FISHING AND FISH HABITAT IN MINNESOTA

A study of anglers' attitudes about fishing and fish habitat in lakes, rivers and streams.

Final Report

A cooperative study conducted by:

Minnesota Cooperative Fish and Wildlife Research Unit
Minnesota Department of Natural Resources

Fishing and Fish Habitat in Minnesota:
A Study of Anglers' Opinions and Activities

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Executive Summary

This study was conducted to understand angler beliefs and perceptions about fish habitat. This information will inform how the DNR can better connect the importance of habitat to sustainable fisheries management.

Surveys were distributed to 2,000 resident anglers. A total of 784 full-length surveys were returned, resulting in an adjusted response rate of 41.7%. An additional 80 shortened or late surveys, used to gauge nonresponse, were returned for a total response rate of 46.0%.

The mean age of respondents was 52 years, and 86% of respondents were male. Over 35% of respondents had a 4-year college degree or higher level of education. Education levels varied significantly between respondents from the metropolitan region and outside the metropolitan region, with metropolitan residents reporting higher levels of education. Metropolitan residents reported higher levels of income, with 26% reporting a household income of greater than $150,000 compared to 10% of non-metropolitan respondents.

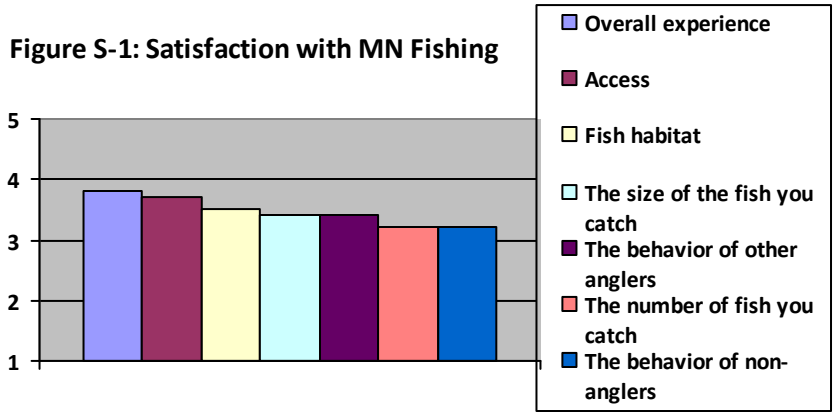
Fishing Experience and Preferences

Respondents had fished in Minnesota for about 40 years, and purchased a Minnesota fishing license an average of 8 of the past 10 years. Respondents fished 24 days in the past year. Respondents rated their preferences for targeting 20 fish species; walleye was the most preferred species while carp and bullhead were least preferred.

Satisfaction with Fishing in Minnesota

Respondents were asked to report their overall satisfaction with the overall fishing experience, along with six other specific aspects of fishing. In general, anglers were satisfied with all aspects of fishing that they were asked about. Respondents were most satisfied with the overall fishing experience and access, and closer to neutral about the number of fish they caught and the behavior of non-anglers (M=3.2) (Figure S-1).

Figure S-1: Satisfaction with MN Fishing



Involvement with Fishing

Respondents were asked how much they agreed with a series of 15 statements about their involvement in fishing. We examined five factors associated with angling involvement: (a) attraction, (b) centrality, (c) social bonding, (d) identity affirmation, and (e) identity expression. Attraction and social bonding associated with fishing were rated the highest, with centrality rated the lowest.

Catch Orientation

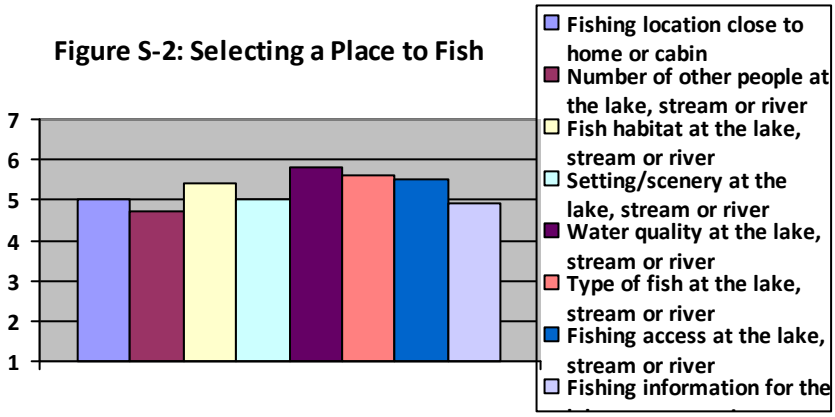
We measured catch orientation using items adapted from previous research. Based on the four factors that represent anglers' catch orientation, on average, catching many fish was rated highest (3.0 on a 5-point scale) with keeping fish rated lowest (2.3).

Fisheries-Related Value Orientations

Respondents were asked how much they agreed with a series of 14 statements about fisheries-related values. Protection related values were rated highest (3.6 on a 5-point scale), compared to utilitarian (2.5) and human dominance (2.6) values.

Selecting a Place to Fish

Respondents were asked to rate how important factors were when selecting a place to go fishing. All factors were rated as somewhat to moderately important with water quality rated the highest (Figure S-2).



Perceived Effectiveness of Strategies used to Improve Fish Habitat

Respondents were asked about the effectiveness of 22 strategies for improving fish habitat on a 5-point scale. Generally, respondents seemed to think all strategies were effective, with over half of respondents saying all strategies were very or extremely effective. Responses to the different statements, however, differed statistically and ranged from a low of 3.4 for "Creation of log cribs and other human-made cover" to 4.2 for "protecting groundwater." Fishing involvement and protection values were positively correlated with the perceived effectiveness of strategies for improving fish habitat. Utilitarian and human dominance values, and a stronger orientation to keep fish, were negatively correlated with ratings of the effectiveness of strategies.

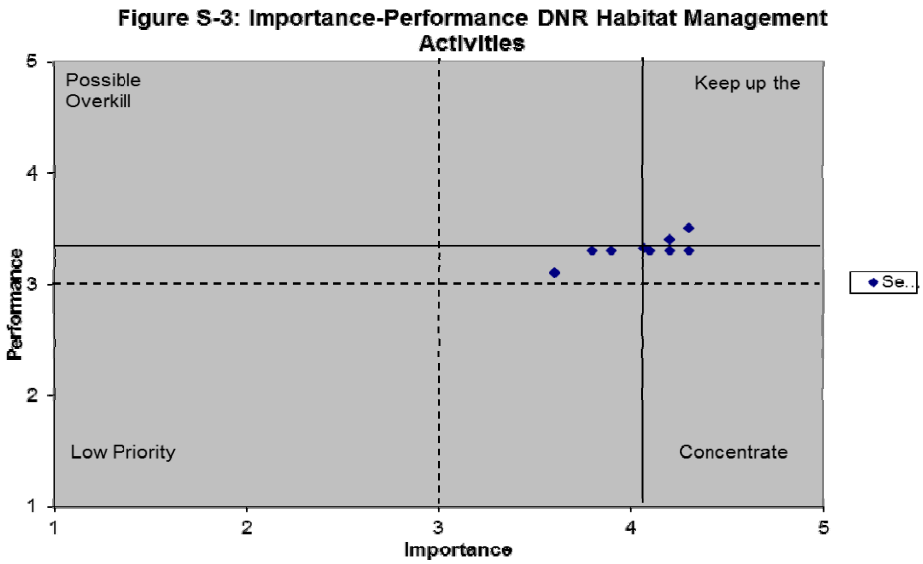
Importance of and DNR Performance on Management Activities

Respondents were asked to rate the importance of 10 management activities related to fish habitat, then rate DNR performance on the same 10 activities. Responses to the different statements differed statistically and ranged from a low of 3.6 for "purchasing land or easements around lakes and streams" to 4.3 for "protecting the habitat in lakes and streams." Although over half of respondents viewed all activities as important or very important, regulations and land acquisition were generally viewed as less important, while education, restoration, and protection were viewed as more important. Fishing involvement and protection values were positively correlated with the importance of management activities for improving fish habitat. Utilitarian and human dominance values, and stronger catch orientation, were negatively correlated with the importance of management activities for improving fish habitat.

Responses to DNR performance on the 10 activities differed statistically and ranged from 3.1 for "purchasing land or easements around lakes and streams" to 3.5 for "protecting the habitat in lakes and

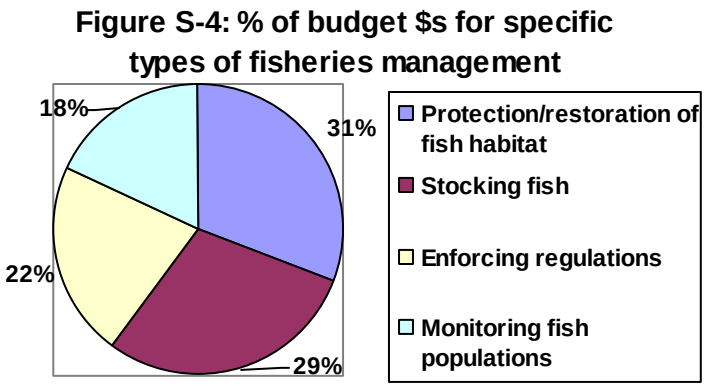
streams." Across the board, about half of respondents rated DNR performance neutral on the listed management activities. There were small positive correlations between measures of fishing involvement and ratings of DNR performance on several management activities related to protection and restoration of habitat in and around streams and lakes.

Importance and performance of DNR habitat management activities is shown in Figure S-3. Importance-performance analysis provides a two-dimensional graphic interpretation of survey results. This type of analysis produces four quadrants: (a) concentrate here, (b) keep up the good work, (c) possible overkill, and (d) low priority Dotted lines are midpoint of scale, and solid lines are the means for importance and performance. "Using the means as a frame of reference is preferable, as the means divide the quadrant into below average and above-average importance, as well as below-average and above average performance." (Van Ryzin & Immerwahr, 2007, p. 221). Using the means (solid lines) to define the importance-performance quadrants, we see four activities where more focus could be emphasized: managing shoreline to protect fish spawning sites, restoring the habitat in lakes and streams, restoring land surrounding lakes and streams that have been damaged/developed, and educating people about lake and stream ecology/habitat. Respondents felt that the Minnesota DNR was doing well at protecting habitat in lakes and streams, protecting land surrounding lakes and streams, and educating people on how they can help protect lakes and streams. Purchasing land or easements around lakes and streams was seen as a low priority.



Allocation of Budget Dollars

Respondents were asked to indicate the percent of budget dollars that should be spent on habitat protection versus restoration, up to 100%. On average, respondents wanted 57.4% of dollars spent on protection of intact, high-quality fish habitat, and 42.7% spent on restoration of degraded fish habitat. Respondents were then asked to indicate the percent of budget dollars they would like to see spent on four specific areas of fisheries management, again totaling 100% Respondents indicated that they wanted an average of 31.0% spent on protection and restoration of fish habitat, 29.4% on stocking fish,



22.1% on enforcement of regulations, and 18.3% on monitoring fish populations (Figure S-4).

Fish Habitat on Minnesota Lakes

Respondents were asked to rate nine characteristics of land adjacent to lakes, near-shore lake characteristics, and open-water lake characteristics, in terms of their contribution to fish habitat using a 5-point scale. Responses for the different characteristics were significantly different, with dense forest (M=3.7) rated most positive and housing subdivisions (M=2.2) rated most negative. Responses for the different near-shore characteristics were significantly different, with natural rocky shoreline (M=4.0) rated most positive and application of lawn fertilizer (M=1.8) rated most negative. Responses for the different open-water characteristics were significantly different, with underwater rocky structure (M=4.1) rated most positive and high algae levels (M=2.2) rated most negative. There were no substantive differences between metropolitan and non-metropolitan residents on these questions.

Fish Habitat at Minnesota Streams and Rivers

Respondents were asked to use a 5-point scale to rate characteristics of (a) land adjacent to streams and rivers, (b) stream and river banks, and (c) off-bank water in terms of their contribution to fish habitat. For land adjacent to streams and rivers, dense forest (M=3.8) was rated most positive and housing subdivisions and drainage tile in farm fields (M=2.1) rated most negative. For stream and river bank characteristics, natural rocky banks (M=3.8) were rated most positive and eroded stream/river banks (M=2.1) rated most negative. For off-bank characteristics, rocky stream/river bed (M=3.8) was rated most positive and usually cloudy water (M=2.7) rated most negative. There were no substantive differences between metropolitan and non-metropolitan residents on these questions.

Minnesota Department of Natural Resources Management

Respondents were asked to rate their agreement with items addressing their trust and desire for voice in Minnesota Department of Natural Resources management. We identified three factors related to respondents' attitudes about management: (a) fairness, trust, and agreement with decisions, (b) acceptance of management, and (c) desire for voice in management. Respondents rated items related to desire for voice in management and acceptance of management higher than items related to perceptions of fairness, listening, and agreement with management (Figure S-5).

Figure S-5: Minnesota DNR Management

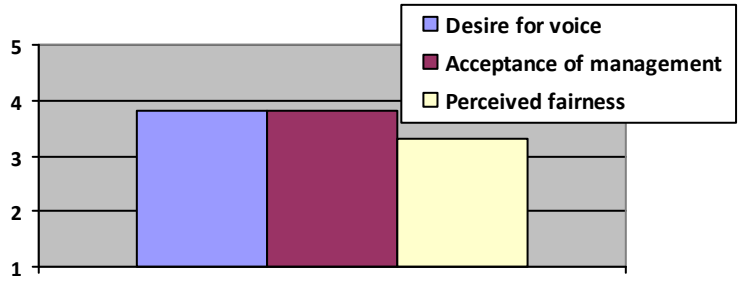


Table of Contents

List of Tables

Introduction

Study Purpose and Objectives

This study was conducted to understand angler beliefs and perceptions about fish habitat. Results will be used to understand anglers' current level of understanding of linkages between habitat characteristics and fishing quality. This information will inform how the DNR can better connect the importance of habitat to sustainable fisheries management.

The questions used to address each objective are provided in the survey instrument (Appendix A) and discussed in more detail in subsequent sections.

Methods

Sampling

The population of interest in this study included all Minnesota residents 18 years of age and older who purchased a resident fishing license in the state for the 2014 season. The sampling frame used to draw the study sample was the Minnesota Department of Natural Resources' (DNR) Electronic Licensing System (ELS). A stratified random sample of Minnesota residents in the ELS was drawn. The study sample was stratified by residence of individuals (determined by county) in two regions, metropolitan and non-metropolitan. The target sample size was 400 for each region (n = 800 statewide). An initial stratified random sample of 2,000 individuals, 1000 from each of the two regions, was drawn from the ELS.

Data Collection

Data were collected using a mail-back survey following a process outlined by Dillman (2000) to enhance response rates. We constructed a relatively straightforward questionnaire, created personalized cover letters, and made multiple contacts with the targeted respondents. Potential study respondents were contacted four times between February and June 2015. In the initial contact, a cover letter, survey questionnaire, and business-reply envelope were mailed to all potential study participants. The personalized cover letter explained the purpose of the study and made a personal appeal for respondents to complete and return the survey questionnaire. Approximately 3 weeks later, a second letter with another copy of the survey and business-reply envelope was sent to all study participants who had not responded to the first mailing. After the second mailing a third mailing that included a $2 incentive along with the personalized cover letter and replacement questionnaire with business-reply envelope was sent to all individuals with valid addresses who had not yet replied. About 6 weeks later, we distributed a shortened one-page, two-sided survey to assess nonresponse bias.

Survey Instrument

The data collection instrument was a 12-page self-administered survey with 11 pages of questions (Appendix A). The questionnaire addressed the following topics:

Part 1: Minnesota fishing background;
Part 2: Managing fish habitat in Minnesota;
Part 3: Budgeting for managing fish habitat in Minnesota;
Part 4: Fish habitat in Minnesota Lakes;

Part 5: Fish habitat in Minnesota streams and rivers;
Part 6: Minnesota DNR fisheries management;
Part 7: Sociodemographics.

Additional information concerning age and gender of respondents was obtained from the ELS database.

Data Entry and Analysis

Data were keypunched and analyzed on a PC using the Statistical Program for the Social Sciences (SPSS for Windows 21). The report presents basic descriptive statistics, including frequency distributions and means. Several statistics presented in the report are used to show the association among variables. The chi-square statistic is used to test whether two categorical variables are independent. The chi-square statistic is not a good measure of association (Norusis, 2002), so Cramer's V statistic was provided to show the strength of the relationship. Values for Cramer's V range from 0.0 (no association) to 1.0 (perfect association) (Norusis, 2002). T-tests were used to test hypotheses about differences in two means (Norusis, 2002). Factor analysis was used to explore relationships among items in scales. Factor analysis "represents relations among observed variables in terms of latent constructs" (Knoke, Bohrnstedt and Mee, 2002, p. 414). Presumably, the latent constructs generate the covariances among observed variables (Knoke, Bohrnstedt and Mee, 2002). The reliability of items that make up a scale indicates the extent to which the scale yields consistent results over repeated observations (Eagly and Chaiken, 1993). Other ways of thinking about the reliability of a measure are: (a) "the extent to which it is free from random error" (Eagly and Chaiken, 1993, p. 64), or (b) "how well scores on the measuring instrument correlate with themselves" (Eagly and Chaiken, 1993, p. 64). We use Chronbach's alpha and Pearson product moment correlations to report the reliability of the scales in this report.

Survey Response Rate

Of the 2,000 questionnaires mailed, 121 were undeliverable or otherwise invalid. Of the remaining 1,879 surveys, a total of 784 were returned, resulting in a response rate of 41.7%. An additional 80 shortened or late full-length surveys, used to gauge nonresponse, were returned for a total response rate of 46.0%.

Population Estimates

The study sample was drawn using a stratified random sample with region of residence defining the two study strata. For this reason the data had to be weighted to reflect the proportion of the population residing in each region when making statewide estimates. Based on ELS records for the 2014 fishing season, 58.2% of anglers age 18 and over reside in counties outside the metropolitan area with 41.9% residing in seven metropolitan counties (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington). Our respondents included 52.1% from outside the metropolitan area and 47.9% from the metropolitan area. Weights were applied to data so statewide results reflected the angler population in 2014. Regional results were not weighted.

Section 1: Fishing Background and Preferences

Fishing Participation

On average, respondents had fished in Minnesota for about 40 years. There was no significant difference in years fishing in the state, when comparing anglers from the metropolitan and non-metropolitan areas (Table 1-1). Respondents had purchased a Minnesota fishing license an average of 8.4 of the past 10 years (Table 1-2), with no significant difference by region of residence. On average, respondents fished a total of 24.2 days in the past year, with an average of 21.2 in lakes and 3.1 in rivers or streams (Table 1-3). Respondents from outside the metropolitan areas fished significantly more days. On average, respondents fished the greatest number of days in the northwest (M=8.3 days) and central-southeast (M=8.2 days) regions (Table 1-4). Respondents from outside the metropolitan area fished significantly more days in the northwest and south-southwest regions.

Fish Species Preferences

Respondents were asked to rate their preferences for targeting 20 fish species using the scale 1 (strongly not preferred) to 5 (strongly preferred) (Table 1-5 to 1-25). Walleye was the most preferred species (M=4.3) with crappies also high on the list (M=4.2); carp or suckers (M=1.9) and bullhead (M=1.9) were least preferred (Table 1-5). Northern pike (Table 1-8), muskellunge (Table 1-9), smallmouth bass (Table 1-13), and largemouth bass (Table 1-14) were more strongly preferred by metropolitan residents relative to those from outside the metropolitan area.

Section 1: Fishing Background and Preferences

Table 1-1: Number of years fishing in Minnesota.

Strata	n	Mean	SD	Range
Statewide[1]	739	40.2	18.3	0-82
Metro respondents	350	39.0	18.0	1-82
Non-metro respondents	388	41.0	18.5	0-73
		t=1.506 n.s.		

[1] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 1-2: Number of years of past 10 purchased a Minnesota fishing license.

Strata	n	Mean	SD	Range
Statewide[1]	729	8.4	2.7	0-10
Metro respondents	349	8.2	2.8	1-10
Non-metro respondents	380	8.6	2.6	0-10
		t = 1.803 n.s.		

[1] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 1-3: Number of days fishing…

Strata	Total			In lakes			In rivers or streams		
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range
Statewide[1]	24.2	30.1	0-200	21.2	27.5	0-200	3.1	7.8	0-75
Metro respondents	19.9	24.5	0-200	18.3	23.7	0-200	1.7	4.1	0-40
Non-metro respondents	27.2	33.2	0-200	23.2	29.8	0-200	4.0	9.5	0-75
	t = 3.355**			t = 2.491*			t = 4.097***		

[1] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Section 1: Fishing Background and Preferences

Table 1-4: Number of days fishing in different regions…

Strata	Northwest			Northeast			South-southwest			Central-southeast		
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range
Statewide[1]	8.3	19.2	0-180	4.1	9.7	0-100	3.7	16.0	0-200	8.2	17.4	0-200
Metro respondents	5.1	12.4	0-150	4.4	9.1	0-70	1.3	4.4	0-35	9.5	19.8	0-200
Non-metro respondents	10.5	22.5	0-180	4.0	10.1	0-100	5.5	20.4	0-200	7.3	15.5	0-100
	t = 3.962***			t = 0.564 n.s.			t = 3.741***			t = 1.702 n.s.		

[1] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 1-5: Comparison of preferences for fish species.

	% who target	Mean[1]
Walleye	91.8%	4.3
Crappie	89.4%	4.2
Sunfish	86.1%	3.9
Sauger	54.0%	3.6
Smallmouth bass	74.4%	3.6
Largemouth bass	75.6%	3.6
Northern pike	79.8%	3.5
Yellow Perch	69.5%	3.4
Rainbow trout	40.7%	3.2
Brook trout	37.2%	3.2
Lake trout	40.8%	3.1
Brown trout	37.2%	3.1
Muskellunge	48.0%	3.0
Salmon (Lake Superior)	33.2%	2.9
White bass	45.7%	2.7
Lake sturgeon	30.6%	2.6
Channel catfish	39.2%	2.4
Flathead catfish	39.2%	2.3
Carp or suckers	41.1%	1.9
Bullhead	42.6%	1.9

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Section 1: Fishing Background and Preferences

Table 1-6: Species preference: Walleye.

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	714	3.0%	0.3%	12.1%	28.6%	56.0%	4.3
Metro respondents	340	2.4%	0.3%	13.2%	28.2%	55.9%	4.4
Non-metro respondents	377	3.5%	0.3%	11.2%	28.9%	56.1%	4.3
	χ^2=1.384 n.s.						t = 0.152 n.s.

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 37 do not fish for

Table 1-7: Species preference: Sauger.

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	420	4.8%	8.3%	35.1%	30.5%	21.3%	3.6
Metro respondents	203	4.4%	10.8%	38.4%	26.1%	20.2%	3.5
Non-metro respondents	217	5.1%	6.5%	32.7%	33.6%	22.1%	3.6
	χ^2=5.571 n.s.						t = 1.397 n.s.

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 297 do not fish for

Table 1-8: Species preference: Northern pike.

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	620	3.3%	10.5%	32.8%	35.5%	17.9%	3.5
Metro respondents	294	1.4%	8.8%	33.0%	37.4%	19.4%	3.6
Non-metro respondents	325	4.6%	11.7%	32.6%	34.2%	16.9%	3.5
	χ^2=7.524 n.s.						t = 2.185*

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 100 do not fish for

Section 1: Fishing Background and Preferences

Table 1-9: Species preference: Muskellunge.

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	366	11.3%	22.0%	35.1%	18.0%	13.6%	3.0
Metro respondents	192	6.8%	21.4%	35.4%	18.8%	17.7%	3.2
Non-metro respondents	178	15.2%	22.5%	34.8%	17.4%	10.1%	2.8
	χ^2=9.970*, V=0.164						t = 2.826**

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 335 do not fish for

Table 1-10: Species preference: Yellow Perch.

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	540	4.8%	13.1%	39.2%	27.2%	15.7%	3.4
Metro respondents	264	4.9%	15.2%	40.5%	27.3%	12.1%	3.3
Non-metro respondents	277	4.7%	11.6%	38.3%	27.1%	18.4%	3.4
	χ^2=4.995 n.s.						t = 1.835 n.s.

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 179 do not fish for

Table 1-11: Species preference: Crappie.

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	695	1.9%	2.8%	16.2%	36.1%	43.1%	4.2
Metro respondents	331	1.8%	3.3%	14.2%	38.1%	42.6%	4.2
Non-metro respondents	364	1.9%	2.5%	17.6%	34.6%	43.4%	4.2
	χ^2=2.285 n.s.						t = 0.172 n.s.

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 50 do not fish for

Section 1: Fishing Background and Preferences

Table 1-12: Species preference: Sunfish.

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	669	2.4%	4.9%	25.3%	32.9%	34.6%	3.9
Metro respondents	322	2.5%	5.6%	26.4%	32.6%	32.9%	3.9
Non-metro respondents	347	2.3%	4.3%	24.5%	33.1%	35.7%	4.0
	χ^2=1.203 n.s.						t = 1.004 n.s.

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 63153do not fish for

Table 1-13: Species preference: Smallmouth bass.

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	575	2.8%	10.1%	35.0%	30.4%	21.6%	3.6
Metro respondents	292	2.4%	5.8%	30.8%	34.9%	26.0%	3.8
Non-metro respondents	287	3.1%	13.6%	38.3%	26.8%	18.1%	3.4
	χ^2=18.843**, V=0.180						t = 3.955***

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 153 do not fish for

Table 1-14: Species preference: Largemouth bass.

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	583	3.4%	12.0%	30.8%	29.2%	24.6%	3.6
Metro respondents	297	2.0%	6.7%	26.6%	36.0%	28.6%	3.8
Non-metro respondents	290	4.5%	16.2%	34.1%	23.8%	21.4%	3.4
	χ^2=27.430***, V=0.216						t = 4.706***

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 142 do not fish for

Section 1: Fishing Background and Preferences

Table 1-15: Species preference: White bass.

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	352	10.5%	31.3%	42.5%	9.9%	5.8%	2.7
Metro respondents	182	9.9%	25.8%	45.6%	12.1%	6.6%	2.8
Non-metro respondents	173	11.0%	35.8%	39.9%	8.1%	5.2%	2.6
	χ^2=5.362 n.s.						t = 1.814 n.s.

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 363 do not fish for

Table 1-16: Species preference: Lake trout.

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	314	9.5%	22.4%	35.2%	15.7%	17.2%	3.1
Metro respondents	160	6.9%	20.0%	40.6%	19.4%	13.1%	3.1
Non-metro respondents	156	11.5%	24.4%	30.8%	12.8%	20.5%	3.1
	χ^2=9.368 n.s.						t = 0.407 n.s.

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 397 do not fish for

Table 1-17: Species preference: Rainbow trout.

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	315	9.0%	18.8%	34.4%	17.3%	20.4%	3.2
Metro respondents	152	7.9%	17.8%	42.1%	19.1%	13.2%	3.1
Non-metro respondents	163	9.8%	19.6%	28.8%	16.0%	25.8%	3.3
	χ^2=11.198*, V=0.189						t = 1.200 n.s.

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 403 do not fish for

Section 1: Fishing Background and Preferences

Table 1-18: Species preference: Brook trout.

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	287	9.1%	22.0%	34.8%	12.7%	21.4%	3.2
Metro respondents	141	8.5%	20.6%	44.0%	10.6%	16.3%	3.1
Non-metro respondents	147	9.5%	23.1%	27.9%	14.3%	25.2%	3.2
	χ^2=8.978 n.s.						t = 1.154 n.s.

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 432 do not fish for

Table 1-19: Species preference: Brown trout.

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	287	10.4%	23.0%	33.8%	12.9%	20.0%	3.1
Metro respondents	141	10.6%	19.1%	42.6%	12.8%	14.9%	3.0
Non-metro respondents	147	10.2%	25.9%	27.2%	12.9%	23.8%	3.1
	χ^2=9.268 n.s.						t = 0.829 n.s.

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 430 do not fish for

Table 1-20: Species preference: Carp or suckers.

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	319	46.1%	24.7%	21.1%	5.1%	3.0%	1.9
Metro respondents	143	51.7%	20.3%	21.7%	4.9%	1.4%	1.8
Non-metro respondents	174	42.5%	27.6%	20.7%	5.2%	4.0%	2.0
	χ^2=5.107 n.s.						t = 1.388 n.s.

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 398 do not fish for

Section 1: Fishing Background and Preferences

Table 1-21: Species preference: Bullhead.

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	332	45.5%	26.3%	22.3%	3.5%	2.4%	1.9
Metro respondents	154	50.0%	22.7%	22.7%	1.9%	2.6%	1.8
Non-metro respondents	177	42.4%	28.8%	22.0%	4.5%	2.3%	2.0
	χ^2=3.913 n.s.						t = 0.991 n.s.

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 387 do not fish for

Table 1-22: Species preference: Flathead catfish.

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	305	33.2%	26.6%	25.2%	9.1%	5.9%	2.3
Metro respondents	145	35.9%	26.2%	22.1%	9.7%	6.2%	2.2
Non-metro respondents	160	31.3%	26.9%	27.5%	8.8%	5.6%	2.3
	χ^2=1.509 n.s.						t = 0.476 n.s.

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 410 do not fish for

Table 1-23: Species preference: Channel catfish.

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	305	27.3%	26.2%	29.8%	9.4%	7.3%	2.4
Metro respondents	145	29.7%	26.9%	26.9%	10.3%	6.2%	2.4
Non-metro respondents	160	25.6%	25.6%	31.9%	8.8%	8.1%	2.5
	χ^2=1.726 n.s.						t = 0.846 n.s.

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 407 do not fish for

Table 1-24: Species preference: Salmon (Lake Superior).

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	255	17.7%	17.0%	34.7%	15.1%	15.5%	2.9
Metro respondents	135	15.6%	14.1%	43.0%	15.6%	11.9%	2.9
Non-metro respondents	123	19.5%	19.5%	27.6%	14.6%	18.7%	2.5
	χ^2=7.989 n.s.						t = 0.036 n.s.

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 461 do not fish for

Table 1-25: Species preference: Lake sturgeon.

	n	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	Mean[1]
Statewide[2]	237	20.3%	22.6%	40.3%	11.2%	5.5%	2.6
Metro respondents	119	22.7%	19.3%	44.5%	8.4%	5.0%	2.5
Non-metro respondents	119	18.5%	25.2%	37.0%	13.4%	5.9%	2.6
	χ^2=3.731 n.s.						t = 0.648 n.s.

[1] Mean is based on the scale: 1 = strongly not preferred, 2 = not preferred, 3 = neutral, 4 = preferred, 5 = strongly preferred.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001
n = 480 do not fish for

Section 2: Satisfaction With Minnesota Fishing

Satisfaction with Fishing in Minnesota

Respondents were asked to report their overall satisfaction with the overall fishing experience, along with six other specific aspects of fishing (Tables 2-1 through 2-8). Response was on the scale 1 (very dissatisfied) to 5 (very satisfied). On average, respondents were most satisfied with the overall fishing experience (*M*=3.8) and access (*M*=3.7) and closer to neutral about the number of fish they caught (*M*=3.2) and the behavior of non-anglers (*M*=3.2) (Table 2-1). Nearly three-fourths of respondents (73.3%) were satisfied or very satisfied with their overall fishing experience (Table 2-2). Just over half (50.2%) were satisfied or very satisfied with the size of the fish they caught (Table 2-3), while less than half (43.4%) were satisfied or very satisfied with the number of fish they caught (Table 2-4).

Less than half (45.8%) were satisfied or very satisfied with the behavior of other anglers (Table 2-5), or non-anglers (37.4%) (Table 2-6). About two-thirds of respondents (66.5%) were satisfied or very satisfied with access (Table 2-7), and 54.9% were satisfied or very satisfied with fish habitat (Table 2-8).

Section 2: Satisfaction With Minnesota Fishing

Table 2-1: Comparison of satisfaction with different aspects of fishing.

	Mean[1]
Overall fishing experience	3.8
Access	3.7
Fish habitat	3.5
The size of the fish you catch	3.4
The behavior of other anglers	3.4
The number of fish you catch	3.2
The behavior of non-anglers	3.2

[1] Mean is based on the scale: Mean is based on the following scale: 1 = very dissatisfied; 2 = dissatisfied; 3 = neutral; 4 = satisfied; 5 = very satisfied.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 2-2: Satisfaction with: Overall fishing experience.

	n	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied	Mean[1]
Statewide[2]	752	1.1%	5.7%	19.9%	54.6%	18.7%	3.8
Metro respondents	356	0.8%	4.5%	16.9%	58.4%	19.4%	3.9
Non-metro respondents	395	1.3%	6.6%	22.0%	51.9%	18.2%	3.8
	χ^2=5.916 n.s.						t = 1.956 n.s.

[1] Mean is based on the scale: Mean is based on the following scale: 1 = very dissatisfied; 2 = dissatisfied; 3 = neutral; 4 = satisfied; 5 = very satisfied.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 2-3: Satisfaction with: The size of the fish you catch.

	n	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied	Mean[1]
Statewide[2]	756	1.0%	15.5%	33.3%	43.4%	6.8%	3.4
Metro respondents	358	0.3%	16.8%	35.2%	41.3%	6.4%	3.4
Non-metro respondents	397	1.5%	14.6%	32.0%	44.8%	7.1%	3.4
	χ^2=4.859 n.s.						t = 0.706 n.s.

[1] Mean is based on the scale: Mean is based on the following scale: 1 = very dissatisfied; 2 = dissatisfied; 3 = neutral; 4 = satisfied; 5 = very satisfied.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Section 2: Satisfaction With Minnesota Fishing

Table 2-4: Satisfaction with: The number of fish you catch.

	n	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied	Mean[1]
Statewide[2]	747	2.9%	19.9%	33.8%	36.4%	7.0%	3.2
Metro respondents	357	2.0%	20.4%	34.7%	36.1%	6.7%	3.3
Non-metro respondents	390	3.6%	19.5%	33.1%	36.7%	7.2%	3.2
	χ^2=2.067 n.s.						t = 0.123 n.s.

[1] Mean is based on the scale: Mean is based on the following scale: 1 = very dissatisfied; 2 = dissatisfied; 3 = neutral; 4 = satisfied; 5 = very satisfied.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 2-5: Satisfaction with: The behavior of other anglers.

	n	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied	Mean[1]
Statewide[2]	753	1.9%	9.7%	42.7%	40.7%	5.1%	3.4
Metro respondents	358	1.7%	10.1%	42.5%	40.8%	5.0%	3.4
Non-metro respondents	394	2.0%	9.4%	42.9%	40.6%	5.1%	3.4
	χ^2=0.223 n.s.						t = 0.021 n.s.

[1] Mean is based on the scale: Mean is based on the following scale: 1 = very dissatisfied; 2 = dissatisfied; 3 = neutral; 4 = satisfied; 5 = very satisfied.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 2-6: Satisfaction with: The behavior of non-anglers.

	n	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied	Mean[1]
Statewide[2]	749	5.0%	10.7%	46.8%	32.5%	4.9%	3.2
Metro respondents	360	5.8%	11.4%	47.5%	30.3%	5.0%	3.2
Non-metro respondents	389	4.4%	10.3%	46.3%	34.2%	4.9%	3.2
	χ^2=1.951 n.s.						t = 1.189 n.s.

[1] Mean is based on the scale: Mean is based on the following scale: 1 = very dissatisfied; 2 = dissatisfied; 3 = neutral; 4 = satisfied; 5 = very satisfied.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Section 2: Satisfaction With Minnesota Fishing

Table 2-7: Satisfaction with: Access.

	n	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied	Mean[1]
Statewide[2]	752	1.8%	6.3%	25.4%	57.1%	9.4%	3.7
Metro respondents	357	1.4%	8.7%	24.6%	55.7%	9.5%	3.6
Non-metro respondents	394	2.0%	4.6%	25.9%	58.1%	9.4%	3.7
	χ^2=5.593 n.s.						t = 0.844 n.s.

[1] Mean is based on the scale: Mean is based on the following scale: 1 = very dissatisfied; 2 = dissatisfied; 3 = neutral; 4 = satisfied; 5 = very satisfied.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 2-8: Satisfaction with: Fish habitat.

	n	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied	Mean[1]
Statewide[2]	755	0.8%	9.1%	35.2%	48.4%	6.5%	3.5
Metro respondents	360	1.1%	12.0%	34.3%	46.2%	6.4%	3.4
Non-metro respondents	396	0.5%	7.1%	35.9%	49.9%	6.6%	3.5
	χ^2=6.325 n.s.						t = 1.668 n.s.

[1] Mean is based on the scale: Mean is based on the following scale: 1 = very dissatisfied; 2 = dissatisfied; 3 = neutral; 4 = satisfied; 5 = very satisfied.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Section 3: Involvement With Fishing

Involvement with Fishing

Respondents were asked how much they agreed with a series of 15 statements about their involvement in fishing. Items were derived from previous studies addressing involvement in recreation activities (Kyle et al., 2007). This research has identified five factors addressing the personal relevance of recreation activities to individuals, including: (a) attraction to the activity, (b) centrality of the activity, which is comprised of items that examine the locus of the activity within the context of an individual's lifestyle, (c) social bonding, which includes items that capture how involvement is driven by social ties, (d) identity affirmation, which examines the extent that the activity affirms the self to the self, and (e) identity expression, which examines the extent that the activity expresses the self to others (Kyle et al., 2007).

Response was on a scale of 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agree). The statements included general statements about how much people enjoy fishing, how important fishing is to them, how much they personally identify as an angler, fishing-related social connections, and fishing equipment (Tables 3-1 to 3-16). Responses to statements ranged from 2.7 for "A lot of my life is organized around fishing" to 4.1 for "Fishing is one of the most enjoyable things I do" (F=209.464; $p\leq$0.001) (Table 3-1).

Based on the Kyle et al. (2007) five factor scale of recreation involvement, we examined the following five factors: (a) attraction (M=3.7), (b) centrality (M=3.0), (c) social bonding (M=3.7), (d) identity affirmation (M=3.4), and (e) identity expression (M=3.2). For comparison, involvement ratings on a recent statewide angler study were: (a) attraction (M=4.0), (b) centrality (M=3.0), (c) social bonding (M=3.4), (d) identity affirmation (M=3.6), and (e) identity expression (M=3.2) (Schroeder, 2012). There was no significant difference between metropolitan and non-metropolitan residents in ratings of involvement factors.

Three items related to attraction to fishing: (a) Fishing is one of the most enjoyable things I do (M=4.1) (Table 3-2); (b) Fishing is one of the most satisfying things I do (M=3.5) (Table 3-10); and (c) Fishing is very important to me (M=3.5) (Table 3-12).

Three items related to the centrality of fishing to peoples' lives: (a) To change my preference from fishing to another recreation activity would require major rethinking (M=3.4) (Table 3-4); (b) A lot of my life is organized around fishing (M=2.7) (Table 3-5); and (c) Fishing has a central role in my life (M=2.8) (Table 3-6).

Three items addressed social bonding related to fishing: (a) Fishing provides me with the opportunity to be with friends (M=4.1) (Table 3-3); (b) Most of my friends are in some way connected with fishing (M=3.2) (Table 3-7); and (c) I enjoy discussing fishing with my friends (M=3.7) (Table 3-15).

Three items related identity affirmation related to fishing: (a) I identify with the people and image associated with fishing (M=3.3) (Table 3-9); (b) When I am fishing I can really be myself (M=3.6) (Table 3-14); and (c) When I am fishing, I don't have to be concerned about what other people think of me (M=3.4) (Table 3-16).

Three items related identity expression related to fishing: (a) When I am fishing, others see me the way I want them to see me (M=3.4) (Table 3-8); (b) Participating in fishing says a lot about who I am (M=3.1) (Table 3-11); and (c) You can tell a lot about a person when you see them fishing (M=3.1) (Table 3-13).

Results suggest that respondents are attracted to fishing, and their involvement is related to social connections to the activity. To some extent, fishing affirms and expresses their identity, but it is not necessarily a central activity in their lives. Looking at other concepts measured in the study, we found that fishing involvement factors were generally positively correlated with overall satisfaction and satisfaction with the size and number of fish, while it was negatively correlated to satisfaction with angler and non-angler behavior.

Section 3: Involvement With Fishing

Table 3-1: Comparison involvement measures.

	Mean[1]
Fishing is one of the most enjoyable things I do.	4.1
Fishing provides me with the opportunity to be with friends.	4.1
I enjoy discussing fishing with my friends.	3.7
When I am fishing I can really be myself.	3.6
Fishing is one of the most satisfying things I do.	3.5
Fishing is very important to me.	3.5
To change my preference from fishing to another recreation activity would require major rethinking.	3.4
When I am fishing, others see me the way I want them to see me.	3.4
When I am fishing, I don't have to be concerned about what other people think of me.	3.4
I identify with the people and image associated with fishing.	3.3
Most of my friends are in some way connected with fishing.	3.2
Participating in fishing says a lot about who I am.	3.1
You can tell a lot about a person when you see them fishing.	3.1
Fishing has a central role in my life.	2.8
A lot of my life is organized around fishing.	2.7

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.

Table 3-2: Involvement with fishing: Fishing is one of the most enjoyable things I do.

		% of anglers indicating that they _____ with this statement:					
Residence of angler	**n**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**Mean[1]**
Statewide[2]	751	1.0%	3.1%	17.2%	44.1%	34.5%	4.1
Metro respondents	358	0.3%	5.0%	16.8%	43.9%	34.1%	4.1
Non-metro respondents	393	1.5%	1.8%	17.6%	44.3%	34.9%	4.1
		χ^2= 9.170 n.s.					t=0.438 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 3: Involvement With Fishing

Table 3-3: Involvement with fishing: Fishing provides me with the opportunity to be with friends.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	751	0.3%	2.6%	13.0%	54.4%	29.7%	4.1
Metro respondents	358	0.0%	1.7%	12.3%	55.3%	30.7%	4.2
Non-metro respondents	393	0.5%	3.3%	13.5%	53.7%	29.0%	4.1
		χ^2= 4.277 n.s.					t=1.435 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 3-4: Involvement with fishing: To change my preference from fishing to another recreation activity would require major rethinking.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	749	4.8%	17.6%	34.2%	24.5%	18.9%	3.4
Metro respondents	357	4.5%	18.2%	31.7%	26.1%	19.6%	3.4
Non-metro respondents	392	5.1%	17.1%	36.0%	23.5%	18.4%	3.3
		χ^2= 1.964 n.s.					t=0.634 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 3: Involvement With Fishing

Table 3-5: Involvement with fishing: A lot of my life is organized around fishing.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	751	11.3%	34.0%	32.1%	15.3%	7.3%	2.7
Metro respondents	357	11.2%	35.6%	30.8%	16.0%	6.4%	2.7
Non-metro respondents	393	11.5%	32.8%	33.1%	14.8%	7.9%	2.7
		χ^2= 1.446 n.s.					t=0.499 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 3-6: Involvement with fishing: Fishing has a central role in my life.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	743	12.4%	30.0%	28.7%	21.4%	7.5%	2.8
Metro respondents	354	13.8%	29.9%	28.2%	20.3%	7.6%	2.8
Non-metro respondents	389	11.3%	30.1%	29.0%	22.1%	7.5%	2.8
		χ^2= 1.270 n.s.					t=0.764 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 3: Involvement With Fishing

Table 3-7: Involvement with fishing: Most of my friends are in some way connected with fishing.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	750	6.1%	22.5%	26.8%	35.4%	9.1%	3.2
Metro respondents	356	7.6%	28.1%	26.1%	28.4%	9.8%	3.0
Non-metro respondents	393	5.1%	18.6%	27.2%	40.5%	8.7%	3.3
		χ^2= 17.404**, Cramer's V=0.152					t=3.081**

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 3-8: Involvement with fishing: When I am fishing, others see me the way I want them to see me.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	749	4.3%	8.1%	37.7%	40.2%	9.6%	3.4
Metro respondents	355	4.2%	8.5%	42.5%	33.8%	11.0%	3.4
Non-metro respondents	393	4.3%	7.9%	34.4%	44.8%	8.7%	3.5
		χ^2= 10.069*, Cramer's V=0.116					t=0.983 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 3: Involvement With Fishing

Table 3-9: Involvement with fishing: I identify with the people and image associated with fishing.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	747	4.1%	14.7%	38.3%	34.7%	8.1%	3.3
Metro respondents	356	4.5%	16.0%	0.0%	37.4%	0.3%	3.3
Non-metro respondents	392	3.8%	13.8%	0.3%	38.8%	0.0%	3.3
		χ^2= 3.548 n.s.					t=0.538 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 3-10: Involvement with fishing: Fishing is one of the most satisfying things I do.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	747	4.8%	10.4%	30.3%	37.6%	16.9%	3.5
Metro respondents	354	5.4%	11.0%	29.1%	36.7%	17.8%	3.5
Non-metro respondents	392	4.3%	9.9%	31.1%	38.3%	16.3%	3.5
		χ^2= 1.220 n.s.					t=0.226 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 3: Involvement With Fishing

Table 3-11: Involvement with fishing: Participating in fishing says a lot about who I am.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	747	7.3%	16.6%	39.6%	27.9%	8.5%	3.1
Metro respondents	355	7.6%	17.7%	39.2%	27.3%	8.2%	3.1
Non-metro respondents	392	7.2%	15.9%	39.9%	28.4%	8.7%	3.2
		χ^2= 0.609 n.s.					t=0.591 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 3-12: Involvement with fishing: Fishing is very important to me.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	749	4.1%	9.5%	32.3%	35.7%	18.4%	3.5
Metro respondents	355	4.2%	10.4%	30.4%	38.3%	16.6%	3.5
Non-metro respondents	393	4.1%	8.9%	33.6%	33.8%	19.6%	3.6
		χ^2= 2.981 n.s.					t=0.439 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 3: Involvement With Fishing

Table 3-13: Involvement with fishing: You can tell a lot about a person when you see them fishing.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	745	6.1%	16.8%	42.7%	26.0%	8.3%	3.1
Metro respondents	352	6.5%	20.7%	41.5%	24.1%	7.1%	3.1
Non-metro respondents	392	5.9%	14.0%	43.6%	27.3%	9.2%	3.2
		χ^2= 6.877 n.s.					t=2.105*

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 3-14: Involvement with fishing: When I am fishing I can really be myself.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	743	2.6%	7.4%	34.9%	40.2%	14.9%	3.6
Metro respondents	353	3.4%	7.9%	34.0%	40.8%	13.9%	3.5
Non-metro respondents	389	2.1%	6.9%	35.5%	39.8%	15.7%	3.6
		χ^2= 2.046 n.s.					t=0.933 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 3: Involvement With Fishing

Table 3-15: Involvement with fishing: I enjoy discussing fishing with my friends.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	749	2.3%	5.4%	27.2%	49.6%	15.5%	3.7
Metro respondents	355	3.4%	5.9%	25.6%	51.0%	14.1%	3.7
Non-metro respondents	393	1.5%	5.1%	28.2%	48.6%	16.5%	3.7
		χ^2= 4.311 n.s.					t=1.097 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 3-16: Involvement with fishing: When I am fishing, I don't have to be concerned about what other people think of me.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	744	5.0%	13.9%	31.7%	32.6%	14.8%	3.4
Metro respondents	353	3.7%	13.3%	33.7%	34.3%	15.0%	3.4
Non-metro respondents	390	5.9%	14.4%	30.3%	33.8%	15.6%	3.4
		χ^2= 2.772 n.s.					t=0.598 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 4: Fishing Catch Orientation

Catch Orientation

We measured catch orientation using items adapted from Anderson et al. (2007), Kyle et al. (2007), and Carlin, Schroeder, and Fulton (2012), and previously used to study catch orientation among Minnesota anglers (Schroeder & Fulton, 2013), including walleye anglers (Schroeder, Fulton, & Moeckel, 2009), northern pike anglers (Schroeder & Moeckel, 2010), and bass anglers (Schroeder, 2012a). Respondents were asked to rate their agreement with each item on the 5-point scale 1(strongly disagree) to 5 (strongly agree). Results are summarized in Tables 4-1 through 4-20.

We identified four factors that represent anglers' catch orientation: catching many fish (M= 3.0), catching some fish (M= 2.7), catching big fish (M= 2.9), and keeping fish (M= 2.3). For comparison, catch orientation ratings on a recent statewide angler study were: (a) catching many fish (M=3.1), (b) catching some fish (M=2.7), (c) catching big fish (M=2.9), (d) keeping fish (M=2.2) (Schroeder, 2012). Metropolitan residents rated keeping fish significantly less important (M=2.2) than non-metropolitan residents did (M=2.4) (t=3.381, p<0.01).

Six statements were associated with keeping fish (M=2.3, Cronbach's alpha (α) = 0.814). The items included in this scale are: (a) "I'm just as happy if I release the fish I catch" (reversed) (M=3.8) (Table 4-7) (unreversed mean shown, score reversed for reliability), (b) "I'm just as happy if I don't keep the fish I catch" (reversed) (M=3.5) (Table 4-10) (unreversed mean shown, score reversed for reliability), (c) I want to keep all the fish I catch (M=2.0) (Table 4-11), (d) I must keep the fish I catch for the trip to be successful (M=1.9) (Table 4-12), (e) A full stringer of fish is the best indicator of a good fishing trip (M=2.5) (Table 4-14), (f) "Keeping a few fish is more important to me than catching and releasing larger fish" (M=2.8) (Table 4-20).

Five statements loaded on the factor related to catching some fish (M=2.7, Cronbach's alpha (α) = 0.504). The items included in this scale are: (a) "When I go fishing, I'm just as happy if I don't catch anything" (M=3.0) (Table 4-3), (unreversed mean shown, score reversed for factor mean reliability), (b) "If I thought I wouldn't catch any fish, I wouldn't go fishing" (M=2.7) (Table 4-5), (c) "I must catch fish for the fishing trip to be enjoyable" (M=2.7) (Table 4-13), (d) "When I go fishing, I'm not satisfied unless I catch at least something" (M=3.1) (Table 4-15), and (e) "A fishing trip can be enjoyable even if no fish are caught" (M=3.7) (Table 4-18), (unreversed mean shown, score reversed for factor mean and reliability).

Four statements loaded on the factor related to catching big fish (M=2.9, Cronbach's alpha (α) = 0.646). The items included in this scale are: (a) "Catching large fish is essential to a "good" fishing trip" (M=2.8) (Table 4-4), (b) "I like to fish where I know I have a chance to catch a "trophy"" (M=2.8) (Table 4-6), (c) "I would rather catch 1 or 2 big fish than 10 smaller fish" (M=2.9) (Table 4-9), and (d) "I would rather catch 1 or 2 big fish than 5 smaller fish" (M=3.0) (Table 4-19).

Three statements loaded on the factor related to catching many fish (M=3.0, Cronbach's alpha (α) = 0.746). The items included in this scale are: (a) "The more fish I catch the happier I am" (M=3.4) (Table 4-8), (b) "A successful fishing trip is one in which many fish are caught" (M=2.9) (Table 4-16), and (c) "I'm happiest with a fishing trip if I catch at least the limit" (M=2.7) (Table 4-17).

Results suggest that these anglers are similar to other studies on Minnesota anglers in terms of catch orientation, with keeping fish relatively less important than catching some or many fish, or catching big

fish. Looking at other concepts measured in the study, we found that increased catch orientation was negatively related to overall satisfaction and satisfaction with the size and number of fish.

Section 4: Fishing Catch Orientation

Table 4-1: Comparison of catch orientation measures.

	Mean[1]
I like to fish where I know I have a chance to catch a "trophy"	3.8
I'm happiest with a fishing trip if I catch at least the limit	3.7
I would rather catch 1 or 2 big fish than 10 smaller fish	3.5
I'm just as happy if I release the fish I catch	3.4
A full stringer of fish is the best indicator of a good fishing trip	3.1
Catching enough fish for a meal is essential to a "good" fishing trip	3.0
A fishing trip can be enjoyable even if no fish are caught	3.0
Keeping a few fish is more important to me than catching & releasing larger fish	3.0
The more fish I catch the happier I am	2.9
When I go fishing, I'm not satisfied unless I catch at least something	2.9
When I go fishing, I'm just as happy if I don't catch anything	2.8
If I thought I wouldn't catch any fish, I wouldn't go fishing	2.8
I would rather catch 1 or 2 big fish than 5 smaller fish	2.8
Catching large fish is essential to a "good" fishing trip	2.7
I must keep the fish I catch for the trip to be successful	2.7
A successful fishing trip is one in which many fish are caught	2.7
I must catch fish for the fishing trip to be enjoyable	2.5
I'm just as happy if I don't keep the fish I catch	2.0
I want to keep all the fish I catch	1.9

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Section 4: Fishing Catch Orientation

Table 4-2: Fishing catch orientation: Catching enough fish for a meal is essential to a "good" fishing trip.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	750	6.7%	20.0%	23.1%	37.3%	12.9%	3.3
Metro respondents	356	9.3%	23.0%	21.9%	35.4%	10.4%	3.1
Non-metro respondents	393	4.8%	17.8%	23.9%	38.7%	14.8%	3.4
		χ^2=11.479* , Cramer's V=0.124					t=3.172**

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 4-3: Fishing catch orientation When I go fishing, I'm just as happy if I don't catch anything.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	741	5.0%	32.5%	29.0%	27.3%	6.3%	3.0
Metro respondents	355	5.1%	36.9%	26.5%	25.9%	5.6%	2.9
Non-metro respondents	386	4.9%	29.3%	30.8%	28.2%	6.7%	3.0
		χ^2=5.222 n.s.					t=1.655 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 4: Fishing Catch Orientation

Table 4-4: Fishing catch orientation: Catching large fish is essential to a "good" fishing trip.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	748	4.9%	36.9%	35.4%	19.3%	3.5%	2.8
Metro respondents	356	4.2%	37.5%	35.8%	19.2%	3.4%	2.8
Non-metro respondents	393	5.4%	36.5%	35.2%	19.4%	3.6%	2.8
		χ^2=0.586 n.s.					t=0.021 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 4-5: Fishing catch orientation If I thought I wouldn't catch any fish, I wouldn't go fishing.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	748	11.8%	38.7%	21.4%	21.3%	6.8%	2.7
Metro respondents	354	11.6%	41.0%	19.2%	21.5%	6.8%	2.7
Non-metro respondents	393	12.0%	37.2%	22.9%	21.1%	6.9%	2.7
		χ^2=1.930 n.s.					t=0.349 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 4: Fishing Catch Orientation

Table 4-6: Fishing catch orientation: I like to fish where I know I have a chance to catch a "trophy".

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	750	8.5%	31.3%	34.3%	18.8%	7.1%	2.8
Metro respondents	356	9.0%	30.3%	32.9%	19.4%	8.4%	2.9
Non-metro respondents	393	8.1%	32.1%	35.4%	18.3%	6.1%	2.8
		χ^2=2.183 n.s.					t=0.744 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 4-7: Fishing catch orientation: I'm just as happy if I release the fish I catch.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	748	2.1%	8.4%	22.4%	39.6%	27.5%	3.8
Metro respondents	355	2.3%	6.2%	17.7%	42.8%	31.0%	3.9
Non-metro respondents	392	2.0%	9.9%	25.8%	37.2%	25.0%	3.7
		χ^2=12.554* , Cramer's V=0.130					t=2.876**

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 4: Fishing Catch Orientation

Table 4-8: Fishing catch orientation: The more fish I catch the happier I am.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	750	3.1%	15.8%	26.9%	43.0%	11.2%	3.4
Metro respondents	356	3.1%	12.4%	22.5%	48.0%	14.0%	3.6
Non-metro respondents	393	3.1%	18.3%	30.0%	39.4%	9.2%	3.3
		χ^2=15.369** , Cramer's V=0.143					t=3.385**

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 4-9: Fishing catch orientation: I would rather catch 1 or 2 big fish than 10 smaller fish.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	751	4.2%	32.8%	38.8%	18.3%	6.0%	2.9
Metro respondents	356	3.9%	31.2%	37.9%	18.3%	8.7%	3.0
Non-metro respondents	394	4.3%	34.0%	39.3%	18.3%	4.1%	2.8
		χ^2=7.067 n.s.					t=1.842 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 4: Fishing Catch Orientation

Table 4-10: Fishing catch orientation: I'm just as happy if I don't keep the fish I catch.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	748	2.1%	14.9%	30.3%	34.5%	18.2%	3.5
Metro respondents	353	2.3%	13.3%	24.6%	36.5%	23.2%	3.7
Non-metro respondents	394	2.0%	16.0%	34.3%	33.0%	14.7%	3.4
		χ^2=14.617** , Cramer's V=0.140					t=3.051**

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 4-11: Fishing catch orientation: I want to keep all the fish I catch.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	746	27.9%	49.3%	17.2%	4.8%	0.8%	2.0
Metro respondents	353	30.3%	48.7%	17.3%	2.8%	0.8%	2.0
Non-metro respondents	392	26.3%	49.7%	17.1%	6.1%	0.8%	2.1
		χ^2=5.537 n.s.					t=1.648 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 4: Fishing Catch Orientation

Table 4-12: Fishing catch orientation: I must keep the fish I catch for the trip to be successful.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	751	29.7%	50.2%	16.4%	3.2%	0.5%	1.9
Metro respondents	356	34.0%	50.8%	11.5%	3.1%	0.6%	1.9
Non-metro respondents	394	26.6%	49.7%	19.8%	3.3%	0.5%	2.0
		χ^2=11.505* , Cramer's V=0.124					t=2.741**

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 4-13: Fishing catch orientation I must catch fish for the fishing trip to be enjoyable.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	747	12.0%	36.1%	26.1%	23.2%	2.5%	2.7
Metro respondents	356	11.0%	37.6%	25.8%	22.8%	2.8%	2.7
Non-metro respondents	391	12.8%	35.0%	26.3%	23.5%	2.3%	2.7
		χ^2=1.128 n.s.					t=0.171 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 4: Fishing Catch Orientation

Table 4-14: Fishing catch orientation A full stringer of fish is the best indicator of a good fishing trip.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	752	14.0%	42.5%	27.0%	15.0%	1.7%	2.5
Metro respondents	357	14.0%	44.0%	26.3%	14.6%	1.1%	2.4
Non-metro respondents	394	14.0%	41.4%	27.4%	15.2%	2.0%	2.5
		χ^2=1.406 n.s.					t=0.737 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 4-15: Fishing catch orientation: When I go fishing, I'm not satisfied unless I catch at least something.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	751	7.0%	25.9%	24.8%	36.0%	6.3%	3.1
Metro respondents	356	7.6%	23.3%	27.2%	33.7%	8.1%	3.1
Non-metro respondents	394	6.6%	27.7%	23.1%	37.6%	5.1%	3.1
		χ^2=6.401 n.s.					t=0.594 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 4: Fishing Catch Orientation

Table 4-16: Fishing catch orientation A successful fishing trip is one in which many fish are caught

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	750	7.9%	29.6%	31.2%	27.6%	3.6%	2.9
Metro respondents	355	7.6%	27.3%	31.3%	29.0%	4.8%	3.0
Non-metro respondents	394	8.1%	31.2%	31.2%	26.6%	2.8%	2.8
		χ^2=3.395 n.s.					t=1.523 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 4-17: Fishing catch orientation I'm happiest with a fishing trip if I catch at least the limit.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	747	8.7%	40.0%	29.6%	18.2%	3.4%	2.7
Metro respondents	355	10.1%	41.7%	30.7%	14.4%	3.1%	2.6
Non-metro respondents	391	7.7%	38.9%	28.9%	21.0%	3.6%	2.7
		χ^2=6.534 n.s.					t=2.140*

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 4: Fishing Catch Orientation

Table 4-18: Fishing catch orientation: A fishing trip can be enjoyable even if no fish are caught.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	749	2.9%	9.1%	22.2%	51.5%	14.3%	3.7
Metro respondents	357	3.4%	9.0%	22.1%	49.0%	16.5%	3.7
Non-metro respondents	392	2.6%	9.2%	22.2%	53.3%	12.8%	3.6
		χ^2=2.927 n.s.					t=0.269 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 4-19: Fishing catch orientation: I would rather catch 1 or 2 big fish than 5 smaller fish.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	746	4.1%	29.4%	35.6%	24.2%	6.7%	3.0
Metro respondents	352	3.4%	25.9%	33.8%	27.6%	9.4%	3.1
Non-metro respondents	393	4.6%	31.8%	36.9%	21.9%	4.8%	2.9
		χ^2=11.321* , Cramer's V=0.123					t=3.198**

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 4: Fishing Catch Orientation

Table 4-20: Fishing catch orientation: Keeping a few fish is more important to me than catching & releasing larger fish.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	751	11.5%	30.0%	30.8%	23.2%	4.5%	2.8
Metro respondents	357	16.0%	32.8%	27.2%	19.6%	4.5%	2.6
Non-metro respondents	393	8.4%	28.0%	33.3%	25.7%	4.6%	2.9
		χ^2=15.732** , Cramer's V=0.145					t=3.376**

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 5: Fish Values

Fisheries-Related Value Orientations

Respondents were asked how much they agreed with a series of 14 statements about fisheries-related values. Items were derived from previous studies addressing fisheries-related value orientations (Bruskotter & Fulton, 2008) (Tables 5-1 to 5-15). Response was on a scale of 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agree). Responses to the different statements ranged from 2.0 for "Fisheries are valuable only if they produce jobs and income for people" to 4.5 for "People have a duty to protect fish and other parts of nature" (F=430.361; $p \leq 0.001$) (Table 5-1).

Based on the Bruskotter and Fulton (2008) three factor scale of recreation involvement, we examined the following fisheries-related value orientation factors: (a) utilitarian (M=2.5; α=0.731), (b) human dominance (M=2.6; α=0.706), and (c) protection (M=3.6; r=0.582).

Four items related to utilitarian values: (a) Fish are primarily valuable as food for people (M=3.1) (Table 5-8), (b) Nature's primary value is to provide things that are useful to people (M=2.7) (Table 5-12), (c) Fish are valuable only if people get to use them in some way (M=2.4) (Table 5-13), and (d) Fisheries are valuable only if they produce jobs and income for people (M=2.0), (Table 5-15).

Four items related to dominance values: (a) Fish have as much right to exist as people (reversed) (M=3.3) (Table 5-7), (b) Humans were meant to rule over the rest of nature (M=2.6) (Table 5-9), (c) Humans are no more important than other parts of nature (reversed) (M=2.9) (Table 5-10), and (d) Humans have a right to change the natural world to suit their needs (M=2.1) (Table 5-14).

Two items related to protection values: (a) Protecting the environment is more important than providing fishing opportunities (M=3.7) (Table 5-4) and (b) Management should focus on doing what is best for nature instead of what is best for people (M=3.6) (Table 5-6).

Results suggest that, on average, respondents hold protection values more strongly than dominance or utilitarian values. Differences in metropolitan versus non-metropolitan value orientations were not statistically significant. Higher utilitarian values were negatively related to with overall satisfaction and satisfaction with the size and number of fish.

Section 5: Fish Values

Table 5-1: Comparison of fish value orientation measures.

	Mean[1]
People have a duty to protect fish and other parts of nature.	4.5
Fish are valuable in their own right, regardless of people	4.1
Protecting the environment is more important than providing fishing opportunities.	3.7
Management should focus on doing what is best for nature instead of what is best for people.	3.6
Fish have as much right to exist as people.	3.3
The primary value of fisheries is to provide recreation for people.	3.2
Fish are primarily valuable as food for people.	3.1
Humans are no more important than other parts of nature.	2.9
Fish should primarily be managed for human benefit.	2.8
Nature's primary value is to provide things that are useful to people.	2.7
Humans were meant to rule over the rest of nature.	2.6
Fish are valuable only if people get to use them in some way.	2.4
Humans have a right to change the natural world to suit their needs.	2.1
Fisheries are valuable only if they produce jobs and income for people.	2.0

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 5-2: Fish value orientations: People have a duty to protect fish and other parts of nature.

		% of anglers indicating that they _____ with this statement:					
Residence of angler	**n**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**Mean[1]**
Statewide[2]	751	0.1%	0.2%	3.0%	41.1%	55.5%	4.5
Metro respondents	357	0.0%	0.6%	2.5%	37.8%	59.1%	4.6
Non-metro respondents	393	0.3%	0.0%	3.3%	43.5%	52.9%	4.5
		χ^2=6.270 n.s.					t=1.550 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 5: Fish Values

Table 5-3: Fish value orientations: Fish are valuable in their own right, regardless of people.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	747	1.4%	2.7%	13.9%	46.5%	35.5%	4.1
Metro respondents	356	0.8%	2.5%	15.2%	44.9%	36.5%	4.1
Non-metro respondents	391	1.8%	2.8%	13.0%	47.6%	34.8%	4.1
		χ^2=2.340 n.s.					t=0.489 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 5-4: Fish value orientations: Protecting the environment is more important than providing fishing opportunities.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	751	1.2%	8.7%	30.2%	39.4%	20.4%	3.7
Metro respondents	358	0.8%	8.7%	28.8%	39.4%	22.3%	3.7
Non-metro respondents	393	1.5%	8.7%	31.3%	39.4%	19.1%	3.7
		χ^2=2.105 n.s.					t=1.150 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 5-5: Fish value orientations: The primary value of fisheries is to provide recreation for people.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	748	3.4%	20.9%	32.3%	36.4%	7.0%	3.2
Metro respondents	357	3.1%	23.2%	31.1%	35.9%	6.7%	3.2
Non-metro respondents	391	3.6%	19.2%	33.2%	36.8%	7.2%	3.2
		χ^2=1.970 n.s.					t=0.694 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 5-6: Fish value orientations: Management should focus on doing what is best for nature instead of what is best for people.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	750	1.7%	10.0%	33.3%	37.2%	17.7%	3.6
Metro respondents	356	1.7%	8.7%	34.0%	37.4%	18.3%	3.6
Non-metro respondents	393	1.8%	10.9%	32.8%	37.2%	17.3%	3.6
		χ^2=1.127 n.s.					t=0.655 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 5: Fish Values

Table 5-7: Fish value orientations: Fish have as much right to exist as people.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	747	7.7%	13.4%	31.7%	30.9%	16.3%	3.3
Metro respondents	357	9.3%	13.2%	32.0%	31.2%	14.3%	3.3
Non-metro respondents	391	6.6%	13.6%	31.5%	30.7%	17.6%	3.4
		χ^2=2.950 n.s.					t=1.356 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 5-8: Fish value orientations: Fish are primarily valuable as food for people.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	747	3.8%	23.8%	36.4%	29.0%	7.0%	3.1
Metro respondents	355	4.5%	27.0%	34.6%	28.7%	5.1%	3.0
Non-metro respondents	391	3.3%	21.5%	37.6%	29.2%	8.4%	3.2
		χ^2=6.600 n.s.					t=2.117*

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 5: Fish Values

Table 5-9: Fish value orientations: Humans were meant to rule over the rest of nature.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	745	18.5%	28.1%	30.0%	17.0%	6.5%	2.6
Metro respondents	354	18.1%	30.8%	28.2%	15.3%	7.6%	2.6
Non-metro respondents	391	18.7%	26.2%	31.3%	18.2%	5.6%	2.7
		χ^2=4.094 n.s.					t=0.272 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 5-10: Fish value orientations: Humans are no more important than other parts of nature.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	743	11.8%	25.1%	31.0%	22.2%	10.0%	2.9
Metro respondents	354	13.8%	27.4%	30.8%	18.4%	9.6%	2.8
Non-metro respondents	389	10.3%	23.4%	31.1%	24.9%	10.3%	3.0
		χ^2=6.902 n.s.					t=2.243*

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 5: Fish Values

Table 5-11: Fish value orientations: Fish should primarily be managed for human benefit.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	747	8.5%	33.3%	34.6%	20.0%	3.6%	2.8
Metro respondents	355	9.6%	34.9%	30.4%	21.4%	3.7%	2.7
Non-metro respondents	391	7.7%	32.2%	37.6%	18.9%	3.6%	2.8
		χ^2=4.568 n.s.					t=0.535 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 5-12: Fish value orientations: Nature's primary value is to provide things that are useful to people.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	746	10.8%	34.4%	32.3%	18.8%	3.6%	2.7
Metro respondents	357	12.3%	36.1%	30.8%	17.1%	3.6%	2.6
Non-metro respondents	390	9.8%	33.2%	33.4%	20.1%	3.6%	2.7
		χ^2=2.854 n.s.					t=1.473 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 5: Fish Values

Table 5-13: Fish value orientations: Fish are valuable only if people get to use them in some way.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	749	15.6%	45.7%	28.0%	8.9%	1.8%	2.4
Metro respondents	356	14.9%	49.6%	25.1%	9.3%	1.1%	2.3
Non-metro respondents	393	16.0%	43.0%	30.0%	8.7%	2.3%	2.4
		χ^2=5.088 n.s.					t=0.905 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 5-14: Fish value orientations: Humans have a right to change the natural world to suit their needs.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	746	29.4%	40.5%	20.4%	7.6%	2.0%	2.1
Metro respondents	356	26.1%	40.2%	20.5%	11.5%	1.7%	2.2
Non-metro respondents	390	31.8%	40.8%	20.3%	4.9%	2.3%	2.1
		χ^2=12.656* , Cramer's V=0.130					t=2.397*

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 5-15: Fish value orientations: Fisheries are valuable only if they produce jobs and income for people.

Residence of angler	n	% of anglers indicating that they _____ with this statement: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Statewide[2]	749	24.7%	53.0%	18.1%	6.8%	0.3%	2.0
Metro respondents	357	21.8%	56.6%	17.1%	4.2%	0.3%	2.0
Non-metro respondents	392	26.8%	50.5%	18.9%	3.6%	0.3%	2.0
		χ^2=3.682 n.s.					t=0.788 n.s.

[1] Mean is based on the following scale: 1 = strongly disagree; 2 = disagree; 3 = neutral, 4 = agree; 5 = strongly agree.
[2] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 6: Selecting a Place to Fish

Respondents were asked to rate how important eight factors were when selecting a place to go fishing (Tables 6-1 to 6-9). All factors were rated as somewhat to moderately important. Response was on a scale of 1 (very unimportant to 7 (very important). Responses to the different statements were significantly different and ranged from 4.7 for "Number of other people at the lake, stream or river" to 5.8 for "Water quality at the lake, stream or river" (F=92.503; $p \leq 0.001$) (Table 6-1). Differences between metropolitan and non-metropolitan residents were not statistically significant.

Section 6: Selecting a Place to Fish

Table 6-1: Comparison of importance of factors when selecting a place to fish.

	Mean[1]
Water quality at the lake, stream or river	5.8
Type of fish at the lake, stream or river	5.6
Fishing access at the lake, stream or river	5.5
Fish habitat at the lake, stream or river	5.4
Fishing location close to home or cabin	5.0
Setting/scenery at the lake, stream or river	5.0
Fishing information for the lake, stream or river	4.9
Number of other people at the lake, stream or river	4.7

[1] F= n.s., η=0.. Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = somewhat unimportant, 4= neither, 5 = somewhat important, 6 = important, 7= very important.

Table 6-2: Importance of factors when selecting a place to go fishing: Fishing location close to home or cabin.

		Unimportant				Important			
Regions	**N**	**Very**		**Somewhat**	**Neither**	**Somewhat**		**Very**	**Mean[1]**
Statewide[2]	751	2.1%	7.0%	8.8%	10.5%	30.6%	26.9%	14.1%	5.0
Metro respondents	357	3.4%	7.8%	7.8%	10.6%	34.2%	22.1%	14.0%	4.9
Non-metro respondents	393	1.3%	6.4%	9.4%	10.4%	28.0%	30.3%	14.2%	5.1
		χ^2=11.750 n.s.							

[1] t=1.678 n.s. Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = somewhat unimportant, 4= neither, 5 = somewhat important, 6 = important, 7= very important.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 6-3: Importance of factors when selecting a place to go fishing: Number of other people at the lake, stream or river.

		Unimportant				Important			
Regions	**N**	**Very**		**Somewhat**	**Neither**	**Somewhat**		**Very**	**Mean[1]**
Statewide[2]	749	2.0%	8.9%	8.9%	13.5%	34.0%	25.6%	7.1%	4.7
Metro respondents	357	1.1%	8.4%	7.8%	12.0%	39.5%	24.6%	6.4%	4.8
Non-metro respondents	392	2.6%	9.2%	9.7%	14.5%	30.1%	26.3%	7.7%	4.7
		χ^2=9.121 n.s.							

[1] t=0.974 n.s. Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = somewhat unimportant, 4= neither, 5 = somewhat important, 6 = important, 7= very important.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 6: Selecting a Place to Fish

Table 6-4: Importance of factors when selecting a place to go fishing Fish habitat at the lake, stream or river.

		Unimportant				Important			
Regions	**N**	**Very**		**Somewhat**	**Neither**	**Somewhat**		**Very**	**Mean[1]**
Statewide[2]	749	1.1%	1.9%	3.9%	10.6%	31.0%	36.3%	15.1%	5.4
Metro respondents	358	0.6%	1.7%	3.6%	10.3%	30.4%	36.0%	17.3%	5.5
Non-metro respondents	391	1.5%	2.0%	4.1%	10.7%	31.5%	36.6%	13.6%	5.3
		χ^2 =3.736 n.s.							

[1] t=1.526 n.s. Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = somewhat unimportant, 4= neither, 5 = somewhat important, 6 = important, 7= very important.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 6-5: Importance of factors when selecting a place to go fishing Setting/scenery at the lake, stream or river.

		Unimportant				Important			
Regions	**N**	**Very**		**Somewhat**	**Neither**	**Somewhat**		**Very**	**Mean[1]**
Statewide[2]	750	1.1%	5.2%	5.1%	16.1%	36.0%	28.1%	8.3%	5.0
Metro respondents	358	0.8%	3.9%	4.5%	16.5%	36.0%	29.3%	8.9%	5.1
Non-metro respondents	392	1.3%	6.1%	5.6%	15.8%	36.0%	27.3%	7.9%	4.9
		χ^2 =3.187 n.s.							

[1] t=1.521 n.s. Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = somewhat unimportant, 4= neither, 5 = somewhat important, 6 = important, 7= very important.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 6-6: Importance of factors when selecting a place to go fishing: Water quality at the lake, stream or river.

		Unimportant				Important			
Regions	**N**	**Very**		**Somewhat**	**Neither**	**Somewhat**		**Very**	**Mean[1]**
Statewide[2]	746	0.6%	1.5%	2.8%	5.1%	24.1%	39.0%	26.9%	5.8
Metro respondents	356	0.3%	1.1%	2.5%	6.7%	23.3%	40.2%	25.8%	5.8
Non-metro respondents	390	0.8%	1.8%	3.1%	3.8%	24.6%	38.2%	27.7%	5.8
		χ^2 =5.132 n.s.							

[1] t=0.052 n.s. Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = somewhat unimportant, 4= neither, 5 = somewhat important, 6 = important, 7= very important.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 6: Selecting a Place to Fish

Table 6-7: Importance of factors when selecting a place to go fishing: Type of fish at the lake, stream or river.

		Unimportant				Important			
Regions	**N**	**Very**		**Somewhat**	**Neither**	**Somewhat**		**Very**	**Mean[1]**
Statewide[2]	751	0.8%	2.1%	2.8%	7.1%	24.8%	44.4%	18.1%	5.6
Metro respondents	357	0.8%	1.4%	3.1%	8.1%	22.4%	44.3%	19.9%	5.6
Non-metro respondents	393	0.8%	2.5%	2.5%	6.4%	26.5%	44.5%	16.8%	5.6
		χ^2 =4.474 n.s.							

[1] t=0.738 n.s. Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = somewhat unimportant, 4= neither, 5 = somewhat important, 6 = important, 7= very important.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 6-8: Importance of factors when selecting a place to go fishing: Fishing access at the lake, stream or river.

		Unimportant				Important			
Regions	**N**	**Very**		**Somewhat**	**Neither**	**Somewhat**		**Very**	**Mean[1]**
Statewide[2]	750	0.3%	1.1%	3.5%	8.7%	27.4%	42.8%	16.2%	5.5
Metro respondents	358	0.0%	1.7%	3.1%	8.4%	28.2%	41.9%	16.8%	5.6
Non-metro respondents	392	0.5%	0.8%	3.8%	8.9%	26.8%	43.4%	15.8%	5.5
		χ^2 =3.827 n.s.							

[1] t=0.227 n.s. Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = somewhat unimportant, 4= neither, 5 = somewhat important, 6 = important, 7= very important.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 6-9: Importance of factors when selecting a place to go fishing: Fishing information for the lake, stream or river.

		Unimportant				Important			
Regions	**N**	**Very**		**Somewhat**	**Neither**	**Somewhat**		**Very**	**Mean[1]**
Statewide[2]	750	0.6%	5.0%	5.7%	20.7%	34.7%	25.6%	7.8%	4.9
Metro respondents	358	0.3%	5.9%	6.1%	18.7%	38.3%	23.2%	7.5%	4.9
Non-metro respondents	392	0.8%	4.3%	5.4%	22.2%	32.1%	27.3%	7.9%	4.9
		χ^2 =6.281 n.s.							

[1] t=0.617 n.s. Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = somewhat unimportant, 4= neither, 5 = somewhat important, 6 = important, 7= very important.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 7: Managing Fish Habitat in Minnesota

Perceived Effectiveness of Strategies used to Improve Fish Habitat

Respondents were asked about the effectiveness of 22 strategies for improving fish habitat (Tables 7-1 to 7-23). Response was on a scale of 1 (not at all effective) to 5 (extremely effective). Generally, respondents seemed to think all strategies were effective, with over half of respondents saying all strategies were very or extremely effective. Responses to the different statements ranged from 3.4 for "Creation of log cribs and other human-made cover" to 4.2 for "protecting groundwater" (F=25.873; $p \leq 0.001$) (Table 7-1). Fishing involvement and protection values were positively correlated with the perceived effectiveness of strategies for improving fish habitat. Utilitarian and human dominance values, and a stronger orientation to keep fish, were negatively correlated with ratings of the effectiveness of strategies.

Importance of and DNR Performance on Management Activities

Respondents were asked to rate the importance of 10 management activities related to fish habitat, then rate DNR performance on the same 10 activities. The importance of activities was rated on the scale 1 (very unimportant) to 5 (very important) (Tables 7-24 to 7-34). DNR performance on the activities was rated on the scale 1 (very poor) to 5 (very good) (Tables 7-35 to 7-45).

Responses to the different statements ranged from 3.6 for "purchasing land or easements around lakes and streams" to 4.3 for "protecting the habitat in lakes and streams" (F=113.563; $p \leq 0.001$) (Table 7-24). Although over half of respondents viewed all activities as important or very important, regulations and land acquisition were generally viewed as less important, while education, restoration, and protection were viewed as more important.

Fishing involvement and protection values were positively correlated with the importance of management activities for improving fish habitat. Utilitarian and human dominance values, and stronger catch orientation, were negatively correlated with the importance of management activities for improving fish habitat.

Responses ranged from 3.1 for "purchasing land or easements around lakes and streams" to 3.5 for "protecting the habitat in lakes and streams" (F=16.591; $p \leq 0.001$) (Table 7-35). Across the board, about half of respondents rated DNR performance neutral on the listed management activities. There were small positive correlations between measures of fishing involvement and ratings of DNR performance on several management activities related to protection and restoration of habitat in and around streams and lakes.

Section 7: Managing Fish Habitat

Table 7-1: Effectiveness of strategies for improving fish habitat.

	Mean[1]
Protecting groundwater	4.2
Regulation of urban run-off	4.1
Promoting land management practices that reduce erosion and run off	4.0
Planting vegetation to reduce erosion and run off	4.0
Watershed improvements	4.0
Regulation of agricultural run-off	4.0
Using conservation programs to decrease soil erosion to improve fishing	3.9
Controlling wetland drainage	3.9
Partnering with nonprofit organizations to implement habitat projects	3.8
Regulations to protect fish habitat	3.8
Regulations to limit removal of aquatic plants	3.7
Conservation easements to protect high-water-quality lakes. These easements keep land in private hands but restrict development.	3.7
Land acquisition of riparian shoreline parcels to conserve critical fish and wildlife habitat.	3.7
Financial grants for shoreline restoration	3.7
Partnering with other government agencies to implement habitat projects	3.7
Zoning proposals to protect fish habitat	3.7
Rip-rapping banks to reduce erosion	3.6
Fencing out livestock	3.6
Education/technical assistance programs about shoreline restoration	3.6
Regulations to protect aquatic plants	3.6
Land acquisition of riparian shoreline parcels to maintain public water access.	3.5
Creation of log cribs and other human-made cover	3.4

[1] Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-2: Effectiveness of strategies for improving fish habitat: Creation of log cribs and other human-made cover.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	506	2.5%	11.6%	42.0%	35.1%	8.8%	3.4
Metro respondents	226	1.3%	7.1%	46.5%	34.5%	10.6%	3.5
Non-metro respondents	276	3.3%	14.5%	39.1%	35.5%	7.6%	3.3
	χ^2=10.929*, Cramer's V=0.148						t=2.064*

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-3: Effectiveness of strategies for improving fish habitat: Rip-rapping banks to reduce erosion.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	547	2.2%	8.1%	31.5%	43.1%	15.2%	3.6
Metro respondents	244	0.8%	6.1%	29.5%	47.1%	16.4%	3.7
Non-metro respondents	299	3.0%	9.4%	32.8%	40.5%	14.4%	3.5
	χ^2=7.124 n.s.						t=2.347*

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-4: Effectiveness of strategies for improving fish habitat: Fencing out livestock.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	538	4.0%	11.3%	27.0%	33.8%	23.9%	3.6
Metro respondents	236	3.0%	8.9%	29.2%	35.6%	23.3%	3.7
Non-metro respondents	297	4.7%	12.8%	25.6%	32.7%	24.2%	3.6
	χ^2=3.848 n.s.						t=0.896 n.s.

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-5: Effectiveness of strategies for improving fish habitat: Promoting land management practices that reduce erosion and run off.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	663	0.9%	5.1%	19.9%	39.7%	34.4%	4.0
Metro respondents	304	0.7%	4.3%	16.8%	44.1%	34.2%	4.1
Non-metro respondents	356	1.1%	5.6%	21.9%	36.8%	34.6%	4.0
	χ^2=5.363 n.s.						t=1.254 n.s.

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-6: Effectiveness of strategies for improving fish habitat: Planting vegetation to reduce erosion and run off.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	662	0.9%	4.5%	20.3%	41.8%	32.5%	4.0
Metro respondents	309	1.3%	3.6%	18.8%	45.0%	31.4%	4.0
Non-metro respondents	351	0.6%	5.1%	21.4%	39.6%	33.3%	4.0
	χ^2=3.741 n.s.						t=0.234 n.s.

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-7: Effectiveness of strategies for improving fish habitat: Watershed improvements.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	578	0.9%	3.2%	23.0%	41.4%	31.4%	4.0
Metro respondents	263	0.4%	2.3%	24.0%	43.3%	30.0%	4.0
Non-metro respondents	312	1.3%	3.8%	22.4%	40.1%	32.4%	4.0
	χ^2=3.211 n.s.						t=0.273 n.s.

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-8: Effectiveness of strategies for improving fish habitat: Regulations to limit removal of aquatic plants.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	574	3.3%	8.1%	30.3%	36.5%	21.8%	3.7
Metro respondents	267	3.4%	9.0%	28.1%	37.1%	22.5%	3.7
Non-metro respondents	305	3.3%	7.5%	31.8%	36.1%	21.3%	3.6
	χ^2=1.147 n.s.						t=0.200 n.s.

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-9: Effectiveness of strategies for improving fish habitat: Conservation easements to protect high-water-quality lakes. These easements keep land in private hands but restrict development.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	558	3.7%	8.7%	28.7%	34.2%	24.8%	3.7
Metro respondents	267	3.0%	7.9%	27.0%	36.0%	26.2%	3.7
Non-metro respondents	291	4.1%	9.3%	29.9%	33.0%	23.7%	3.6
	χ^2=1.944 n.s.						t=1.309 n.s.

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-10: Effectiveness of strategies for improving fish habitat: Land acquisition of riparian shoreline parcels to conserve critical fish and wildlife habitat.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	505	4.4%	5.6%	30.5%	35.8%	23.7%	3.7
Metro respondents	234	3.8%	5.6%	27.8%	37.2%	25.6%	3.8
Non-metro respondents	269	4.8%	5.6%	32.3%	34.9%	22.3%	3.6
	χ^2=1.899 n.s.						t=1.182 n.s.

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-11: Effectiveness of strategies for improving fish habitat: Land acquisition of riparian shoreline parcels to maintain public water access.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	486	6.0%	9.8%	31.3%	33.8%	19.0%	3.5
Metro respondents	224	5.8%	8.5%	32.1%	32.6%	21.0%	3.5
Non-metro respondents	260	6.2%	10.8%	30.8%	34.6%	17.7%	3.5
	χ^2=1.570 n.s.						t=0.758 n.s.

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-12: Effectiveness of strategies for improving fish habitat: Education/technical assistance programs about shoreline restoration.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	593	2.3%	12.6%	29.7%	35.0%	20.4%	3.6
Metro respondents	283	2.5%	11.7%	32.9%	34.3%	18.7%	3.6
Non-metro respondents	310	2.3%	13.2%	27.4%	35.5%	21.6%	3.6
	χ^2=2.450 n.s.						t=0.696 n.s.

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-13: Effectiveness of strategies for improving fish habitat: Financial grants for shoreline restoration.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	563	3.1%	9.5%	28.4%	37.0%	22.0%	3.7
Metro respondents	255	4.3%	5.9%	31.8%	38.4%	19.6%	3.6
Non-metro respondents	305	2.3%	11.8%	26.2%	36.1%	23.6%	3.7
	χ^2=9.816*, Cramer's V=0.132						t=0.433 n.s.

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-14: Effectiveness of strategies for improving fish habitat: Regulation of agricultural run-off.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	632	2.4%	6.8%	20.8%	31.2%	38.8%	4.0
Metro respondents	293	0.7%	6.8%	19.1%	33.4%	39.9%	4.1
Non-metro respondents	337	3.6%	6.8%	22.0%	29.7%	38.0%	3.9
	χ^2=7.321 n.s.						t=1.628 n.s.

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-15: Effectiveness of strategies for improving fish habitat: Regulation of urban run-off.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	633	2.0%	5.2%	17.2%	33.9%	41.6%	4.1
Metro respondents	291	1.0%	5.2%	17.9%	34.1%	41.7%	4.1
Non-metro respondents	340	2.6%	5.3%	16.8%	33.8%	41.5%	3.9
	χ^2=2.271 n.s.						t=0.549 n.s.

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-16: Effectiveness of strategies for improving fish habitat: Protecting groundwater.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	608	1.9%	3.4%	15.5%	34.1%	45.1%	4.2
Metro respondents	280	0.7%	3.9%	14.3%	37.9%	43.2%	4.2
Non-metro respondents	326	2.8%	3.1%	16.3%	31.6%	46.3%	4.2
	χ^2=6.215 n.s.						t=0.430 n.s.

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-17: Effectiveness of strategies for improving fish habitat: Using conservation programs to decrease soil erosion to improve fishing.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	605	1.8%	3.8%	24.4%	41.9%	28.1%	3.9
Metro respondents	275	2.2%	3.6%	23.3%	45.1%	25.8%	3.9
Non-metro respondents	327	1.5%	4.0%	25.1%	39.8%	29.7%	3.9
	χ^2=2.393 n.s.						t=0.445 n.s.

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-18: Effectiveness of strategies for improving fish habitat: Controlling wetland drainage.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	605	2.6%	6.8%	21.8%	34.5%	34.3%	3.9
Metro respondents	273	1.1%	5.5%	20.5%	39.2%	33.7%	4.0
Non-metro respondents	328	3.7%	7.6%	22.6%	31.4%	34.8%	3.9
	χ^2=7.850 n.s.						t=1.545 n.s.

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-19: Effectiveness of strategies for improving fish habitat: Partnering with nonprofit organizations to implement habitat projects.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	579	1.6%	8.0%	23.2%	39.4%	27.7%	3.8
Metro respondents	262	1.1%	7.6%	23.7%	39.3%	28.2%	3.9
Non-metro respondents	314	1.9%	8.3%	22.9%	39.5%	27.4%	3.8
	χ^2=0.683 n.s.						t=0.456 n.s.

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-20: Effectiveness of strategies for improving fish habitat: Partnering with other government agencies to implement habitat projects.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	575	4.7%	7.3%	28.0%	35.3%	24.6%	3.7
Metro respondents	262	5.0%	5.7%	27.5%	37.0%	24.8%	3.7
Non-metro respondents	310	4.5%	8.4%	28.4%	34.2%	24.5%	3.7
	χ^2=1.830 n.s.						t=0.579 n.s.

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-21: Effectiveness of strategies for improving fish habitat: Zoning proposals to protect fish habitat.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	552	3.7%	7.9%	29.7%	35.6%	23.2%	3.7
Metro respondents	259	1.5%	6.9%	30.5%	35.5%	25.5%	3.8
Non-metro respondents	292	5.1%	8.6%	29.1%	35.6%	21.6%	3.6
	χ^2=6.579 n.s.						t=1.891n.s.

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-22: Effectiveness of strategies for improving fish habitat: Regulations to protect fish habitat.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	619	2.0%	6.9%	28.3%	37.6%	25.1%	3.8
Metro respondents	281	1.1%	6.0%	27.4%	36.3%	29.2%	3.9
Non-metro respondents	335	2.7%	7.5%	29.0%	38.5%	22.4%	3.7
	χ^2=5.600 n.s.						t=2.052*

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-23: Effectiveness of strategies for improving fish habitat: Regulations to protect aquatic plants.

Regions	N	Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Mean[1]
Statewide[2]	594	2.2%	10.7%	32.1%	31.2%	23.8%	3.6
Metro respondents	267	2.2%	10.1%	30.0%	31.1%	26.6%	3.7
Non-metro respondents	323	2.2%	11.1%	33.4%	31.3%	22.0%	3.6
	χ^2=1.996 n.s.						t=1.165 n.s.

[1]Mean is based on the scale: 1 = not at all effective, 2 = slightly effective, 3 = moderately effective, 4= very effective, 5 = extremely effective.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-24: Importance of management activities.

	Mean[2]
Protecting the habitat in lakes and streams	4.3
Managing shoreline to protect fish spawning sites	4.3
Protecting the land surrounding lakes and streams from damage/development	4.2
Restoring the habitat in lakes and streams	4.2
Educating people on how they can help protect lakes and streams	4.2
Restoring land surrounding lakes and streams that have been damaged/developed	4.1
Educating people about lake and stream ecology/habitat	4.1
Partnering with nonprofit organizations to improve lake and stream habitat	3.9
Regulation of aquatic plant removal by property owners and lake associations	3.8
Purchasing land or easements around lakes and streams	3.6

[1] Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = neutral, 4= important, 5 = very important.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-25: Importance of management activities: Protecting the land surrounding lakes and streams from damage/development.

Regions	N	Very unimportant	Unimportant	Neutral	Important	Very important	Mean[1]
Statewide[2]	745	0.7%	2.2%	11.7%	51.2%	34.3%	4.2
Metro respondents	357	0.6%	2.0%	11.5%	51.0%	35.0%	4.2
Non-metro respondents	388	0.8%	2.3%	11.9%	51.3%	33.8%	4.1
	χ^2=0.347 n.s.						t=0.533 n.s.

[1]Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = neutral, 4= important, 5 = very important.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-26: Importance of management activities: Restoring land surrounding lakes and streams that have been damaged/developed.

Regions	N	Very unimportant	Unimportant	Neutral	Important	Very important	Mean[1]
Statewide[2]	745	0.7%	2.4%	16.2%	51.3%	29.4%	4.1
Metro respondents	357	0.6%	2.2%	12.3%	54.1%	30.8%	4.1
Non-metro respondents	388	0.8%	2.6%	19.1%	49.2%	28.4%	4.0
	χ^2=6.782 n.s.						t=1.844 n.s.

[1]Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = neutral, 4= important, 5 = very important.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-27: Importance of management activities: Protecting the habitat in lakes and streams

Regions	N	Very unimportant	Unimportant	Neutral	Important	Very important	Mean[1]
Statewide[2]	742	0.4%	0.4%	6.1%	55.0%	38.1%	4.3
Metro respondents	356	0.6%	0.3%	4.8%	54.8%	39.6%	4.3
Non-metro respondents	386	0.3%	0.5%	7.0%	55.2%	37.0%	4.3
	χ^2=2.539 n.s.						t=0.931 n.s.

[1]Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = neutral, 4= important, 5 = very important.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-28: Importance of management activities: Restoring the habitat in lakes and streams.

Regions	N	Very unimportant	Unimportant	Neutral	Important	Very important	Mean[1]
Statewide[2]	742	0.4%	1.0%	12.3%	50.7%	35.5%	4.2
Metro respondents	356	0.6%	0.3%	11.8%	52.8%	34.6%	4.2
Non-metro respondents	386	0.3%	1.6%	12.7%	49.2%	36.3%	4.2
	χ^2= 4.347 n.s.						t=0.155 n.s.

[1]Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = neutral, 4= important, 5 = very important.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-29: Importance of management activities: Purchasing land or easements around lakes and streams.

Regions	N	Very unimportant	Unimportant	Neutral	Important	Very important	Mean[1]
Statewide[2]	738	3.2%	6.5%	39.0%	32.2%	19.1%	3.6
Metro respondents	354	2.8%	4.0%	35.6%	37.6%	20.1%	3.7
Non-metro respondents	384	3.4%	8.3%	41.4%	28.4%	18.5%	3.5
	χ^2=12.4378*, Cramer's V=0.130						t=2.503*

[1]Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = neutral, 4= important, 5 = very important.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-30: Importance of management activities: Partnering with nonprofit organizations to improve lake and stream habitat.

Regions	N	Very unimportant	Unimportant	Neutral	Important	Very important	Mean[1]
Statewide[2]	744	1.3%	2.9%	27.0%	44.6%	24.1%	3.9
Metro respondents	357	1.4%	2.0%	26.1%	47.1%	23.5%	3.9
Non-metro respondents	387	1.3%	3.6%	27.6%	42.9%	24.5%	3.9
	χ^2=2.796 n.s.						t=0.569 n.s.

[1]Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = neutral, 4= important, 5 = very important.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-31: Importance of management activities: Educating people on how they can help protect lakes and streams.

Regions	N	Very unimportant	Unimportant	Neutral	Important	Very important	Mean[1]
Statewide[2]	745	0.7%	2.3%	13.2%	46.9%	37.0%	4.2
Metro respondents	357	0.6%	2.5%	14.0%	46.5%	36.4%	4.2
Non-metro respondents	388	0.8%	2.1%	12.6%	47.2%	37.4%	4.2
	χ^2=0.626 n.s.						t=0.450 n.s.

[1]Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = neutral, 4= important, 5 = very important.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-32: Importance of management activities: Educating people about lake and stream ecology/habitat.

Regions	N	Very unimportant	Unimportant	Neutral	Important	Very important	Mean[1]
Statewide[2]	744	0.6%	3.1%	17.8%	46.2%	32.4%	4.1
Metro respondents	356	0.3%	3.1%	17.4%	47.8%	31.5%	4.1
Non-metro respondents	388	0.8%	3.1%	18.0%	45.1%	33.0%	4.1
	χ^2=1.294 n.s.						t=0.096 n.s.

[1]Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = neutral, 4= important, 5 = very important.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-33: Importance of management activities: Managing shoreline to protect fish spawning sites.

Regions	N	Very unimportant	Unimportant	Neutral	Important	Very important	Mean[1]
Statewide[2]	741	0.7%	0.7%	11.8%	45.1%	41.7%	4.3
Metro respondents	352	0.6%	0.6%	8.8%	47.7%	42.3%	4.3
Non-metro respondents	388	0.8%	0.8%	13.9%	43.3%	41.2%	4.2
	χ^2=5.276 n.s.						t=1.326 n.s.

[1]Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = neutral, 4= important, 5 = very important.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-34: Importance of management activities: Regulation of aquatic plant removal by property owners and lake associations.

Regions	N	Very unimportant	Unimportant	Neutral	Important	Very important	Mean[1]
Statewide[2]	744	1.5%	5.1%	29.5%	39.1%	24.7%	3.8
Metro respondents	357	1.1%	6.2%	24.6%	44.5%	23.5%	3.8
Non-metro respondents	387	1.8%	4.4%	33.1%	35.1%	25.6%	3.8
	χ^2=10.697*, Cramer's V=0.120						t=0.727 n.s.

[1]Mean is based on the scale: 1 = very unimportant, 2 = unimportant, 3 = neutral, 4= important, 5 = very important.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-35: Performance of DNR on management activities.

	Mean[2]
Protecting the habitat in lakes and streams	3.5
Protecting the land surrounding lakes and streams from damage/development	3.4
Educating people on how they can help protect lakes and streams	3.4
Restoring land surrounding lakes and streams that have been damaged/developed	3.3
Restoring the habitat in lakes and streams	3.3
Partnering with nonprofit organizations to improve lake and stream habitat	3.3
Educating people about lake and stream ecology/habitat	3.3
Managing shoreline to protect fish spawning sites	3.3
Regulation of aquatic plant removal by property owners and lake associations	3.3
Purchasing land or easements around lakes and streams	3.1

[1] Mean is based on the scale: 1 = very poor, 2 = poor, 3 = neutral, 4= good, 5 = very good.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-36: Performance on management activities: Protecting the land surrounding lakes and streams from damage/development.

Regions	N	Very poor	Poor	Neutral	Good	Very good	Mean[1]
Statewide[2]	728	1.1%	9.2%	46.1%	38.9%	4.7%	3.4
Metro respondents	349	0.0%	9.2%	47.6%	37.5%	5.7%	3.4
Non-metro respondents	379	1.8%	9.2%	45.1%	39.8%	4.0%	3.3
	χ^2=8.119 n.s.						t=0.891 n.s.

[1]Mean is based on the scale: 1 = very poor, 2 = poor, 3 = neutral, 4= good, 5 = very good.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-37: Performance on management activities: Restoring land surrounding lakes and streams that have been damaged/developed.

Regions	N	Very poor	Poor	Neutral	Good	Very good	Mean[1]
Statewide[2]	730	1.2%	9.4%	53.3%	32.2%	4.0%	3.3
Metro respondents	350	0.3%	8.9%	54.9%	30.6%	5.4%	3.3
Non-metro respondents	380	1.8%	9.7%	52.1%	33.4%	2.9%	3.3
	χ^2=7.745 n.s.						t=1.141 n.s.

[1]Mean is based on the scale: 1 = very poor, 2 = poor, 3 = neutral, 4= good, 5 = very good.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-38: Performance on management activities: Protecting the habitat in lakes and streams

Regions	N	Very poor	Poor	Neutral	Good	Very good	Mean[1]
Statewide[2]	729	1.0%	8.2%	41.3%	43.2%	6.3%	3.5
Metro respondents	350	0.6%	6.9%	41.1%	43.7%	7.7%	3.5
Non-metro respondents	379	1.3%	9.2%	41.4%	42.7%	5.3%	3.4
	χ^2=4.050 n.s.						t=1.698 n.s.

[1]Mean is based on the scale: 1 = very poor, 2 = poor, 3 = neutral, 4= good, 5 = very good.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-39: Performance on management activities: Restoring the habitat in lakes and streams.

Regions	N	Very poor	Poor	Neutral	Good	Very good	Mean[1]
Statewide[2]	729	1.2%	9.9%	50.8%	33.3%	4.7%	3.3
Metro respondents	350	1.1%	8.3%	50.3%	34.9%	5.4%	3.4
Non-metro respondents	379	1.3%	11.1%	51.2%	32.2%	4.2%	3.3
	χ^2=2.474 n.s.						t=1.460 n.s.

[1]Mean is based on the scale: 1 = very poor, 2 = poor, 3 = neutral, 4= good, 5 = very good.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-40: Performance on management activities: Purchasing land or easements around lakes and streams.

Regions	N	Very poor	Poor	Neutral	Good	Very good	Mean[1]
Statewide[2]	724	1.6%	8.4%	67.0%	19.9%	3.0%	3.1
Metro respondents	346	0.6%	7.5%	67.9%	20.8%	3.2%	3.2
Non-metro respondents	378	2.4%	9.0%	66.4%	19.3%	2.9%	3.1
	χ^2= 4.650 n.s.						t=1.437 n.s.

[1]Mean is based on the scale: 1 = very poor, 2 = poor, 3 = neutral, 4= good, 5 = very good.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-41: Performance on management activities: Partnering with nonprofit organizations to improve lake and stream habitat.

Regions	N	Very poor	Poor	Neutral	Good	Very good	Mean[1]
Statewide[2]	727	1.4%	5.8%	59.3%	29.4%	4.1%	3.3
Metro respondents	348	0.9%	5.7%	59.5%	31.0%	2.9%	3.3
Non-metro respondents	379	1.8%	5.8%	59.1%	28.2%	5.0%	3.3
	χ^2=3.849 n.s.						t=0.106 n.s.

[1]Mean is based on the scale: 1 = very poor, 2 = poor, 3 = neutral, 4= good, 5 = very good.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-42: Performance on management activities: Educating people on how they can help protect lakes and streams.

Regions	N	Very poor	Poor	Neutral	Good	Very good	Mean[1]
Statewide[2]	731	1.3%	10.4%	44.9%	36.0%	7.4%	3.4
Metro respondents	349	0.9%	11.5%	44.4%	35.8%	7.4%	3.4
Non-metro respondents	382	1.6%	9.7%	45.3%	36.1%	7.3%	3.4
	χ^2=1.334 n.s.						t=0.070 n.s.

[1]Mean is based on the scale: 1 = very poor, 2 = poor, 3 = neutral, 4= good, 5 = very good.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-43: Performance on management activities: Educating people about lake and stream ecology/habitat.

Regions	N	Very poor	Poor	Neutral	Good	Very good	Mean[1]
Statewide[2]	731	1.4%	12.0%	47.2%	32.4%	6.9%	3.3
Metro respondents	349	0.9%	13.5%	44.4%	33.5%	7.7%	3.3
Non-metro respondents	382	1.8%	11.0%	49.2%	31.7%	6.3%	3.3
	χ^2=3.818 n.s.						t=0.691 n.s.

[1]Mean is based on the scale: 1 = very poor, 2 = poor, 3 = neutral, 4= good, 5 = very good.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-44: Performance on management activities: Managing shoreline to protect fish spawning sites.

Regions	N	Very poor	Poor	Neutral	Good	Very good	Mean[1]
Statewide[2]	727	3.0%	9.5%	50.8%	31.0%	5.7%	3.3
Metro respondents	347	2.3%	10.4%	51.6%	29.4%	6.3%	3.3
Non-metro respondents	380	3.4%	8.9%	50.3%	32.1%	5.3%	3.3
	χ^2=2.024 n.s.						t=0.040 n.s.

[1]Mean is based on the scale: 1 = very poor, 2 = poor, 3 = neutral, 4= good, 5 = very good.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 7-45: Performance on management activities: Regulation of aquatic plant removal by property owners and lake associations.

Regions	N	Very poor	Poor	Neutral	Good	Very good	Mean[1]
Statewide[2]	728	2.2%	8.9%	53.0%	30.4%	5.5%	3.3
Metro respondents	347	2.0%	9.5%	53.6%	28.2%	6.6%	3.3
Non-metro respondents	381	2.4%	8.4%	52.5%	32.0%	4.7%	3.3
	χ^2= 2.418 n.s.						t=0.067 n.s.

[1]Mean is based on the scale: 1 = very poor, 2 = poor, 3 = neutral, 4= good, 5 = very good.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 8: Budgeting for Managing Fish Habitat in Minnesota

Allocation of Budget Dollars

Respondents were asked to indicate the percent of budget dollars that should be spent on habitat protection versus restoration, up to 100%. On average, respondents wanted 57.4% of dollars spent on protection of intact, high-quality fish habitat, and 42.7% spent on restoration of degraded fish habitat (Table 8-1).

Next, respondents were asked to indicate the percent of budget dollars they would like to see spent on four specific areas of fisheries management, again totaling 100%. Respondents indicated that they wanted an average of 31.0% on protection and restoration of fish habitat, 29.4% on stocking fish, 22.1% on enforcement of regulations, and 18.3% on monitoring fish populations (Table 8-2).

Table 8-1: Percentage of MNDNR budget dollars spent on the following activities following activities.

Activity	Mean %	Median %	Modal %	Range of %s
Protection of intact, high-quality fish habitat	57.3%	50.0%	50.0%	0-100
Restoration of degraded fish habitat	42.7%	50.0%	50.0%	0-100

Table 8-2: Among respondents who felt some proportion of funds should be allocated to management and research for trout and salmon in Lake Superior and its tributaries, percentage of MNDNR trout stamp dollars allocated to this area that should be spent on the following activities.

Activity	Mean %	Median %	Modal %	Range of %s
Protection and restoration of fish habitat	31.0%	30.0%	25.0%	0-100
Monitoring fish populations	18.3%	20.0%	20.0%	0-100
Stocking fish	29.4%	25.0%	25.0%	0-100
Enforcement of regulations	22.1%	20.0%	20.0%	0-70

Section 9: Fish Habitat in Minnesota Lakes

Contributions of land adjacent to lakes to fish habitat

Respondents were asked to rate nine characteristics of land adjacent to lakes in terms of their contribution on fish habitat (Tables 9-1 to 9-10). Ratings were on the scale 1 (very negative) to 5 (very positive). Responses for the different characteristics were significantly different (F=470.258, p<0.001), with dense forest (M=3.7) rated most positive and housing subdivisions (M=2.2) rated most negative. A majority of respondents indicated that dense forest (Table 9-2) adjacent to lakes was positive or very positive. Nearly half of respondents felt that open fields (unplowed) were positive adjacent to lakes (Table 9-4). A majority of respondents were neutral about forest with open understory (Table 9-3), farms or houses widely spaced (Table 9-7), and hills or bluffs (Table 9-9) adjacent to lakes. A majority of respondents indicated that the remaining characteristics listed were negative or very negative adjacent to lakes, including: row crops (Table 9-5), pasture with animals (Table 9-6), housing subdivisions (Table 9-8), and roads/parking lots (Table 9-9). There were no substantive differences between metropolitan and non-metropolitan residents on these questions.

Contributions of near-shore lake characteristics to fish habitat

Respondents were asked to rate 12 near-shore lake characteristics in terms of their contribution on fish habitat (Tables 9-11 to 9-23). Ratings were on the scale 1 (very negative) to 5 (very positive). Responses for the different characteristics were significantly different (F=463.091, p<0.001), with natural rocky shoreline (M=4.0) rated most positive and application of lawn fertilizer (M=1.8) rated most negative. A majority of respondents indicated that emergent and floating leaf vegetation (Table 9-12), submerged vegetation (Table 9-13), natural rocky shoreline (Table 9-17), unmowed natural vegetation (Table 9-21), and downed trees or logs (Table 9-23) were positive or very positive near-shore lake characteristics. A majority of respondents were neutral about clear sand beaches (Table 9-14), docks (Table 9-15), swim rafts (Table 9-16), and retaining walls (Table 9-19). Nearly half were neutral about man-made rip rap (Table 9-18). A majority of respondents indicated that mowed turf grass (Table 9-20) and application of lawn fertilizer (Table 9-23) were negative or very negative. There were no substantive differences between metropolitan and non-metropolitan residents on these questions.

Contributions of open-water lake characteristics to fish habitat

Respondents were asked to rate five open-water lake characteristics in terms of their contribution on fish habitat (Tables 9-24 to 9-29). Ratings were on the scale 1 (very negative) to 5 (very positive). Responses for the different characteristics were significantly different (F=798.127, p<0.001), with underwater rocky structure (M=4.1) rated most positive and high algae levels (M=2.2) rated most negative. A majority of respondents indicated that: oxygenated water (Table 9-25), underwater rocky structure (Table 9-26), clear water (Table 9-27), and deep, cold water (Table 9-28) were positive or very positive. A majority felt that high algae levels were negative or very negative (Table 9-29). There were no substantive differences between metropolitan and non-metropolitan residents on these questions.

Table 9-1: Contributions of characteristics of land adjacent to lakes to fish habitat.

	Mean[2]
Dense forest	3.7
Forest with open understory	3.5
Open fields (unplowed)	3.4
Hills or bluffs	3.3
Individual farms/houses spaced far apart	3.1
Fields with row crops	2.4
Pasture with animals	2.4
Roads or parking lots	2.3
Housing subdivisions	2.2

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-2: Contributions of characteristics of land adjacent to lakes to fish habitat: Dense forest.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	717	0.1%	1.6%	39.3%	42.6%	16.4%	3.7
Metro respondents	349	0.3%	2.0%	35.2%	45.6%	16.9%	3.8
Non-metro respondents	369	0.0%	1.4%	42.3%	40.4%	16.0%	3.7
	χ^2=5.008 n.s.						t=1.032 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-3: Contributions of characteristics of land adjacent to lakes to fish habitat: Forest with open understory.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	714	0.2%	2.4%	51.5%	39.8%	6.1%	3.5
Metro respondents	348	0.0%	3.4%	46.8%	43.1%	6.6%	3.5
Non-metro respondents	367	0.3%	1.6%	55.0%	37.3%	5.7%	3.5
	χ^2=7.347 n.s.						t=1.277 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-4: Contributions of characteristics of land adjacent to lakes to fish habitat: Open fields (unplowed).

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	716	1.4%	8.6%	43.9%	40.3%	5.8%	3.4
Metro respondents	349	1.7%	8.9%	42.7%	39.0%	7.7%	3.4
Non-metro respondents	368	1.1%	8.4%	44.8%	41.3%	4.3%	3.4
	χ^2= 4.418 n.s.						t=0.462 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-5: Contributions of characteristics of land adjacent to lakes to fish habitat: Fields with row crops.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	719	13.3%	39.0%	38.5%	7.6%	0.5%	2.4
Metro respondents	349	13.5%	44.1%	35.0%	6.6%	0.9%	2.4
Non-metro respondents	371	13.2%	35.3%	42.9%	8.4%	0.3%	2.5
	χ^2=8.920 n.s.						t=1.597 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-6: Contributions of characteristics of land adjacent to lakes to fish habitat: Pasture with animals.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	719	17.0%	39.1%	36.0%	7.2%	0.7%	2.4
Metro respondents	352	20.5%	40.3%	31.3%	7.4%	0.6%	2.3
Non-metro respondents	369	14.4%	38.2%	39.6%	7.0%	0.8%	2.4
	χ^2=7.758 n.s.						t=2.232*

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-7: Contributions of characteristics of land adjacent to lakes to fish habitat: Individual farms/houses spaced far apart.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	718	1.7%	11.7%	63.8%	21.0%	1.8%	3.1
Metro respondents	350	1.7%	11.1%	65.4%	20.0%	1.7%	3.1
Non-metro respondents	369	1.6%	12.2%	62.6%	21.7%	1.9%	3.1
	χ^2=0.679 n.s.						t=0.232 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-8: Contributions of characteristics of land adjacent to lakes to fish habitat: Housing subdivisions.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	722	18.3%	46.2%	31.5%	3.2%	0.8%	2.2
Metro respondents	352	18.2%	45.2%	31.5%	4.3%	0.9%	2.2
Non-metro respondents	371	18.3%	46.9%	31.5%	2.4%	0.8%	2.2
	χ^2= 1.957 n.s.						t=0.655 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-9: Contributions of characteristics of land adjacent to lakes to fish habitat: Hills or bluffs.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	718	0.8%	7.8%	54.2%	33.1%	4.1%	3.3
Metro respondents	350	1.1%	6.3%	54.6%	33.4%	4.6%	3.3
Non-metro respondents	369	0.5%	8.9%	53.9%	32.8%	3.8%	3.3
	χ^2=2.731 n.s.						t=0.688 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-10: Contributions of characteristics of land adjacent to lakes to fish habitat: Roads or parking lots.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	722	16.0%	43.9%	35.0%	4.0%	1.1%	2.3
Metro respondents	351	20.2%	42.2%	31.9%	4.3%	1.4%	2.2
Non-metro respondents	372	12.9%	45.2%	37.4%	3.8%	0.8%	2.3
	χ^2=8.547 n.s.						t=1.610 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-11: Contributions of characteristics of near-shore to fish habitat.

	Mean[1]
Natural rocky shoreline	4.0
Emergent and floating leaf vegetation (like cattails and water lilies)	3.8
Unmowed natural vegetation	3.7
Submerged vegetation which grow entirely underwater (like pondweeds)	3.6
Downed trees/logs along the shore	3.5
Man-made rip-rap along the shore	3.4
Docks	3.3
Clear sand beaches	3.1
Swim rafts	3.1
Retaining wall along the shore	3.1
Mowed turf grass along the shore	2.5
Application of lawn fertilizer	1.8

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-12: Contributions of characteristics of near-shore to fish habitat: Emergent and floating leaf vegetation (like cattails and water lilies).

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	721	1.3%	4.4%	23.5%	52.7%	18.1%	3.8
Metro respondents	350	2.3%	3.1%	21.4%	54.6%	18.6%	3.8
Non-metro respondents	372	0.5%	5.4%	25.0%	51.3%	17.7%	3.8
	χ^2=7.486 n.s.						t=0.590 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-13: Contributions of characteristics of near-shore to fish habitat: Submerged vegetation which grow entirely underwater (like pondweeds).

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	721	1.3%	8.1%	31.0%	45.5%	14.1%	3.6
Metro respondents	351	2.0%	7.1%	30.2%	45.0%	15.7%	3.7
Non-metro respondents	371	0.8%	8.9%	31.5%	45.8%	12.9%	3.6
	χ^2=3.610 n.s.						t=0.623 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-14: Contributions of characteristics of near-shore to fish habitat: Clear sand beaches.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	717	2.0%	15.8%	52.2%	25.4%	4.6%	3.1
Metro respondents	350	2.9%	18.0%	50.9%	24.0%	4.3%	3.1
Non-metro respondents	368	1.4%	14.1%	53.3%	26.4%	4.9%	3.2
	χ^2=4.343 n.s.						t=1.722 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-15: Contributions of characteristics of near-shore to fish habitat: Docks.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	714	0.7%	7.1%	58.8%	29.1%	4.4%	3.3
Metro respondents	347	0.9%	6.3%	58.2%	29.1%	5.5%	3.3
Non-metro respondents	368	0.5%	7.6%	59.2%	29.1%	3.5%	3.3
	χ^2=2.213 n.s.						t=0.876 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-16: Contributions of characteristics of near-shore to fish habitat: Swim rafts.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	719	2.6%	12.4%	64.2%	18.3%	2.5%	3.1
Metro respondents	350	2.0%	13.1%	60.9%	20.0%	4.0%	3.1
Non-metro respondents	370	3.0%	11.9%	66.8%	17.0%	1.4%	3.0
	χ^2=7.528 n.s.						t=1.682 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-17: Contributions of characteristics of near-shore to fish habitat: Natural rocky shoreline.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	720	0.0%	1.0%	21.3%	59.4%	18.3%	4.0
Metro respondents	351	0.0%	0.9%	21.7%	60.7%	16.8%	3.9
Non-metro respondents	370	0.0%	1.1%	21.1%	58.4%	19.5%	4.0
	χ^2=0.980 n.s.						t=0.565 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-18: Contributions of characteristics of near-shore to fish habitat: Man-made rip-rap along the shore.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	722	1.8%	7.4%	44.6%	40.5%	5.7%	3.4
Metro respondents	351	1.4%	6.6%	45.6%	41.0%	5.4%	3.4
Non-metro respondents	372	2.2%	8.1%	43.8%	40.1%	5.9%	3.4
	χ^2=1.341 n.s.						t=0.504 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-19: Contributions of characteristics of near-shore to fish habitat: Retaining wall along the shore.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	721	4.0%	17.4%	50.9%	25.0%	2.8%	3.1
Metro respondents	351	3.1%	17.9%	51.6%	24.5%	2.8%	3.1
Non-metro respondents	371	4.6%	17.0%	50.4%	25.3%	2.7%	3.0
	χ^2=1.186 n.s.						t=0.227 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-20: Contributions of characteristics of near-shore to fish habitat: Mowed turf grass along the shore.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	717	14.9%	35.4%	38.6%	9.9%	1.3%	2.5
Metro respondents	348	16.4%	39.4%	34.5%	8.6%	1.1%	2.4
Non-metro respondents	370	13.8%	32.4%	41.6%	10.8%	1.4%	2.5
	χ^2=6.549 n.s.						t=2.181*

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-21: Contributions of characteristics of near-shore to fish habitat: Unmowed natural vegetation.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	717	2.5%	3.5%	28.9%	53.2%	11.9%	3.7
Metro respondents	348	2.3%	3.7%	28.2%	54.6%	11.2%	3.7
Non-metro respondents	370	2.7%	3.2%	29.5%	52.2%	12.4%	3.7
	χ^2=0.773 n.s.						t=0.049 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-22: Contributions of characteristics of near-shore to fish habitat: Application of lawn fertilizer.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	719	49.3%	32.0%	14.4%	3.2%	1.2%	1.8
Metro respondents	349	50.7%	29.2%	15.2%	3.4%	1.4%	1.8
Non-metro respondents	371	48.2%	34.0%	13.7%	3.0%	1.1%	1.7
	χ^2=2.060 n.s.						t=0.145 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-23: Contributions of characteristics of near-shore to fish habitat: Downed trees/logs along the shore.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	719	2.3%	7.5%	33.7%	45.9%	10.6%	3.5
Metro respondents	350	1.7%	7.1%	32.6%	45.4%	13.1%	3.6
Non-metro respondents	370	2.7%	7.8%	34.6%	46.2%	8.6%	3.5
	χ^2=4.504 n.s.						t=1.688n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-24: Contributions of characteristics of open-water to fish habitat.

	Mean[2]
Underwater rocky structure	4.1
Oxygenated water	4.0
Clear water	3.8
Deep, cold water	3.8
High algae levels	2.2

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-25: Contributions of characteristics of open-water to fish habitat: Oxygenated water.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	710	0.6%	1.4%	26.2%	44.2%	27.6%	4.0
Metro respondents	348	1.1%	1.4%	25.9%	45.7%	25.9%	3.9
Non-metro respondents	364	0.3%	1.4%	26.4%	43.1%	28.8%	4.0
	χ^2=2.802 n.s.						t=0.861 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-26: Contributions of characteristics of open-water to fish habitat: Underwater rocky structure.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	720	0.4%	0.9%	16.9%	56.0%	25.7%	4.1
Metro respondents	351	0.3%	1.4%	18.5%	54.7%	25.1%	4.0
Non-metro respondents	370	0.5%	0.5%	15.7%	57.0%	26.2%	4.1
	χ^2=2.852 n.s.						t=0.946 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-27: Contributions of characteristics of open-water to fish habitat: Clear water.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	716	0.6%	1.9%	29.2%	49.5%	18.8%	3.8
Metro respondents	348	1.1%	1.4%	29.9%	50.0%	17.5%	3.8
Non-metro respondents	369	0.3%	2.2%	28.7%	49.1%	19.8%	3.9
	χ^2=3.112 n.s.						t=0.799 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-28: Contributions of characteristics of open-water to fish habitat: Deep, cold water.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	719	1.3%	1.8%	25.8%	53.4%	17.7%	3.8
Metro respondents	349	1.1%	1.7%	24.6%	55.6%	16.9%	3.9
Non-metro respondents	371	1.3%	1.9%	26.7%	51.8%	18.3%	3.8
	χ^2= 1.078 n.s.						t=0.271 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-29: Contributions of characteristics of open-water to fish habitat: High algae levels.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	721	25.4%	37.4%	29.6%	5.9%	1.7%	2.2
Metro respondents	351	23.9%	36.2%	32.2%	6.3%	1.4%	2.3
Non-metro respondents	371	26.4%	38.3%	27.8%	5.7%	1.9%	2.2
	χ^2=2.181 n.s.						t=0.958 n.s.

[1]Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 10: Fish Habitat in Minnesota Streams and Rivers

Contributions of land adjacent to streams and rivers to fish habitat

Respondents were asked to rate 11 characteristics of land adjacent to streams and rivers in terms of their contribution on fish habitat (Tables 10-1 to 10-12). Ratings were on the scale 1 (very negative) to 5 (very positive). Responses for the different characteristics were significantly different (F=512.407, p<0.001), with dense forest (M=3.8) rated most positive and housing subdivisions and drainage tile in farm fields (M=2.1) rated most negative. A majority of respondents indicated that dense forest (Table 10-2) and forest with open understory (Table 10-3) adjacent to streams and rivers were positive or very positive. Nearly half of respondents felt that open fields (unplowed) were positive adjacent to streams or rivers (Table 10-4). A majority of respondents were neutral about farms or houses widely spaced adjacent to streams and rivers (Table 10-7). A majority of respondents indicated that the remaining characteristics listed were negative or very negative adjacent to streams and rivers, including: row crops (Table 10-5), pasture with animals (Table 10-6), housing subdivisions (Table 10-8), roads/parking lots (Table 10-9), drained wetlands (Table 10-10), drainage tile (Table 10-11), and pumping water from streams (Table 10-12). There were no significant differences between metropolitan and non-metropolitan residents on these questions.

Contributions of stream and river bank characteristics to fish habitat

Respondents were asked to rate nine stream and bank characteristics in terms of their contribution on fish habitat (Tables 10-13 to 9-22). Ratings were on the scale 1 (very negative) to 5 (very positive). Responses for the different characteristics were significantly different (F=437.702, p<0.001), with natural rocky banks (M=3.8) rated most positive and eroded stream/river banks (M=2.1) rated most negative. A majority of respondents indicated that low brush or grass (Table 10-14), tall brush (Table 10-15), natural rocky banks (Table 10-17), and trees on banks (Table 10-22) were positive or very positive. A majority of respondents were neutral about clear sand beaches (Table 10-16), man-made rip rap (Table 10-18), and retaining walls (Table 10-19). A majority of respondents indicated that mowed turf grass (Table 10-20) and erosion (Table 10-21) were negative or very negative adjacent on banks of streams and rivers. There were no substantive differences between metropolitan and non-metropolitan residents on these questions.

Contributions of off-bank water characteristics to fish habitat

Respondents were asked to rate 12 off-bank characteristics in terms of their contribution on fish habitat (Tables 10-23 to 10-35). Ratings were on the scale 1 (very negative) to 5 (very positive). Responses for the different characteristics were significantly different (F=194.872, p<0.001), with rocky stream/river bed (M=3.8) rated most positive and usually cloudy water (M=2.7) rated most negative. Respondents were generally less certain about whether off-bank water characteristics were positive or negative. A majority of respondents were neutral about the following off-bank water characteristics: no rapids (Table 10-27), dams (Table 10-28), a wide channel with less than knee deep water (Table 10-29), a narrow channel with greater than waist deep water (Table 10-30), usually cloudy water (Table 10-34), and clear water that was cloudy during high water (Table 10-35). For two other characteristics, rocky stream bed (Table 10-24) and silty water (Table 10-25), nearly a majority were neutral. A majority of respondents indicated that rapids (Table 10-26), channels with curves and bends (Table 10-32), and usually clear (Table 10-33) off-bank water characteristics were positive or very positive. There were no listed characteristics that a majority of respondents indicated were negative or very negative. There were no substantive differences between metropolitan and non-metropolitan residents on these questions.

These data suggest that anglers have a good understanding of land use factors that influence fish habitat. Anglers also have a fairly good understanding of riparian zone effects on stream habitat with perhaps the exception of stream bank riprap and retaining walls. Anglers have the least understanding of instream factors influencing fish habitat, notably dams and instream characteristics indicative of unstable stream channels (i.e., straightened channels and wide and shallow rivers).

Section 10: Fish Habitat at Minnesota Streams and Rivers

Table 10-1: Contributions of characteristics of land adjacent to rivers and streams to fish habitat.

	Mean[2]
Dense forest	3.8
Forest with open understory	3.6
Open fields (unplowed)	3.5
Individual farms/houses spaced far apart	3.0
Fields with row crops	2.4
Pasture with animals	2.3
Roads or parking lots	2.2
Drained wetlands	2.2
Pumping water from the stream/river	2.2
Housing subdivisions	2.1
Drainage tile in farm fields	2.1

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-2: Contributions of characteristics of land adjacent to rivers and streams to fish habitat: Dense forest.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	700	0.2%	2.1%	34.0%	47.0%	16.7%	3.8
Metro respondents	338	0.0%	2.1%	30.8%	48.8%	18.3%	3.8
Non-metro respondents	363	0.3%	2.2%	36.4%	45.7%	15.4%	3.7
	χ^2=3.810 n.s.						t=1.703 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-3: Contributions of characteristics of land adjacent to rivers and streams to fish habitat: Forest with open understory.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	695	0.6%	2.4%	45.8%	42.9%	8.3%	3.6
Metro respondents	334	0.3%	1.8%	44.0%	46.4%	7.5%	3.6
Non-metro respondents	361	0.8%	2.8%	47.1%	40.4%	8.9%	3.5
	χ^2=3.754 n.s.						t=0.985 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-4: Contributions of characteristics of land adjacent to rivers and streams to fish habitat: Open fields (unplowed).

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	696	1.3%	6.0%	44.0%	42.7%	6.0%	3.5
Metro respondents	334	1.2%	6.0%	44.0%	42.8%	6.0%	3.5
Non-metro respondents	362	1.4%	6.1%	43.9%	42.5%	6.1%	3.5
	χ^2=0.053 n.s.						t=0.096 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-5: Contributions of characteristics of land adjacent to rivers and streams to fish habitat: Fields with row crops.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	701	14.2%	40.1%	37.9%	6.9%	0.9%	2.4
Metro respondents	337	13.1%	41.5%	37.1%	7.4%	0.9%	2.4
Non-metro respondents	364	15.1%	39.0%	38.5%	6.6%	0.8%	2.4
	χ^2=1.068 n.s.						t=0.396 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-6: Contributions of characteristics of land adjacent to rivers and streams to fish habitat: Pasture with animals.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	699	19.7%	43.0%	30.9%	5.0%	1.5%	2.3
Metro respondents	335	21.8%	41.2%	29.9%	6.3%	0.9%	2.2
Non-metro respondents	364	18.1%	44.2%	31.6%	4.1%	1.9%	2.3
	χ^2=4.573 n.s.						t=0.627 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-7: Contributions of characteristics of land adjacent to rivers and streams to fish habitat: Individual farms/houses spaced far apart.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	699	3.1%	15.3%	64.8%	15.4%	1.5%	3.0
Metro respondents	338	3.3%	15.4%	66.9%	13.3%	1.2%	2.9
Non-metro respondents	362	3.0%	15.2%	63.3%	16.9%	1.7%	3.0
	χ^2=2.0999 n.s.						t=0.968 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-8: Contributions of characteristics of land adjacent to rivers and streams to fish habitat: Housing subdivisions.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	697	19.9%	48.1%	30.0%	1.5%	0.4%	2.1
Metro respondents	335	18.5%	46.3%	32.8%	2.1%	0.3%	2.2
Non-metro respondents	362	21.0%	49.4%	27.9%	1.1%	0.6%	2.1
	χ^2=3.640 n.s.						t=1.494 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-9: Contributions of characteristics of land adjacent to rivers and streams to fish habitat: Roads or parking lots.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	699	18.9%	43.3%	34.3%	3.3%	0.3%	2.2
Metro respondents	336	22.9%	41.4%	31.8%	3.6%	0.3%	2.2
Non-metro respondents	363	16.0%	44.6%	36.1%	3.0%	0.3%	2.3
	χ^2=5.861 n.s.						t=1.655 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-10: Contributions of characteristics of land adjacent to rivers and streams to fish habitat: Drained wetlands.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	698	26.2%	35.8%	31.8%	5.3%	0.9%	2.2
Metro respondents	336	27.4%	33.6%	33.3%	5.1%	0.6%	2.2
Non-metro respondents	362	25.4%	37.3%	30.7%	5.5%	1.1%	2.3
	χ^2=1.900 n.s.						t=0.253 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-11: Contributions of characteristics of land adjacent to rivers and streams to fish habitat: Drainage tile in farm fields.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	694	27.5%	39.1%	27.9%	4.6%	0.9%	2.1
Metro respondents	336	27.4%	39.6%	26.5%	6.3%	0.3%	2.1
Non-metro respondents	359	27.6%	38.7%	29.0%	3.3%	1.4%	2.1
	χ^2=5.921 n.s.						t=0.036 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-12: Contributions of characteristics of land adjacent to rivers and streams to fish habitat: Pumping water from the stream/river.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	697	21.6%	39.4%	35.7%	2.3%	0.9%	2.2
Metro respondents	337	21.7%	40.4%	33.8%	3.3%	0.9%	2.2
Non-metro respondents	361	21.6%	38.8%	37.1%	1.7%	0.8%	2.2
	χ^2=2.485 n.s.						t=0.006 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-13: Contributions of bank characteristics to fish habitat.

	Mean[2]
Natural rocky banks	3.8
Tall brush on banks	3.6
Trees on stream/river banks	3.6
Low brush or grass on banks	3.5
Man-made rip-rap along the banks	3.4
Clear sand banks	3.0
Retaining wall along the banks	2.9
Mowed turf grass along the banks	2.4
Eroded stream/river banks	2.1

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-14: Contributions of bank characteristics to fish habitat: Low brush or grass on banks.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	699	1.1%	5.7%	39.4%	46.6%	7.2%	3.5
Metro respondents	338	1.2%	4.7%	42.6%	43.8%	7.7%	3.5
Non-metro respondents	362	1.1%	6.4%	37.0%	48.6%	6.9%	3.5
	χ^2=3.236 n.s.						t=0.313 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-15: Contributions of bank characteristics to fish habitat: Tall brush on banks.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	698	0.8%	4.5%	37.5%	46.5%	10.8%	3.6
Metro respondents	335	0.3%	3.0%	40.6%	44.5%	11.6%	3.6
Non-metro respondents	363	1.1%	5.5%	35.3%	47.9%	10.2%	3.6
	χ^2=6.250 n.s.						t=0.618 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-16: Contributions of bank characteristics to fish habitat: Clear sand banks.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	695	3.1%	17.8%	53.5%	22.9%	2.6%	3.0
Metro respondents	336	2.1%	19.3%	54.2%	20.8%	3.6%	3.0
Non-metro respondents	360	3.9%	16.7%	53.1%	24.4%	1.9%	3.0
	χ^2=5.296 n.s.						t=0.095 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-17: Contributions of bank characteristics to fish habitat: Natural rocky banks.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	699	0.4%	1.6%	26.6%	58.4%	13.0%	3.8
Metro respondents	336	0.3%	1.5%	26.8%	59.2%	12.2%	3.8
Non-metro respondents	363	0.6%	1.7%	26.4%	57.9%	13.5%	3.8
	χ^2=0.583 n.s.						t=0.106 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-18: Contributions of bank characteristics to fish habitat: Man-made rip-rap along the banks.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	699	1.4%	7.8%	49.6%	36.1%	5.1%	3.4
Metro respondents	336	0.6%	6.8%	49.7%	36.0%	6.8%	3.4
Non-metro respondents	363	1.9%	8.5%	49.6%	36.1%	3.9%	3.3
	χ^2=6.002 n.s.						t=1.799 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-19: Contributions of bank characteristics to fish habitat: Retaining wall along the banks.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	698	5.8%	20.5%	50.6%	20.5%	2.5%	2.9
Metro respondents	335	6.6%	20.0%	50.1%	20.3%	3.0%	2.9
Non-metro respondents	363	5.2%	20.9%	51.0%	20.7%	2.2%	2.9
	χ^2=1.048 n.s.						t=0.081 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-20: Contributions of bank characteristics to fish habitat: Mowed turf grass along the banks.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	700	17.1%	38.9%	35.5%	7.7%	0.8%	2.4
Metro respondents	337	20.2%	40.9%	30.9%	6.8%	1.2%	2.3
Non-metro respondents	363	14.9%	37.5%	38.8%	8.3%	0.6%	2.4
	χ^2=7.845 n.s.						t=2.138*

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-21: Contributions of bank characteristics to fish habitat: Eroded stream/river banks.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	701	26.7%	43.9%	25.0%	3.7%	0.6%	2.1
Metro respondents	337	27.9%	39.8%	27.0%	3.9%	1.5%	2.1
Non-metro respondents	364	25.8%	47.0%	23.6%	3.6%	0.0%	2.0
	χ^2=8.603 n.s.						t=0.982 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-22: Contributions of bank characteristics to fish habitat: Trees on stream/river banks.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	699	1.9%	5.5%	33.2%	50.3%	9.1%	3.6
Metro respondents	336	1.5%	5.1%	33.0%	49.4%	11.0%	3.6
Non-metro respondents	363	2.2%	5.8%	33.3%	51.0%	7.7%	3.6
	χ^2=2.780 n.s.						t=1.181 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-23: Contributions of off-bank water characteristics to fish habitat.

	Mean[2]
Rocky stream/river bed	3.8
Channel with curves and bends	3.6
Rapids	3.5
Usually clear water (even during high water times)	3.5
Narrow channel deeper than waist deep	3.4
No rapids	3.1
Clear water that is cloudy during high water	3.1
Wide channel less than knee deep	3.0
Straight stream channel	3.0
Dams	2.9
Silty stream/river bed	2.8
Usually cloudy water	2.7

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-24: Contributions of off-bank water characteristics to fish habitat: Rocky stream/river bed.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	694	5.5%	31.7%	44.0%	15.8%	3.0%	3.8
Metro respondents	333	0.9%	1.5%	31.2%	54.1%	12.3%	3.8
Non-metro respondents	361	0.3%	1.4%	26.6%	59.6%	12.2%	3.8
	χ^2=3.403 n.s.						t=1.263 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-25: Contributions of off-bank water characteristics to fish habitat: Silty stream/river bed.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	695	5.5%	31.7%	44.0%	15.8%	3.0%	2.8
Metro respondents	334	6.3%	31.1%	41.6%	17.7%	3.3%	2.8
Non-metro respondents	361	5.0%	32.1%	45.7%	14.4%	2.8%	2.8
	χ^2=2.553 n.s.						t=0.403 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-26: Contributions of off-bank water characteristics to fish habitat: Rapids.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	695	0.6%	3.8%	44.1%	43.8%	7.6%	3.5
Metro respondents	334		3.0%	43.1%	44.9%	9.0%	3.6
Non-metro respondents	361	1.1%	4.4%	44.9%	42.9%	6.6%	3.5
	χ^2=6.152 n.s.						t=1.896 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-27: Contributions of off-bank water characteristics to fish habitat: No rapids.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	696	2.0%	10.5%	68.3%	16.9%	2.3%	3.1
Metro respondents	334	1.8%	11.7%	66.8%	17.1%	2.7%	3.1
Non-metro respondents	362	2.2%	9.7%	69.3%	16.9%	1.9%	3.1
	χ^2=1.417 n.s.						t=0.110 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-28: Contributions of off-bank water characteristics to fish habitat: Dams.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	691	6.0%	19.9%	53.9%	18.8%	1.5%	2.9
Metro respondents	332	4.2%	22.3%	54.8%	16.6%	2.1%	2.9
Non-metro respondents	359	7.2%	18.1%	53.2%	20.3%	1.1%	2.9
	χ^2=6.705 n.s.						t=0.014 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-29: Contributions of off-bank water characteristics to fish habitat: Wide channel less than knee deep.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	694	1.8%	18.9%	61.9%	15.1%	2.2%	3.0
Metro respondents	333	0.9%	18.3%	62.2%	16.8%	1.8%	3.0
Non-metro respondents	361	2.5%	19.4%	61.8%	13.9%	2.5%	2.9
	χ^2=4.030 n.s.						t=1.090 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-30: Contributions of off-bank water characteristics to fish habitat: Narrow channel deeper than waist deep.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	691	0.7%	4.1%	56.0%	36.6%	2.6%	3.4
Metro respondents	333	0.6%	3.6%	56.5%	36.6%	2.7%	3.4
Non-metro respondents	358	0.8%	4.5%	55.6%	36.6%	2.5%	3.4
	χ^2=0.500 n.s.						t=0.362 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-31: Contributions of off-bank water characteristics to fish habitat: Straight stream channel.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	695	2.5%	14.6%	63.9%	17.1%	1.8%	3.0
Metro respondents	333	1.8%	12.9%	63.4%	19.8%	2.1%	3.1
Non-metro respondents	362	3.0%	15.7%	64.4%	15.2%	1.7%	3.0
	χ^2=4.395 n.s.						t=2.039*

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-32: Contributions of off-bank water characteristics to fish habitat: Channel with curves and bends.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	692	1.1%	3.2%	37.1%	51.3%	7.3%	3.6
Metro respondents	331	0.3%	4.2%	39.3%	48.3%	7.9%	3.6
Non-metro respondents	361	1.7%	2.5%	35.5%	53.5%	6.9%	3.6
	χ^2=6.490 n.s.						t=0.418 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-33: Contributions of off-bank water characteristics to fish habitat: Usually clear water (even during high water times).

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	694	0.6%	5.3%	42.1%	43.7%	8.3%	3.5
Metro respondents	334	0.0%	5.7%	43.4%	41.9%	9.0%	3.5
Non-metro respondents	360	1.1%	5.0%	41.1%	45.0%	7.8%	3.5
	χ^2=4.762 n.s.						t=0.151 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-34: Contributions of off-bank water characteristics to fish habitat: Usually cloudy water.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	690	4.5%	33.8%	53.2%	7.4%	1.1%	2.7
Metro respondents	332	3.0%	32.2%	54.5%	8.7%	1.5%	2.7
Non-metro respondents	358	5.6%	34.9%	52.2%	6.4%	0.8%	2.6
	χ^2=5.047 n.s.						t=2.081*

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-35: Contributions of off-bank water characteristics to fish habitat: Clear water that is cloudy during high water.

Regions	N	Very negative	Negative	Neutral	Positive	Very positive	Mean[1]
Statewide[2]	691	1.1%	11.7%	62.8%	22.5%	1.9%	3.1
Metro respondents	334	0.0%	10.2%	63.8%	24.0%	2.1%	3.2
Non-metro respondents	358	2.0%	12.8%	62.0%	21.5%	1.7%	3.1
	χ^2=8.298 n.s.						t=1.954 n.s.

[1] Mean is based on the scale: 1 = very negative, 2 = negative, 3 = neutral, 4= positive, 5 = very positive.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section11: Minnesota Department of Natural Resources Fisheries Management

Minnesota Department of Natural Resources Management

Respondents were asked to rate their agreement with 13 items addressing their trust and desire for voice in Minnesota Department of Natural Resources management using the scale 1 (not at all) to 5 (very much) (Tables 11-1 to 11-14). Respondents rated items related to voice in management and respect for/acceptance of management higher than items related to perceptions of fairness, listening, and agreement with management (Table 11-1). Respondents from the metropolitan region rated their acceptance of the advice of MNDNR fisheries management slightly higher than non-metropolitan residents (Table 11-4).

We identified three factors related to respondents' attitudes about management: (a) fairness, trust, and agreement with decisions (*M*=3.3), (b) acceptance of management (*M*=3.8), and (c) desire for voice in management (*M*=3.8).

Seven statements were associated with fairness, trust, and agreement with decisions, Cronbach's alpha (α) = 0.930). The items included in this scale are: (a) do you consider MNDNR fisheries management to be trustworthy? (*M*=3.5) (Table 11-6), (b) do you consider Minnesota DNR decision-making procedures related to fisheries management fair? (*M*=3.3) (Table 11-7), (c) do you trust MNDNR fisheries management? (*M*=3.5) (Table 11-9), (d) do you think the Minnesota DNR handles fisheries management related decisions fairly? (*M*=3.3) (Table 11-10), (e) do you think MNDNR fisheries management listens to anglers when making management decisions? (*M*=3.1) (Table 11-12), (f) do you think MNDNR fisheries management uses the best available science when making management decisions? (*M*=3.4) (Table 11-13), and do you agree with the way MNDNR fisheries management has handled management of your favorite lake or stream? (*M*=3.1) (Table 11-13).

Three statements were associated with respect for and acceptance of management, Cronbach's alpha (α) = 0.882). The items included in this scale are: (a) do you intend to respect the advice of MNDNR fisheries management on future management decisions? (*M*=3.9) (Table 11-3), (b) do you accept the advice of MNDNR fisheries management? (*M*=3.8) (Table 11-4), and (c) are you willing to accept the advice of MNDNR fisheries management? (*M*=3.7) (Table 11-11).

Three statements were associated with desire for voice in management, Cronbach's alpha (α) = 0.707). The items included in this scale are: (a) do you consider an opportunity to voice opinions to Minnesota DNR fisheries management desirable? (*M*=3.4) (Table 11-2), (b) do you consider an opportunity to voice opinions to Minnesota DNR about fisheries management important? (*M*=3.7) (Table 11-5), and (c) should Minnesotans have the right to voice opinions about fisheries management to the DNR? (*M*=4.3) (Table 11-8).

Results suggest that while anglers ultimately may accept the decisions of management, they are largely neutral in their trust in the agency and they desire voice in agency decisions. The factor related to fairness, trust and agreement with management decisions was strongly correlated to respect and acceptance of management (*R*=.674). The factor related to fairness, trust, and agreement with management decisions was also negatively correlated with utilitarian (*R*=-.177) and dominance (*R*=-167) values, and positively correlated with protection values (*R*=.267). It was also positively correlated with education (*R*=.164) and negatively correlated with the orientation to keep fish (*R*=-.120). The acceptance of management factor

was also negatively correlated with utilitarian (*R*=-.215) and dominance (*R*=-213) values, and positively correlated with protection values (*R*=.287). It was positively correlated with education (*R*=.171) and negatively correlated with age (*R*=-.128) and percent of life in Minnesota (*R*=-.085). It was also negatively correlated to the orientation to keep fish (*R*=-.215) and catch some fish (*R*=-.136). Desire for voice in management was positively related to all factors related to angling involvement (*R*=.214 to.287). It was positively correlated with education (*R*=.100) and negatively correlated with utilitarian values (*R*=-.146), but unrelated to dominance and protection values.

Section 11: Minnesota Department of Natural Resources Fisheries Management

Table 11-1: Mean results: Minnesota Department of Natural Resources Fisheries Management.

To what extent…	N	Mean[1,2]
…do you consider an opportunity to voice opinions to Minnesota DNR fisheries management desirable?	726	3.4
…do you intend to respect the advice of MNDNR fisheries management on future management decisions?	725	3.9
…do you accept the advice of MNDNR fisheries management?	724	3.8
…do you consider an opportunity to voice opinions to Minnesota DNR about fisheries management important?	728	3.7
…do you consider MNDNR fisheries management to be trustworthy?	725	3.5
…do you consider Minnesota DNR decision-making procedures related to fisheries management fair?	727	3.3
…should Minnesotans have the right to voice opinions about fisheries management to the DNR?	729	4.3
…do you trust MNDNR fisheries management?	727	3.5
…do you think the Minnesota DNR handles fisheries management related decisions fairly?	724	3.3
…are you willing to accept the advice of MNDNR fisheries management?	727	3.7
…do you think MNDNR fisheries management listens to anglers when making management decisions?	727	3.1
…do you think MNDNR fisheries management uses the best available science when making management decisions?	727	3.4
…do you agree with the way MNDNR fisheries management has handled management of your favorite lake or stream?	727	3.1

[1]F=139.524p<0.001. Mean based on scale: 1=not at all, 5=very much.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 11: Minnesota Department of Natural Resources Fisheries Management

Table 11-2: Minnesota Department of Natural Resources Fisheries Management: To what extent… …do you consider an opportunity to voice opinions to Minnesota DNR fisheries management desirable?

	N	Not at all				Very much	Mean[1]
Statewide[2]	726	5.8%	11.2%	34.2%	31.5%	17.3%	3.4
Metro respondents	351	6.6%	13.1%	32.5%	29.9%	17.9%	3.4
Non-metro respondents	376	5.3%	9.8%	35.4%	32.7%	16.8%	3.5
	χ^2=3.212 n.s.						t=0.763 n.s.

[1] Mean is based on the scale: Mean is based on the scale: Mean based on scale: 1=not at all, 5=very much.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 11-3: Minnesota Department of Natural Resources Fisheries Management: To what extent… …do you intend to respect the advice of MNDNR fisheries management on future management decisions?

	N	Not at all				Very much	Mean[1]
Statewide[2]	725	0.8%	3.2%	27.4%	47.6%	21.1%	3.9
Metro respondents	351	1.4%	3.1%	22.5%	49.6%	23.4%	3.9
Non-metro respondents	375	0.3%	3.2%	30.9%	46.1%	19.5%	3.8
	χ^2=9.473 n.s.						t=1.486 n.s.

[1] Mean is based on the scale: Mean is based on the scale: Mean based on scale: 1=not at all, 5=very much.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 11-4: Minnesota Department of Natural Resources Fisheries Management: To what extent… …do you accept the advice of MNDNR fisheries management?

	N	Not at all				Very much	Mean[1]
Statewide[2]	724	0.8%	4.3%	28.4%	49.3%	17.1%	3.8
Metro respondents	348	0.9%	3.7%	23.3%	53.4%	18.7%	3.9
Non-metro respondents	376	0.8%	4.8%	32.2%	46.3%	16.0%	3.7
	χ^2=8.257 n.s.						t=2.261*

[1] Mean is based on the scale: Mean is based on the scale: Mean based on scale: 1=not at all, 5=very much.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 11: Minnesota Department of Natural Resources Fisheries Management

Table 11-5: Minnesota Department of Natural Resources Fisheries Management: To what extent… …do you consider an opportunity to voice opinions to Minnesota DNR about fisheries management important?

	N	Not at all				Very much	Mean[1]
Statewide[2]	728	3.1%	6.7%	27.7%	42.1%	20.5%	3.7
Metro respondents	352	3.4%	5.7%	28.1%	41.2%	21.6%	3.7
Non-metro respondents	377	2.9%	7.4%	27.3%	42.7%	19.6%	3.7
	χ^2=1.464 n.s.						t=0.441 n.s.

[1] Mean is based on the scale: Mean is based on the scale: Mean based on scale: 1=not at all, 5=very much.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 11-6: Minnesota Department of Natural Resources Fisheries Management: To what extent… …do you consider MNDNR fisheries management to be trustworthy?

	N	Not at all				Very much	Mean[1]
Statewide[2]	725	2.1%	8.1%	35.1%	42.7%	12.1%	3.5
Metro respondents	352	1.4%	7.4%	34.4%	44.3%	12.5%	3.6
Non-metro respondents	374	2.7%	8.6%	35.6%	41.4%	11.8%	3.5
	χ^2=2.193 n.s.						t=1.228 n.s.

[1] Mean is based on the scale: Mean is based on the scale: Mean based on scale: 1=not at all, 5=very much.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 11-7: Minnesota Department of Natural Resources Fisheries Management: To what extent… …do you consider Minnesota DNR decision-making procedures related to fisheries management fair?

	N	Not at all				Very much	Mean[1]
Statewide[2]	727	3.6%	9.7%	43.8%	34.5%	8.3%	3.3
Metro respondents	351	3.4%	7.4%	43.6%	36.8%	8.8%	3.4
Non-metro respondents	377	3.7%	11.4%	44.0%	32.9%	8.0%	3.3
	χ^2=4.064 n.s.						t=1.539 n.s.

[1] Mean is based on the scale: Mean is based on the scale: Mean based on scale: 1=not at all, 5=very much.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 11: Minnesota Department of Natural Resources Fisheries Management

Table 11-8: Minnesota Department of Natural Resources Fisheries Management: To what extent… …should Minnesotans have the right to voice opinions about fisheries management to the DNR?

	N	Not at all				Very much	Mean[1]
Statewide[2]	729	0.1%	1.3%	11.3%	43.2%	44.1%	4.3
Metro respondents	351	0.3%	0.6%	10.8%	40.7%	47.6%	4.3
Non-metro respondents	377	0.0%	1.9%	11.6%	45.0%	41.5%	4.3
	χ^2=5.863 n.s.						t=1.593 n.s.

[1] Mean is based on the scale: Mean is based on the scale: Mean based on scale: 1=not at all, 5=very much.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 11-9: Minnesota Department of Natural Resources Fisheries Management: To what extent… …do you trust MNDNR fisheries management?

	N	Not at all				Very much	Mean[1]
Statewide[2]	727	3.4%	9.6%	36.4%	38.7%	11.8%	3.5
Metro respondents	351	2.3%	8.3%	36.5%	41.3%	11.7%	3.5
Non-metro respondents	377	4.2%	10.6%	36.3%	36.9%	11.9%	3.4
	χ^2=4.115 n.s.						t=1.474 n.s.

[1] Mean is based on the scale: Mean is based on the scale: Mean based on scale: 1=not at all, 5=very much.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 11-10: Minnesota Department of Natural Resources Fisheries Management: To what extent… …do you think the Minnesota DNR handles fisheries management related decisions fairly?

	N	Not at all				Very much	Mean[1]
Statewide[2]	724	3.3%	9.8%	45.0%	34.3%	7.7%	3.3
Metro respondents	351	3.1%	7.4%	45.0%	36.2%	8.3%	3.4
Non-metro respondents	374	3.5%	11.5%	44.9%	32.9%	7.2%	3.3
	χ^2=4.072 n.s.						t=1.560 n.s.

[1] Mean is based on the scale: Mean is based on the scale: Mean based on scale: 1=not at all, 5=very much.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 11: Minnesota Department of Natural Resources Fisheries Management

Table 11-11: Minnesota Department of Natural Resources Fisheries Management: To what extent… …are you willing to accept the advice of MNDNR fisheries management?

	N	Not at all				Very much	Mean[1]
Statewide[2]	727	1.0%	5.5%	34.1%	45.5%	13.9%	3.7
Metro respondents	350	0.9%	5.1%	30.6%	49.7%	13.7%	3.7
Non-metro respondents	377	1.1%	5.8%	36.6%	42.4%	14.1%	3.6
	χ^2=4.303 n.s.						t=1.266 n.s.

[1] Mean is based on the scale: Mean is based on the scale: Mean based on scale: 1=not at all, 5=very much.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 11-12: Minnesota Department of Natural Resources Fisheries Management: To what extent… …do you think MNDNR fisheries management listens to anglers when making management decisions?

	N	Not at all				Very much	Mean[1]
Statewide[2]	727	7.0%	14.8%	45.9%	26.7%	5.6%	3.1
Metro respondents	351	5.4%	15.1%	43.3%	30.2%	6.0%	3.2
Non-metro respondents	377	8.2%	14.6%	47.7%	24.1%	5.3%	3.0
	χ^2=5.523 n.s.						t=1.772 n.s.

[1] Mean is based on the scale: Mean is based on the scale: Mean based on scale: 1=not at all, 5=very much.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 11-13: Minnesota Department of Natural Resources Fisheries Management: To what extent… …do you think MNDNR fisheries management uses the best available science when making management decisions?

	N	Not at all				Very much	Mean[1]
Statewide[2]	727	3.0%	9.9%	40.3%	37.0%	9.7%	3.4
Metro respondents	351	2.0%	10.8%	35.6%	40.5%	11.1%	3.5
Non-metro respondents	377	3.7%	9.3%	43.8%	34.5%	8.8%	3.4
	χ^2=8.085 n.s.						t=1.883 n.s.

[1] Mean is based on the scale: Mean is based on the scale: Mean based on scale: 1=not at all, 5=very much.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 11: Minnesota Department of Natural Resources Fisheries Management

Table 11-14: Minnesota Department of Natural Resources Fisheries Management: To what extent… …do you agree with the way MNDNR fisheries management has handled management of your favorite lake or stream?

	N	Not at all				Very much	Mean[1]
Statewide[2]	727	7.3%	14.5%	41.1%	30.8%	6.2%	3.1
Metro respondents	350	7.1%	12.3%	39.7%	33.4%	7.4%	3.2
Non-metro respondents	377	7.4%	16.2%	42.2%	28.9%	5.3%	3.1
	χ^2=4.697 n.s.						t=1.805 n.s.

[1] Mean is based on the scale: Mean is based on the scale: Mean based on scale: 1=not at all, 5=very much.
[2] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 12: Characteristics of Respondents

Angler Age, Gender, Children, and Years in Minnesota

The mean age of respondents was 52 years (Table 12-1). The mean age was not significantly different between metropolitan and non-metropolitan respondents. A great majority of respondents were male (86%) (Table 12-2). There was no significant difference in gender between metropolitan and non-metropolitan respondents. Nearly one-fourth of respondents had children at home, with no significant difference between regions (Table 12-3). On average, respondents had lived 87.3% of their lives in Minnesota, with no significant difference between regions (Table 12-4).

Angler Education and Income

Over 35% of respondents (37.3%) had a 4-year college degree or higher level of education (Table 12-5). Education levels varied significantly between respondents from the metropolitan region and outside the metropolitan region, with metropolitan residents reporting higher levels of education. Similarly, metropolitan residents reported higher levels of income, with 26.1% reporting a household income of greater than $150,000 compared to 10.3% of non-metropolitan respondents (Table 12-6)

Late Respondents

A comparison of late respondents to other respondents found that late respondents had been fishing in Minnesota for somewhat fewer years (M=33.0 years) than early respondents had (M=40.1 years) (t = 10.588, p<0.001). Late respondents had fished an average of 7.6 of the previous 10 years compared to 8.4 years for early respondents (t = 8.245, p<0.001). Late respondents had fished an average of 20.8 days during the 2014 season, compared to 23.7 days for early respondents (t=2.726, p<0.01). Late respondents also rated their preferences for catching specific fish species lower, on average, than early respondents did, and were slightly less satisfied with their overall angling experiences.

Late respondents rated all of 10 habitat management activities that the Minnesota Department of Natural Resources performs significantly more important than early respondents did. Compared to early respondents, late respondents felt that a slightly greater proportion of funds should go toward protection relative to restoration. When asked about specific fisheries management activities, relative to early respondents, late respondents felt that a slightly smaller proportion of funds should be allocated to stocking and slightly more to enforcement,

Section 12: Characteristics of Respondents

Table 12-1: Age of survey respondents

Residence of angler	n	Mean	SD	Range	% <30	% 30-39	% 40-49	% 50-59	% 60+
Statewide[1]	735	51.9	15.9	19-88	11.2%	13.8%	14.6%	26.0%	34.3%
Metro respondents	351	50.6	50.6	19-85	11.7%	15.7%	15.4%	28.8%	28.5%
Non-metro respondents	384	52.8	52.8	19-88	10.9%	12.5%	14.1%	24.0%	38.5%
		t=1.890 n.s.							

[1] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 12-2: Gender of study population and survey respondents

Residence of angler	n	% male	% female
Statewide[1]	738	86.0%	14.0%
Metro respondents	353	85.3%	14.7%
Non-metro respondents	385	86.5%	13.5%
	χ^2=0.228 n.s.		

[1] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 12-3: Children age 2-16 years living with you?

Residence of angler	n	% no	% yes
Statewide[1]	738	75.2%	24.8%
Metro respondents	354	73.7%	26.3%
Non-metro respondents	384	76.3%	23.7%
	χ^2=0.652 n.s.		

[1] A stratified sample based on region was drawn. Statewide data is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 12: Characteristics of Respondents

Table 12-4: Number of years living in Minnesota

Residence of angler	n	Mean number of years	% of life
Statewide[1]	734	45.3	87.3%
Metro respondents	349	43.3	86.0%
Non-metro respondents	384	46.7	88.3%
		t=2.594*	t=1.376 n.s.

[1] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 12-5: Highest Level of Education.

	Percent of respondents whose highest level of education was…								
Regions	**Grade school**	**Some high school**	**High school diploma (or GED)**	**Some vocational or technical school**	**Associate's degree**	**Some college**	**4-year college degree**	**Some graduate school**	**Graduate degree**
Statewide[1]	0.5%	2.0%	16.7%	8.5%	16.2%	18.8%	23.0%	4.2%	10.1%
Metro respondents	0.5%	1.1%	13.2%	4.9%	11.0%	19.5%	31.0%	4.9%	13.7%
Non-metro respondents	0.5%	2.6%	19.3%	11.2%	20.1%	18.3%	17.0%	3.7%	7.3%
	χ^2=49.264***, Cramer's V=0.257								

[1] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 12-6: Income

Residence of angler	n	< $10k	$10-49,999k	$50-99,999k	$100-149,999k	$150k+
Statewide[1]	626	2.5%	22.5%	38.6%	19.3%	17.0%
Metro respondents	307	1.6%	17.3%	34.9%	20.2%	26.1%
Non-metro respondents	321	3.1%	26.5%	41.4%	18.7%	10.3%
		χ^2=31.188***, Cramer's V=0.223				

[1] A stratified sample based on region of residence was drawn. Statewide data in this table is weighted to reflect regional proportions in the population.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

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Appendix A: Survey Instrument

FISHING AND FISH HABITAT IN MINNESOTA

A study of anglers' attitudes about fishing and fish habitat in lakes, rivers and streams.

A cooperative study conducted by the University of Minnesota for the Minnesota Department of Natural Resources

Your help on this study is greatly appreciated!

Please return your completed questionnaire in the enclosed envelope. The envelope is self-addressed and no postage is required. Thanks!

Minnesota Cooperative Fish and Wildlife Research Unit,
Department of Fisheries, Wildlife and Conservation Biology
University of Minnesota
St. Paul, Minnesota 55108-6124

Part I. Minnesota Fishing Background

Q1. In what year did you first fish in Minnesota? If uncertain please estimate.

_____ year (*If you have never fished in Minnesota, enter '0' here, and return your survey.*)

Q2. Over the <u>past ten years</u>, about how many years did you purchase a <u>Minnesota fishing license</u>?

_____ Years

Q3. In 2014, how many <u>total days</u> did you fish <u>in Minnesota</u>?

_____ Days

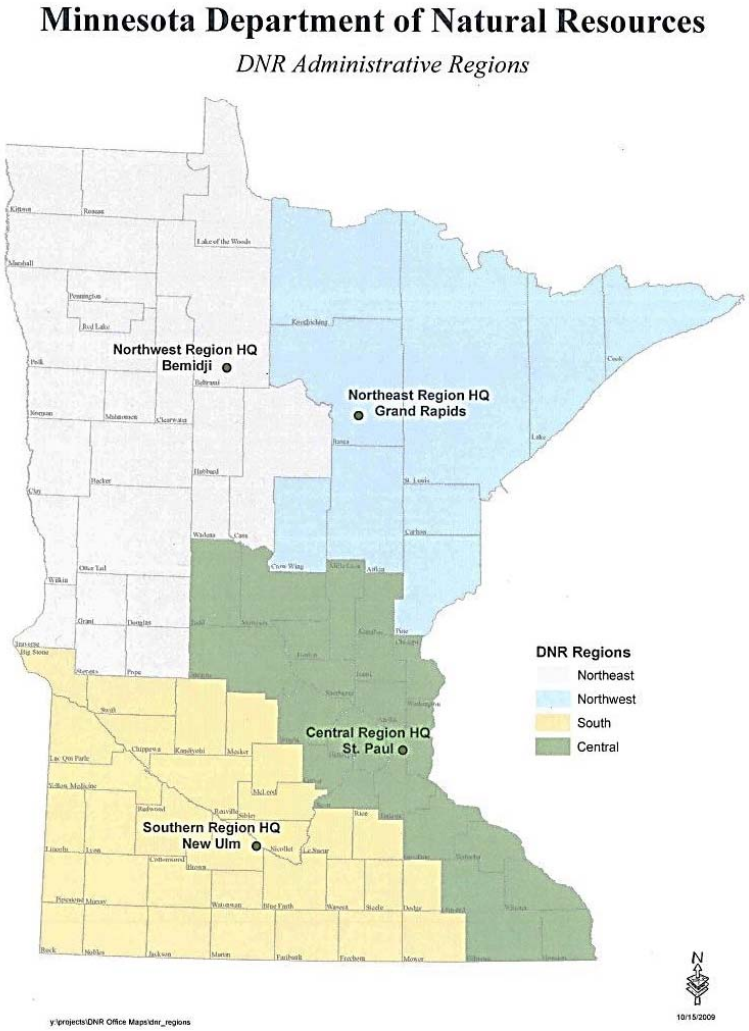
Q4. In 2014, how many days did you:

fish <u>in lakes</u> in Minnesota: _____ days

fish <u>in rivers or streams</u> in Minnesota: _____ days

Q5. In 2014, how many days did you spend fishing in each region of the state listed below? (See map.)

REGION	NUMBER OF DAYS
Northwest region	days
Northeast region	days
South-southwest region	days
Central-southeast region	days



Q6. Please indicate your preference for targeting the following types of fish when fishing in Minnesota. (*Circle one response for each. If you do not target the species, circle 9 at right.*)

	Strongly not preferred	Not preferred	Neutral	Preferred	Strongly preferred	DO NOT FISH FOR
Walleye	1	2	3	4	5	9
Sauger	1	2	3	4	5	9
Northern pike	1	2	3	4	5	9
Muskellunge	1	2	3	4	5	9
Yellow Perch	1	2	3	4	5	9
Crappie	1	2	3	4	5	9
Sunfish	1	2	3	4	5	9
Smallmouth bass	1	2	3	4	5	9
Largemouth bass	1	2	3	4	5	9
White bass	1	2	3	4	5	9
Lake trout	1	2	3	4	5	9
Rainbow trout	1	2	3	4	5	9
Brook trout	1	2	3	4	5	9
Brown trout	1	2	3	4	5	9
Carp or suckers	1	2	3	4	5	9
Bullhead	1	2	3	4	5	9
Flathead catfish	1	2	3	4	5	9
Channel catfish	1	2	3	4	5	9
Salmon (Lake Superior)	1	2	3	4	5	9
Lake sturgeon	1	2	3	4	5	9

Q7. How satisfied or dissatisfied are you with each of the following when fishing in Minnesota? (*Circle one response for each.*)

	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
Overall fishing experience	1	2	3	4	5
The size of the fish you catch	1	2	3	4	5
The number of fish you catch	1	2	3	4	5
The behavior of other anglers	1	2	3	4	5
The behavior of non-anglers	1	2	3	4	5
Access	1	2	3	4	5
Fish habitat	1	2	3	4	5

Q8. Please indicate how much you agree or disagree with the following statements. (*Circle one for each item.*)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Fishing is one of the most enjoyable things I do.	1	2	3	4	5
Fishing provides me with the opportunity to be with friends.	1	2	3	4	5
To change my preference from fishing to another recreation activity would require major rethinking.	1	2	3	4	5
A lot of my life is organized around fishing.	1	2	3	4	5
Fishing has a central role in my life.	1	2	3	4	5
Most of my friends are in some way connected with fishing.	1	2	3	4	5
When I am fishing, others see me the way I want them to see me.	1	2	3	4	5
I identify with the people and image associated with fishing.	1	2	3	4	5
Fishing is one of the most satisfying things I do.	1	2	3	4	5
Participating in fishing says a lot about who I am.	1	2	3	4	5
Fishing is very important to me.	1	2	3	4	5
You can tell a lot about a person when you see them fishing.	1	2	3	4	5
When I am fishing I can really be myself.	1	2	3	4	5
I enjoy discussing fishing with my friends.	1	2	3	4	5
When I am fishing, I don't have to be concerned about what other people think of me.	1	2	3	4	5

Q9. Please write in your <u>one</u> favorite type of fish to target when fishing in Minnesota: _____

Q9a. Next, indicate how much you agree or disagree with the following statements about catching your favorite type of fish named above. (*Circle one for each item.*)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Catching enough fish for a meal is essential to a "good" fishing trip	1	2	3	4	5
When I go fishing, I'm just as happy if I don't catch anything	1	2	3	4	5
Catching large fish is essential to a "good" fishing trip	1	2	3	4	5
If I thought I wouldn't catch any fish, I wouldn't go fishing	1	2	3	4	5
I like to fish where I know I have a chance to catch a "trophy"	1	2	3	4	5
I'm just as happy if I release the fish I catch	1	2	3	4	5
The more fish I catch the happier I am	1	2	3	4	5
I would rather catch 1 or 2 big fish than 10 smaller fish	1	2	3	4	5
I'm just as happy if I don't keep the fish I catch	1	2	3	4	5
I want to keep all the fish I catch	1	2	3	4	5
I must keep the fish I catch for the trip to be successful	1	2	3	4	5
I must catch fish for the fishing trip to be enjoyable	1	2	3	4	5
A full stringer of fish is the best indicator of a good fishing trip	1	2	3	4	5
When I go fishing, I'm not satisfied unless I catch at least something	1	2	3	4	5
A successful fishing trip is one in which many fish are caught	1	2	3	4	5
I'm happiest with a fishing trip if I catch at least the limit	1	2	3	4	5
A fishing trip can be enjoyable even if no fish are caught	1	2	3	4	5
I would rather catch 1 or 2 big fish than 5 smaller fish	1	2	3	4	5
Keeping a few fish is more important to me than catching & releasing larger fish	1	2	3	4	5

Q10. Please tell us how important each of the following things are to you when selecting a place to go fishing. (*Circle one for each item*.)

	Very Unimportant	Unimportant	Somewhat Unimportant	Neither	Somewhat Important	Important	Very Important
Fishing location close to home or cabin	1	2	3	4	5	6	7
Number of other people at the lake, stream or river	1	2	3	4	5	6	7
Fish habitat at the lake, stream or river	1	2	3	4	5	6	7
Setting/scenery at the lake, stream or river	1	2	3	4	5	6	7
Water quality at the lake, stream or river	1	2	3	4	5	6	7
Type of fish at the lake, stream or river	1	2	3	4	5	6	7
Fishing access at the lake, stream or river	1	2	3	4	5	6	7
Fishing information for the lake, stream or river	1	2	3	4	5	6	7

Q11. Please indicate how much you agree or disagree with the following statements. (*Circle one for each item*.)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
People have a duty to protect fish and other parts of nature.	1	2	3	4	5
Fish are valuable in their own right, regardless of people	1	2	3	4	5
Protecting the environment is more important than providing fishing opportunities.	1	2	3	4	5
The primary value of fisheries is to provide recreation for people.	1	2	3	4	5
Management should focus on doing what is best for nature instead of what is best for people.	1	2	3	4	5
Fish have as much right to exist as people.	1	2	3	4	5
Fish are primarily valuable as food for people.	1	2	3	4	5
Humans were meant to rule over the rest of nature.	1	2	3	4	5
Humans are no more important than other parts of nature.	1	2	3	4	5
Fish should primarily be managed for human benefit.	1	2	3	4	5
Nature's primary value is to provide things that are useful to people.	1	2	3	4	5
Fish are valuable only if people get to use them in some way.	1	2	3	4	5
Humans have a right to change the natural world to suit their needs.	1	2	3	4	5
Fisheries are valuable only if they produce jobs and income for people.	1	2	3	4	5

Part II. Managing Fish Habitat in Minnesota

Q12. Indicate <u>how effective</u> you feel each of the following strategies is <u>for improving fish habitat</u>. (*Circle one response for each. Circle DK if you don't know.*)

	Not at all Effective	Slightly Effective	Moderately Effective	Very Effective	Extremely Effective	Don't know
Creation of log cribs and other human-made cover	1	2	3	4	5	DK
Rip-rapping banks to reduce erosion	1	2	3	4	5	DK
Fencing out livestock	1	2	3	4	5	DK
Promoting land management practices that reduce erosion and run off	1	2	3	4	5	DK
Planting vegetation to reduce erosion and run off	1	2	3	4	5	DK
Watershed improvements	1	2	3	4	5	DK
Regulations to limit removal of aquatic plants	1	2	3	4	5	DK
Conservation easements to protect high-water-quality lakes. These easements keep land in private hands but restrict development.	1	2	3	4	5	DK
Land acquisition of riparian shoreline parcels to conserve critical fish and wildlife habitat.	1	2	3	4	5	DK
Land acquisition of riparian shoreline parcels to maintain public water access.	1	2	3	4	5	DK
Education/technical assistance programs about shoreline restoration	1	2	3	4	5	DK
Financial grants for shoreline restoration	1	2	3	4	5	DK
Regulation of agricultural run-off	1	2	3	4	5	DK
Regulation of urban run-off	1	2	3	4	5	DK
Protecting groundwater	1	2	3	4	5	DK
Using conservation programs to decrease soil erosion to improve fishing	1	2	3	4	5	DK
Controlling wetland drainage	1	2	3	4	5	DK
Partnering with nonprofit organizations to implement habitat projects	1	2	3	4	5	DK
Partnering with other government agencies to implement habitat projects	1	2	3	4	5	DK
Zoning proposals to protect fish habitat	1	2	3	4	5	DK
Regulations to protect fish habitat	1	2	3	4	5	DK
Regulations to protect aquatic plants	1	2	3	4	5	DK

Q13. Listed below are fish habitat management activities that the Minnesota Department of Natural Resources performs. How important is each of these activities to you? (*Circle one answer for each activity*.)

	Very unimportant	Unimportant	Neutral	Important	Very important
Protecting the land surrounding lakes and streams from damage/development	1	2	3	4	5
Restoring land surrounding lakes and streams that have been damaged/developed	1	2	3	4	5
Protecting the habitat in lakes and streams	1	2	3	4	5
Restoring the habitat in lakes and streams	1	2	3	4	5
Purchasing land or easements around lakes and streams	1	2	3	4	5
Partnering with nonprofit organizations to improve lake and stream habitat	1	2	3	4	5
Educating people on how they can help protect lakes and streams	1	2	3	4	5
Educating people about lake and stream ecology/habitat	1	2	3	4	5
Managing shoreline to protect fish spawning sites	1	2	3	4	5
Regulation of aquatic plant removal by property owners and lake associations	1	2	3	4	5

Q14. Now, for the same list of fish habitat management activities, please rate the performance of the Minnesota Department of Natural Resources. (*Circle one answer for each activity*.)

	DNR performance on activity…				
	Very poor	Poor	Neutral	Good	Very good
Protecting the land surrounding lakes and streams from damage/development	1	2	3	4	5
Restoring land surrounding lakes and streams that have been damaged/developed	1	2	3	4	5
Protecting the habitat in lakes and streams	1	2	3	4	5
Restoring the habitat in lakes and streams	1	2	3	4	5
Purchasing land or easements around lakes and streams	1	2	3	4	5
Partnering with nonprofit organizations to improve lake and stream habitat	1	2	3	4	5
Educating people on how they can help protect lakes and streams	1	2	3	4	5
Educating people about lake and stream ecology/habitat	1	2	3	4	5
Managing shoreline to protect fish spawning sites	1	2	3	4	5
Regulation of aquatic plant removal by property owners and lake associations	1	2	3	4	5

Part III. Budgeting for Managing Fish Habitat in Minnesota

Fish habitat can be enhanced through protection and/or restoration.

Protection reduces impacts to high-quality fish habitat and prevents degradation. Protection measures include both voluntary and legally mandated actions. For example, property owners can volunteer—and receive compensation—for setting aside conservation easements to ensure that some lands have limited human impacts, while zoning regulations limit development legally. Habitat protection measures that prevent degradation before it occurs typically cost less and succeed more often than habitat restoration measures implemented after habitat is degraded.

Habitat restoration attempts to re-establish quality habitat from degraded habitats, by returning ecosystems to a close approximation of their condition prior to disturbance. Restoration means the re-establishment of pre-disturbance aquatic functions and related physical, chemical, and biological characteristics.

Q15. After reading the descriptions above, please indicate the percentage of Minnesota DNR habitat budget dollars you would like to see spent on the following activities. (The total must add up to 100%)

_____ % protection of intact, high-quality fish habitat

_____ % restoration of degraded fish habitat
= 100 %

Q16. With limited budget dollars, the Minnesota DNR has to make trade-offs when spending for fisheries management. Please indicate the percentage of Minnesota DNR habitat budget dollars you would like to see spent on the following fisheries management activities. (The total must add up to 100%)

_____ % protection and restoration of fish habitat

_____ % monitoring fish populations

_____ % stocking fish

_____ % enforcement of regulations
= 100 %

Part IV. Fish Habitat at Minnesota Lakes

Q17. How positive or negative are the contributions of the following characteristics to fish habitat in lakes (*Circle one answer for each activity*.)

	Very negative	Negative	Neutral	Positive	Very positive
Land adjacent to lakes					
Dense forest	1	2	3	4	5
Forest with open understory	1	2	3	4	5
Open fields (unplowed)	1	2	3	4	5
Fields with row crops	1	2	3	4	5
Pasture with animals	1	2	3	4	5
Individual farms/houses spaced far apart	1	2	3	4	5
Housing subdivisions	1	2	3	4	5
Hills or bluffs	1	2	3	4	5
Roads or parking lots	1	2	3	4	5
Near-shore					
Emergent and floating leaf vegetation (like cattails and water lilies)	1	2	3	4	5
Submerged vegetation which grow entirely underwater (like pondweeds)	1	2	3	4	5
Clear sand beaches	1	2	3	4	5
Docks	1	2	3	4	5
Swim rafts	1	2	3	4	5
Natural rocky shoreline	1	2	3	4	5
Man-made rip-rap along the shore	1	2	3	4	5
Retaining wall along the shore	1	2	3	4	5
Mowed turf grass along the shore	1	2	3	4	5
Unmowed natural vegetation	1	2	3	4	5
Application of lawn fertilizer	1	2	3	4	5
Downed trees/logs along the shore	1	2	3	4	5
Open-water					
Oxygenated water	1	2	3	4	5
Underwater rocky structure	1	2	3	4	5
Clear water	1	2	3	4	5
Deep, cold water	1	2	3	4	5
High algae levels	1	2	3	4	5

Part V. Fish Habitat at Minnesota Streams and Rivers

Q18. How positive or negative are the contributions of the following characteristics to fish habitat in streams and rivers (*Circle one answer for each activity*.)

	Very negative	Negative	Neutral	Positive	Very positive
Land adjacent to stream/river					
Dense forest	1	2	3	4	5
Forest with open understory	1	2	3	4	5
Open fields (unplowed)	1	2	3	4	5
Fields with row crops	1	2	3	4	5
Pasture with animals	1	2	3	4	5
Individual farms/houses spaced far apart	1	2	3	4	5
Housing subdivisions	1	2	3	4	5
Roads or parking lots	1	2	3	4	5
Drained wetlands	1	2	3	4	5
Drainage tile in farm fields	1	2	3	4	5
Pumping water from the stream/river	1	2	3	4	5
Bank characteristics					
Low brush or grass on banks	1	2	3	4	5
Tall brush on banks	1	2	3	4	5
Clear sand banks	1	2	3	4	5
Natural rocky banks	1	2	3	4	5
Man-made rip-rap along the banks	1	2	3	4	5
Retaining wall along the banks	1	2	3	4	5
Mowed turf grass along the banks	1	2	3	4	5
Eroded stream/river banks	1	2	3	4	5
Trees on stream/river banks	1	2	3	4	5
Off-bank water characteristics					
Rocky stream/river bed	1	2	3	4	5
Silty stream/river bed	1	2	3	4	5
Rapids	1	2	3	4	5
No rapids	1	2	3	4	5
Dams	1	2	3	4	5
Wide channel less than knee deep	1	2	3	4	5
Narrow channel deeper than waist deep	1	2	3	4	5
Straight stream channel	1	2	3	4	5
Channel with curves and bends	1	2	3	4	5
Usually clear water (even during high water times)	1	2	3	4	5
Usually cloudy water	1	2	3	4	5
Clear water that is cloudy during high water	1	2	3	4	5

Part VI. Minnesota DNR Fisheries Management

Q19. Please respond to the following statements. ***(Circle one answer for each statement.)***

To what extent…	**Not at all**				**Very much**
…do you consider an opportunity to voice opinions to Minnesota DNR fisheries management desirable?	1	2	3	4	5
…do you intend to respect the advice of MNDNR fisheries management on future management decisions?	1	2	3	4	5
…do you accept the advice of MNDNR fisheries management?	1	2	3	4	5
…do you consider an opportunity to voice opinions to Minnesota DNR about fisheries management important?	1	2	3	4	5
…do you consider MNDNR fisheries management to be trustworthy?	1	2	3	4	5
…do you consider Minnesota DNR decision-making procedures related to fisheries management fair?	1	2	3	4	5
…should Minnesotans have the right to voice opinions about fisheries management to the DNR?	1	2	3	4	5
…do you trust MNDNR fisheries management?	1	2	3	4	5
…do you think the Minnesota DNR handles fisheries management related decisions fairly?	1	2	3	4	5
…are you willing to accept the advice of MNDNR fisheries management?	1	2	3	4	5
…do you think MNDNR fisheries management listens to anglers when making management decisions?	1	2	3	4	5
…do you think MNDNR fisheries management uses the best available science when making management decisions?	1	2	3	4	5
…do you agree with the way MNDNR fisheries management has handled management of your favorite lake or stream?	1	2	3	4	5

Part VII. About You

Q20. In what year were you born?

_____ year

Q21. How many years have you lived in Minnesota?

_____ years

Q22. What is your gender?

- ❑ Male
- ❑ Female

Q23. Do you currently have children (ages 2-16) living with you? (*Please check one*.)

- ❑ Yes

- ❑ No

Q24. What is the highest level of education you have completed? *(Check one)*

- ❑ Grade school
- ❑ Some high school
- ❑ High school diploma or GED
- ❑ Some vocational or technical school
- ❑ Vocational/technical school (associate's) degree
- ❑ Some college
- ❑ Four-year college (bachelor's) degree
- ❑ Some graduate school
- ❑ Graduate (master's or doctoral) degree

Q25. What was your approximate annual household income from all sources, before taxes, in 2014?

- ❑ Less than $10,000
- ❑ $10,000 to $19,999
- ❑ $20,000 to $29,999
- ❑ $30,000 to $39,999
- ❑ $40,000 to $49,999
- ❑ $50,000 to $59,999
- ❑ $60,000 to $69,999
- ❑ $70,000 to $79,999
- ❑ $80,000 to $89,999
- ❑ $90,000 to $99,999
- ❑ $100,000 to $124,999
- ❑ $125,000 to $149,999
- ❑ $150,000 to $174,999
- ❑ $175,000 to $199,999
- ❑ $200,000 or more

Please write any additional comments below:

THANK YOU FOR YOUR HELP!
Please return the completed questionnaire in the enclosed self-addressed, stamped envelope.