in generating additional economic impacts from catfishing related tourism.

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APPENDIX A

2010 SURVEY OF TEXAS FRESHWATER CATFISH ANGLERS

Survey of Texas Freshwater Catfish Anglers

Conducted for the
Texas Parks and Wildlife Department, Inland Fisheries Division
by the
Human Dimensions & Conservation Law Enforcement Laboratory
Forest & Wildlife Research Center
Mississippi State University

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 for freshwater catfish in the last two years?

   1 I HAVE PURPOSELY TARGETED CATFISH IN THE LAST TWO YEARS
   2 I HAVE CAUGHT CATFISH WHILE FISHING FOR OTHER FISH IN THE LAST 2 YEARS
   3 I HAVE NEITHER FISHED FOR NOR CAUGHT CATFISH IN THE LAST TWO YEARS
   (I*f you selected 3, please skip to question #28.)*

2. How many years have you been fishing? _____ YEARS FISHING

   How many years have you been fishing for freshwater catfish? _____ YEARS CATFISHING

3. How confident are you in your ability to identify the following species of catfish? **(*Please circle only one*)**

	Not at all Confident	Moderately Confident	Very Confident
a) Channel catfish	1	2	3
b) Blue catfish	1	2	3
c) Flathead catfish	1	2	3

4. What species of freshwater catfish have you caught in the last two years? **(*Please circle all that apply*)**

   1 CHANNEL CATFISH
   2 FLATHEAD CATFISH
   3 BLUE CATFISH
   4 OTHER CATFISH ***(Please specify:_____)***
   5 I DO NOT KNOW THE DIFFERENCE
   (I*f you selected 5, please skip to question #6.)*

5. For the species of catfish listed below, what minimum length must they reach before you consider them to be a "eating-size" catfish, or a "trophy" catfish?

Species	Eating-Size Length (inches)	Trophy Length (inches)
a) Blue catfish	_____	_____
b) Flathead catfish	_____	_____
c) Channel catfish	_____	_____

6. Which of the species of catfish indicated above do you **MOST** prefer to catch?

   _____ SPECIES MOST PREFERRED

7. How many catfish do you catch and harvest in a typical day of catfishing?

_____ NUMBER CATFISH CAUGHT IN A TYPICAL DAY

_____ NUMBER CATFISH HARVESTED IN A TYPICAL DAY

8. What length range do **MOST** of the catfish you catch fall within? ***(Please circle only one)***

1	LESS THAN 10 INCHES	5	26 – 30 INCHES
2	10 – 15 INCHES	6	31 – 35 INCHES
3	16 – 20 INCHES	7	36 – 40 INCHES
4	21 – 25 INCHES	8	GREATER THAN 40 INCHES

9. Compared to your other fishing activities, would you rate catfishing as: (***Please circle only one answer***)

1 YOUR MOST IMPORTANT FISHING ACTIVITY
2 YOUR SECOND MOST IMPORTANT FISHING ACTIVITY
3 YOUR THIRD MOST IMPORTANT FISHING ACTIVITY
4 NONE OF THE ABOVE

10. How many days did you go fishing in the **last 12 months**? _____ DAYS FISHING

11. How many days have you gone **catfishing** in the **last 12 months** on the following types of water:

_____ PRIVATE FARM PONDS OR STOCK TANKS

_____ STOCKED FISHING PONDS IN PUBLIC COMMUNITY/CITY PARKS

_____ LAKES OR RESERVOIRS FROM A BOAT

_____ LAKES OR RESERVOIRS FROM SHORE OR PIERS

_____ RIVERS AND STREAMS FROM A BOAT

_____ RIVERS AND STREAMS FROM SHORE OR PIERS

_____ OTHER, please specify: _____

12. In how many of the days listed in **Question #11** did your catfishing activity extend into the night?

_____ NUMBER NIGHTS FISHING FOR CATFISH

13. In which of the seasons listed below did you fish for catfish in the last 12 months? **(*Please circle all that apply*)**

1	MARCH - MAY	3	SEPTEMBER - NOVEMBER
2	JUNE - AUGUST	4	DECEMBER - FEBRUARY

14. What methods have you used to catch catfish in Texas in the **last 12 months**? **(*Please circle all that apply*)**

1	ROD AND REEL	4	JUG LINES
2	TROTLINES	5	OTHER METHODS(S)
3	LIMB LINES		***(Please specify: _____)***

15. Which method did you use **MOST OFTEN** to catch catfish in the last 12 months? (***Please circle only one answer***)

1	ROD AND REEL	4	JUG LINES
2	TROTLINES	5	OTHER METHODS(S)
3	LIMB LINES		***(Please specify: _____)***

16. Which of the following methods should recreational anglers be allowed to use for taking catfish:

Currently Legal Methods in **MOST** of Texas	**ALLOW**	**NOT ALLOW**	**NO OPINION**
a) Rod and reel	1	2	3
b) Trotlines	1	2	3
c) Jug lines	1	2	3
d) Limb lines	1	2	3
Currently Illegal Methods in Texas			
e) Hand-fishing / Grabbling / Noodling	1	2	3
f) Bowfishing	1	2	3

17. If you had to replace all the fishing equipment you use when **catfishing** with similar equipment, how much would it cost you to replace the following items?

a) Rods and reels .....$ _____

b) Tackle (hooks, lures, line, and other hardware).....$ _____

c) Electronic equipment (depth finder, GPS, etc.).....$ _____

d) Boat, motor, and trailer.....$ _____

18. Please indicate the extent to which you agree or disagree with each of the following statements about **fishing for and catching catfish**.

		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 one or two big fish than ten smaller fish	1	2	3	4	5
f)	When I go fishing, I'm just as happy if I don't catch a fish	1	2	3	4	5
g)	If I thought I wouldn't catch any fish, I wouldn't go fishing	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)	A full stringer is the best indicator of a good fishing trip	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 a fishing trip if I at least catch the daily bag limit of 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)	I'm happiest with a fishing trip if I catch a challenging game fish	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 something	1	2	3	4	5

The following questions regard your level of satisfaction with catfishing in Texas.

19. Please indicate your level of satisfaction with the following aspects of your fishing activities in Texas.

		Not at all Satisfied	Slightly Satisfied	Moderately Satisfied	Very Satisfied	Extremely Satisfied
a)	Overall satisfaction with freshwater fishing in Texas	1	2	3	4	5
b)	Overall satisfaction with catfishing in Texas	1	2	3	4	5
c)	The number of eating size catfish I catch	1	2	3	4	5
d)	The number of trophy size catfish I catch	1	2	3	4	5
e)	The average size of the catfish I caught	1	2	3	4	5
f)	The number of catfish I am allowed to harvest	1	2	3	4	5
g)	The size of catfish I am allowed to harvest	1	2	3	4	5

20. Please indicate how important the following considerations are to you when selecting a place to fish for freshwater catfish

Please start each statement with "It is important for me to go…."	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a) Fishing where I can expect to catch a limit of catfish	1	2	3	4	5
b) Fishing where there are other recreational opportunities available for the family to enjoy	1	2	3	4	5
c) Fishing were you cannot hear or see busy traffic	1	2	3	4	5
d) Fishing waters that have been stocked recently	1	2	3	4	5
e) Fishing where you don't have to see too many other people	1	2	3	4	5
f) Fishing where you can rent or buy fishing equipment	1	2	3	4	5
g) Fishing where boat launches are available	1	2	3	4	5
h) Fishing where restrooms are available	1	2	3	4	5
i) Fishing where you feel far away from other people and cities	1	2	3	4	5
j) Fishing where piers or jetties are available	1	2	3	4	5
k) Fishing where picnic tables are available	1	2	3	4	5
l) Fishing where you do not have to walk for more than 15 minutes	1	2	3	4	5
m) Fishing where fishing guides are available for hire	1	2	3	4	5
n) Fishing waters that are close to home	1	2	3	4	5
o) Fishing where boat rentals are available	1	2	3	4	5
p) Fishing an area that is free of litter	1	2	3	4	5

The following questions regard your level of satisfaction with the places you catfish in Texas.

21. Please indicate your level of satisfaction with the following aspects of the places you go catfishing in Texas.

	Not at all Satisfied	Slightly Satisfied	Moderately Satisfied	Very Satisfied	Extremely Satisfied
a) Overall satisfaction with the places you go freshwater fishing in Texas	1	2	3	4	5
b) Overall satisfaction with the places you go catfishing in Texas	1	2	3	4	5
c) The availability of catfish fishing spots in your area	1	2	3	4	5
d) The number of people in the areas you fished	1	2	3	4	5
e) The amenities (i.e., docks, restrooms, picnic tables, etc.) in the areas you fished	1	2	3	4	5
f) The cleanliness of the areas you fished	1	2	3	4	5
g) The availability of other activities	1	2	3	4	5
h) The services (i.e., guides, boat rentals, etc.) in the areas you fished	1	2	3	4	5

TRIP CHOICE SECTION. YOUR SELECTION OF PREFERRED FISHING TRIPS

The purpose of this section of the questionnaire is to determine your preferences regarding catfishing trips in Texas. This section includes six sets of hypothetical fishing trips for catfish that differ from each other with regard to the following fishing site attributes:

- CATCH – A relative measure of the number of catfish you would catch on this hypothetical trip. Attribute levels include ***half as many caught as usual***, ***same as usual***, and ***three times as many caught as usual***. Please consider these levels in relation to your earlier answer to Question #5 regarding the number of catfish you catch on a typical trip.

- HARVEST - A relative measure of the number of catfish you would harvest on this hypothetical trip. Attribute levels include ***none harvested***, ***same as usual***, and ***twice as many harvested as usual***. Please consider these levels in relation to your earlier answer to Question #5 regarding the number of catfish you harvest on a typical trip.

- SIZE – A relative measure of the size of catfish you would catch on this hypothetical trip. Attribute levels include ***smaller than usual***, ***same as usual***, and ***larger than usual***. Please consider these levels in relation to your earlier answer to Question #6 regarding the size of catfish you typically catch.

- TYPE OF WATER – This attribute designates the type of water would be catfishing on this hypothetical trip. Attribute levels include ***large reservoir (over 100 acres)***, ***river or stream***, and ***small pond or reservoir (under 100 acres)***.

- LEVEL OF SITE DEVELOPMENT – This attribute deals with the types of amenities provided at the catfishing site where the hypothetical catfishing trip takes place, and includes the following levels with additional description found here:

  - ***Undeveloped site*** – Characterized by rustic shoreline access with no boat ramps, restrooms, or picnic tables.

  - ***Basic site development*** – Characterized by gravel shoreline trails with a boat launch, portable restroom facilities, and picnic tables.

  - ***Well developed site*** – Characterized by well maintained trails, some paved, with fishing piers, marinas, permanent restroom facilities, and sheltered picnic areas.

- DISTANCE – Range of distance in miles the catfishing site is located from your home.

Closely examine each pair of hypothetical catfishing trips presented as a whole, and indicate which trip you would prefer to take based on the presented attributes by selecting the trip that suits you best (**TRIP A** or **TRIP B**). If you find neither trip appealing, please indicate that you would choose **NEITHER** trip.

22. If Trip A and B were available to you for catfishing in Texas, which would you prefer to take?

Attribute	Trip A	Trip B	
CATCH	Same as usual	Three times as many caught as usual	
HARVEST	None harvested	Same as usual	
SIZE	Same as usual	Larger than usual, some of trophy size	
TYPE OF WATER	Small pond or reservoir (under 100 acres)	Large reservoir (over 100 acres)	
LEVEL OF SITE DEVELOPMENT	Basic site development	Basic site development	
DISTANCE	Located within 10 miles of home	Located over 100 miles from home	
Which trip do you *MOST* prefer? **(Circle only one)**	**TRIP A**	**TRIP B**	**NEITHER**

23. If Trip A and B were available to you for catfishing in Texas, which would you prefer to take?

Attribute	Trip A	Trip B	
CATCH	Three times as many caught as usual	Same as usual	
HARVEST	None harvested	Twice as many fish harvested as usual	
SIZE	Same as usual	Larger than usual, some of trophy size	
TYPE OF WATER	Large reservoir (over 100 acres)	Small pond or reservoir (under 100 acres)	
LEVEL OF SITE DEVELOPMENT	Undeveloped site	Well developed site	
DISTANCE	Located within 10 miles of home	Located 11 - 100 miles of home	
Which trip do you *MOST* prefer? **(Circle only one)**	**TRIP A**	**TRIP B**	**NEITHER**

24. If Trip A and B were available to you for catfishing in Texas, which would you prefer to take?

Attribute	Trip A	Trip B	
CATCH	Half as many caught as usual	Three times as many caught as usual	
HARVEST	Same as usual	Same as usual	
SIZE	Smaller than usual, many sub-legal	Same as usual	
TYPE OF WATER	River or stream	River or stream	
LEVEL OF SITE DEVELOPMENT	Basic site development	Undeveloped site	
DISTANCE	Located over 100 miles from home	Located over 100 miles from home	
Which trip do you *MOST* prefer? **(Circle only one)**	**TRIP A**	**TRIP B**	**NEITHER**

25. If Trip A and B were available to you for catfishing in Texas, which would you prefer to take?

Attribute	Trip A	Trip B	
CATCH	Same as usual	Half as many caught as usual	
HARVEST	Twice as many fish harvested as usual	None harvested	
SIZE	Larger than usual, some of trophy size	Smaller than usual, many sub-legal	
TYPE OF WATER	Small pond or reservoir (under 100 acres)	Large reservoir (over 100 acres)	
LEVEL OF SITE DEVELOPMENT	Well developed site	Basic site development	
DISTANCE	Located 11 - 100 miles of home	Located within 10 miles of home	
Which trip do you *MOST* prefer? **(Circle only one)**	**TRIP A**	**TRIP B**	**NEITHER**

26. If Trip A and B were available to you for catfishing in Texas, which would you prefer to take?

Attribute	Trip A	Trip B	
CATCH	Half as many caught as usual	Same as usual	
HARVEST	Same as usual	Twice as many fish harvested as usual	
SIZE	Larger than usual, some of trophy size	Smaller than usual, many sub-legal	
TYPE OF WATER	River or stream	River or stream	
LEVEL OF SITE DEVELOPMENT	Undeveloped site	Undeveloped site	
DISTANCE	Located 11 - 100 miles of home	Located 11 - 100 miles of home	
Which trip do you *MOST* prefer? **(Circle only one)**	**TRIP A**	**TRIP B**	**NEITHER**

27. If Trip A and B were available to you for catfishing in Texas, which would you prefer to take?

Attribute	Trip A	Trip B	
CATCH	Three times as many caught as usual	Half as many caught as usual	
HARVEST	Twice as many fish harvested as usual	None harvested	
SIZE	Smaller than usual, many sub-legal	Same as usual	
TYPE OF WATER	Large reservoir (over 100 acres)	Small pond or reservoir (under 100 acres)	
LEVEL OF SITE DEVELOPMENT	Well developed site	Well developed site	
DISTANCE	Located over 100 miles from home	Located within 10 miles of home	
Which trip do you *MOST* prefer? **(Circle only one)**	**TRIP A**	**TRIP B**	**NEITHER**

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.

28. Compared to your other outdoor recreation activities (such as hunting, camping, golfing, etc…) would you rate 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 NONE OF THE ABOVE

29. What is your age? _____ YEARS

30. Are you? 1 MALE 2 FEMALE

31. In what county do you reside? _____ COUNTY

32. What is your approximate annual household income before taxes?

    1 UNDER $20,000
    2 $20,000 - $39,999
    3 $40,000 - $59,999
    4 $60,000 - $79,999
    5 $80,000 - $99,999
    6 $100,000 and ABOVE

33. What was the last **year** of school you completed? ***(Please circle only one number)***

    1 ELEMENTARY
    2 SOME HIGH SCHOOL
    3 HIGH SCHOOL
    4 SOME COLLEGE
    5 COLLEGE
    6 POST GRADUATE

34. 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: _____)***

35. Would you best describe yourself as:

    1 WHITE OR ANGLO
    2 BLACK OR AFRICAN AMERICAN
    3 NATIVE AMERICAN OR ALASKAN NATIVE
    4 ASIAN OR PACIFIC ISLANDER
    5 OTHER ***(Please Specify: _____)***

36. 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 about catfishing in Texas?

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

Mississippi State University
Department of Wildlife and Fisheries
Mississippi State, MS 39762-9690
4/10

Version 1

APPENDIX B

SURVEY CORRESPONDENCE WITH ANGLERS

April 13, 2010 (THIS LETTER WAS SENT ON TPWD LETTERHEAD)

John Fisher
123 Flathead Drive
Austin, TX 78744

Dear John:

In about a week you will receive a questionnaire for an important research project on recreational catfish fishing in Texas' inland rivers, streams, and reservoirs. You will be receiving this survey because you responded to the 2009 Texas Angler Survey and indicated catfish was one of your top three preferred species, or you were randomly selected from last year's fishing license database.

The survey will help us develop a better understanding of catfish anglers in terms of the types of fisheries resources they prefer to use, their attitudes towards fisheries and fisheries management, and how different site attributes influence their choice of fishing sites. The results of this study are critical to the development of the Texas Catfish Management Plan currently being prepared by Texas Parks and Wildlife Department's Inland Fisheries Division.

We are working with Dr. Kevin Hunt at Mississippi State University in conducting the study and further correspondence will come from him. Dr. Hunt is a graduate of Texas A&M University and an expert in angler survey design and analysis. He conducted surveys for our agency while he was in Texas, and we are pleased to be able to work with him again.

I am writing in advance because many people like to know ahead of time that they will be contacted. Although the survey is completely voluntary, I hope that you will take the 15-20 minutes necessary to provide us with your views of catfishing and catfish management. Your responses will be strictly confidential, and you will not be identified with your answers. Your answers will be grouped with other respondents in a non-identifiable manner, and there is no way for anyone outside of Dr. Hunt's laboratory to determine your identity. He will destroy the name and address list at the end of the study.

It's only through helpful people like you that our research can be successful. If you should have any questions about this research project, please feel free to contact Dr. Hunt at Mississippi State University at (662) 325-0999.

Thank you in advance for your cooperation.

Sincerely,

Dave R. Terre
Chief of Management and Research
Inland Fisheries Division

Human Dimensions & Conservation Law Enforcement Laboratory
Forest & Wildlife Research Center
Box 9690
Mississippi State, MS 39762-9690

April 20, 2010

John Fisher
123 Catfish Drive
Austin, TX 78744

Dear John:

I am writing to ask for your help in a study of Texas catfish anglers that I am conducting in cooperation with the Texas Parks and Wildlife Department's Inland Fisheries Division. The study examines fishing behavior, attitudes, and preferences of catfish anglers in Texas. Your responses are critical to the development of the Texas Catfish Management Plan currently being prepared by Texas Parks and Wildlife Department's Inland Fisheries Division.

This study is designed to examine the fishing behavior, attitudes, and preferences of catfish anglers in Texas. Your responses to the enclosed questionnaire will help TPWD develop a better understanding of catfish anglers in terms of the types of fisheries resources they prefer to use, their attitudes towards fisheries and fisheries management, and how different site attributes influence their choice of fishing sites.

You are one of a small number of license holders selected to participate in this, and it is important that you and no one else complete the questionnaire. Your responses are important whether you fish for catfish often or just occasionally. All responses will be strictly confidential, and you will not be identified with your answers. Your answers will be grouped with other respondents in a non-identifiable manner. The questionnaire has an identification number for mailing purposes only. This is so I can remove your name from the mailing list once I receive it.

Although the survey is completely voluntary, I hope that you will take the 15-20 minutes necessary to provide your input, be a part of the fisheries management process, and help make catfishing even better in Texas. After you complete the questionnaire, please return it to Mississippi State University in the postage-paid, business reply envelope as soon as possible. If you should have any questions about this research project, please feel free to contact me at (662) 325-4153.

Thank you in advance for your cooperation. I hope that your 2010 fishing season is a safe and successful one.

Sincerely,

Dr. Kevin M. Hunt
Assistant Professor & Director

For additional information regarding human participation in research, please feel free to contact the MSU Regulatory Compliance Office at (662) 325-3294.

Human Dimensions & Conservation Law Enforcement Laboratory
Forest & Wildlife Research Center
Box 9690
Mississippi State, MS 39762-9690

May 11, 2010

John Fisher
123 Catfish Drive
Austin, TX 78744

Dear John:

About three weeks ago, I sent you a survey of Texas catfish anglers that I am conducting in cooperation with the Texas Parks and Wildlife Department's Inland Fisheries Division. As of today, I have not yet received your completed questionnaire. If you have recently returned your survey, please accept my thanks. The comments of people who have already returned their questionnaires included a wide variety of answers. However, the success and accuracy of this study depends on you and the others who have not yet responded. I ask for your help in making sure the results are representative of all catfish anglers in Texas.

In case you misplaced your survey, I've enclosed another. Your responses will help TPWD develop a better understanding of catfish anglers in terms of the types of fisheries resources they prefer to use, their attitudes towards fisheries and fisheries management, and how different site attributes influence their choice of fishing sites. Your responses will be an important component of a Texas Catfish Management Plan currently being prepared by the TPWD Inland Fisheries Division.

You are one of a small number of license holders selected to participate in this study, and it is important that YOU and no one else complete the questionnaire. Your responses are important to whether you fish for catfish often or just occasionally. All responses will be strictly confidential, and you will not be identified with your answers. Your answers will be grouped with other respondents in a non-identifiable manner. The questionnaire has an identification number for mailing purposes only. This is so I can remove your name from the mailing list once I receive it.

Although the survey is completely voluntary, I hope that you will take the 15-20 minutes necessary to provide your input and help make catfishing even better in Texas. After you complete the questionnaire, please return it to Mississippi State University in the postage-paid, business reply envelope as soon as possible. If you should have any questions about this research project, please feel free to contact me at (662) 325-0999.

Thank you in advance for your cooperation. I hope that your 2010 fishing season is a safe and successful one.

Sincerely,

Dr. Kevin M. Hunt
Assistant Professor & Director
Human Dimensions & Conservation Law Enforcement Laboratory

For additional information regarding human participation in research, please feel free to contact the MSU Regulatory Compliance Office at (662) 325-3294.

Human Dimensions & Conservation Law Enforcement Laboratory
Forest & Wildlife Research Center
Box 9690
Mississippi State, MS 39762-9690

June 14, 2010

John Fisher
123 Catfish Drive
Austin, TX 78744

Dear John:

During the last two months, I have sent you several mailings involving a survey on Texas catfish anglers that I am conducting in cooperation with the Texas Parks and Wildlife's Inland Fisheries Division. As of today, I have not yet received your completed questionnaire. If you have recently returned your survey, please accept my thanks.

The Texas Parks and Wildlife Department values your perspective of fisheries management and has funded this study to develop a better understanding of catfish anglers in terms of the types of fisheries resources they prefer to use, their attitudes towards fisheries and fisheries management, and how different site attributes influence their choice of fishing sites. This study is drawing to a close, and this is the last contact that will be made with you. Although the survey is completely voluntary, the success and accuracy of the study depends on you and the others who have not yet responded. If for some reason you prefer not to respond, please let me know by returning the blank questionnaire in the enclosed business reply envelope.

If you choose to respond, the survey should take you no longer than 15-20 minutes to complete. Your responses will be strictly confidential, and you will not be identified with your answers. The survey has an identification number for mailing purposes only. Your answers will be grouped with other respondents in a non-identifiable manner, and there is no way for anyone outside of my laboratory to determine your identity. I will destroy the name and address list at the end of the study.

After you complete the questionnaire, please return it to Mississippi State University in the postage-paid, business reply envelope as soon as possible. If you should have any questions about this research project, please feel free to contact me at (662) 325-0999.

Thank you in advance for your cooperation. I hope that your 2010 fishing season is a safe and successful one.

Sincerely,

Dr. Kevin M. Hunt
Assistant Professor & Director
Human Dimensions & Conservation Law Enforcement Laboratory

For additional information regarding human participation in research, please feel free to contact the MSU Regulatory Compliance Office at (662) 325-3294.

APPENDIX C

DATA TABLES FOR NON-RESPONDENT ANALYSIS, AND CATCH-RELATED ATTITUDE AND SITE PREFERENCE FACTOR ANALYSES

Table 1. Results of non-response bias analysis for both the statewide and follow-up survey of catfish anglers.

Parameter	df	Coefficient	SE	Wald χ^2	p-value
		Statewide Survey			
Intercept	1	2.640	0.135	383.33	< .001
Age	1	-0.043	0.003	299.16	< .001
Coastal	1	0.133	0.067	3.98	.046
Female	1	0.235	0.075	9.80	.002
		Catfish Angler Survey			
Intercept	1	1.623	0.305	28.25	< .001
Age	1	-0.040	0.006	53.74	< .001
Coastal	1	0.103	0.170	0.37	.545
Female	1	0.064	0.170	0.14	.708

Table 2. Mean and median age, gender (%), and county location (%) by response status for both the statewide and catfish angler follow-up surveys.

	Statewide Survey		Catfish Angler Survey	
Variable	Respondents	Non-resp	Respondents	Non-resp
Age (years)	48.8 (51)	42.5 (43)	50.5 (53)	44.8 (46)
Gender (%)				
Male	18.1	14.0	17.7	16.2
Female	75.4	72.6	77.7	76.6
Unidentified	6.5	13.4	4.6	7.3
County (%)				
Inland	24.2	26.6	16.9	18.0
Coastal	75.8	73.4	83.1	82.0

Table 3. Statements used to measure catch-related attitudes towards recreational fishing by four hypothesized constructs of consumptive orientation[a]. Respondents were instructed to rate their level of agreement with each statement as it pertained to fishing for catfish.

Attitudes towards catching something (CATSOM)
V1 – A fishing trip can be successful even if no fish are caught (NOFISH)[b]
V2 – When I go fishing, I'm just as happy if I don't catch a fish (HAPPY)[b]
V3 – If I thought I wouldn't catch any fish, I wouldn't go fishing (NOCATCH)
V4 – When I go fishing, I'm not satisfied unless I catch something (SOMETHING)
Attitudes toward catching numbers of fish (CATNUM)
V5 – The more fish I catch, the happier I am (MOREFISH)
V6 – A successful fishing trip is one in which many fish are caught (MANYFISH)
V7 – A full stringer is the best indicator of a good fishing trip (FULLSTRING)
V8 – I'm happiest with a fishing trip if I at least catch the daily bag limit of fish (LIMIT)
Attitudes toward catching large / trophy gamefish (CATLAR)
V9 – I would rather catch one or two big fish than ten smaller fish (BIGFISH)
V10 – The bigger the fish I catch, the better the fishing trip (BIGBETTER)
V11 – I'm happiest with a fishing trip if I catch a challenging game fish (CHALLENGE)
V12 – I like to fish where I know I have a chance to catch a "trophy" fish (TROPHY)
Attitude toward retaining fish (RETFISH)
V13 – I usually eat the fish I catch (EAT)
V14 – I'm just as happy if I don't keep the fish I catch (DONTKEEP)[b]
V15 – I want to keep all the fish I catch (WANTKEEP)
V16 – I'm just as happy if I release the fish I catch (RELEASE)[b]

[a] Respondents were asked to indicate whether they agreed or disagreed with each item on a 5-point Likert-type scale with 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; and 5 = strongly agree.

[b] Item reverse coded for analysis purposes.

Table 4. Properties of the final revised catch-related attitude measurement model derived from principle components factor analysis.

Factors and indicators[a]	Standardized loading	Indicator reliability[b]	Variance extracted estimate[c]
Catching something		.761	.163
HAPPY	.760		
NOFISH	.753		
NOCATCH	.718		
SOMETHING	.707		
Catching numbers		.761	.152
MANYFISH	.765		
MOREFISH	.763		
FULLSTRING	.646		
LIMIT	.621		
Catching large/trophy		.731	.143
BIGFISH	.758		
TROPHY	.732		
CHALLENGE	.702		
BIGBETTER	.697		
Retaining fish		.758	.141
DONTKEEP	.782		
RELEASE	.772		
EAT	.767		
WANTKEEP	.522		

[a] Statements can be found in Table C1.

[b] Denotes composite reliability which is a measure of the internal consistency of the variables in each factor.

[c] Variance extracted estimates measure the amount of overall scale variance captured by each underlying factor.

Table 5. Statements used to measure the importance anglers placed on select site attributes that were not measured in the stated choice models. Respondents were instructed to rate their level of agreement that each item was an important consideration when selecting a catfishing site.

Importance of site amenities
V1 – Fishing where you can rent or buy fishing equipment (RENTEQP)
V2 – Fishing where piers or jetties are available (PIERS)
V3 – Fishing where picnic tables are available (PICNIC)
V4 – Fishing where fishing guides are available for hire (GUIDES)
V5 – Fishing where boat rentals are available (BOATRNT)
Importance of escaping other people and daily life
V6 – Fishing where you cannot heat or see busy traffic (NOTRAFFIC)
V7 – Fishing where you don't have to see too many other people (FEWPPL)
V8 – Fishing where you feel far away from other people and cities (FARAWAY)
Importance of site convenience
V9 – Fishing where there are other recreational opportunities available for the rest of the family to enjoy (FAMREC)
V10 – Fishing where boat launches are available (LAUNCH)
V11 – Fishing where restrooms are available (RESTROOM)
Importance of park related amenities
V13 – Fishing where you do not have to walk for more than 15 minutes (WALK)
V14 – Fishing waters close to home (HOME)
V15 – Fishing an area that is free of litter (NOLITTER)

Table 6. Properties of the final revised site attribute model derived from principle components factor analysis.

Factors and indicators[a]	Standardized loading	Indicator reliability[b]	Variance extracted estimate[c]
Amenities		.783	.180
PICNIC	.763		
BOATRNT	.745		
PIERS	.712		
GUIDES	.682		
RENTEQP	.609		
Escape		.789	.141
FEWPPL	.837		
FARAWAY	.802		
NOTRAFFIC	.799		
Convenience		.594	.116
LAUNCH	.739		
RESTROOM	.690		
FAMREC	.582		
Park		.372	.087
HOME	.770		
NOLITTER	.586		
WALK	.419		

[a] Statements can be found in Table C5.

[b] Denotes composite reliability which is a measure of the internal consistency of the variables in each factor.

[c] Variance extracted estimates measure the amount of overall scale variance captured by each underlying factor.

APPENDIX D

FREQUENCY TABLES FOR QUESTIONS ASKED IN THE 2010 SURVEY OF TEXAS CATFISH ANGLERS

Table 1. Frequency and percentage of catfish anglers by age adjusted for nonresponse bias. Frequency missing equals 37.

Age	Frequency	Percent
20 or less	11	2.0
21-25	24	4.3
26-30	44	8.0
31-35	51	9.3
36-40	66	12.0
41-45	57	10.3
46-50	66	12.0
51-55	78	14.2
56-60	76	13.9
61-65	57	10.3
66+	20	3.7
18	3	0.4
19	2	0.3
20	7	1.2
21	2	0.4
22	5	1.0
23	5	0.8
24	2	0.4
25	9	1.7
26	6	1.1
27	18	3.2
28	7	1.2
29	3	0.5
30	11	2.0
31	12	2.1
32	13	2.3
33	8	1.4
34	9	1.6
35	10	1.9
36	7	1.3
37	12	2.3
38	10	1.8
39	15	2.6
40	22	4.1
41	12	2.2
42	7	1.3
43	18	3.3
44	12	2.2
45	8	1.4
46	9	1.7
47	16	2.8
48	13	2.3
49	13	2.4
50	15	2.7
51	13	2.3

Table 1. Continued.

Age	Frequency	Percent
52	16	3.0
53	19	3.4
54	14	2.6
55	16	2.9
56	17	3.1
57	19	3.5
58	13	2.4
59	12	2.1
60	15	2.8
61	15	2.7
62	13	2.4
63	12	2.2
64	8	1.4
65+	29	5.3

Table 2. Frequency and percentage of catfish anglers by gender, education, income, Hispanic origin, and race adjusted for nonresponse bias.

Variable	Frequency	Percent
Gender		
Male	474	85.3
Female	82	14.7
Income (%)		
Under $20,000	42	8.1
$20,000 - $39,999	82	15.9
$40,000 - $59,999	96	18.6
$60,000 - $79,999	88	17.1
$80,000 - $99,999	85	16.5
$100,000 and above	124	23.9
Education (%)		
Elementary	1	0.2
Some high school	20	3.7
High School	153	27.8
Some college	171	31.2
College	148	26.9
Post graduate	57	10.3
Hispanic origin		
No, not Hispanic	497	91.2
Yes, Mexican, Mexican American, Chicano	37	6.8
Yes, other Spanish/ Hispanic group	11	2.0
Race		
White or Anglo	493	90.4
Black or African Amer.	11	2.0
Native American	7	1.3
Asian or Pacific Islander	6	1.1
Other	28	5.2

Table 3. Frequency and percentage of catfish anglers by years fishing adjusted for nonresponse bias.

Years fishing	Frequency	Percent
5 or less	9	2.0
6-10	16	3.5
11-20	69	14.8
21-30	94	20.1
31-40	122	26.1
41-50	111	23.9
51+	45	9.6
1	1	0.2
3	5	1.0
5	4	0.8
6	5	1.1
7	3	0.6
8	1	0.3
10	7	1.6
14	2	0.5
15	19	4.1
16	5	1.1
17	3	0.6
18	9	2.0
20	30	6.5
21	2	0.4
22	3	0.6
24	2	0.5
25	30	6.5
27	1	0.3
28	4	0.8
29	3	0.7
30	48	10.3
31	1	0.3
32	5	1.1
33	3	0.6
34	4	1.0
35	36	7.7
36	5	1.1
37	2	0.5
38	6	1.3
39	1	0.1
40	59	12.7
41	3	0.6
42	5	1.1
43	2	0.4
44	3	0.6
45	33	7.0
46	8	1.7
47	2	0.5

Table 3. Continued

Years fishing	Frequency	Percent
48	7	1.4
49	2	0.4
50	48	10.3
52	5	1.1
53	4	0.9
54	1	0.3
55	26	5.5
56	1	0.2
58	7	1.4
60	1	0.3

Table 4. Frequency and percentage of catfish anglers by years fishing for freshwater catfish adjusted for nonresponse bias.

Years catfish	Frequency	Percent
0	11	2.5
1-5	29	6.5
6-10	44	9.8
11-20	88	19.5
21-30	88	19.7
31-40	83	18.5
41-50	74	16.6
50+	31	7.0
0	11	2.5
1	1	0.3
2	3	0.7
3	13	3.0
4	5	1.0
5	7	1.5
6	2	0.5
7	4	1.0
8	5	1.2
10	32	7.1
12	5	1.2
14	1	0.1
15	23	5.2
16	3	0.7
17	3	0.7
18	6	1.3
20	47	10.4
21	2	0.4
22	2	0.4
24	2	0.5
25	31	7.0
27	1	0.3
28	3	0.8
29	2	0.4
30	45	10.0
31	2	0.5
32	4	0.8
33	1	0.2
34	3	0.8
35	20	4.4
36	2	0.5
38	2	0.5
40	49	10.9
41	2	0.5
42	2	0.4
43	1	0.2

Table 4. Continued

Years catfish	Frequency	Percent
44	1	0.2
45	24	5.3
46	5	1.2
47	2	0.5
48	6	1.3
49	2	0.4
50	30	6.6
52	2	0.5
53	4	0.9
54	2	0.5
55	8	1.9
56	1	0.3
57	2	0.5
58	1	0.3
59	1	0.2
60	10	2.0

Table 5. Frequency and percentage of days fishing in the last 12 months adjusted for nonresponse bias.

Days fishing	Frequency	Percent
0	6	1.3
1-5	58	12.8
6-10	84	18.4
11-20	109	23.9
21-30	82	17.9
31-40	24	5.4
41-50	27	5.9
50+	66	14.5
0	6	1.3
1	5	1.0
2	8	1.8
3	12	2.6
4	14	3.1
5	20	4.4
6	13	2.9
7	9	2.0
8	10	2.2
10	51	11.3
11	1	0.2
12	25	5.5
14	11	2.4
15	26	5.7
16	1	0.2
18	1	0.2
20	44	9.7
21	2	0.4
22	2	0.4
24	9	2.0
25	17	3.8
26	4	0.8
28	2	0.5
30	46	10.1
35	4	0.8
36	4	0.8
38	1	0.3
40	16	3.5
45	9	2.0
48	1	0.2
50	17	3.7
56	1	0.2
60	13	2.9
70	1	0.2
72	1	0.2
73	1	0.3

Table 5. Continued

Days fishing	Frequency	Percent
75	5	1.1
80	8	1.7
90	1	0.3
92	1	0.2
96	1	0.3
100 +	33	7.2

Table 6. Frequency and percentage of days fishing for freshwater catfish in the last 12 months adjusted for nonresponse bias.

Days catfishing	Frequency	Percent
0	48	9.9
1-5	86	18.0
6-10	70	14.6
11-20	102	21.3
21-30	74	15.5
31-40	28	5.8
41-50	32	6.6
50+	40	8.3
0	48	9.9
1	12	2.4
2	21	4.4
3	18	3.9
4	19	3.9
5	16	3.4
6	17	3.6
7	6	1.3
8	9	1.9
9	2	0.5
10	36	7.4
11	6	1.2
12	20	4.2
13	2	0.3
14	8	1.7
15	20	4.2
16	6	1.3
20	41	8.5
21	3	0.6
22	3	0.6
24	7	1.4
25	24	5.0
26	2	0.5
27	2	0.4
28	1	0.3
29	1	0.2
30	31	6.5
31	1	0.3
32	1	0.2
34	5	1.0
35	6	1.3
36	5	1.0
40	10	2.0
42	1	0.2
44	3	0.6
45	10	2.1

Table 6. Continued

Days catfishing	Frequency	Percent
46	2	0.4
50	16	3.3
51	2	0.5
52	1	0.2
54	1	0.2
55	2	0.4
58	1	0.2
60	6	1.3
62	1	0.2
64	2	0.4
65	2	0.4
69	1	0.2
70	2	0.4
74	1	0.2
75	2	0.3
76	1	0.3
80	5	0.9
82	2	0.5
84	1	0.2
85	2	0.5
94	1	0.2
95	2	0.4
96	1	0.2
99	1	0.1
100	1	0.2

Table 7. Frequency and percentage of days fishing for freshwater catfish in the last 12 months on various types of waters adjusted for nonresponse bias.

Days catfishing	Frequency	Percent
Private farm ponds or stock tanks		
0	328	68.4
1-5	89	18.6
6-10	28	5.9
11-20	20	4.1
21-30	14	3.0
Stocked ponds in public community or city parks		
0	419	87.4
1-5	38	7.8
6-10	10	2.0
11-20	3	0.5
21-30	11	2.2
Lakes/reservoirs from boat		
0	186	38.7
1-5	123	25.7
6-10	62	13.0
11-20	56	11.7
21-30	22	4.7
31-40	8	1.6
41-50	22	4.6
Lakes/reservoirs from shore or pier		
0	282	58.8
1-5	96	20.0
6-10	33	6.9
11-20	31	6.6
21-30	19	3.9
31-40	5	1.1
41-50	14	2.8
Rivers/streams from boat		
0	368	76.9
1-5	60	12.5
6-10	29	6.0
11-20	12	2.4
21-30	10	2.2
Rivers/streams from shore or pier		
0	355	74.2
1-5	65	13.5
6-10	25	5.1
11-20	23	4.8
21-30	11	2.4

Table 8. Frequency and percentage of days fishing for freshwater catfish in the last 12 months when respondents catfishing activity extended into the night adjusted for nonresponse bias.

Days catfishing into the night	Frequency	Percent
0	203	42.3
1-5	131	27.2
6-10	64	13.2
11-20	38	7.9
21-30	19	4.0
31-40	26	5.5
0	203	42.3
1	28	5.9
2	36	7.6
3	20	4.3
4	18	3.7
5	28	5.8
6	12	2.6
7	11	2.3
8	7	1.5
9	1	0.2
10	32	6.6
12	11	2.3
13	1	0.3
14	1	0.3
15	11	2.3
18	1	0.3
19	1	0.2
20	11	2.3
21	2	0.3
22	3	0.6
25	4	0.8
27	1	0.3
30	10	2.0
35	26	5.5

Table 9. Frequency and percentage of catfish anglers reporting their level of confidence in their ability to identify the three main species of freshwater catfish adjusted for nonresponse bias.

Variable	Frequency	Percent
Channel catfish		
Not at all confident	33	7.4
Moderately confident	91	20.2
Very confident	327	72.4
Blue catfish		
Not at all confident	33	7.6
Moderately confident	95	21.7
Very confident	311	70.8
Flathead catfish		
Not at all confident	47	10.9
Moderately confident	97	22.4
Very confident	290	66.7

Table 10. Frequency and percentage of catfish anglers reporting the species of catfish they have caught in the last two years and the species they most prefer to catch adjusted for nonresponse bias.

Variable	Frequency	Percent
Species caught		
Channel catfish	409	85.4
Flathead catfish	172	36.0
Blue catfish	311	65.1
Other *	44	9.3
Don't know the difference	29	6.0
Species most preferred		
Channel catfish	211	50.6
Flathead catfish	51	12.1
Blue catfish	146	35.1
Other *	9	2.1

* Other answers given included any catfish, bullheads, hard head saltwater catfish, gafftops, and white catfish. Yellow catfish, mud cats, ops, and appaloosa catfish were reclassified as flathead catfish as these are regional names for the species.

Table 11. Frequency and percentage of catfish anglers reporting what they consider to be the minimum length a channel catfish must be to be considered eating-size or trophy-size adjusted for nonresponse bias.

Variable	Frequency	Percent
Eating-size channel catfish		
8	2	0.5
10	9	2.4
12	104	27.0
13	4	1.1
14	67	17.5
15	51	13.3
16	62	16.2
17	2	0.5
18	40	10.4
19	2	0.5
20	41	10.8
Trophy-size channel catfish		
12	2	0.9
14	2	0.6
15	1	0.6
16	2	0.7
18	6	2.3
20	23	9.2
22	4	1.6
24	31	12.1
25	14	5.4
26	5	1.9
27	1	0.5
28	3	1.1
30	71	27.9
32	9	3.4
35	4	1.7
36	41	16.0
38	3	1.1
39	1	0.4
40	12	4.7
45	1	0.4
48	19	7.7

Table 12. Frequency and percentage of catfish anglers reporting what they consider to be the minimum length a flathead catfish must be to be considered eating-size or trophy-size adjusted for nonresponse bias.

Variable	Frequency	Percent
Eating-size flathead catfish		
9	2	0.6
10	3	1.1
12	50	16.5
13	2	0.6
14	31	10.3
15	25	8.4
16	31	10.4
17	1	0.2
18	80	26.5
20	36	11.8
21	2	0.7
21	2	0.7
22	3	0.9
23	1	0.3
24	35	11.5
34	1	0.3
Trophy-size flathead catfish		
13	1	0.5
15	1	0.6
16	2	0.8
18	5	2.2
20	15	7.1
22	2	1.0
24	19	8.8
25	3	1.4
26	4	1.7
28	5	2.3
30	56	26.4
32	1	0.6
34	1	0.7
35	2	1.1
36	46	21.5
38	3	1.3
40	15	7.1
42	2	0.8
45	4	1.8
48	9	4.5
50 +	17	7.9

Table 13. Frequency and percentage of catfish anglers reporting what they consider to be the minimum length a blue catfish must be to be considered eating-size or trophy-size adjusted for nonresponse bias.

Variable	Frequency	Percent
Eating-size blue catfish		
10	15	3.7
11	2	0.5
12	133	32.7
13	4	1.0
14	84	20.8
15	49	12.0
16	46	11.3
17	1	0.2
18	38	9.3
19	2	0.5
20	32	7.9
24	1	0.2
Trophy-size blue catfish		
12	2	0.7
14	1	0.5
15	1	0.3
16	2	0.8
18	10	3.9
20	31	12.2
22	2	0.8
24	51	19.9
25	14	5.5
26	8	3.2
27	2	0.9
28	6	2.5
29	1	0.3
30	53	20.8
32	6	2.5
34	1	0.3
35	2	0.7
36	37	14.4
38	3	1.1
39	1	0.4
40	8	3.1
48	13	5.2

Table 14. Frequency and percentage of catfish anglers reporting the number of catfish they catch and harvest in a typical day of catfishing adjusted for nonresponse bias.

Variable	Frequency	Percent
Catfish caught in a typical day of catfish		
0	5	1.2
1	24	5.3
2	25	5.7
3	26	6.0
4	37	8.4
5	66	14.8
6	47	10.7
7	10	2.2
8	16	3.7
9	1	0.2
10	73	16.4
11	1	0.2
12	13	2.9
14	1	0.3
15	31	6.9
16	3	0.7
17	1	0.3
18	1	0.2
20	31	6.9
24	1	0.1
25	11	2.4
28	20	4.5
Catfish harvested in a typical day of catfish		
0	45	11.1
1	28	7.0
2	56	14.0
3	53	13.1
4	25	6.3
5	44	10.9
6	27	6.6
7	8	2.0
8	18	4.4
9	1	0.2
10	42	10.4
12	13	3.2
15	16	4.0
18	1	0.3
20	18	4.5
23	1	0.2
25	8	1.9

Table 15. Frequency and percentage of catfish anglers reporting the size of catfish they typically catch adjusted for nonresponse bias.

Length range of catfish caught	Frequency	Percent
Less than 10 in.	20	4.4
10-15 in.	196	42.7
16-20 in.	181	39.4
21-25 in.	49	10.6
26-30 in.	11	2.5
31-35 in.	2	0.4
Greater than 35 in.	0	0.0

Table 16. Frequency and percentage of catfish anglers reporting the level of importance they place on fishing compared to other outdoor activities, and the level of importance they place on catfishing compared to other fishing activities adjusted for nonresponse bias.

Variable	Frequency	Percent
Fishing v. other outdoor activities:		
Most important	243	44.7
Second most	182	33.4
Third most	79	14.5
None of the above	40	7.3
Catfishing v. other species fishing:		
Most important	118	25.6
Second most	173	37.3
Third most	131	28.3
None of the above	40	8.7

Table 17. Frequency and percentage of catfish anglers reporting the seasons in which they fished for catfish in Texas in the previous 12 months adjusted for nonresponse bias.

Seasons fished	Frequency	Percent
March – May	356	74.3
June – August	315	65.7
Sept – Nov	146	30.5
Dec – Feb	211	44.1

Table 18. Frequency and percentage of catfish anglers reporting the they used while fishing for catfish in Texas in the previous 12 months and the method they most prefer to use while fishing for catfish adjusted for nonresponse bias.

Variable	Frequency	Percent
***Methods used catfishing*:**		
Rod and Reel	453	94.2
Trotlines	129	27.1
Limb lines	64	13.5
Jug lines	126	26.3
Other methods	3	0.7
***Methods used most often catfishing*:**		
Rod and Reel	372	81.3
Trotlines	41	9.0
Limb lines	11	2.5
Jug lines	33	7.2
Other Methods	0	0.0

Table 19. Frequency and percentage of catfish anglers reporting their opinions on which methods of taking catfish should be legal in the state of Texas adjusted for nonresponse bias.

Variable	Frequency	Percent
Currently legal:		
Rod and Reel		
Allow	448	97.6
Not allow	1	0.1
No opinion	10	2.3
Trot lines		
Allow	342	77.8
Not allow	64	14.6
No opinion	33	7.6
Jug lines		
Allow	327	75.0
Not allow	61	14.0
No opinion	48	11.0
Limb lines		
Allow	275	64.8
Not allow	80	18.8
No opinion	70	16.4
Currently Illegal:		
Hand-fishing / Grabbling / Noodling		
Allow	169	39.3
Not allow	135	31.6
No opinion	125	29.2
Bowfishing		
Allow	151	35.1
Not allow	158	36.6
No opinion	122	28.3

Table 20 Frequency and percentage of catfish anglers reporting their monetary invest in rods and reels adjusted for nonresponse bias.

Investment in rods & reels ($)	Frequency	Percent
0	33	6.9
20	4	0.7
25	1	0.3
30	5	1.1
35	2	0.4
38	1	0.2
39	1	0.2
40	8	1.7
45	1	0.1
50	14	2.9
60	4	0.9
70	6	1.2
75	3	0.7
80	5	1.0
100	61	12.6
110	1	0.3
120	3	0.6
125	1	0.2
129	1	0.2
130	1	0.1
150	30	6.2
175	3	0.6
180	3	0.7
200	70	14.5
220	3	0.5
250	21	4.2
300	66	13.5
350	5	1.0
400	30	6.3
450	1	0.2
500	32	6.7
600	9	1.9
650	1	0.2
660	1	0.2
700	2	0.4
750	4	0.8
800	8	1.6
900	1	0.2
1,000 +	39	8.1

Table 21. Frequency and percentage of catfish anglers reporting their monetary invest in fishing tackle (hooks, weights, line, etc.) adjusted for nonresponse bias.

Investment in tackle ($)	Frequency	Percent
0	32	6.6
5	1	0.2
10	8	1.7
15	10	2.1
20	30	6.3
25	26	5.5
30	22	4.6
35	1	0.1
40	10	2.0
45	1	0.2
50	68	14.0
60	9	1.9
70	2	0.4
75	17	3.5
80	3	0.6
85	2	0.4
90	1	0.1
100	86	17.9
125	2	0.5
130	1	0.1
140	1	0.3
148	1	0.2
150	23	4.7
165	1	0.2
180	3	0.7
200	37	7.6
250	10	2.1
300	30	6.2
350	2	0.4
400	9	1.8
500 +	36	7.4

Table 22. Frequency and percentage of catfish anglers reporting their monetary invest in electronic equipment (depth finders, GPS, etc.) adjusted for nonresponse bias.

Investment in electronics ($)	Frequency	Percent
0	262	54.4
10	2	0.4
45	1	0.1
60	2	0.4
75	1	0.2
80	5	0.9
90	1	0.2
100	10	2.0
125	1	0.2
130	1	0.3
150	18	3.7
175	1	0.1
180	1	0.2
200	31	6.4
250	16	3.4
300	23	4.7
350	2	0.5
375	1	0.1
400	17	3.6
425	1	0.2
450	2	0.4
500	15	3.1
550	1	0.2
600	11	2.3
650	1	0.2
700	3	0.6
750	2	0.3
800	8	1.7
900	2	0.5
1,000	19	3.9
1,100	5	1.0
1,200	2	0.3
1,250	1	0.1
1,500 +	16	3.4

Table 23. Frequency and percentage of catfish anglers reporting their monetary invest in boats, motors, and trailers adjusted for nonresponse bias.

Investment in boats ($)	Frequency	Percent
0	199	41.3
6	2	0.4
100	1	0.1
179	1	0.3
300	1	0.2
350	2	0.4
500	2	0.5
600	1	0.2
750	2	0.4
1,000	3	0.7
1,200	1	0.2
1,500	12	2.6
1,800	2	0.5
2,000	6	1.2
2,500	12	2.4
2,700	3	0.7
2,900	1	0.1
3,000	7	1.4
3,500	2	0.3
3,600	1	0.2
4,000	20	4.1
4,500	1	0.2
5,000	25	5.2
5,500	1	0.2
6,000	14	2.9
6,500	2	0.5
7,000	7	1.5
7,500	5	1.0
8,000	8	1.7
8,500	2	0.5
9,000	5	0.9
9,500	1	0.2
10,000	22	4.7
11,000	1	0.3
12,000	8	1.7
13,000	1	0.2
14,000	1	0.2
15,000	20	4.1
16,000	2	0.4
17,000	3	0.5
17,500	1	0.1
18,000	6	1.3
20,000 +	67	14.0

Table 24. Frequency and percentage of catfish anglers by their level of agreement with four attitude statements related to 'Catching Something' adjusted for nonresponse bias.

Attitude item	Frequency	Percent
A fishing trip can be successful even if no fish are caught		
Strongly disagree	20	4.3
Disagree	42	9.1
Neutral	42	9.1
Agree	224	48.4
Strongly agree	135	29.2
If I thought I wouldn't catch any fish, I wouldn't go fishing		
Strongly disagree	86	18.5
Disagree	178	38.5
Neutral	69	14.9
Agree	93	20.0
Strongly agree	37	8.1
When I go fishing, I'm not satisfied unless I catch something		
Strongly disagree	63	13.6
Disagree	188	40.5
Neutral	94	20.4
Agree	85	18.3
Strongly agree	33	7.2
When I go fishing, I'm just as happy if I don't catch fish		
Strongly disagree	25	5.5
Disagree	127	24.4
Neutral	125	27.1
Agree	144	31.2
Strongly agree	41	8.9

Table 25. Frequency and percentage of catfish anglers by their level of agreement with four attitude statements related to 'Catching Numbers' adjusted for nonresponse bias.

Attitude item	Frequency	Percent
The more fish I catch, the happier I am		
Strongly disagree	10	2.2
Disagree	55	11.9
Neutral	71	15.2
Agree	180	39.0
Strongly agree	147	31.7
A successful fishing trip is one in which many fish are caught		
Strongly disagree	16	3.4
Disagree	126	27.3
Neutral	105	22.7
Agree	148	31.9
Strongly agree	68	14.7
A full stringer is the best indicator of a good fishing trip		
Strongly disagree	38	8.3
Disagree	187	40.4
Neutral	104	22.4
Agree	98	21.1
Strongly agree	36	7.9
I'm happiest with a fishing trip if I catch at least the limit		
Strongly disagree	41	8.9
Disagree	181	39.2
Neutral	112	24.3
Agree	87	18.8
Strongly agree	41	8.9

Table 26. Frequency and percentage of catfish anglers by their level of agreement with four attitude statements related to 'Catching Large Fish' adjusted for nonresponse bias.

Attitude item	Frequency	Percent
I would rather catch 1 or 2 big fish than 10 smaller fish		
Strongly disagree	16	3.5
Disagree	148	32.1
Neutral	142	30.6
Agree	115	24.8
Strongly agree	42	9.0
The bigger the fish I catch, the better the fishing trip		
Strongly disagree	29	6.2
Disagree	125	27.0
Neutral	132	28.4
Agree	127	27.5
Strongly agree	51	10.9
I'm happiest with the fishing trip if I catch a challenging game fish		
Strongly disagree	8	1.7
Disagree	60	13.1
Neutral	117	25.2
Agree	204	44.1
Strongly agree	74	16.0
I like to fish where I know I have a chance of catching a "trophy" fish		
Strongly disagree	13	2.9
Disagree	124	26.7
Neutral	134	29.0
Agree	149	32.1
Strongly agree	43	9.3

Table 27. Frequency and percentage of catfish anglers by their level of agreement with four attitude statements related to 'Retaining Fish' adjusted for nonresponse bias.

Attitude item	Frequency	Percent
I usually eat the fish I catch		
Strongly disagree	16	3.5
Disagree	70	15.1
Neutral	54	11.8
Agree	144	31.1
Strongly agree	178	38.5
I'm just as happy if I don't keep the fish I catch		
Strongly disagree	17	3.6
Disagree	76	16.4
Neutral	76	16.3
Agree	223	48.1
Strongly agree	72	15.6
I want to keep all the fish I catch		
Strongly disagree	119	25.8
Disagree	238	51.3
Neutral	51	11.0
Agree	45	9.7
Strongly agree	10	2.2
I'm just as happy if I release the fish I catch		
Strongly disagree	16	3.4
Disagree	69	14.9
Neutral	95	20.6
Agree	195	42.1
Strongly agree	85	19.1

Table 28. Frequency and percentage of catfish anglers by their level of agreement with statements related to their fishing site preferences regarding 'Amenities 1' adjusted for nonresponse bias.

Preference item	Frequency	Percent
Fishing where you can rent or buy fishing equipment		
Strongly disagree	44	9.5
Disagree	125	27.3
Neutral	211	46.0
Agree	67	14.5
Strongly agree	12	2.7
Fishing where piers or jetties are available		
Strongly disagree	10	2.1
Disagree	65	14.1
Neutral	182	39.6
Agree	172	37.4
Strongly agree	31	6.8
Fishing where picnic tables are available		
Strongly disagree	15	3.3
Disagree	93	20.1
Neutral	215	46.6
Agree	117	25.5
Strongly agree	21	4.5
Fishing where fishing guides are available for hire		
Strongly disagree	61	13.3
Disagree	128	27.5
Neutral	231	49.8
Agree	33	7.2
Strongly agree	10	2.2
Fishing where boat rentals are available		
Strongly disagree	47	10.1
Disagree	134	28.9
Neutral	228	49.2
Agree	44	9.5
Strongly agree	11	2.3

Table 29. Frequency and percentage of catfish anglers by their level of agreement with statements related to their fishing site preferences regarding 'Escape' adjusted for nonresponse bias.

Preference item	Frequency	Percent
Fishing where you cannot heat or see busy traffic		
Strongly disagree	5	1.0
Disagree	24	5.2
Neutral	108	23.4
Agree	204	44.0
Strongly agree	122	26.4
Fishing where you don't have to see too many other people		
Strongly disagree	4	0.8
Disagree	35	7.6
Neutral	124	26.9
Agree	220	47.4
Strongly agree	80	17.3
Fishing where you feel far away from other people and cities		
Strongly disagree	3	0.6
Disagree	47	10.3
Neutral	130	28.2
Agree	195	42.3
Strongly agree	87	18.8

Table 30. Frequency and percentage of catfish anglers by their level of agreement with statements related to their fishing site preferences regarding 'Amenities 2' adjusted for nonresponse bias.

Preference item	Frequency	Percent
Fishing where there are other recreational opportunities available for the rest of the family to enjoy		
Strongly disagree	14	3.0
Disagree	42	9.1
Neutral	119	25.7
Agree	221	47.8
Strongly agree	66	14.4
Fishing where boat launches are available		
Strongly disagree	19	4.2
Disagree	47	10.3
Neutral	110	23.8
Agree	178	38.7
Strongly agree	106	23.0
Fishing where restrooms are available		
Strongly disagree	16	3.4
Disagree	53	11.6
Neutral	143	31.3
Agree	178	38.8
Strongly agree	68	14.8

Table 31. Frequency and percentage of catfish anglers by their level of agreement with statements related to their fishing site preferences regarding 'Convenience' adjusted for nonresponse bias.

Preference item	Frequency	Percent
Fishing where you do not have to walk for more than 15 minutes		
Strongly disagree	17	3.7
Disagree	65	14.0
Neutral	170	36.7
Agree	154	33.2
Strongly agree	57	12.4
Fishing waters close to home		
Strongly disagree	5	1.1
Disagree	24	5.3
Neutral	110	23.8
Agree	240	51.8
Strongly agree	83	18.0
Fishing an area that is free of litter		
Strongly disagree	5	1.0
Disagree	4	0.9
Neutral	28	6.0
Agree	135	29.3
Strongly agree	289	62.8

Table 32. Frequency and percentage of catfish anglers by their level of satisfaction with freshwater fishing and catfishing in Texas adjusted for nonresponse bias.

Level of satisfaction	Frequency	Percent
Overall satisfaction with freshwater fishing in TX		
Not at all	9	2.0
Slightly	21	4.4
Moderately	138	29.8
Very	237	51.1
Extremely	59	12.7
Overall satisfaction with catfishing in TX		
Not at all	8	1.7
Slightly	20	4.4
Moderately	149	32.0
Very	232	49.9
Extremely	56	12.1
The number of eating size catfish caught		
Not at all	16	3.4
Slightly	46	9.9
Moderately	142	30.8
Very	216	46.7
Extremely	43	9.2
The number of trophy size catfish caught		
Not at all	53	11.5
Slightly	87	18.8
Moderately	173	37.4
Very	128	27.6
Extremely	22	4.7
The average size of catfish caught		
Not at all	12	2.5
Slightly	47	10.2
Moderately	176	38.0
Very	198	42.9
Extremely	29	6.4
The number of catfish I am allowed to harvest		
Not at all	6	1.4
Slightly	22	4.7
Moderately	123	26.7
Very	248	53.7
Extremely	62	13.5

Table 32. Continued

The size of catfish I am allowed to harvest		
Not at all	8	1.7
Slightly	25	5.4
Moderately	125	27.1
Very	239	51.9
Extremely	64	14.0

Table 33. Frequency and percentage of catfish anglers by their level of satisfaction with freshwater fishing and catfishing sites in Texas adjusted for nonresponse bias.

Level of satisfaction	Frequency	Percent
Overall satisfaction with the places you go fresh-water fishing in TX		
Not at all	6	1.4
Slightly	21	4.5
Moderately	146	31.9
Very	217	47.3
Extremely	68	14.9
Overall satisfaction with the places you go catfishing in TX		
Not at all	7	1.6
Slightly	20	4.3
Moderately	150	32.6
Very	215	46.8
Extremely	67	14.6
The availability of catfish fishing spots in your area		
Not at all	16	3.4
Slightly	47	10.1
Moderately	136	29.7
Very	201	43.8
Extremely	60	13.1
The number of people in the areas you fished for catfish		
Not at all	9	2.1
Slightly	58	12.7
Moderately	213	46.9
Very	145	31.9
Extremely	29	6.5
The amenities in the areas you fished for catfish		
Not at all	13	2.8
Slightly	56	12.2
Moderately	195	42.5
Very	164	35.7
Extremely	31	6.8
The cleanliness of the areas you fished for catfish		
Not at all	13	2.7
Slightly	69	15.0
Moderately	169	36.8
Very	174	37.9
Extremely	35	7.6

Table 33. Continued

The availability of other activities where you fished for catfish		
Not at all	11	2.5
Slightly	47	10.3
Moderately	198	43.2
Very	173	37.7
Extremely	29	6.3
The services in the areas you fished for catfish		
Not at all	23	5.0
Slightly	77	17.0
Moderately	200	44.1
Very	130	28.7
Extremely	23	5.1

APPENDIX E

ABBREVIATED FREQUENCY TABLES AND MEANS FOR ATTITUDE CLUSTERS AND SIGNIFICANT GROUP DIFFERENCES

Table 1. Mean and median values for years of freshwater and catfish angling experience and days fishing in the previous year in freshwater and for catfish overall and on particular types of waters adjusted for nonresponse bias; overall and by attitude cluster. Statistically significant differences between cluster means were determined by ANOVA and Tukey's multiple comparisons tests at the $\alpha = 0.05$ level.

Variable	Attitude Cluster 1	2	3	4	Overall	p-value
Years fishing	34.9 (35) [ab]	33.7 (35) [ab]	38.2 (40) [a]	31.4 (30) [b]	34.9 (35)	<.001
Years catfishing	27.2 (25) [ab]	28.3 (28) [ab]	32.3 (32) [a]	26.6 (25) [b]	28.8 (30)	.018
Days fishing	31.7 (25)	23.4 (14)	27.9 (15)	30.5 (24)	28.4 (20)	.173
Days catfishing	24.1 (20)	18.8 (14)	19.6 (12)	22.3 (16)	20.6 (15)	.215
Private farm ponds or stock tanks	3.8 (0) [a]	2.7 (0) [ab]	1.5 (0) [b]	2.3 (0) [ab]	2.4 (0)	.012
Stocked ponds in public community or city parks	1.4 (0) [ab]	0.2 (0) [b]	0.6 (0) [ab]	1.7 (0) [a]	1.0 (0)	.035
Lakes/reservoirs from boat	10.0 (3)	6.9 (3)	8.6 (3)	7.5 (3)	8.1 (3)	.303
Lakes/reservoirs from shore or pier	4.8 (0)	5.6 (0)	4.8 (0)	5.7 (0)	5.0 (0)	.835
Rivers/streams from boat	2.1 (0)	1.3 (0)	1.9 (0)	2.0 (0)	1.8 (0)	.616
Rivers/streams from shore or pier	2.0 (0)	2.0 (0)	2.1 (0)	3.0 (0)	2.2 (0)	.415
Other						
Nights fishing for catfish	6.1 (1)	5.9 (2)	6.4 (2)	6.8 (2)	6.1 (2)	.907

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers.

Table 2. Level of respondent confidence in their ability to identify channel, blue, and flathead catfish adjusted for nonresponse bias; overall and by attitude cluster. Statistically significant differences in frequency distributions between clusters were determined by χ^2 tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Variable	1	2	3	4	Overall	p-value
Channel catfish						<.001
Not at all confident	9.0	11.3	4.2	6.1	7.4	
Moderately confident	23.6	10.8	23.6	19.1	20.2	
Very confident	67.4	77.9	72.2	74.8	72.4	
Blue catfish						<.001
Not at all confident	8.5	13.3	5.6	4.0	7.6	
Moderately confident	24.1	13.9	21.4	24.5	21.7	
Very confident	67.4	72.8	73.0	71.6	70.8	
Flathead catfish						<.001
Not at all confident	16.1	14.7	8.5	5.8	10.9	
Moderately confident	26.0	13.6	23.4	23.4	22.4	
Very confident	57.9	71.7	68.1	70.8	66.7	

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 3. Percentage of catfish anglers reporting the species of catfish they have caught in the last two years and the species they most prefer to catch adjusted for nonresponse bias; overall and by attitude cluster. Statistically significant differences in frequency distributions between clusters were determined by χ^2 tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Variable	1	2	3	4	Overall	p-value
Species caught						
Channel catfish	85.6	83.1	90.3	89.2	85.4	<.001
Flathead catfish	31.7	42.0	34.4	40.2	36.0	<.001
Blue catfish	66.7	54.6	73.4	66.7	65.1	<.001
Species most preferred						.003
Channel catfish	50.2	44.9	51.6	56.6	50.6	
Flathead catfish	11.3	14.2	11.9	12.6	12.1	
Blue catfish	38.6	40.9	36.6	30.9	35.1	
Other					2.1	

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 4. Mean (median) responses of catfish anglers reporting what they consider to be the minimum length a channel, blue, or flathead catfish must be to be considered eating-size or trophy-size adjusted for nonresponse bias; overall and by attitude cluster. Statistically significant differences between cluster means were determined by ANOVA and Tukey's multiple comparisons tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Variable	1	2	3	4	Overall	p-value
Blue catfish						
Eating-size length	14.7 (14) [a]	14.6 (14) [a]	14.4 (14) [a]	15.8 (16) [b]	14.9 (15)	.002
Trophy length	30.8 (30)	29.4 (30)	28.8 (30)	31.9 (30)	30.3 (30)	.107
Flathead catfish						
Eating-size length	16.4 (16)	17.0 (18)	17.1 (18)	17.3 (18)	17.0 (18)	.536
Trophy length	33.4 (30)[ab]	29.5 (30) [a]	33.1 (30)[ab]	34.2 (36) [b]	32.9 (30)	.048
Channel catfish						
Eating-size length	14.1 (14) [a]	14.7 (14) [ab]	13.9 (14) [a]	15.1 (14) [b]	14.4 (14)	.002
Trophy length	28.6 (27)	27.4 (25)	27.1 (25)	30.3 (30)	28.5 (28)	.050

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 5. Mean (median) responses of catfish anglers reporting the number and size of catfish they catch and harvest in a typical day of catfishing adjusted for nonresponse bias; overall and by attitude cluster. Statistically significant differences between cluster means were determined by ANOVA and Tukey's multiple comparisons tests at the $\alpha = 0.05$ level. Significant differences in frequency distributions between clusters were determined by χ^2 tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Variable	1	2	3	4	Overall	p-value
Catfish caught	9.5 (8)	8.7 (6)	10.0 (8)	8.0 (5)	9.1 (6)	.105
Catfish harvested	5.6 (4) [ab]	5.8 (5) [ab]	7.7 (5) [a]	4.2 (3) [b]	5.9 (4)	<.001
Length range of catfish caught						<.001
Less than 10 in.	7.5	4.7	4.5	1.7	4.4	
10-15 in.	47.6	53.3	39.2	35.7	42.7	
16-20 in.	34.6	30.0	43.2	45.2	39.4	
21-25 in.	6.7	8.1	9.3	16.8	10.6	
26-30 in.	3.6	4.0	3.9	0.6	2.9	
31-35 in.	0.0	0.0	0.0	0.0	0.0	
36-40 in.	0.0	0.0	0.0	0.0	0.0	
36-40 in.	0.0	0.0	0.0	0.0	0.0	
Greater than 40 in.	0.0	0.0	0.0	0.0	0.0	

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 6. Percentage of catfish anglers reporting the level of importance they place on fishing compared to other outdoor activities, and the level of importance they place on catfishing compared to other fishing activities adjusted for nonresponse bias; overall and by attitude cluster. Statistically significant differences in frequency distributions between clusters were determined by χ^2 tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Variable	1	2	3	4	Overall	p-value
Fishing v. other outdoor activities:						<.001
Most important	44.8	51.0	43.1	56.8	44.7	
Second most	42.3	23.5	41.3	30.1	33.4	
Third most	9.5	19.7	11.7	10.1	14.5	
None of the above	3.4	5.8	3.9	3.1	7.3	
Catfishing v. other species fishing:						<.001
Most important	21.1	28.3	33.5	19.3	25.6	
Second most	41.9	31.7	37.3	38.0	37.3	
Third most	28.1	31.6	23.1	32.2	28.3	
None of the above	8.9	8.4	6.1	10.5	8.7	

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 7. Percentage of catfish anglers reporting the seasons in which they fished for catfish in Texas in the previous 12 months adjusted for nonresponse bias; overall and by attitude cluster. Statistically significant differences in frequency distributions between clusters were determined by χ^2 tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Variable	1	2	3	4	Overall	p-value
Seasons fished						
March – May	81.5	74.4	79.2	69.6	74.3	<.001
June – August	68.4	70.8	61.9	69.2	65.7	<.001
Sept – Nov	25.6	28.3	32.4	37.6	30.5	<.001
Dec – Feb	45.3	47.7	40.4	49.2	44.1	.002

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 8. Percentage of catfish anglers reporting the methods they used while fishing for catfish in Texas in the previous 12 months and the method they most prefer to use while fishing for catfish adjusted for nonresponse bias; overall and by attitude cluster. Statistically significant differences in frequency distributions between clusters were determined by χ^2 tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Variable	1	2	3	4	Overall	p-value
***Methods used catfishing*:**						
Rod and Reel	96.3	95.9	95.2	98.6	94.2	.001
Trotlines	26.1	28.9	33.0	23.0	27.1	<.001
Limb lines	10.5	16.6	16.2	12.2	13.5	<.001
Jug lines	20.8	28.0	34.6	23.3	26.3	<.001
Other methods	0.5	0.0	1.9	0.0	0.7	<.001
***Methods used most often catfishing*:**						<.001
Rod and Reel	85.6	76.4	73.8	89.6	81.3	
Trotlines	8.9	7.9	12.9	5.2	9.0	
Limb lines	2.3	1.1	2.9	3.2	2.5	
Jug lines	3.2	14.6	10.4	2.0	7.2	
Other Methods	0.0	0.0	0.0	0.0	0.0	

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 9. Percentage of catfish anglers reporting their opinions on which methods of taking catfish should be legal in the state of Texas adjusted for nonresponse bias; overall and by attitude cluster. Statistically significant differences in frequency distributions between clusters were determined by χ^2 tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Variable	1	2	3	4	Overall	p-value
Currently legal:						
Rod and Reel						
Allow	97.9	96.7	98.9	96.4	97.6	<.001
Not allow	0.6	0.0	0.0	0.0	0.1	
No opinion	1.5	3.3	1.1	3.6	2.3	
Trot lines						
Allow	76.4	83.0	82.8	70.3	77.8	<.001
Not allow	13.1	10.2	12.3	20.6	14.6	
No opinion	10.5	6.8	4.9	9.0	7.6	
Jug lines						
Allow	73.8	66.8	80.8	75.9	75.0	<.001
Not allow	13.5	20.6	9.4	14.5	14.0	
No opinion	12.7	12.6	9.9	9.6	11.0	
Limb lines						
Allow	61.0	60.3	69.8	65.3	64.8	<.001
Not allow	20.6	20.2	14.8	20.6	18.8	
No opinion	18.3	19.5	15.4	14.1	16.4	
Currently Illegal:						
Hand-fishing / Grabbling / Noodling						
Allow	24.0	51.0	39.5	42.1	39.3	<.001
Not allow	38.3	18.8	34.0	33.6	31.6	
No opinion	37.7	30.2	26.5	24.4	29.2	
Bowfishing						
Allow	25.8	37.1	38.3	37.3	35.1	<.001
Not allow	41.8	28.3	36.9	38.6	36.6	
No opinion	32.4	34.6	24.8	24.1	28.3	

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 10. Mean and median values reported by catfish anglers for their monetary invest in fishing related equipment adjusted for nonresponse bias; overall and by attitude cluster. Statistically significant differences between cluster means were determined by ANOVA and Tukey's multiple comparisons tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Variable	1	2	3	4	Overall	p-value
Rods and Reels	300.0 (200)	258.6 (200)	310.9 (250)	322.8 (200)	293.6 (200)	.437
Tackle	131.4 (80)	132.8 (100)	135.7 (100)	133.7 (75)	129.6 (90)	.380
Electronic equipment	262.7 (0)	178.7 (0)	202.4 (0)	283.3 (80)	226.0 (0)	.996
Boat, motor, and trailer	6121.4 (2000)	6542.6 (3500)	6762.5 (3000)	7988.3 (3000)	6686.1 (2500)	.126
Total	6815.5 (2400)	7112.7 (4350)	7411.4 (3500)	8728.1 (4050)	7329.3 (3050)	.442

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 11. Average summated score for the Catching Something attitude construct, and the percentage of respondents that agreed or disagreed with each construct item; overall and by attitude cluster. Statistically significant differences between cluster construct scores were determined by ANOVA and Tukey's multiple comparisons tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Catching something	1	2	3	4	Overall	p-value
Summated score	7.6 (8) [a]	14.9 (14) [b]	11.4 (11) [c]	7.9 (8) [a]	10.3 (10)	<.001
A fishing trip can be successful even if no fish are caught*						
Strongly disagree	45.0	3.1	17.7	47.1	29.2	
Disagree	50.6	37.6	52.6	49.1	48.4	
Neutral	0.7	19.1	15.1	2.4	9.1	
Agree	0.9	29.2	10.9	1.4	9.1	
Strongly agree	2.9	13.1	3.6	0.0	4.3	
If I thought I wouldn't catch any fish, I wouldn't go fishing						
Strongly disagree	30.7	2.5	9.7	29.2	18.5	
Disagree	55.5	5.5	32.5	54.1	38.5	
Neutral	7.6	21.0	21.9	8.8	14.9	
Agree	5.5	41.6	29.3	6.8	20.0	
Strongly agree	0.7	29.4	6.6	1.2	8.1	
When I go fishing, I'm not satisfied unless I catch at least something						
Strongly disagree	27.7	0.0	2.3	23.7	13.6	
Disagree	61.4	4.9	33.2	55.7	40.5	
Neutral	6.0	17.1	37.9	15.2	20.4	
Agree	4.8	48.5	23.2	3.2	18.3	
Strongly agree	0.0	29.4	3.4	2.2	7.2	
When I go fishing, I'm just as happy if I don't catch fish*						
Strongly disagree	18.1	0	0.6	16.4	8.9	
Disagree	55.7	3.0	16.9	46.1	31.2	
Neutral	14.9	26.7	38.3	25.2	27.1	
Agree	11.2	52.6	38.4	11.2	24.4	
Strongly agree	0.0	17.7	5.9	1.1	5.5	

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 12. Average summated score for the Catching Numbers attitude construct by catfish angler cluster, and the percentage of respondents that agreed or disagreed with each construct item; overall and by attitude cluster. Statistically significant differences between cluster construct scores were determined by ANOVA and Tukey's multiple comparisons tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Catching numbers	1	2	3	4	Overall	p-value
Summated score	9.7 (10) [a]	15.5 (16) [b]	13.8 (14) [c]	12.3 (12) [d]	12.7 (13)	<.001
The more fish I catch, the happier I am						
Strongly disagree	5.4	2.1	0.5	1.3	2.2	
Disagree	31.4	1.7	4.3	10.8	11.9	
Neutral	19.9	4.7	18.9	14.4	15.2	
Agree	35.3	37.9	44.5	36.6	39.0	
Strongly agree	8.0	53.7	31.9	37.0	31.7	
A successful fishing trip is one in which many fish are caught						
Strongly disagree	7.4	0.8	0.5	5.2	3.4	
Disagree	60.5	7.7	15.0	26.0	27.3	
Neutral	16.4	10.6	32.1	26.3	22.7	
Agree	13.0	42.9	38.5	33.0	31.9	
Strongly agree	2.7	38.1	13.9	9.5	14.7	
A full stringer is the best indicator of a good fishing trip						
Strongly disagree	17.2	1.8	2.8	11.4	8.3	
Disagree	64.4	17.0	26.9	51.3	40.3	
Neutral	14.2	23.3	31.7	18.2	22.4	
Agree	4.3	40.4	32.4	9.3	21.1	
Strongly agree	0.0	17.6	6.2	9.8	7.9	
I'm happiest with a fishing trip if I catch at least the limit						
Strongly disagree	17.5	5.4	1.8	11.9	8.9	
Disagree	64.9	18.1	32.4	39.2	39.2	
Neutral	10.2	26.3	28.6	30.3	24.3	
Agree	5.8	27.3	28.7	12.8	18.8	
Strongly agree	1.7	22.9	8.5	5.8	8.9	

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 13. Average summated score for the Catching Large Fish attitude construct by catfish angler cluster, and the percentage of respondents that agreed or disagreed with each construct item; overall and by attitude cluster. Statistically significant differences between cluster construct scores were determined by ANOVA and Tukey's multiple comparisons tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Catching large fish	1	2	3	4	Overall	p-value
Summated score	10.2 (10) [a]	15.6 (16) [b]	11.9 (12) [c]	14.7 (14) [d]	12.9 (13)	<.001
I would rather catch 1 or 2 big fish than 10 smaller fish						
Strongly disagree	5.6	0.0	5.2	2.3	3.5	
Disagree	54.1	16.4	41.8	12.4	32.1	
Neutral	27.6	24.1	36.7	30.8	30.6	
Agree	11.6	38.0	15.8	37.6	24.8	
Strongly agree	1.1	21.5	0.5	16.9	9.0	
The bigger the fish I catch, the better the fishing trip						
Strongly disagree	16.6	2.5	5.9	0.0	6.2	
Disagree	55.1	1.2	29.3	17.8	27.0	
Neutral	23.7	10.7	37.9	34.2	28.4	
Agree	4.6	50.6	24.5	34.8	27.5	
Strongly agree	0	35.0	2.4	13.2	10.9	
I'm happiest with the fishing trip if I catch a challenging game fish						
Strongly disagree	4.2	0.0	2.2	0.0	1.7	
Disagree	29.6	0.9	18.3	1.1	13.1	
Neutral	30.4	16.4	30.1	21.2	25.2	
Agree	29.4	64.4	38.3	49.4	44.1	
Strongly agree	6.4	18.3	11.1	28.3	16.0	
I like to fish where I know I have a chance of catching a "trophy" fish						
Strongly disagree	7.1	1.8	2.9	0.0	2.9	
Disagree	53.2	6.8	31.1	12.6	26.7	
Neutral	25.3	21.1	36.4	29.2	29.0	
Agree	13.1	51.9	26.3	41.5	32.1	
Strongly agree	1.4	18.4	3.3	16.7	9.3	

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 14. Average summated score for the Retaining Fish attitude construct by catfish angler cluster, and the percentage of respondents that agreed or disagreed with each construct item; overall and by attitude cluster. Statistically significant differences between cluster construct scores were determined by ANOVA and Tukey's multiple comparisons tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Retaining fish	1	2	3	4	Overall	p-value
Summated score	10.0 (10) [a]	11.1 (11) [b]	13.4 (13) [c]	8.4 (8) [d]	10.8 (11)	<.001
I usually eat the fish I catch						
Strongly disagree	3.1	5.0	0.0	6.9	3.5	
Disagree	8.4	16.8	1.0	36.0	15.1	
Neutral	10.8	16.3	6.5	15.4	11.8	
Agree	47.7	25.8	34.7	16.2	31.1	
Strongly agree	30.1	36.1	57.8	25.4	38.5	
I'm just as happy if I don't keep the fish I catch*						
Strongly disagree	14.0	13.2	2.8	33.3	15.6	
Disagree	68.3	48.0	26.0	55.8	48.1	
Neutral	12.1	14.7	25.8	10.3	16.3	
Agree	4.5	16.8	39.0	0.6	16.4	
Strongly agree	1.2	7.3	6.3	0.0	3.6	
I want to keep all the fish I catch						
Strongly disagree	24.6	30.6	7.5	44.4	25.8	
Disagree	64.7	43.0	47.6	49.8	51.3	
Neutral	6.8	5.3	23.0	4.9	11.0	
Agree	3.3	17.1	18.5	0.0	9.7	
Strongly agree	0.7	4.0	3.5	0.9	2.2	
I'm just as happy if I release the fish I catch*						
Strongly disagree	23.6	12.3	2.5	39.3	19.1	
Disagree	53.8	41.6	30.2	45.7	42.1	
Neutral	17.6	21.7	28.6	13.2	20.6	
Agree	4.4	17.3	32.7	1.8	14.9	
Strongly agree	0.6	7.3	6.0	0.0	3.4	

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 15. Average score for the "Amenities1" site preference construct by catfish angler cluster, and the percentage of respondents that agreed or disagreed with each construct item; overall and by attitude cluster. Statistically significant differences between cluster construct scores were determined by ANOVA and Tukey's multiple comparisons tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Amenities1	1	2	3	4	Overall	p-value
Average score	2.9 (3)	2.8 (3)	2.9 (3)	2.9 (3)	2.9 (3)	.987
Fishing where you can rent or buy fishing equipment						
Strongly disagree	6.8	12.1	9.8	9.6	9.5	
Disagree	28.8	30.3	26.5	25.4	27.3	
Neutral	45.7	37.2	49.1	48.5	46.0	
Agree	18.7	11.7	12.6	15.5	14.5	
Strongly agree	0.0	8.6	2.1	1.0	2.7	
Fishing where piers or jetties are available						
Strongly disagree	3.8	2.9	1.0	0.7	2.1	
Disagree	9.9	21.1	17.0	10.6	14.1	
Neutral	45.7	33.2	37.9	38.9	39.6	
Agree	37.8	34.0	38.3	39.9	37.4	
Strongly agree	2.8	8.8	5.8	9.8	6.8	
Fishing where picnic tables are available						
Strongly disagree	3.3	3.1	1.5	5.1	3.3	
Disagree	17.4	26.4	21.5	18.0	20.1	
Neutral	52.3	39.6	44.5	48.0	46.6	
Agree	24.9	21.6	29.7	24.5	25.5	
Strongly agree	2.2	9.4	2.9	4.6	4.5	
Fishing where fishing guides are available for hire						
Strongly disagree	9.8	17.0	13.8	12.8	13.3	
Disagree	28.6	23.5	30.4	28.3	27.5	
Neutral	57.5	49.1	45.0	50.2	49.8	
Agree	4.2	7.0	8.0	6.9	7.2	
Strongly agree	0.0	3.5	2.9	1.8	2.2	
Fishing where boat rentals are available						
Strongly disagree	9.4	11.2	8.5	11.7	10.1	
Disagree	27.6	28.5	28.8	32.1	28.9	
Neutral	51.6	51.7	46.8	46.4	49.2	
Agree	10.4	5.1	12.6	9.0	9.5	
Strongly agree	1.0	3.5	3.3	0.9	2.3	

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 16. Average score for the "Escape" site preference construct by catfish angler cluster, and the percentage of respondents that agreed or disagreed with each construct item; overall and by attitude cluster. Statistically significant differences between cluster construct scores were determined by ANOVA and Tukey's multiple comparisons tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Escape	1	2	3	4	Overall	p-value
Average score	3.6 (4) [a]	4.0 (4) [c]	3.7 (4) [ab]	3.9 (4) [bc]	3.8 (4)	.001
Fishing where you cannot heat or see busy traffic						
Strongly disagree	1.4	0.0	1.0	1.5	1.0	
Disagree	4.2	4.8	6.9	4.0	5.2	
Neutral	30.6	16.6	24.9	20.0	23.4	
Agree	48.0	41.0	47.0	38.6	44.0	
Strongly agree	15.9	37.6	20.2	36.0	26.4	
Fishing where you don't have to see too many other people						
Strongly disagree	1.3	0.0	0.5	1.3	0.8	
Disagree	9.5	4.9	8.3	7.5	7.6	
Neutral	33.6	23.9	25.9	23.0	26.9	
Agree	49.1	47.2	47.0	46.8	47.4	
Strongly agree	6.6	24.0	18.3	21.4	17.3	
Fishing where you feel far away from other people and cities						
Strongly disagree	0.0	0.0	0.0	1.4	0.6	
Disagree	12.7	6.0	13.5	7.4	10.3	
Neutral	33.0	23.5	29.7	24.3	28.2	
Agree	42.7	46.8	38.4	44.3	42.3	
Strongly agree	11.6	23.6	18.4	22.6	18.8	

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 17. Average score for the "Amenities 2" site preference construct by catfish angler cluster, and the percentage of respondents that agreed or disagreed with each construct item; overall and by attitude cluster. Statistically significant differences between cluster construct scores were determined by ANOVA and Tukey's multiple comparisons tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Amenities	1	2	3	4	Overall	p-value
Average score	3.7 (4)	3.6 (4)	3.6 (4)	3.5 (4)	3.6 (4)	.364
Fishing where there are other recreational opportunities available for the rest of the family to enjoy						
Strongly disagree	3.7	1.9	3.2	3.3	3.0	
Disagree	4.6	13.1	8.4	9.8	9.1	
Neutral	24.6	25.9	25.1	26.4	25.7	
Agree	52.0	44.9	47.5	48.1	47.8	
Strongly agree	15.2	14.2	15.8	12.4	14.4	
Fishing where boat launches are available						
Strongly disagree	2.4	4.1	2.8	7.7	4.2	
Disagree	9.3	11.3	12.3	8.2	10.3	
Neutral	23.4	26.7	21.5	22.6	23.8	
Agree	46.1	20.8	43.0	41.0	38.7	
Strongly agree	18.8	37.1	20.5	20.5	23.0	
Fishing where restrooms are available						
Strongly disagree	2.2	3.4	2.6	5.6	3.4	
Disagree	12.4	14.6	10.8	10.7	11.6	
Neutral	26.8	23.4	35.9	35.8	31.3	
Agree	41.8	33.3	40.4	37.7	38.8	
Strongly agree	16.9	25.4	10.3	10.2	14.8	

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 18. Average score for the "Convenience" site preference construct by catfish angler cluster, and the percentage of respondents that agreed or disagreed with each construct item; overall and by attitude cluster. Statistically significant differences between cluster construct scores were determined by ANOVA and Tukey's multiple comparisons tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Convenience	1	2	3	4	Overall	p-value
Average score	3.8 (4) [a]	4.0 (4) [b]	3.9 (4) [ab]	3.9 (4) [ab]	3.9 (4)	.041
Fishing where you do not have to walk for more than 15 minutes						
Strongly disagree	2.6	4.4	0.7	7.2	3.7	
Disagree	19.3	7.9	17.5	10.8	14.0	
Neutral	38.9	34.4	33.9	39.7	36.7	
Agree	30.2	37.1	32.7	33.5	33.2	
Strongly agree	9.1	16.2	15.2	8.8	12.4	
Fishing waters close to home						
Strongly disagree	1.7	0.0	0.0	1.8	1.1	
Disagree	8.4	3.1	5.2	4.7	5.3	
Neutral	29.2	20.5	23.3	21.8	23.8	
Agree	47.6	53.6	55.0	51.4	51.8	
Strongly agree	13.2	22.8	16.6	20.3	18.0	
Fishing an area that is free of litter						
Strongly disagree	1.7	0.0	0.6	1.8	1.0	
Disagree	0.0	0.0	2.3	0.9	0.9	
Neutral	4.5	5.7	7.6	4.7	6.0	
Agree	31.3	26.1	34.4	23.7	29.3	
Strongly agree	62.5	68.2	55.1	69.0	62.8	

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 19. Percentage of catfish anglers by their reported level of satisfaction with freshwater fishing in Texas, fishing for catfish in Texas, and various catch-related aspects of catfishing in Texas; overall and by attitude cluster. Statistically significant differences between clusters were determined by Kruskal-Wallis tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Level of satisfaction	1	2	3	4	Overall	p-value
Overall satisfaction with freshwater fishing in TX						.875
Not at all	0.8	4.8	0.0	1.4	2.0	
Slightly	3.2	3.2	6.4	4.5	4.4	
Moderately	30.3	27.9	27.0	35.1	29.8	
Very	54.5	50.0	56.7	42.9	51.1	
Extremely	11.3	14.1	9.9	16.2	12.7	
Overall satisfaction with catfishing in TX						.912
Not at all	0.8	4.8	0.0	2.2	1.7	
Slightly	4.0	4.1	7.2	2.0	4.4	
Moderately	33.3	25.8	28.1	38.7	32.0	
Very	52.4	49.0	57.7	40.3	49.9	
Extremely	9.5	16.3	7.0	17.0	12.1	
The number of eating size catfish caught						.256
Not at all	0.8	6.8	0	7.2	3.4	
Slightly	2.6	10.9	6.9	19.7	9.9	
Moderately	35.9	26.5	33.0	25.1	30.8	
Very	55.7	43.1	54.1	33.4	46.7	
Extremely	5.05	12.7	6.0	14.6	9.2	
The number of trophy size catfish caught						.163
Not at all	6.5	14.1	6.5	19.6	11.5	
Slightly	12.4	20.8	21.3	18.7	18.8	
Moderately	47.1	36.1	35.9	33.0	37.4	
Very	28.9	25.3	33.7	21.2	27.6	
Extremely	5.2	3.8	2.7	7.5	4.7	
The average size of catfish caught						.117
Not at all	0.8	6.8	1.1	2.0	2.5	
Slightly	5.2	10.0	9.7	14.5	10.2	
Moderately	39.7	38.7	33.1	42.6	38.0	
Very	48.6	40.0	50.5	32.2	42.9	
Extremely	5.7	4.6	5.6	8.7	6.4	
The number of catfish I am allowed to harvest						.456
Not at all	1.7	2.3	1.2	0.0	1.4	
Slightly	1.7	4.7	7.2	4.9	4.7	
Moderately	25.6	28.9	26.3	25.1	26.7	
Very	57.5	47.4	57.9	51.4	53.7	
Extremely	13.5	16.8	7.5	18.6	13.5	

Table 19. Continued

The size of catfish I am allowed to harvest						.664
Not at all	2.21	3.1	0.6	0.0	1.7	
Slightly	2.5	7.5	5.3	6.6	5.4	
Moderately	24.2	24.9	28.2	29.4	27.1	
Very	56.1	47.3	57.4	46.3	51.9	
Extremely	15.0	17.2	8.5	17.8	14.0	

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 20. Percentage of catfish anglers by their reported level of satisfaction with freshwater fishing sites in Texas, catfishing sites in Texas, and various aspects of catfishing sites in Texas; overall and by attitude cluster. Statistically significant differences between clusters were determined by Kruskal-Wallis tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Level of satisfaction	1	2	3	4	Overall	p-value
Overall satisfaction with the places you go fresh-water fishing in TX						<.001
Not at all	0.0	4.0	0.6	1.6	1.4	
Slightly	2.7	4.8	8.1	2.1	4.5	
Moderately	34.4	31.6	24.3	37.9	31.9	
Very	52.1	41.5	55.6	39.5	47.3	
Extremely	10.8	18.1	11.3	18.9	14.9	
Overall satisfaction with the places you go catfishing in TX						.755
Not at all	0.0	5.3	0.6	1.6	1.6	
Slightly	0.0	3.9	5.4	7.3	4.3	
Moderately	38.9	30.0	28.0	33.7	32.6	
Very	51.8	42.8	53.1	39.9	46.8	
Extremely	9.3	18.1	12.8	17.5	14.6	
The availability of catfish fishing spots in your area						.003
Not at all	1.4	5.3	1.7	5.9	3.4	
Slightly	3.1	11.1	11.3	13.2	10.1	
Moderately	34.4	32.5	30.8	22.3	29.7	
Very	46.9	38.3	46.9	42.7	43.8	
Extremely	14.2	12.8	9.2	16.0	13.1	
The number of people in the areas you fished for catfish						.021
Not at all	3.2	1.5	1.2	2.6	2.1	
Slightly	11.0	15.7	15.2	8.8	12.7	
Moderately	47.1	50.6	41.0	51.2	46.9	
Very	32.4	25.4	41.0	27.5	31.9	
Extremely	6.4	6.8	2.1	10.1	6.5	
The amenities in the areas you fished for catfish						.015
Not at all	0.7	3.5	5.3	1.6	2.8	
Slightly	13.9	13.5	10.6	11.1	12.2	
Moderately	52.8	35.6	37.7	45.3	42.5	
Very	28.0	31.6	42.4	37.5	35.7	
Extremely	4.7	15.7	4.0	4.5	6.8	

Table 20. Continued

The cleanliness of the areas you fished for catfish						.753
Not at all	4.2	4.3	1.9	0.9	2.7	
Slightly	15.1	7.9	10.3	24.1	15.0	
Moderately	44.1	37.3	38.0	30.6	36.8	
Very	32.0	38.6	43.8	36.0	37.9	
Extremely	4.7	11.9	6.1	8.5	7.6	
The availability of other activities where you fished for catfish						.827
Not at all	0.8	3.3	3.0	3.0	2.5	
Slightly	15.2	5.5	7.5	12.5	10.3	
Moderately	44.2	45.2	44.9	39.4	43.2	
Very	34.7	39.8	39.5	37.5	37.7	
Extremely	5.1	6.3	5.0	7.6	6.3	
The services in the areas you fished for catfish						.163
Not at all	5.9	5.3	4.8	4.7	5.0	
Slightly	16.6	18.1	18.3	15.0	17.0	
Moderately	47.5	43.1	41.7	44.2	44.1	
Very	25.5	25.9	30.9	31.7	28.7	
Extremely	4.6	7.6	4.4	4.4	5.1	

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 21. Percent of catfish anglers reporting their level of angling knowledge and skill compared to other anglers; overall and by attitude cluster. Statistically significant differences in frequency distributions between clusters were determined by χ^2 tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
	1	2	3	4	Overall	p-value
Level of knowledge						<.001
Less	17.6	23.0	14.4	16.8	17.9	
Equally	72.2	55.5	63.7	54.0	61.6	
More	10.2	21.5	22.0	29.2	20.6	
Level of skill						<.001
Less	16.8	18.7	18.8	14.0	17.4	
Equally	72.4	61.9	65.5	63.7	65.5	
More	10.9	19.5	15.8	22.3	17.1	

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

Table 22. Mean (median) age and percentage of catfish anglers reporting there gender income, education level, Hispanic origin, and race; overall and by attitude cluster. Statistically significant differences between cluster means were determined by ANOVA and Tukey's multiple comparisons tests at the $\alpha = 0.05$ level. Statistically significant differences in frequency distributions between clusters were determined by χ^2 tests at the $\alpha = 0.05$ level.

	Attitude Cluster					
Variable	1	2	3	4	Overall	p-value
Average age (years)	46.1 (48)[ab]	43.3 (43)[b]	50.1 (53)[a]	41.8 (41)[b]	46.0 (47)	<.001
Gender (%)						<.001
Male	86.9	86.5	80.6	89.2	85.3	
Female	13.1	13.5	19.4	10.9	14.7	
Income (%)						<.001
Under $20,000	4.9	9.7	5.8	8.0	8.1	
$20,000 - $39,999	17.4	14.1	18.4	15.9	15.9	
$40,000 - $59,999	14.4	22.5	18.7	23.6	18.6	
$60,000 - $79,999	16.4	19.1	18.6	12.7	17.1	
$80,000 - $99,999	18.3	12.0	15.9	22.4	16.5	
$100,000 and above	28.5	22.7	22.6	17.5	23.9	
Education (%)						<.001
Elementary	0.8	0.0	0.0	0.0	0.2	
Some high school	0.8	1.0	6.7	2.1	3.7	
High School	33.5	28.8	31.3	23.5	27.8	
Some college	35.9	27.4	27.6	35.1	31.2	
College	19.9	27.0	25.9	31.7	26.9	
Post graduate	9.1	15.8	8.4	7.6	10.3	
Hispanic origin (%)						<.001
No, not Hispanic	92.6	88.8	96.2	85.8	91.2	
Yes, Mexican, Mexican American, Chicano	3.6	7.2	1.8	14.2	6.8	
Yes, other Spanish/ Hispanic group	3.9	4.0	2.0	0.0	2.0	
Race (%)						<.001
White or Anglo	90.9	87.7	92.9	85.6	90.4	
Black or African Amer.	1.6	2.8	3.3	2.2	2.0	
Native American	1.4	1.0	0.6	2.4	1.3	
Asian or Pacific Islander	1.6	1.3	1.3	1.3	1.1	
Other	4.5	7.1	1.9	8.5	5.2	

Note: The attitude clusters presented in this table are: 1 = Casual Anglers (n = 112), 2 = Numbers & Size Anglers (n = 81), 3 = Numbers & Harvest Anglers (n = 159), and 4 = Size Anglers (n = 110).

APPENDIX F

OPEN-ENDED COMMENTS (IN RAW FORM) TO THE 2010 SURVEY OF TEXAS FRESHWATER CATFISH ANGLERS

Open-ended comments to the Texas Catfish Angler Survey

ID	Comment
10002	Yes, please send me some info on fishing and catfish?
10016	I mostly fish 3 lakes in my area. But the traffic and the water sports is getting bad. I have friends with ski boats and I ski. I've owned 6 diff. Jet skies. But I have always been respectful. There are so many now and people just don't care. I think there should be certain areas. For these activities and speed limits on lakes and rivers.
10020	Plenty of places to go, too many small fish/ most trashy and too controlled.
10027	There is not enough catfish in the rivers because of the human waste in the waters and trash too need some of the Mississippi white cats and other cats too like the ones that eat more too to help keep the rivers and lakes cleaner.
10031	Help kids get in to fishing. I did with all my kids and grand kids and still doing it
10055	Lost job and had bed rest (pregnant) so haven't gone fishing much in last 2 years.
10081	I really love to eat catfish. This is the only fish I like. Have a blessed day!
10083	We wish we had more time for it. We mainly crappie fish, weather permitting.
10088	I have to say that the catfishing in the Texas panhandle is pretty slow at best
10091	The reason I have not been fishing much in the last two years is because we have been in a drought so long most of my fishing spots dried up
10092	The three lakes I usually fish at are Ray Roberts, Grapevine, and Lewisville. I have used numerous baits, but I might only catch 1 fish per 5 or 6 times I catfish. I fish from the shore, so the deeper areas of the lake aren't accessible to me.
10097	Catfishing with jugs is ok. But people should pick up their jugs when they get through fishing. Thanks
10099	Hispanics are pretty dirty people when it comes to litter. Just my opinion
10119	Senior Texans should not have to purchase a license. Other states are free.

ID	Comment
10120	Bring back Yo-Yo's and use of nets
10125	The places I used to go fishing when I was younger are now closed to the public.
10132	I would like local areas to be stocked with catfish
10152	Sometimes when I'm fishing, I see some people keeping whatever they catch regardless of size.
10160	Catfishing is usually a trotline or jug line experience while targeting bass. Occasionally for the grandkids we will rod and reel fish for catfish.
10163	Send me something on pheasant hunting
10166	Why is someone in Mississippi doing a survey on catfish in Texas? Just wondering?
10169	Very little is advertised from TPWD about catfish other than limits in Texas. The average fisherman doesn't know if any stocking is done on lakes and rivers.
10176	I like the size limit of 25 yellow cat . Size should be cut to 18 inches. On hwy 35 in Calhoun county need a boat ramp to fish the Guadalupe River. No public boat ramp. The lakes in Texas do not need to have gates that close at certain hrs. you have to end the trip sometimes like 8 pm to be out before 9pm
10181	My family and I have wonderful times fishing-regardless of whether we catch any or not! It's just a fun time to "try" regardless of the end result!
10187	It's great!
10203	I enjoy an occasional fishing trip and not too many have concentrated on catfish. I am probably not a good candidate for future survey regarding fishing.
10208	My fishing experience these days is either private lake or river/stream fishing. I am very big on canoeing, thus any river I can fish and actually catch fish from the canoe is the best fishing experience I can imagine.
10211	Yes
10212	I think a slot limit on a lake or reservoir is not a good thing for the fish. It will

ID	Comment
	in time take out the smaller fish by predation and over fishing for smaller fish I target fish 20"+ except for channel cat.
10214	We love lake fork! We can catch channel cats up to 34 lbs. catfishing is very good on lake fork bass fishing is good too!
10229	I'm not opposed to jug lines, trot lines, sail lines throw lines etc. however I would love for more people to spend their time rod and reeling.(more work and less success) because more fish would be available for rod and reel if the other forms were banned.
10236	Love it
10238	I love to fish and love to take my 12 yr old son fishing. The challenge is managing time and being aware of good places to fish.
10254	I do not see how my income, age, education level or race could possible help you in your survey, about catfish.
10290	My main concern is to be able to go on a fishing trip and to have a chance to catch my limit that the law has put on that body of water. To spend what it costs to go fishing nowadays I am going to keep at least 75% of what's legal or what my family can eat that is legal (I am speaking of catfish and crappie)
10293	Why do I have to buy a license and also buy a fresh water stamp or saltwater stamp? Used to a license covered freshwater. What does the license cover by itself without a stamp?
10296	Lake fork is in bad need of better catfishing. Not enough catfish in it. I go several times and catch nothing. So that makes me not want to return. Lake Livingston needs more channel cats.
10336	You should NOT need a license to fish or hunt.
10341	I prefer to fish private ponds of friends.
10366	Would like to be able to use yo-yo's
10369	I enjoy every fishing outing plus fish are a great table fare and healthy to eat.
10371	I love fishing and like to be near fishing areas. Travel time is important due to

ID	Comment
	time off from work
10374	I don’t go "catfishing" I occasionally go fishing
10383	I’m not really a catfish fisherman, so I won't take the rest of this survey and screw the results
10393	I feel that the daily bag limits for channel catfish are pretty liberal. The areas I fish for catfish are very good and a limit can usually be caught on each trip out. 25x4 people in the boat = 100 fish. That is a lot of catfish that is allowed to be kept when you have people that keep their limit every time they go out.
10402	There are plenty of catfish they are as common here as cattle. Please don’t reduce limits, change sizes, put more limits on methods, etc. Do something useful instead. Go after litterers and poachers.
10405	Completed by husband w/ wife giving answers. She states that most of the time no restroom would be preferred to the filthy ones she has to deal with.
10414	I fish for black bass I release them. Hybrid stripers and crappie for eating
10422	All the places I fished as a boy Texas wildlife has fenced off or put boats ramps or fence them off to the public. Texas parks taking public fishing is not the way it use to be
10426	I wish I had more time to fish
10438	Minimum should be 18" not 12" is to small
10442	Feel free to contact me if you have any further questions
10445	Only that I and Grandkids fish @ the Gidson pond, have fun and eat fish
10449	I've only been catfishing a couple of times in my childhood and had a wonderful experience. I fished in a private pond from the shoreline and caught several catfish in the 12-15 inch range. Sorry I was not more helpful with the rest of the survey. I've only fished a handful of times in the last 10 years. I think Texas parks and wildlife is doing a wonderful job of educating and providing public fishing opportunities for Texas anglers.
10450	This is crappie season, pier fishing and catch catfish, that’s ok, too If I want a mess of catfish I drive a mile from the house to the tank, sit under a covered RV, neat

ID	Comment
10451	My father-in-law just went fishing last weekend with his cousins and caught 90 catfish on trout lines on lake Livingston
10475	Limit trophy size catfish like redfish with limb lines and trotlines trophy might get over harvested.
10484	Thank you for helping preserve our wilds for future generations.
10487	I would like to make this clear. I like to eat fish. Once I get me a mess of fish. I release the one I don't take home. More people would fish if they knew where to go. And I hope they don't change all the rules for the people who have boats. Bow fishing would hurt the people fishing from the bank more.
10494	I enjoy it
10501	I'm a disabled vet. I find catfishing to be less stressful than casting continuously. I fish primarily to relax. Mostly release fish. I mostly fish out of a jon boat. Dodging jugs and lines, getting line tangled in them annoys me. Do not consider jugs and lines fishing. Same as trapping vs. hunting
10506	My prefer trip Catch legal methods harvest same as usual size same as usual type of water river - pond - lake - reservoir development basic site Distance 10 - 100 miles at home
10507	Finger size mullet caught in salt water will produce some nice catfish in freshwater on trotline.
10526	Gas prices determine if I travel further to go fishing for the kitty fish.
10527	Do away with any and all "slot" limits for Bass and or catfish in all Lakes in Texas!! People who spend their money to buy license. Support and pay for the chance to catch fish, they should not be allowed to keep their fish!! Enforce limits but not a "slot limit." If you can't keep your fish, you shouldn't be required to buy a license. Getting too many Restrictions!!
10529	This is the 3rd survey sent to me that was "volunteer." One is enough! If someone wants to take the time great, but, they should not be bothered with second & third. Survey questions were very redundant.
10552	Didn't get to fish much in last 12 months due to injury. Mainly fish Arkansas River on my Deer lease.

ID	Comment
10560	I live on Lake Buchanan in Burnet, TX so some of the questions don't apply. I catch as many fish as I want most keeper size some very big I fish all year round at least 2 days a week. Thanks for your interest. "Stock more yellow CATS"
10581	Only fished for catfish maybe once in past 20 years. Fished for Blacks mostly.
10588	Come see us.
10589	I really do not fish that much. The last couple of years I have had family obligations that have made it difficult to take the time to fish. Fishing has not been that important to me.
10595	Unlittered is best. Just the fulfillment of doing something outside is more important than catching the fish.
10599	In years past I have enjoyed drifting for catfish using shrimp as bait. Mainly I fish Lake Grapevine. Caught 2-5 lb Channel Catfish. Great Fishing.
10605	Completed 5/19/10 at 1700 hrs by Texas Law Enforcement Officer. Thanks
10608	We go fishing in OKLA. Because we have better luck than Texas.
10614	Bad day fishing is better then a good day at work. Thanks.
10618	We must do everything we can to preserve our lakes, streams and rivers so we can truly be able to enjoy fishing.
10623	I'm moving to Arkansas!
10648	This was a long survey
10654	I fish for catfish mostly in my own pond and other local lakes. You kind of burnt me out on the A and B type stuff.
10693	I am no longer interested in catfishing in Texas since I am no longer able to Bowfish for them. Very few catfish were taken by Bowfishermen buy yet we're unable to continue to bowfish for them. I do not believe public comment supported TPWD commission's decision to to discontinue Bowfishing for catfish. I've only fished twice for them since bowfishing was discontinued and that was in a private pond. Bowfishing needs to be reinstated.
10695	Dear Dr. Hunt: I appreciate your interest in freshwater catfishing, however I am probably not the best catfish survey candidate since I have not target catfish for

ID	Comment
	some time now. In the past, I catfished while floating rivers and searching out the "holes" or deep areas. I now fish the central the central Texas highland lakes mainly because they are close to home. These lakes are clear water, rocky impoundments. Due to the clear water and mostly sunny Texas skies, daytime catfishing is not productive. Believe me, if they were catfish productive during the day, I would be fishing for catfish! However, because I do not target catfish anymore, I filled in the Trip A versus B section hypothetically. In other words, if I still targeted catfish, this what I would choose. Most likely my survey should be tossed out however. I appreciate the time you are taking to study freshwater fishing patterns. As a fisherman of many years and one of the dying breeds of fish harvest/ consumers, it saddens me to have personally witnessed the decline of fisheries in Texas, as well as my original state of Nebraska. It appears to me that the primary focus of fishing has been lost: it does not matter where you fish - people go fishing to catch fish! If the size limits and consumption on each body of water, no matter how large or small, would be evaluated for their individual capacity to produce fish given the amount fishing pressure each receives, then the fishing world would be a better place! Fisheries management, plain and simple. The emphasis from where I see TPWD acting appears to be on tournament and fishing clubs, outdoor expo days, trophy bass fisheries and non-native trout stockings! In other words, special interest projects with the average local fisherman left out. One last note, I do have a strong opinion from personal experience that slot limits improve a fish species. The black bass 14"-18" slot in Lake Georgetown revived that lake's bass population. It is now possible to catch a few harvest worthy 12-14" bass combined with a high probability of catching a nice 16-18" fish to enhance the pleasure of the outing. The slot limits appears to have achieved a nice balance between harvest and sport fishing requirements. The slot limit does not appear too popular with the tournament fishing crowd since they cannot keep the majority of the fish they catch for the weigh-in. I would think that it is a small price to pay to improve a fish species however. I also wonder why the slot limit has not been applied to other species such as catfish.
10705	Retired June last year. I had planned to run some trot lines this spring, but it has worked out yet. Just replaced trailer lights on both boats (corroded from saltwater) Now as soon as I find the short in the trailer wiring, harness on the truck, I'm catfishing.
10709	Catfishing is fun for kids to introduce them to fishing and get them excited about the sport. That tends to be why we (my family) catfishes, when I go fishing it tends to be for bass. Thank you for doing this study! And Happy Fishing
10725	I think Twin Buttes reservoir could stand a larger channel cat population. Please consider stocking.

ID	Comment
10726	My family and I fish Choke Canyon a lot it is 3 hours away and a very nice place or lake to teach our kids to fish, but the Hispanics are too much, they think they own the lake and park. That is why my family stopped going to the Lake
10740	I've been told that catfish from the Mississippi Delta Bottom has a better taste than anywhere else. Is that true or a myth?
10741	Fishing license are too costly. Gov't should stay out of landowners private pond rights. Game Wardens need to enforce waste of game regulations more without regard to politics and how rich and influential a person is.
10752	Catfish size limit just right. Need more Trophy class fish. Bag limit to high. Too many people keeping every fish they catch no matter size or limit. More people need to buy a fishing license and follow the law of state and GOD. (Hold your lip right & keep your line tight)
10754	Illness has caused me to stop fishing.-
10755	Have not fished in the last 2 yrs.
10758	There should be stiffer penalties for polluting the rivers, streams, and outdoors (Dumping Trash)
10763	We have a lake house at Cedar Creek Lake and it is right on the water edge. We do all our fishing off our pier. We have had many guests who never fished before, catching a catfish or two the 1st time is a thrilling experience for them and a "kodak" moment.
10768	I am a saltwater angler but enjoy freshwater fishing and catfishing, in particular, when visiting friends or family not fortunate enough to have the canal access at Galveston Bay that I have. I enjoy freshwater fishing from a boat for many species (bass stripes, white bass). My most enjoyable catfishing experiences, however, have been bank fishing at night with friends and family. These night bank fishing experiences are how I introduced my children to fishing. They have been a way that I have turned acquaintances into lifelong friends. Sitting around a fire, sharing stories, watching for a rod tip to bend is an experience I love. I was just reminded of this two nights ago when visiting a friend on Lake Livingston. It had been about 6 years since my last catfishing night. I enjoyed it and decided that I would try to make it a type of fishing that I try much more often. It will never replace inshore and offshore saltwater fishing for me but is something to enjoy and cherish. Note: I thought this was an excellent survey! It was my pleasure to participate.

ID	Comment
10784	Just that I like to fish. Don't need fancy gear, boat or attire. Just to sit and wait for that one fish everyone wants. Relax, forget work, problems, and all other things that take up too much of our time.
10792	Plan to take my grandkids trot-lining for catfish in the near future. Own a lake home (small) near Lake B.A. Steinhagen and Sam Rayburn but have only been going about twice a year. Love trot-lining and plan to start back soon.
10801	Yes it’s great!
10802	When I go, I don't care if I catch anything. I just like to be out away from people.
10803	Our family fishes a large reservoir in Texas with facilities at site. Catch made up with limits 12 inches or longer assuredly not on limit but close. Our family puts a little more effort in catfishing than average angler.
10818	One Blue cat 30" per day? No Good! Bow hunting for catfish (Blues) should be legal. Many people want to catch and eat channel and blue in the 16" to 18" range.
10830	Do we get a free fishing license for doing this? Jody Manning
10837	Need more fishing piers form Texas lakes for people that do not have boats.
10838	It would be nice to be able to rent a boat and spend the day fishing. The only thing around here is pontoon rentals for 300.00 per 1/2 day. That is a stretch--- I am thinking 50.00 per 1/2 day is a reasonable price that would allow more people to enjoy the time in the outdoors and also the enjoyment of catching a fish. Might even help the economy by putting people to work renting the boats to people. Thank you for your time!!
10847	My wife Carolyn has had two major back surgeries, so she does not like walking in area that are rocky or slippery. She loves the fishing pier at Cooper Lake, south Sulphur State Park Texas, It's Big. The fishing pier at Lake Bob Sandlin State Park Texas is small, it can get real crowded sometime at early evening. Carolyn Loves Fishing At the Trout Pond when it stock with trout. We need bigger and more fishing piers for people who have a hard time moving around. The ladies need Good Clean Bathroom Close by. You should have seen Carolyn face lit up when she hook on to 11lb Blue Catfish. We were on the fishing pier so we walk along the pier to the shore to land the catfish. That same day we landed two 6lbs. Blue Catfish and Bunch of 3 to 2 lbs.

ID	Comment
10853	Fishing for fun is great, however, HARVEST is the main reason, just as in the Hunt!
10855	Lets Fish!
10857	I have fished in a number of states Texas is # 1 all fish!
10867	Some waters are over populated with catfish.
10869	Currently fish outside of Harris county due to water quality. Primarily fishing for catfish. Target Blue cats. Typical destination Lake Conroe. Bank fishing only.
10870	I grew up fishing and camping. I enjoy just being outside around water fishing. Its most relaxing for me and my family. Cat fishing is a lot of fun when fish are biting.
10875	We don't need slot limits or other length restrictions we have enough govt restrictions as it is.
10883	Sorry I hunt Bass.
10894	Yes- We need to have tags for catfish over ten pounds. Too many big catfish are removed from our lakes and rivers by a very small number of fishermen and it is having an impact.
10896	Some of the most memorable times are spent fishing with family and friends and usually its for catfish. On one occasion my son and I caught, Channel, Blues, Flathead, and Bullhead all on the same trip in a small stream near our home in Houston/Katy area. Thank you
10897	Most fishing done at Lake LBJ, Walnut Creek, Llano County o Lake House.
10908	I like the regs. The way they are. I would like to see more public opportunities to do good catfishing w/o driving for 2 or 3 hours.
10912	I am the worst person to complete this survey but out of respect for colleagues and research, I did. However, to clarify, I fish for fun; mostly perch. I catch and release. I think they are pretty and another one of God's wonderful creatures. I don't care to eat fish- I do like the tarter sauce though. I fish with my husband and daughter they are more gun-ho! I like to relax and challenge the fish to get on. If they are not biting it's okay. I enjoy the peace of it w/out the competition.

ID	Comment
10913	I am still working full time and caring for a small farm. I would like to fish a lot more often, but time does not permit. I hope my answers helped you. Thank you
10919	I have a family of 5. Catfish is out favorite fish to eat. Many times I am fishing for food. Sometimes I am on an outing with my children and my goal is for them to experience catching fish.
10920	I would like to see a study on re-stocking of B.A. Steinhagen Lake (Dam-B). For many years it was an excellent catfishing lake. These days the lake level almost always stays low. If handled correctly, it could be restored to its former effectiveness for catfishing, bass fishing, and family outings. It is such a waste to see it mismanaged for those of us who used to frequent the lake. It is so much closer to us than Rayburn or Toledo.
10934	Need to limit trot lines to 20 hooks- 1 line per person to increase the size & number of fish in the Lake-(100 Hooks per person is too much) 20 hooks per person is plenty.
10937	Fishing in Texas is great, me & my wife try to fish every week-end we can. Catfish, crappie, bass, and perch, mostly we catch for fun, sometimes we might keep one to eat. But not very often. This is my new mailing address. Thank you.
10942	Go back to 9" limit on Channel cat.
10951	I don't get to go because of work but when I do I can't because of no license. And I don't see the reason to pay for a license when I may catch 1 or 2 fish a year.
10961	Please help it to continue to grow as sport/recreation!
10963	p.s.. sorry it took too long to respond.
10972	Fun! Fun!
10973	As a college grad, with a degree in wildlife and fisheries, I appreciate your studies. I would like to say on your comparison of trip A and B the difference in distance comparison. In my personal opinion Jug lines should be greatly reduced or banned not only do they cause vast numbers of dead fish they litter our lakes worse than anything else.
10975	I love Fishing

ID	Comment
10976	To many restrictions
10981	He does not Catfish, but I do. I don't Bass Fish, etc-
10989	It would be nice to know where fishing is good at any given time.
10999	No more surveys please
11005	We moved to Angelina 3 months ago. I'm a salt water fisherman not fresh water. Spent extensive time fishing in the Bays around Corpus Christi.
11009	Congratulations on the fine job you are all doing for fishing in Texas. God Bless You All!
11023	Most fishing is Spring (April/May) during spawn. Limits should be cut 1/2 to ensure catfish remain a viable resource.
11024	I believe fishing is a good way to keep up with your children & grandkids. The slow pace makes the kids sit & talk, maybe I'm old fashioned but I catch about 4 catfish & maybe a perch or tow and I'm through. I always buy my kids fishing license for their birthdays, so no excuse why they can't go. I also own all of the tackle including storing their fresh & salt water reels. We do have a 18 ft saltwater boat, but we have never gone into the open Gulf. We fish in Sabine Lake. Its currents are not too rough for the little grandkids. The limits on fish have gotten out of hand, the length is the problem. I think if its big enough to fit in a skillet and not huge it should be legal but maybe, they want the fish to spawn first. But then the fish are too big & you wind up filleting it. Because it doesn't fit skillet sizes. The tail is so crispy when fried. But I do know the people in the salt water area are keeping ill legal fish, because a guy gutted a 36 lb or better red and iced it down in his wheel well of his car, the Vietnamese people that fish around us, everything is kept tiny to huge. We've seen them get 15 flounders and keep all. Not one game warden around.
11052	I think you should be able to fish anywhere in Texas with a resident license instead of having to buy a separate license for the Red River and Lake Texoma.
11054	I think TX laws should be like Louisiana law a person should be able to keep a certain number of catfish under 12". Some of the fish are 1/4-1/2" under the legal limit. A lot of people I know even myself go to La. & but La fishing license for that reason.
11059	It would help to keep area's around the lake's clean where people could have

ID	Comment
	more access to the lake for catfishing or any type of fishing.
11071	Only saltwater fish
11072	Raise the legal size limit in all lakes to at least 14" min.
11073	There should be more game wardens, especially around the riverside of the Lake Livingston dam.
11079	Thank you
11088	Need much more channel cat's in East Texas rivers & less blue cat's. I love to catch blue cats on lures. But would bate fish much more if I could catch channel cats. (Sabine River)
11110	Bowfishing for game fish should NEVER be allowed.
11113	License for fishing to expensive, and 9 out of 10 times, I never catch anything.
11118	The catfish are always too small here-this is Texas where everything is supposed to be bigger!
11141	Wish I had time
11144	Thank you
11150	Teach a man to fish He will eat for a lifetime.
11152	We have a healthy reservoir Lake Corpus Christi is fed by Lower Nueces River. There are lots Blue Cats, Channel's, but Yellow's are few. Flatheads or yellow's are usually pretty large, smaller one's hard to come by I'm still happy my overall fishing is good here on Lake Corpus Christi.
11165	We have a wonderful fishery in Texas. Need to quit spending our money going to the general fund. License fees should be spent on fishing/hunting improvement. Instead of the legislatures piggy bank.
11170	1. Catfishing should be closed season during July August September. 2. Maximum length 30" 3. Minimum length 14" 4. No trotlines 5. Jug lines removed after 7 days in water and re-dated. 6. Ban fish traps 7. Better commercial catfish regulations
11180	I crappie fish a lot too. I don't like Asians & Mexicans throwing every crappie they catch in a bucket and not even checking the size. They use nets in the creek

ID	Comment
	by my house. Something needs to be done about it. I mainly fish for the sport of it. When I go bass fishing I go for one over 1 lb. When I go crappie fishing I'm looking for one over 3 lbs. When I go catfishing I'm going for one over 40 lbs. My friends have been cut in over half in the last two years. I live to fish and it's kind of hard these days. So if you know someone that has a barge they don't need let me know. Thank you. P.S. I think there is something about getting slime on your line. I think it attracts other cats.
11189	I am glad to see the efforts put forth by the Texas Parks and Wildlife Department to ensure quality catfishing in Texas. I would like to see an increase in the number of trophy cats! I catch a good number now but more would be better. On an unrelated topic I would like to see something done about the litter around the lakes and creeks where I fish in north Texas. It sickens me to see so much trash. Keep up the GREAT WORK!
11217	Trotlines are dangerous Really don't clean anything sub 20 lbs that equals about 5 lbs of boneless fillet suitable for a fish fry Lake Tanokoni bills itself as "Catfish Capital of Texas" and I just about believe them Don't see how a 100 acre site with unlimited public fishing pressure could produce trophy catfish long term You could raise min length to 18 inches and it wouldn't bother me
11222	had better look this Spring Break w/ the family on Inks than we did last 2 spring breaks. Kids loved checking the jug lines. I lost fish were nice size 18".
11230	I will reiterate again I go FISHING not just catfishing as a recreational and social event. Some of the persons I go with do want to specifically catfish but not me. I do not think I am your average angler because I don't care if I catch something or not
11236	I do not fish for catfish.
11241	Yes, we have a lot of very nice parks that were damaged after the hurricanes hit the Gulf Coast. So why close them down, why not open them back up. Take Caney Creek Recreation area on Sam Rayburn Reservoir.
11250	Yes we would like for Corp of Engineers to reopen our parks! We really miss them Harvey Creek for one!
11251	Have a great day!
11262	I follow the catfish from season to season. Deep water to shallow. I know where they are and when they move. I dearly love to fish and hunt. The Good Lord made 7 times more water than land, He intended for us to fish 7 times more than

ID	Comment
	we work.
11264	I have been catfishing in Texas since I was 6 & always had a great time. I am now transition to bass fishing. But still catfish from time to time.
11282	I had my own 7 acre lake w/ channel cat the state helped stock it. Had it 12 years catfish ranged from 5" to 22" in that time. Bluegill & bass I fed them every day. I lived in Texas for the last 5 years 05-10 love it. Thank you
11296	I usually fish for white bass or crappie. If I get lucky and catch a flathead I'll eat it.
11301	I love it! Great state-great fishing!
11308	Too many turtles!
11312	A lot of people love it. I fish saltwater for redfish. Good luck with your study.
11479	I like to fish weather it is bass or catfish. It makes no difference. The calm of the water being in the middle of nature as long as I catch something its a good day. Also I don't eat fish for some reason I just don't like the way it tastes.
11501	We always make our fishing trips a family affair my wife, daughter & granddaughter also enjoy fishing for catfish. We go as often as we can and like to try different places. We will contact a guide to pick up fishing info when fishing a new lake. Thank you for the opportunity of filling out this survey. Last thing to keep in mind. Bad day fishing is always better than a good day at work. I'd rather be fishing with my family.
11505	I don't think it should be legal to bait a hole (chum). Person who does it feels they have exclusive use of this area of public waters
11515	Don't catfish
11524	I DO NOT fish for catfish. I DO NOT eat catfish. I catch catfish only by accident.