

TROUT ANGLING IN MINNESOTA



Final Report

A cooperative study conducted by:

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

TROUT ANGLING IN MINNESOTA

Prepared by:

Sue Schroeder

Research Associate

Minnesota Cooperative Fish and Wildlife Research Unit
Department of Fisheries, Wildlife, and Conservation Biology
University of Minnesota

Acknowledgements

This study was a cooperative effort supported by the Minnesota Department of Natural Resources, Division of Fish and Wildlife (DNR) and the U.S. Geological Survey through the Minnesota Cooperative Fish and Wildlife Research Unit at the University of Minnesota. We especially wish to thank the Minnesota Department of Natural Resources for their support of the project. We give special thanks to Rick Nordby for his assistance in working with the electronic licensing system. Finally, we thank the many Minnesota trout anglers who took the time to complete the survey and helped to further our understanding of this important clientele.

Suggested Citation

Schroeder, S. (2013). *Trout Angling in Minnesota*. University of Minnesota, Minnesota Cooperative Fish and Wildlife Research Unit, Department of Fisheries, Wildlife, and Conservation Biology.

Contact Information

- 1) Sue Schroeder, Research Associate
Minnesota Cooperative Fish and Wildlife Research Unit
University of Minnesota
200 Hodson Hall, 1980 Folwell Avenue
St. Paul, MN 55108
(612)624-3479 (phone)
(612)625-5299 (fax)
sas@umn.edu

Key Findings

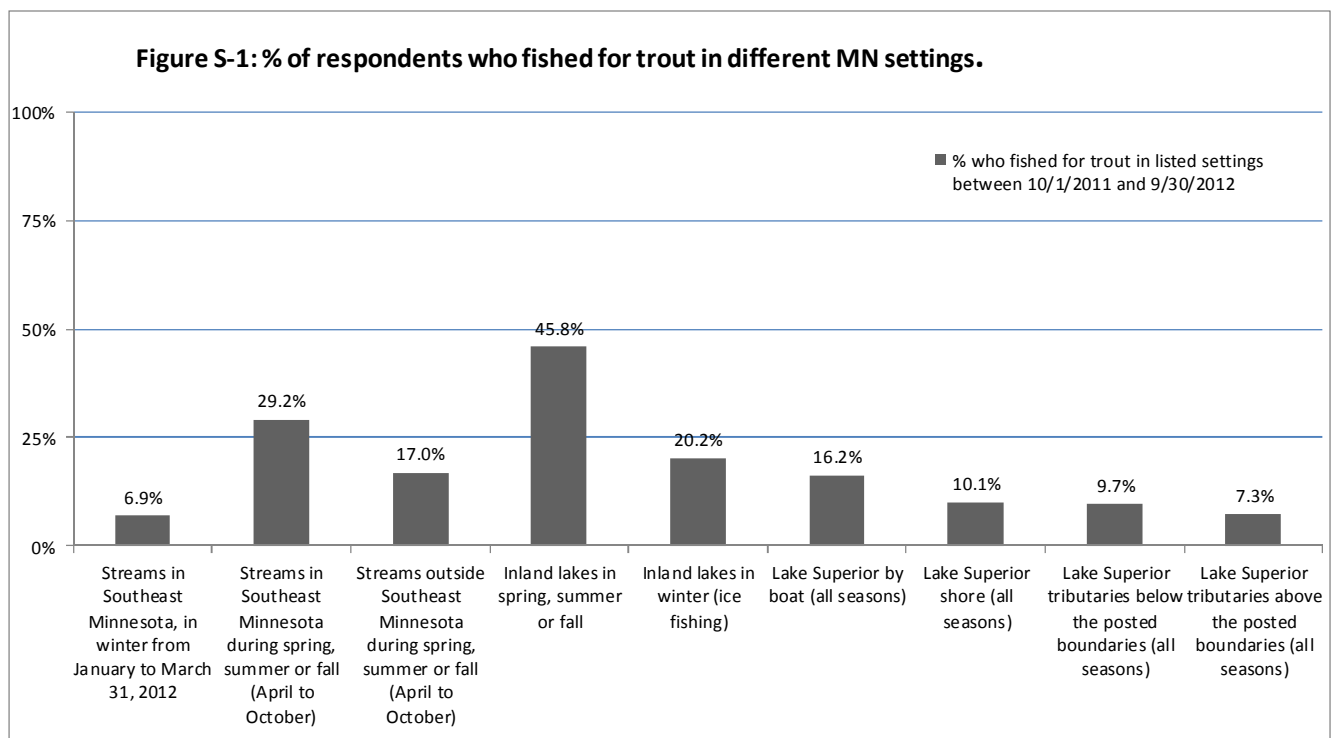
- This survey targeted Minnesota trout anglers, with a study emphasis on the rainbow trout (Kamloops and steelhead) fishery in Lake Superior and its tributaries.
- A total of 85,825 anglers purchased trout stamps during the study timeframe; 2,500 anglers were sent surveys with a response rate of 59%.
- An estimated 30.5% (26,177) of trout anglers fished Lake Superior and its tributaries with 14.6% (12,530) participating in the Lake Superior rainbow trout fishery.
- Of trout anglers participating in the Lake Superior rainbow trout fishery during the study timeframe, 20.4% targeted only Kamloops, 34.0% targeted only steelhead, and 45.6% targeted both Kamloops and steelhead. Based on the 85,825 Minnesota resident anglers who purchased trout stamps during the study timeframe, these results suggest that 12,530 Minnesota trout anglers targeted rainbow trout in Lake Superior and its tributaries during the study timeframe. 2,575 targeted Kamloops exclusively, 4,291 targeted steelhead exclusively, and 5,664 targeted both Kamloops and steelhead.
- Of all trout anglers surveyed, 52.5% were willing to pay more for a trout stamp if the additional funds were used statewide, 21.1% were willing to pay more if funds went toward steelhead management, and 13.1% were willing to pay more if funds went toward Kamloops management. The most common increase in the amount anglers would be willing to pay for a trout stamp in all three scenarios was \$5.00.
- Based on the above estimates trout anglers contributed \$858,250 to statewide trout management through the purchase of trout stamps during the study timeframe.
 - Trout anglers fishing Lake Superior and its tributaries contributed \$261,766 through purchase of trout stamps.
 - Lake Superior rainbow trout anglers contributed \$125,300, of which:
 - § anglers who exclusively targeted steelhead contributed \$42,910,
 - § anglers exclusively targeting Kamloops contributed \$25,750, and
 - § anglers fishing for both strains contributed \$56,640.

Executive Summary

This study sought to gather information from anglers about trout fishing in Minnesota, with emphasis on the rainbow trout fishery (Kamloops and steelhead) in Lake Superior and its tributaries. Specifically, the purpose of this study was to better understand angler participation in trout fishing at various locations, along with opinions about the use of trout stamp funds and willingness to maintain or enhance cold water management programs by increasing the price of a trout stamp. Surveys were sent to 2,500 Minnesota residents who purchased a trout stamp between October 1, 2011 and September 30, 2012. A total of 1,202 full-length surveys and 207 non-response postcards were returned for an overall response rate of 59%.

Minnesota Trout Fishing Participation

Eighty-five percent of respondents had targeted trout during the 12 months from October 1, 2011 through September 30, 2012. The proportion of respondents who fished for trout in each of the nine listed trout-fishing settings is shown in Figure S-1. Anglers surveyed may have fished in multiple locations.

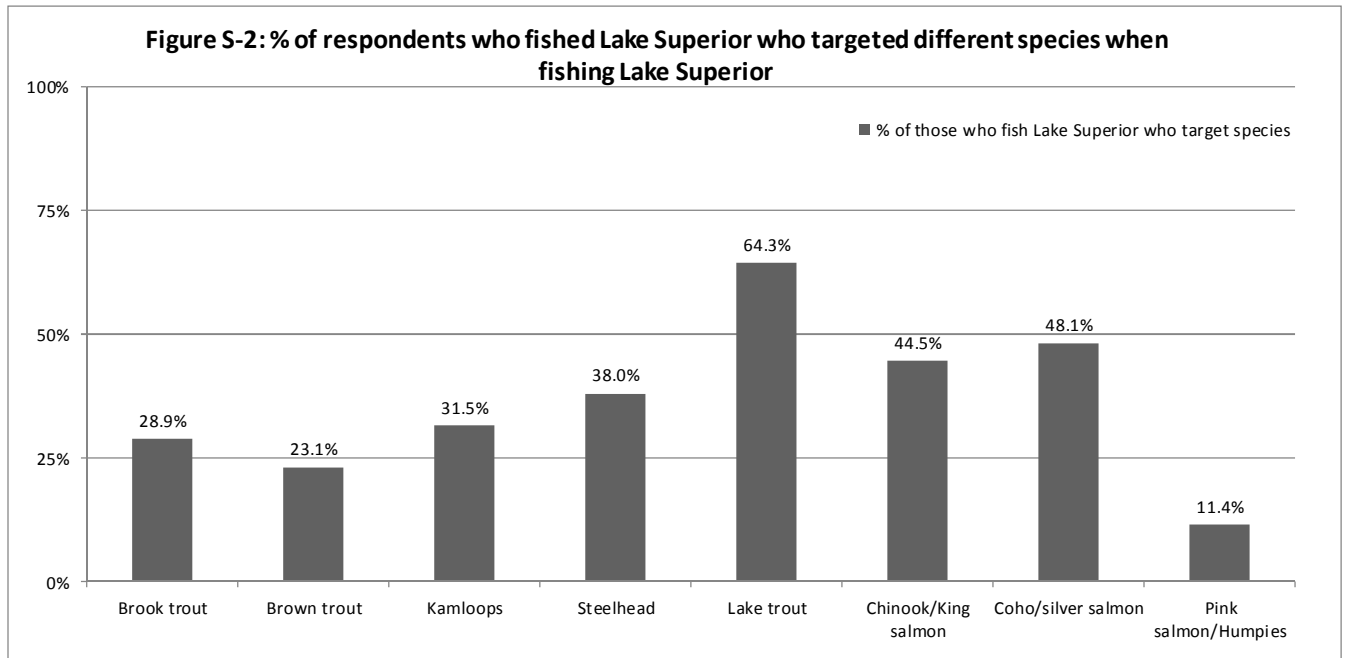


Note: Percentages do not add to 100% because many respondents fished in more than one setting.

Lake Superior Trout Fishing

Nearly one-third of respondents who had fished for trout during the noted timeframe had fished in one or more settings on or near Lake Superior.

The proportion of respondents targeting different species in or near Lake Superior during the noted timeframe is shown in Figure S-2. Again, percentages do not add to 100% because many anglers targeted multiple species.

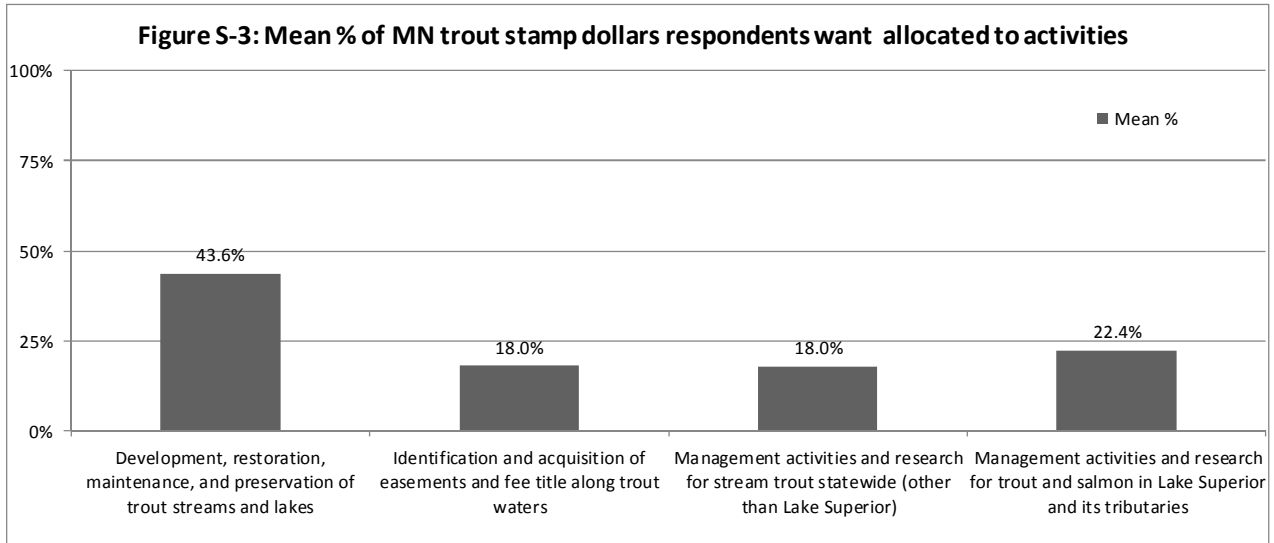


Note: Percentages do not add to 100% because many respondents fished for more than one species.

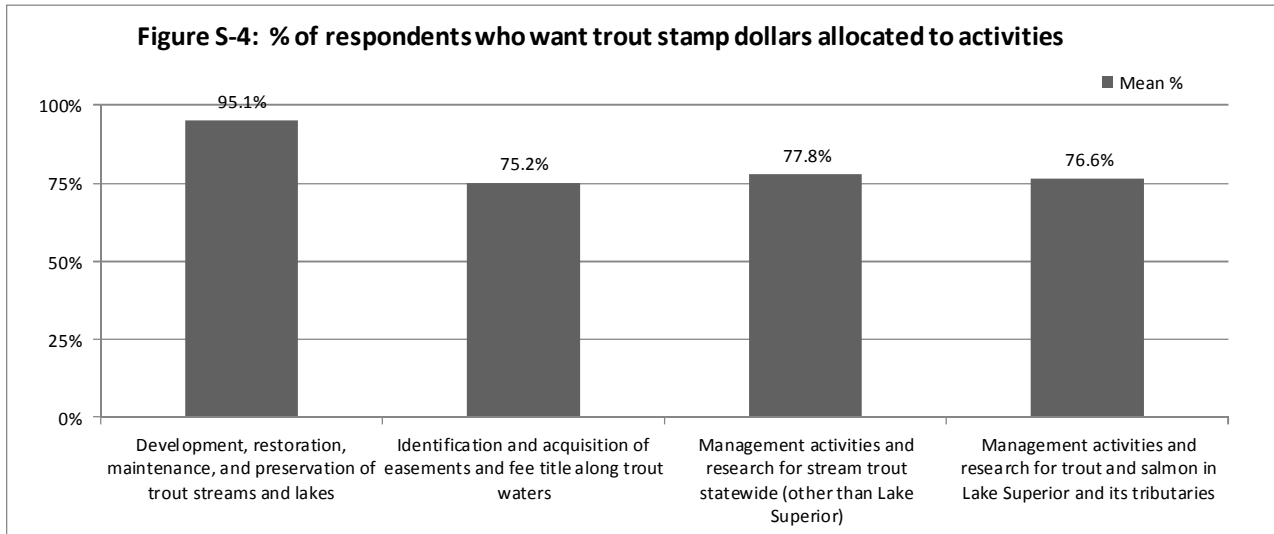
Nearly half of respondents who had fished Lake Superior during the study timeframe had targeted rainbow trout there. Nearly half of these individuals reported targeting both Kamloops and steelhead, while about 20% reported targeting Kamloops exclusively and 34% reported targeting steelhead exclusively.

Allocation of Trout Stamp Funds

Respondents were asked to indicate the percentage of Minnesota DNR trout stamp dollars they would like allocated to each of four categories: (a) development, restoration, maintenance, and preservation of trout streams and lakes, (b) identification and acquisition of easements and fee title along trout waters, (c) management activities and research for stream trout statewide (other than Lake Superior), and (d) management activities and research for trout and salmon in Lake Superior and its tributaries. The mean percentage of dollars respondents allocated to each category is shown in Figure S-3.



Nearly all respondents wanted some funds allocated to development, restoration, maintenance, and preservation of trout streams and lakes, while about three-fourths of respondents wanted some funds allocated to: identification and acquisition of easements and fee title along trout waters, management activities and research for stream trout statewide (other than Lake Superior), and management activities and research for trout and salmon in Lake Superior and its tributaries (Figure S-4).



Of the three-fourths of respondents who indicated that some funds should be allocated to trout management for Lake Superior and its tributaries, most wanted funds evenly divided for management of Kamloops, steelhead, lake trout, salmon and brook trout.

Willingness to Increase Cost of Trout Stamps

Respondents were asked to indicate their willingness to pay additional funds for: (a) a trout stamp for maintaining management of trout fisheries statewide, (b) a trout stamp if it went specifically for maintaining current management of Kamloops in Lake Superior and its tributaries, and (c) a trout stamp if it went specifically for maintaining current management of steelhead in Lake Superior and its tributaries. Over half of respondents were willing to pay more for a trout stamp for maintaining management of trout fisheries statewide. About 20% were willing to pay more for a trout stamp if it went specifically for maintaining current management of steelhead in Lake Superior and its tributaries, and about 13% were willing to pay more for a trout stamp if it went specifically for maintaining current management of Kamloops in Lake Superior and its tributaries. The most common increase in the amount respondents indicated they would be willing to pay for a trout stamp was \$5.

Population Estimates

Based on the 85,825 Minnesota resident anglers who purchased trout stamps during the study timeframe, we estimated numbers of anglers fishing different locations and potential trout stamp revenues. Based on our estimates, 26,177 Minnesota resident trout anglers fished in Lake Superior or its tributaries during the study timeframe. Rainbow trout anglers numbered 12,530 with 2,575 exclusively targeting Kamloops, 4,291 exclusively targeting steelhead and 5,664 targeting both Kamloops and steelhead. Estimates of Minnesota resident trout anglers targeting different fish species in Lake Superior and its tributaries ranged from 3,004 for pink salmon to 16,822 for lake trout. Most anglers had fished for multiple species.

Based on our willingness to pay calculations, the most common increase in the amount respondents were willing to pay for trout stamps was \$5. Assuming the same number of trout stamps are purchased, a \$5 increase in a trout stamp to maintain management of trout fisheries statewide could raise an additional \$429,125 (i.e., 85,825 resident trout anglers x \$5). This is likely an overestimate because a \$5 increase could price some anglers out of the market.

Table of Contents

Acknowledgements.....	iii
Suggested Citation.....	iii
Contact Information.....	iii
Key Findings.....	iv
Executive Summary.....	v
Minnesota Trout Fishing Participation.....	v
Lake Superior Trout Fishing.....	vi
Allocation of Trout Stamp Funds.....	vii
Willingness to Increase Cost of Trout Stamps.....	viii
Population Estimates.....	viii
Table of Contents.....	ix
List of Tables.....	x
Introduction.....	1
Study Purpose and Objectives.....	1
Methods.....	1
Sampling.....	1
Data Collection.....	1
Survey Instruments.....	2
Data Entry and Analysis.....	2
Survey Response Rate.....	2
Section 1: Trout Fishing Locations and Participation.....	3
Findings:.....	3
Fishing at Various Minnesota Locations.....	3
Days Fishing.....	3
Fishing for Trout in Lake Superior.....	3
Section 2: Allocation of MNDNR Trout Stamp Dollars.....	7
Findings:.....	7
Allocation of MNDNR Trout Stamp Dollars.....	7
Allocation of Funds to Management Activities and Research for Trout and Salmon in Lake Superior and its Tributaries.....	7
Section 3: Willingness to Pay for Trout Stamps.....	9
Findings:.....	9
Willingness to Pay for Trout Stamps.....	9
Section 4: Demographic Information.....	15
Findings:.....	15
Age and Gender.....	15
Late Respondents.....	15
References.....	18
Appendix 1: Survey Instruments.....	19

List of Tables

Table 1-1: Fishing for trout in various settings in Minnesota in the 12 months from October 1, 2011 through September 30, 2012.	5
Table 1-2: Of respondents who fished in the listed settings, number of days fished.	5
Table 1-3: Percent of respondents who targeted specific fish in Lake Superior or its tributaries...6	6
Table 1-4: Proportions and estimated numbers of those targeting Kamloops and steelhead.....6	6
Table 2-1: Percentage of MNDNR trout stamp dollars should be spent on the following activities.....	8
Table 2-2: 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.....	8
Table 3-1: Willingness to pay for trout stamps	10
Table 3-2: Willingness to pay more for trout stamp for maintaining management of trout fisheries statewide: Comparison of respondents who fished Lake Superior versus those who did not.....	10
Table 3-3: Willingness to pay more for trout stamp if it went specifically for maintaining current management of Kamloops in Lake Superior and its tributaries: Comparison of respondents who fished Lake Superior versus those who did not.	11
Table 3-4: Willingness to pay more for trout stamp if it went specifically for maintaining current management of steelhead in Lake Superior and its tributaries: Comparison of respondents who fished Lake Superior versus those who did not.	11
Table 4-1: Age	16
Table 4-2: Gender.	16
Table 4-3: Fishing participation: Late respondents vs. early respondents.	16
Table 4-4: Fishing participation on or near Lake Superior: Late respondents vs. early respondents.	16
Table 4-5: Age and gender: Late respondents vs. early respondents.....	17

Introduction

Minnesota is home to over about 1.6 million sportspeople, including 1,108,000 anglers (U.S. Department of the Interior, Fish and Wildlife Service, 2006). Approximately 28% of Minnesota residents 16 years and older participate in fishing (U.S. Department of the Interior, Fish and Wildlife Service, 2006).

Between 2001 and 2006, the number of state resident anglers decreased 15% from 1,345,000 to 1,143,000; the angling-related expenditures by state resident anglers increased 73%, and the resident angling days in the state increased from 20,277,000 to 22,305,000 (U.S. Department of the Interior, Fish and Wildlife Service, 2006). In 2006, anglers in Minnesota (resident and nonresident) spent over \$850 million dollars on angling trip-related expenses, and a combined \$1.1 billion on trips and equipment (U.S. Department of the Interior, Fish and Wildlife Service, 2006).

In 2012, approximately 95,870 trout stamps were sold in Minnesota. Trout stamps cost \$10 each, for a total of \$958,700 in stamp sales. Trout stamp funds go into a dedicated account and are used to help support the extra costs required to manage the cold water fisheries in Minnesota.

Study Purpose and Objectives

This study sought to gather angler opinions about trout angling and management in Minnesota, with a particular emphasis on Lake Superior and its tributaries. Specifically, the purpose of this study was to better understand angler participation in trout fishing at various locations, along with opinions about use of trout stamp funds and willingness to pay more for trout stamps. In addition, we wanted to estimate the number of trout stamp buyers who target Kamloops and steelhead in Lake Superior and its tributaries.

The questions used to address the study purpose are provided in the survey instrument (Appendix A) and discussed in more detail in the subsequent sections. This report details responses to the survey. Survey recipients were selected based on their purchase of a trout stamp between October 1, 2011 and September 30, 2012.

Methods

Sampling

The population of interest was Minnesota residents who purchased a trout stamp between October 1, 2011 and September 30, 2012. In order to minimize recall bias, the study timeframe was selected to coincide with the most recently completed summer fishing season, rather than the most recently completed license year (which ended February 29, 2012). A total of 85,825 individuals purchased a stamp during the October 1, 2011 and September 30, 2012 time frame. The survey sample was drawn from the Minnesota Department of Natural Resources' (DNR) electronic licensing system (ELS). An initial sample of 2,500 Minnesota residents who purchased a trout stamp between October 1, 2011 and September 30, 2012 was drawn from the ELS.

Data Collection

Data were collected using mail-back surveys following the process outlined by Dillman (2000) to enhance response rates. We constructed two relatively straightforward questionnaires, created personalized cover letters, and made multiple contacts with the targeted respondents. Potential study respondents were contacted three times between October 2012 and February 2013. In the initial contact, a cover letter, a one-page, two-sided 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 an appeal for respondents to complete and return the survey. Approximately 3 weeks after the first mailing, a second mailing that included a personalized cover letter and replacement questionnaire with business-reply envelope, was sent to all individuals with valid addresses who had not yet replied. Because of lower than expected response rates, we reformatted the questionnaire into a survey booklet with a trout image for the third mailing. Immediately following the New Year, the third mailing that included the revised survey, a personalized cover letter with business-reply envelope, was sent to all individuals with valid addresses who had not yet replied. In February 2013, a postcard with two questions was sent to people who had not responded to gauge nonresponse bias. Returned full-length surveys were collected through February 26, 2013. Postcards were accepted through April 10, 2013.

Survey Instruments

The data collection instrument for trout anglers was a self-administered survey with 4 sections of questions (Appendix A). The questionnaire included the following subjects:

- § Minnesota trout fishing locations and days of participation;
- § Fishing for trout in Lake Superior or its tributaries;
- § Allocation of Minnesota DNR trout stamp dollars;
- § Willingness to pay more for Minnesota DNR trout stamps.

Data Entry and Analysis

Data were keypunched in Excel 2010 and analyzed on a personal computer using the Statistical Program for the Social Sciences (SPSS for Windows 19 and 21). We computed basic descriptive statistics and frequencies for the results.

Several statistics presented in the report are used to show the association between variables. The chi-square statistic is used to test whether two categorical variables are independent. In addition to the chi-square statistic, the Cramer's V statistic is 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 are used to test hypotheses about differences between two population means (Norusis, 2002). Large t-values indicate that the sample means vary more than you would expect (Norusis, 2002).

Survey Response Rate

Of the 2,500 full-length questionnaires mailed to trout anglers, 110 were undeliverable. Of the remaining 2,390 surveys, a total of 1,202 full-length surveys were returned, resulting in an overall response rate of 50%. In order to examine nonresponse bias, postcard surveys were sent to the individuals who had not responded to the first two full-length survey mailings. We received 207 responses to the follow-up postcard for a total response rate of 59%. Differences between early and late responses are described in Section 4.

Section 1: Trout Fishing Locations and Participation

Findings:

Fishing at Various Minnesota Locations

Respondents were asked to report if they targeted trout in nine different settings in Minnesota during the 12 months from October 1, 2011 through September 30, 2012. The nine Minnesota settings included: (a) streams in Southeast Minnesota, in winter from January to March 31, 2012, (b) streams in southeast Minnesota during spring, summer or fall (April to October), (c) streams outside southeast Minnesota during spring, summer or fall (April to October), (d) inland lakes in spring, summer or fall, (e) inland lakes in winter (ice fishing), (f) Lake Superior by boat (all seasons), (g) Lake Superior shore (all seasons), (h) Lake Superior tributaries below the posted boundaries (all seasons), (i) Lake Superior tributaries above the posted boundaries (all seasons). Eighty-five percent of respondents had targeted trout during the noted timeframe. Nearly half (45.8%) of respondents reported targeting trout on inland lakes in spring, summer or fall, with about one-third (29.2%) targeting trout on streams in southeast Minnesota during spring, summer or fall, and about one in five (20.2%) targeted trout on inland lakes in winter. Less than 20% of respondents reported targeting trout in the other listed settings. (See Table 1-1.) Many anglers indicated they had targeted trout in multiple locations.

Days Fishing

Respondents who had fished in the different listed Minnesota trout-fishing settings were asked to report the number of days they had fished there during the noted timeframe. The average number of days fished in a setting ranged from 4.73 days for Lake Superior tributaries above the posted boundaries to 6.85 days for streams in southeast Minnesota during spring, summer or fall (April to October). The median number of days fished ranged from 2.00 to 4.00. The settings with the highest median number of days fished were: (a) streams in southeast Minnesota during spring, summer, and fall, (b) inland lakes in spring, summer, and fall, and (c) inland lakes in winter. (See Table 1-2.)

Fishing for Trout in Lake Superior

Nearly one-third (30.5%, $n = 308$) of respondents who had fished for trout during the noted timeframe had fished in one or more of the listed settings in Lake Superior or its tributaries. Based on 85,825 trout stamps sold, this suggests that 26,177 Minnesota resident trout anglers fished in one or more of the listed settings in Lake Superior or its tributaries during the study timeframe.

Respondents who had fished Lake Superior during the noted timeframe were asked to indicate the types of fish they targeted. The greatest proportion of respondents who fished Lake Superior targeted Lake trout (64.3%), followed by Coho (48.1%), Chinook (44.5%), Steelhead (38.0%), Kamloops (31.5%), Brook trout (28.9%), Brown trout (23.1%), and Pink salmon (11.4%). The proportion of respondents who targeted each of these types of fish, and an estimated total number of individuals targeting the different fish types is summarized in Table 1-3.

Nearly half (47.7%, $n = 147$) of respondents who had fished Lake Superior during the study timeframe had targeted rainbow trout there. Nearly half (45.6%, $n = 67$) of these individuals reported targeting both

Section 1: Trout Fishing Locations and Participation

Kamloops and steelhead, while 20.4% ($n = 30$) reported targeting Kamloops exclusively and 34% ($n = 50$) reported targeting steelhead exclusively. See Table 1-4.

Based on the 85,825 Minnesota resident anglers who purchased trout stamps during the study timeframe, these results suggest that 12,530 Minnesota trout anglers targeted rainbow trout during the study timeframe with 2,575 targeting Kamloops exclusively, 4,291 targeting steelhead exclusively, and 5,664 targeting both Kamloops and steelhead. If only anglers who targeted rainbow trout from shore and tributary streams are considered, 1,716 targeted Kamloops exclusively, 2,145 targeted steelhead exclusively, and 3,950 targeted both.

Section 1: Trout Fishing Locations and Participation

Table 1-1: Fishing for trout in various settings in Minnesota in the 12 months from October 1, 2011 through September 30, 2012.

Setting	% who fished ¹	Estimated number of Minnesota residents fishing ²
Streams in <u>Southeast Minnesota</u> , in winter from January to March 31, 2012	6.9%	5,922
Streams in <u>Southeast Minnesota</u> during spring, summer or fall (April to October)	29.2%	25,061
Streams <u>outside Southeast Minnesota</u> during spring, summer or fall (April to October)	17.0%	14,590
Inland lakes in spring, summer or fall	45.8%	39,308
Inland lakes in winter (ice fishing)	20.2%	17,337
Lake Superior by boat (all seasons)	16.2%	13,904
Lake Superior shore (all seasons)	10.1%	8,668
Lake Superior tributaries <u>below the posted boundaries</u> (all seasons)	9.7%	8,325
Lake Superior tributaries <u>above the posted boundaries</u> (all seasons)	7.3%	6,265

Notes:

Results based on respondents indicating yes or no regarding whether they had targeted trout in the setting.

¹Percentages do not add to 100% because respondents could have fished in more than one setting.

²Total of estimated number of Minnesota resident anglers fishing by setting exceeds the total number of resident trout stamps sold because respondents could have fished in more than one setting.

Table 1-2: Of respondents who fished in the listed settings, number of days fished.

Setting	Mean number of days	Median number of days	Mode number of days	Range
Streams in <u>Southeast Minnesota</u> , in winter from January to March 31, 2012	5.19	3.00	2	1-30
Streams in <u>Southeast Minnesota</u> during spring, summer or fall (April to October)	6.85	4.00	2	1-100
Streams <u>outside Southeast Minnesota</u> during spring, summer or fall (April to October)	6.47	3.00	2	1-50
Inland lakes in spring, summer or fall	6.28	4.00	1	1-75
Inland lakes in winter (ice fishing)	6.28	4.00	2	1-50
Lake Superior by boat (all seasons)	6.54	2.00	1	1-80
Lake Superior shore (all seasons)	6.21	3.00	2	1-50
Lake Superior tributaries <u>below the posted boundaries</u> (all seasons)	6.61	3.00	1	1-45
Lake Superior tributaries <u>above the posted boundaries</u> (all seasons)	4.73	2.00	2	1-30

Notes:

Two outlier values eliminated from analysis: 200 days fishing for trout on inland lakes in spring, summer or fall, and 300 days fishing for trout on Lake Superior by boat (all seasons).

Section 1: Trout Fishing Locations and Participation

Table 1-3: Percent of respondents who targeted specific fish in Lake Superior or its tributaries.

Types of trout	% who targeted among anglers who fished Lake Superior ¹	% who targeted among all respondents ²	Estimated number of Minnesota residents targeting ³
Brook trout	28.9%	8.8%	7,553
Brown trout	23.1%	7.0%	6,008
Kamloops	31.5%	9.6%	8,239
Steelhead	38.0%	11.6%	9,956
Lake trout	64.3%	19.6%	16,822
Chinook/King salmon	44.5%	13.6%	11,672
Coho/silver salmon	48.1%	14.7%	12,616
Pink salmon/Humpies	11.4%	3.5%	3,004

Notes:

¹Percentages do not add to 100% because respondents could have targeting more than one type of fish in Lake Superior or its tributaries.

²Percent who targeted among all respondents, accounts for 30.5% of respondents fishing Lake Superior and 69.5% not fishing Lake Superior.

³Estimated number of Minnesota resident anglers targeting calculated based on 85,825 trout/salmon stamps sold from October 1, 2011 through September 30, 2012.

Table 1-4: Proportions and estimated number of anglers targeting rainbow trout (Kamloops and steelhead).

	% who targeted rainbow trout in Lake Superior ¹	% who targeted among anglers who fished Lake Superior ²	% who targeted among all respondents ³	Estimated number of Minnesota residents targeting ⁴
Targeted Kamloops exclusively	20.4%	9.7%	3.0%	2,575
Targeted steelhead exclusively	34.0%	16.2%	5.0%	4,291
Targeted both Kamloops and steelhead	45.6%	21.8%	6.6%	5,664

Notes:

¹Percentage of $n = 147$ respondents who fished for rainbow trout (Kamloops or steelhead) in Lake Superior and its tributaries.

²Percentages do not add to 100% because all respondents who fished Lake Superior and its tributaries do not target rainbow trout.

³Percent who targeted among all respondents, based on 30.5% of respondents fishing Lake Superior and 69.5% not fishing Lake Superior.

⁴Estimated number of Minnesota resident trout anglers targeting rainbow trout in Lake Superior and its tributaries calculated based on 85,825 trout/salmon stamps sold from October 1, 2011 through September 30, 2012.

Section 2: Allocation of MNDNR Trout Stamp Dollars

Findings:

Allocation of MNDNR Trout Stamp Dollars

Respondents were asked to indicate the percentage of Minnesota DNR trout stamp dollars they would like allocated to four groups of activities. Activities included: (a) development, restoration, maintenance, and preservation of trout streams and lakes, (b) identification and acquisition of easements and fee title along trout waters, (c) management activities and research for stream trout statewide (other than Lake Superior), and (d) management activities and research for trout and salmon in Lake Superior and its tributaries.

Respondents indicated the greatest mean percentage of dollars be allocated to development, restoration, maintenance, and preservation of trout streams and lakes (43.6%). (See Table 2-1). Nearly all respondents (95.1%, $n = 1,031$) wanted some funds allocated to development, restoration, maintenance, and preservation of trout streams and lakes. About three-fourths of respondents wanted some funds allocated to: (a) identification and acquisition of easements and fee title along trout waters (75.2%, $n = 794$), (b) management activities and research for stream trout statewide (other than Lake Superior) (77.8%, $n = 822$), and (c) management activities and research for trout and salmon in Lake Superior and its tributaries (76.6%, $n = 810$).

Allocation of Funds to Management Activities and Research for Trout and Salmon in Lake Superior and its Tributaries

If respondents indicated that they would like a proportion of trout stamp funds allocated to management activities and research for trout and salmon in Lake Superior and its tributaries, they were asked to indicate the percentage they would like allocated to five Lake Superior species. The species included: (a) Kamloops, (b) steelhead, (c) lake trout, (d) salmon, and (e) brook trout. Respondents who wanted funds allocated to Lake Superior trout management wanted the funds evenly divided among the species, except for Kamloops which had the lowest amount of support (Table 2-2).

Section 2: Allocation of MNDNR Trout Stamp Dollars

Table 2-1: Percentage of MNDNR trout stamp dollars should be spent on the following activities.

Activity	Mean %	Median %	Modal %	Range of %s
Development, restoration, maintenance, and preservation of trout streams and lakes	43.63%	40%	50%	0-100
Identification and acquisition of easements and fee title along trout waters	18.04%	20%	0%	0-100
Management activities and research for stream trout statewide (<u>other than Lake Superior</u>)	18.00%	20%	25%	0-100
Management activities and research for trout and salmon <u>in Lake Superior and its tributaries</u>	22.35%	20%	0%	0-100

Table 2-2: 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
Management activities for Kamloops	12.49%	14.3%	20.0%	0-100
Management activities for steelhead	19.38%	20.0%	20.0%	0-100
Management activities for lake trout	21.83%	20.0%	20.0%	0-100
Management activities for salmon	23.83%	20.0%	20.0%	0-100
Management activities for brook trout	21.06%	20.0%	20.0%	0-100

Section 3: Willingness to Pay for Trout Stamps

Findings:

Willingness to Pay for Trout Stamps

Respondents were asked to indicate their willingness to pay additional funds for trout fishing in Minnesota. Specifically, they were asked about their willingness to pay more for: (a) a trout stamp for maintaining management of trout fisheries statewide, (b) a trout stamp if it went specifically for maintaining current management of Kamloops in Lake Superior and its tributaries, and (c) a trout stamp if it went specifically for maintaining current management of steelhead in Lake Superior and its tributaries. Over half of respondents (52.5%) were willing to pay more for a trout stamp for maintaining management of trout fisheries statewide. About one in five (21.2%) were willing to pay more for a trout stamp if it went specifically for maintaining current management of steelhead in Lake Superior and its tributaries. Only 13.1% were willing to pay more for a trout stamp if it went specifically for maintaining current management of Kamloops in Lake Superior and its tributaries. The most common amount that respondents indicated that they would be willing to pay for any of the three listed stamps was \$5. (See Table 3-1.)

We compared willingness to pay additional funds for trout stamps between anglers who fished for trout in Lake Superior and its tributaries versus those who did not. Results are presented in Tables 3-2, 3-3, and 3-4. A significantly higher proportion of anglers who fished in Lake Superior and its tributaries were willing to pay more for stamps if they went specifically to pay for management of Kamloops (Table 3-3) or steelhead (Table 3-4) management in Lake Superior and its tributaries. However, there was no significant difference between the groups in the increased amount they were willing to pay. Histograms of the amounts respondents were willing to pay additional for trout stamps are presented in Figures 3-1 to 3-3.

Section 3: Willingness to Pay for Trout Stamps

Table 3-1: Willingness to pay for trout stamps

Sample	n	% willing to pay more	Of respondents who are willing to pay more...		
			Mean amount more willing to pay	Modal amount more willing to pay	Range of amounts more willing to pay
Willing to pay more for a trout stamp for maintaining management of trout fisheries statewide?	1165	52.5%	\$9.74	\$5	\$1-100
Willing to pay more for a trout stamp if it went <u>specifically</u> for maintaining current management of <u>Kamloops</u> in Lake Superior and its tributaries?	1142	13.1%	\$7.07	\$5	\$0.50-30
Willing to pay more for a trout stamp if it went <u>specifically</u> for maintaining current management of <u>steelhead</u> in Lake Superior and its tributaries?	1141	21.2%	\$7.98	\$5	\$1-50

Table 3-2: Willingness to pay more for trout stamp for maintaining management of trout fisheries statewide: Comparison of respondents who fished Lake Superior versus those who did not.

Sample	n	% willing to pay more	Of respondents who are willing to pay more...		
			Mean amount more willing to pay	Modal amount more willing to pay	Range of amounts more willing to pay
Respondents who did not fish Lake Superior during the timeframe	688	52.3%	\$9.71	\$5	\$1-50
Respondents who fished Lake Superior during the timeframe	303	56.1%	\$10.05	\$5	\$1-100
		$X^2 = 1.208$ n.s. $V = 0.035$	$t = \text{n.s.}$		

Notes:

n.s.=not significant, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Section 3: Willingness to Pay for Trout Stamps

Table 3-3: Willingness to pay more for trout stamp if it went specifically for maintaining current management of Kamloops in Lake Superior and its tributaries: Comparison of respondents who fished Lake Superior versus those who did not.

Sample	n	% willing to pay more	Of respondents who are willing to pay more...		
			Mean amount more willing to pay	Modal amount more willing to pay	Range of amounts more willing to pay
Respondents who did not fish Lake Superior during the timeframe	672	9.2%	\$7.13	\$5	\$1-25
Respondents who fished Lake Superior during the timeframe	296	24.3%	\$6.82	\$5	\$1-30
		$X^2 = 39.275^{***}$ $V = 0.201$	t = n.s.		

Notes:

n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 3-4: Willingness to pay more for trout stamp if it went specifically for maintaining current management of steelhead in Lake Superior and its tributaries: Comparison of respondents who fished Lake Superior versus those who did not.

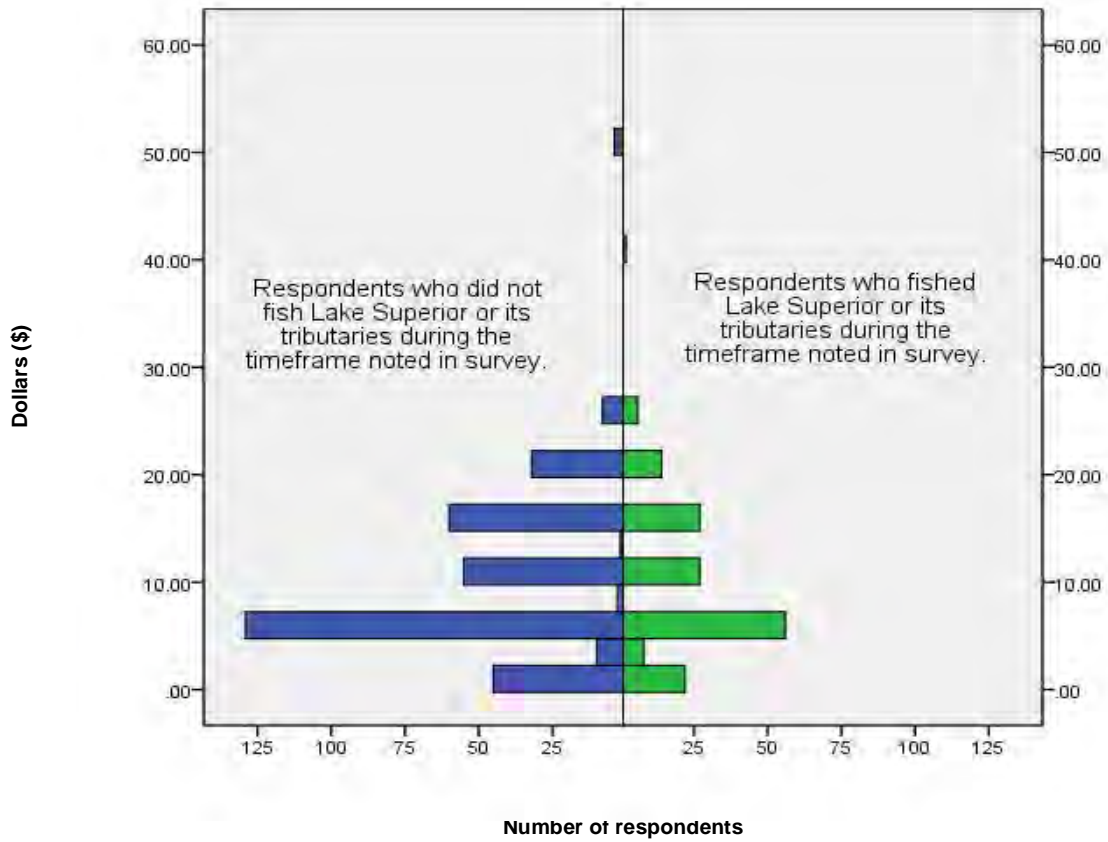
Sample	n	% willing to pay more	Of respondents who are willing to pay more...		
			Mean amount more willing to pay	Modal amount more willing to pay	Range of amounts more willing to pay
Respondents who did not fish Lake Superior during the timeframe	672	15.0%	\$8.92	\$5	\$1-50
Respondents who fished Lake Superior during the timeframe	295	36.6%	\$7.48	\$5	\$1-25
		$X^2 = 56.354^{***}$ $V = 0.241$	t = n.s.		

Notes:

n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

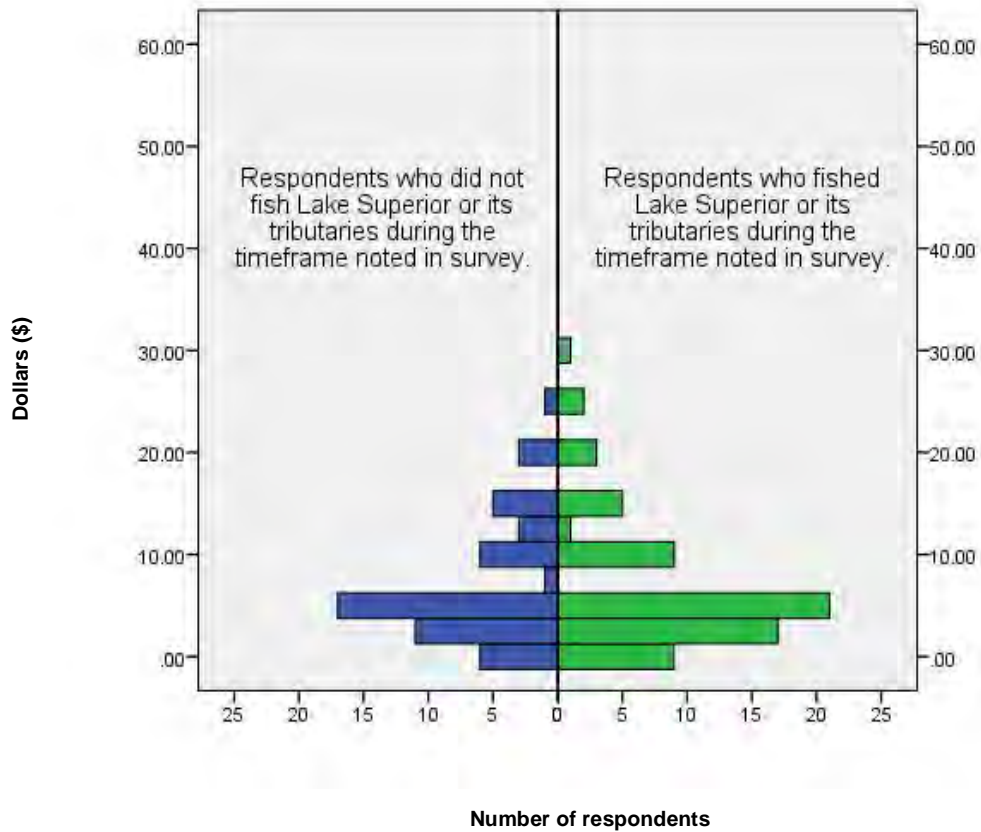
Section 3: Willingness to Pay for Trout Stamps

Figure 3-1: Histogram of amounts respondents are willing to pay more for trout stamp for maintaining management of trout fisheries statewide: Comparison of respondents who fished Lake Superior versus those who did not.



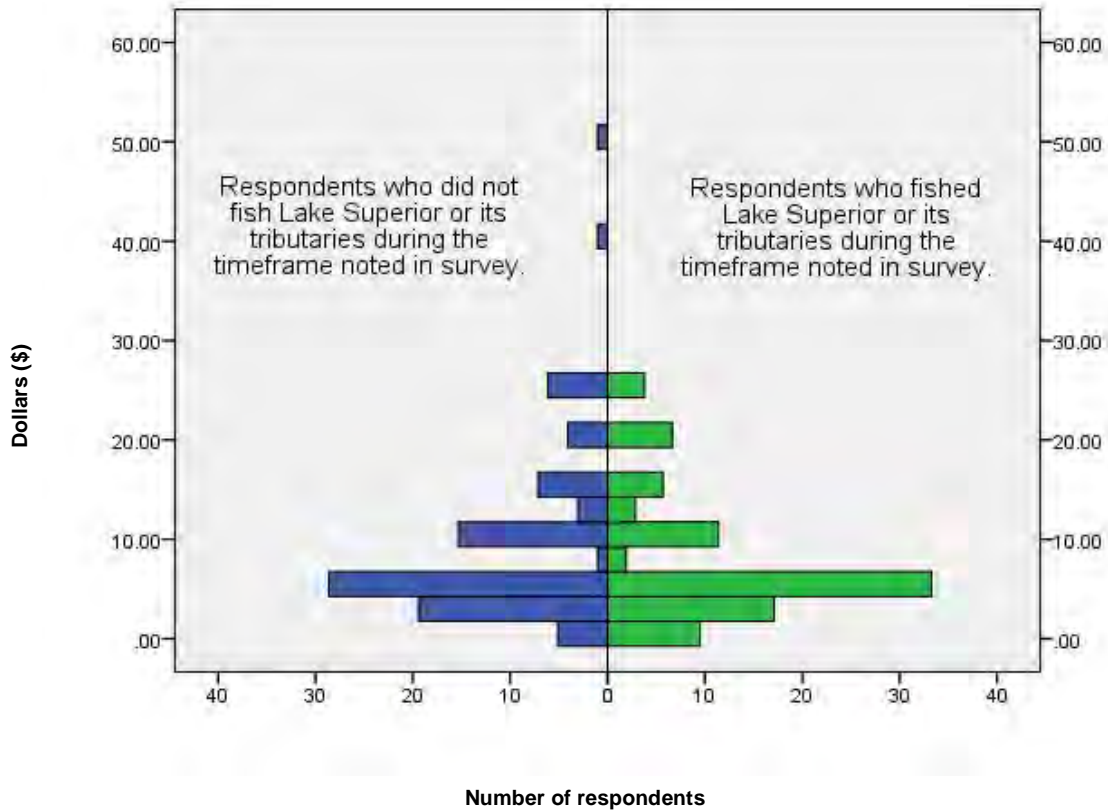
Section 3: Willingness to Pay for Trout Stamps

Figure 3-2: Histogram of amounts respondents are willing to pay more for a trout stamp if it went specifically for maintaining current management of Kamloops in Lake Superior and its tributaries: Comparison of respondents who fished Lake Superior versus those who did not.



Section 3: Willingness to Pay for Trout Stamps

Figure 3-3: Histogram of amounts respondents are willing to pay more for a trout stamp if it went specifically for maintaining current management of steelhead in Lake Superior and its tributaries: Comparison of respondents who fished Lake Superior versus those who did not.



Section 4: Demographic Information

Findings:

Age and Gender

Age and gender information for the sample of trout stamp buyers and for respondents was derived from the electronic licensing system. The average age of respondents was 43.85 years, and 10.2% were female. (See Tables 4-1 and 4-2.)

Late Respondents

Late respondents had a lower level of participation in trout fishing, and lower participation in fishing on or near Lake Superior. They were slightly younger and included a greater proportion of females (Tables 4-3, 4-4, and 4-5). This bias would likely make our statewide estimates, which we expanded based on returns of full surveys in this study, over estimates.

Section 4: Demographic Information

Table 4-1: Age

	Mean age	Range
Sample	43.47	15-89
Respondents	43.85	16-89
t= 0.942 n.s.		

Notes:

n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 4-2: Gender.

	Male	Female
Sample	88.1%	11.9%
Respondents	89.8%	10.2%
X ² =3.186 n.s.		

Notes:

n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 4-3: Fishing participation: Late respondents vs. early respondents.

	Fish for trout from Oct. 1, 2011 – Sept. 30, 2012	Mean number of days fishing for trout
Early respondents	85.0%	12.53
Late respondents	58.5%	10.19
X ² = 344.08***		t=2.77**

Note: Late respondents returned a postcard survey that asked total number of days fishing for trout. Early respondents returned a full-length survey that asked the number of days fishing for trout in nine different Minnesota settings; the number of days of trout fishing was calculated as a sum of the days in the nine settings.

n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 4-4: Fishing participation on or near Lake Superior: Late respondents vs. early respondents.

	Fish Lake Superior from Oct. 1, 2011 – Sept. 30, 2012	Mean number of days fishing Lake Superior
Early respondents	30.5%	11.27
Late respondents	21.3%	5.50
X ² =50.94***		t= 3.91***

Note: Late respondents returned a postcard survey that asked total number of days fishing for Lake Superior. Early respondents returned a full-length survey that asked the number of days fishing for trout in four different Lake Superior settings; the total number of days fishing Lake Superior was calculated as a sum of the days in the four settings.

n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Section 4: Demographic Information

Table 4-5: Age and gender: Late respondents vs. early respondents.

	Age	Gender
Early respondents	43.85	10.2% female
Late respondents	42.39	12.1% female
	t=3.83***	X ² =n.s.

Notes:

n.s.=not significant, *p < 0.05, **p < 0.01, ***p < 0.001

References

Dillman, D. (2000). *Mail and Internet surveys: The tailored design method*. New York: John Wiley & Sons, Inc.

U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. (2006). *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*.

Appendix 1: Survey Instruments

Appendix A: Survey Instruments

Q1. Please indicate whether you fished for trout in Minnesota in the following settings in the 12 months from October 1, 2011 through September 30, 2012. If you did fish in the setting, estimate the total number of days that you fished in that setting. (Please respond only for trout fishing in Minnesota, not outside the state.)

In the 12 months from October 1, 2011 through September 30, 2012, did you fish for trout in Minnesota at:	Please circle yes.		If yes, estimate how many days you fished in that setting during that time period. (Write in number of days.)
Streams in Southeast Minnesota, in winter from January to March 31, 2012	no	yes	_____ days
Streams in Southeast Minnesota during spring, summer or fall (April to October)	no	yes	_____ days
Streams outside Southeast Minnesota during spring, summer or fall (April to October)	no	yes	_____ days
Inland lakes in spring, summer or fall	no	yes	_____ days
Inland lakes in winter (ice fishing)	no	yes	_____ days
Lake Superior by boat (all seasons)	no	yes	_____ days
Lake Superior shore (all seasons)	no	yes	_____ days
Lake Superior tributaries below the provincial boundaries. (all seasons)	no	yes	_____ days
Lake Superior tributaries above the provincial boundaries. (all seasons)	no	yes	_____ days

Q2. If you fished for trout in Lake Superior or its tributaries, please indicate which types of fish you specifically targeted. (Check all that apply.)

- Brook trout
- Brown trout
- Kamloops
- Steelhead
- Lake trout
- Chinook/King salmon
- Coho/silver salmon
- Pink salmon/Humpies

Q2a) If you fished for both Kamloops and steelhead trout in Lake Superior or its tributaries, which best describes how you fish? (Check one)

- Primarily target Kamloops
- Primarily target steelhead
- Target Kamloops and steelhead equally

Appendix A: Survey Instruments

Q3. Please indicate the percentage of Minnesota DNR trout stamp dollars you would like to see spent on the following activities. (The total must add up to 100%)

_____ % development, restoration, maintenance, and preservation of trout streams and lakes

_____ % identification and acquisition of easements and fee title along trout waters

_____ % management activities and research for stream trout statewide (other than Lake Superior)

_____ % management activities and research for trout and salmon in Lake Superior and its tributaries
= 100 %

→ Of the _____% you would spend on Lake Superior and its tributaries, what percent would you want spent on:

_____ % management activities for Kamloops

_____ % management activities for steelhead

_____ % management activities for lake trout

_____ % management activities for salmon (Chinook, coho, etc.)

_____ % management activities for brook trout

_____ % OTHER _____

Q4. Currently in Minnesota all anglers between 16 and 64 need to purchase a trout stamp validation in order to fish in designated trout streams, trout lakes and Lake Superior. The current fee for the stamp is \$10.

A) Would you be willing to pay more for a trout stamp for maintaining management of trout fisheries statewide?

q NO

q YES → If YES, How much more would you be willing to pay? \$ _____

B) Would you be willing to pay more for a trout stamp if it went specifically for maintaining current management of Kamloops in Lake Superior and its tributaries?

q NO

q YES → If YES, How much more would you be willing to pay? \$ _____

C) Would you be willing to pay more for a trout stamp if it went specifically for maintaining current management of steelhead in Lake Superior and its tributaries?

q NO

q YES → If YES, How much more would you be willing to pay? \$ _____

If you would be willing to respond to additional questions about trout fishing in Minnesota and are willing to provide your email address, please write it below. We will only use your email address for this short-term research project about trout angling and will not share it with anyone.

e-mail address: _____

TROUT ANGLING IN MINNESOTA



A Study of Resident Trout Anglers

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

Appendix A: Survey Instruments

Q1. Please indicate whether you fished for trout in Minnesota in the following settings in the 12 months from October 1, 2011 through September 30, 2012. If you did fish in the setting, estimate the total number of days that you fished in that setting. (Please respond only for trout fishing in Minnesota, not outside the state.)

In the 12 months from October 1, 2011 through September 30, 2012, did you fish for trout in <u>Minnesota</u> at:	Please circle no or yes.		If yes, estimate how many days you fished in this setting during that time period. (Write in number of days.)
Streams in <u>Southeast Minnesota</u> , in winter from January to March 31, 2012	no	yes	_____ days
Streams in <u>Southeast Minnesota</u> during spring, summer or fall (April to October)	no	yes	_____ days
Streams <u>outside Southeast Minnesota</u> during spring, summer or fall (April to October)	no	yes	_____ days
Inland lakes in spring, summer or fall	no	yes	_____ days
Inland lakes in winter (ice fishing)	no	yes	_____ days
Lake Superior by boat (all seasons)	no	yes	_____ days
Lake Superior shore (all seasons)	no	yes	_____ days
Lake Superior tributaries <u>below the posted boundaries</u> . (all seasons)	no	yes	_____ days
Lake Superior tributaries <u>above the posted boundaries</u> . (all seasons)	no	yes	_____ days

Q2. If you fished for trout in Lake Superior or its tributaries, please indicate which types of fish you specifically targeted. (Check all that apply.)

- Brook trout
- Brown trout
- Kamloops
- Steelhead
- Lake trout
- Chinook/King salmon
- Coho/silver salmon
- Pink salmon/Humpies

Q2a) If you fished for both Kamloops and steelhead trout in Lake Superior or its tributaries, which best describes how you fish? (Check one)

- Primarily target Kamloops
- Primarily target steelhead
- Target Kamloops and steelhead equally

Appendix A: Survey Instruments

Q3. Please indicate the percentage of Minnesota DNR trout stamp dollars you would like to see spent on the following activities. (The total must add up to 100%)

_____ % development, restoration, maintenance, and preservation of trout streams and lakes

_____ % identification and acquisition of easements and fee title along trout waters

_____ % management activities and research for stream trout statewide (other than Lake Superior)

_____ % management activities and research for trout and salmon in Lake Superior and its tributaries
= 100 %

→ Of the _____% you would spend on Lake Superior and its tributaries, what percent would you want spent on:

_____ % management activities for Kamloops

_____ % management activities for steelhead

_____ % management activities for lake trout

_____ % management activities for salmon (Chinook, coho, etc.)

_____ % management activities for brook trout

_____ % OTHER _____

Q4. Currently in Minnesota all anglers between 16 and 64 need to purchase a trout stamp validation in order to fish in designated trout streams, trout lakes and Lake Superior. The current fee for the stamp is \$10.

D) Would you be willing to pay more for a trout stamp for maintaining management of trout fisheries statewide?

q NO

q YES → If YES, How much more would you be willing to pay? \$_____

E) Would you be willing to pay more for a trout stamp if it went specifically for maintaining current management of Kamloops in Lake Superior and its tributaries?

q NO

q YES → If YES, How much more would you be willing to pay? \$_____

F) Would you be willing to pay more for a trout stamp if it went specifically for maintaining current management of steelhead in Lake Superior and its tributaries?

q NO

q YES → If YES, How much more would you be willing to pay? \$_____

Appendix A: Survey Instruments

<p>UNIVERSITY OF MINNESOTA 612531 Minnesota Cooperative Fish and Wildlife Research Unit Attn: Fish and Wildlife Study 200 Hodson Hall 1980 Folwell Avenue St. Paul, MN 55108</p>		<p>NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES</p> 
<p>BUSINESS REPLY MAIL FIRST-CLASS MAIL PERMIT NO. 16972 MINNEAPOLIS MN</p>		
<p>POSTAGE WILL BE PAID BY ADDRESSEE</p>		
<p>UNIVERSITY OF MINNESOTA 100 CHURCH ST SE MINNEAPOLIS MN 55455-9817</p>		
		

During the past few months, we have sent you several mailings. We are sending you this postcard because we are concerned that people who did not respond may differ from those who responded. We appreciate your willingness to complete these questions as we conclude this effort to better understand fishing in Minnesota.

Q1. Did you fish for trout in Minnesota in the 12 months from October 1, 2011 through September 30, 2012?

NO
 YES. *If yes, please answer Q1b.*

Q1b. If YES, How many days did you fish during this time?

_____ days

Q2. Did you fish for trout in Lake Superior or its tributaries in the 12 months from October 1, 2011 through September 30, 2012?

NO
 YES. *If yes, please answer Q2b.*

Q2b. If YES, How many days did you fish Lake Superior during this time?

_____ days 1000