

Abstract. – Thirty-two trout streams were surveyed in a roving-roving creel survey from January 1 to March 31, 2013 that are included in the southeast Minnesota winter trout angling season. Regulations include barbless hooks and catch-and-release. Cars parked in specific areas were counted and received a letter survey with a prepaid envelope. Angler surveys were also left at three state parks for park staff to hand to anglers. Anglers consisted of mostly males (97.6%) using several different gear types of bait (2%), lure (16.4%), fly (76.4%), and mixed method (5.2%). Mean angler trip length was calculated as 3.7 hours with a catch rate of 1.38 trout/hour. An estimated 5,978 trout were caught totaling 13,603 angler-hours.

Table of Contents

Introduction	9
Methods	10
Survey design	10
Analysis	12
Results	14
Angler characteristics.....	14
Angling gear	15
Party size and trip length	16
Stream specific motivations.....	16
Angler satisfaction and factors associated with satisfaction	17
Angler pressure (Method 1)	18
Angler pressure (Method 2)	19
Angler catch and catch rate	19
Discussion	20
Management implications	24
Acknowledgements	25
Literature Cited	25

List of Tables

Table 1. Trout angling seasons in southeast Minnesota (Houston, Fillmore, Mower, Dodge, Olmsted, Winona, Wabasha and Goodhue counties) during January 1 to December 31, 2013.....	27
Table 2. History of the number of stream miles open to winter trout angling in southeast Minnesota. All winter trout seasons were from January 1 to March 31.	27
Table 3. Thirty two trout streams in southeast Minnesota that were included in a winter trout season creel surveyed from January 1 to March 31, 2013 with kittle number, county and assigned area.	28
Table 4. Trout stream improved regulations proposal forwarded by Minnesota Department of Natural Resources Lanesboro and Lake City Fisheries offices in 2013 for southeast Minnesota (Houston, Fillmore, Mower, Dodge, Olmsted, Winona, Wabasha and Goodhue counties).	29
Table 5. Trout streams open for winter angling area, clerk and number of specific spots surveyed in southeast Minnesota during the winter creel survey from January 1 to March 31, 2013	30

Table 6. Alternating running orders for Area A streams surveyed by a creel clerk in the southeast Minnesota winter trout stream creel, January 1 to March 31, 2013 31

Table 7. Alternating running orders for Area B streams surveyed by a creel clerk in the southeast Minnesota winter trout stream creel, January 1 to March 31, 2013. 32

Table 8. Routes randomly selected with replacement for Area C during the southeast Minnesota winter trout stream creel survey January 1 to March 31, 2013. Whitewater watershed included Middle Branch Whitewater, Trout Run Creek, North Branch Whitewater, South Branch Whitewater, Main Branch Whitewater, Beaver Creek and Trout Valley Creek. 33

Table 9. Total number of days available (number sampled), by month and stream area strata, southeast Minnesota winter trout stream creel survey, January 1 to March 31, 2013. 33

Table 10. All weekend/holiday survey days from the southeast Minnesota winter trout stream creel from January 1 to March 31, 2013 and which of five scenarios they fit into based on data collected. 33

Table 11. All weekday survey days from the southeast Minnesota winter trout stream creel from January 1 to March 31, 2013 and which of five scenarios they fit into based on data collected. 34

Table 12. Survey distribution by state parks with resulting return rate for the southeast Minnesota winter trout stream creel survey, January 1 to March 31, 2013. 35

Table 13. Survey distribution from clerks by stream with resulting return rate for the southeast Minnesota winter trout stream creel survey, January 1 to March 31, 2013. 36

Table 14. Gender of anglers surveyed on trout streams open to winter angling between January 1 and March 31, 2013 in southeast Minnesota. 38

Table 15. Hometown, zip code, and number of anglers from Minnesota residents encountered on trout streams open to winter angling between January 1 and March 31, 2013. 39

Table 16. Hometown, zip code, and number of returned letter surveys from non-residents encountered on trout streams open to winter angling between January 1 and March 31, 2013 in southeast Minnesota. 41

Table 17. Number of anglers that returned their surveys in the winter trout stream creel, January 1 to March 31, 2013 in southeast Minnesota that were “Local” (Fillmore, Goodhue, Houston, Olmsted, Wabasha, Winona, Dodge, Freeborn, Mower, Steele counties). 41

Table 18. Number of anglers that returned their surveys in the winter trout stream creel, January 1 to March 31, 2013 in southeast Minnesota that were “Metro” (Dakota, Ramsey, Washington, Hennepin, Anoka, Scott, Carver counties). 42

Table 19. Percent answer to the question, “What angling gear were you using on this trip?” taken from letter surveys of anglers fishing the winter trout season in southeast Minnesota from January 1 to March 31, 2013. 42

Table 20. Age by angling gear choice in percent from letter surveys of anglers fishing 32 trout streams in southeast Minnesota open to winter angling from January 1 to March 31, 2013..... 42

Table 21. Angling gear choice by age in percent from letter surveys of anglers fishing 32 trout streams in southeast Minnesota open to winter angling from January 1 to March 31, 2013..... 43

Table 22. Gear choice by percent of Minnesota resident anglers fishing the winter trout season in southeast Minnesota, January 1 to March 31, 2013. Local anglers are those with home zip codes in Dodge, Fillmore, Goodhue, Houston, Mower, Olmsted, Steele, Wabasha and Winona counties. Metro anglers are those with home zip codes in Anoka, Carver, Dakota, Hennepin, Ramsey, Scott and Washington counties. 43

Table 23. Number and percent answers to the question, “How many anglers traveled in this vehicle to the stream today?” as reported in the winter trout stream angler creel in southeast Minnesota, January 1 to March 31, 2013..... 43

Table 24. Proportion of cars counted that were angling and mean party size estimates used in calculations to estimate angler pressure for Method 1 (Nelson 2002) in southeast Minnesota, January 1 to March 31,2013. Proportions and mean party sizes were based on returned angler surveys (N)..... 44

Table 25. Angler trip length by Area (A, B and C) and overall in percent of responses collected from anglers fishing the winter trout season in southeast Minnesota, January 1 to March 31, 2013. Information below includes park letter surveys and clerk distributed letter surveys..... 45

Table 26. Percent answer to the question, “Why did you decide to fish here today?” taken from letter surveys of anglers fishing the winter trout season in southeast Minnesota from January 1 to March 31, 2013 (Note that some surveyed chose multiple reasons. Ex. ABE). 45

Table 27. Rank of streams fished with answer “Favorite stream” to question, “Why did you decide to fish here today?” taken from letter surveys of anglers fishing the winter trout season in southeast Minnesota from January 1 to March 31, 2013 (Note that some surveyed chose multiple reasons). N = 77 46

Table 28. Rank of streams fished with answer “Live close by” to question, “Why did you decide to fish here today?” taken from letter surveys of anglers fishing the winter trout season in southeast Minnesota from January 1 to March 31, 2013 (Note that some surveyed chose multiple reasons). N = 62 46

Table 29. Rank of streams fished with answer “Easy access” to question, “Why did you decide to fish here today?” taken from letter surveys of anglers fishing the winter season in southeast Minnesota from January 1 to March 31, 2013 (Note that some surveyed chose multiple reasons). N = 86..... 46

Table 30. Rank of streams fished with answer “Number of fish” to question, “Why did you decide to fish here today?” taken from letter surveys of anglers fishing the winter season in southeast Minnesota from January 1 to March 31, 2013 (Note that some surveyed chose multiple reasons). N = 28..... 47

Table 31. Rank of streams fished with answer “Size of fish” to question, “Why did you decide to fish here today?” taken from letter surveys of anglers fishing the winter season in southeast Minnesota from January 1 to March 31, 2013 (Note that some surveyed chose multiple reasons). N = 9..... 47

Table 32. Number and percent answer to the question, “How satisfied are you with the overall fishing experience today?” taken from letter surveys of anglers fishing 32 trout streams in southeast Minnesota open to winter angling from January 1 to March 31, 2013. 47

Table 33. Number and percent answer to the question, “How satisfied are you with the size of the trout you caught today?” taken from letter surveys of anglers fishing 32 trout streams in southeast Minnesota open to winter angling from January 1 to March 31, 2013. 47

Table 34. Number and percent answer to the question, “How satisfied are you with the number of trout you caught today?” taken from letter surveys of anglers fishing 32 trout streams in southeast Minnesota open to winter angling from January 1 to March 31, 2013. 48

Table 35. Percent answer to the question, “How satisfied are you with you overall fishing experience today?” relative to gear methods used taken from letter surveys of anglers fishing 32 trout streams in southeast Minnesota open to winter angling from January 1 to March 31, 2013..... 48

Table 36. Percent answer to the question, “How satisfied are you with the size of the trout you caught today?” relative to gear methods used taken from letter surveys of anglers fishing 32 trout streams in southeast Minnesota open to winter angling from January 1 to March 31, 2013..... 48

Table 37. Percent answer to the question, “How satisfied are you with the number of the trout you caught today?” relative to gear methods used taken from letter surveys of anglers fishing 32 trout streams in southeast Minnesota open to winter angling from January 1 to March 31, 2013. 48

Table 38. Coeffients of determination (r^2) testing selected associations among angler satisfaction indices and other variables collected during a winter trout fishing creel between January 1 and March 31, 2013 in southeast Minnesota. A minus sign preceding a coefficient denotes a negative relationship; *P*-values and sample sizes shown in parentheses..... 49

Table 39. Estimated fishing pressure by individual stratum (stream x month x day type), during southeast Minnesota winter fishing seasons 2002 and 2013 (January 1 to March 31). Data for 2002 from Nelson (2002)..... 50

Table 40. Estimated fishing pressure (angler hours \pm 1 SE) by month and day type strata for each of two areas in southeast Minnesota during a winter creel survey (January 1 to March 31) in 2013. Pressure estimate made following Method 2 calculations (see text and Pollock et al. 1994 for more information). See Figure 1 for a map showing exact sampling areas and streams. 56

Table 41. Average high, average low, average and departure from normal temperature for winter 2002 and winter 2013. 57

Table 42. Total precipitation, departure from normal precipitation, and snowfall for winter 2002 and winter 2013. 57

List of Figures

Figure 1. Map of stream areas (A, B, and C) surveyed in the winter trout stream creel January 1 to March 31, 2013 in southeast Minnesota. The number within each block of streams facilitated survey routes for creel clerks. 1) Forestville Creek, Canfield Creek, S. Br. Root River; 2) Duschee Creek, Camp Creek; 3) S. Br. Root River, Torkelson Creek; 4) Gribben Creek, Diamond Creek; 5) Wisel Creek, S. Fork Root River; 6) Bee Creek; 7) Crooked Creek, S. Fork Crooked Creek; 8) East Beaver Creek, West Beaver Creek; 9) Swede Bottom Creek; 10) Daley Creek; 11) Rush Creek, Pine Creek, Hemmingway Creek, Coolridge Creek; 12) W. Br. Money Creek; 13) Garvin Brook; 14) M. Br. Whitewater River, S. Br. Whitewater River, N. Br. Whitewater River; 15) Main Whitewater River, Beaver Creek (Whitewater), Trout Valley Creek; 16) Hay Creek. 58

Figure 2. Age distribution of anglers fishing southeast Minnesota during the winter trout season in southeast Minnesota, January 1 to March 31, 2013. 59

Figure 3. Age distribution of anglers fishing the winter trout season in southeast Minnesota, January 1 to March 31, in 1997 (Hendrickson 1998) and 2013. 60

Figure 4. Distances anglers drove to fish southeast Minnesota stream during the winter trout season, January 1 to March 31, 2002 (Nelson 2002) and 2013. 61

Figure 5. Gear use distribution of anglers fishing the winter trout season in southeast Minnesota, January 1 to March 31 in 1997 and 2013 (Data from Hendrickson 1998). 62

Figure 6. Overall fishing experience satisfaction taken from surveys of anglers fishing during the winter trout season in southeast Minnesota, January 1 to March 31, 2013. 63

Figure 7. Satisfaction with the size of trout caught taken from surveys of anglers fishing during the winter trout season in southeast Minnesota, January 1 to March 31, 2013. 63

Figure 8. Satisfaction with the numbers of trout caught taken from surveys of anglers fishing during the winter trout season in southeast Minnesota, January 1 to March 31, 2013. 64

Figure 9. Relationship between satisfaction of the overall angling experience (1=very dissatisfied, 2=dissatisfied, 3=neither, 4=satisfied, and 5=very satisfied) and catch rates of trout for anglers fishing the winter trout season in southeast Minnesota, January 1 to March 31, 2013. Reference line at 2 trout/hour on the x-axis suggests a point at which anglers fishing for trout are never dissatisfied with their experience if they catch more than 2 trout/hr. 65

Figure 10. Relationship between the total minutes fished by each angling party (i.e., trip length x total number of anglers in the party) and their catch rate for anglers fishing the winter trout season in southeast Minnesota, January 1 to March 31, 2013. 66

Figure 11 Temporal changes in estimates of angler pressure (angler-hours) for streams in the winter trout fishery (January 1 – March 31) in southeast Minnesota. Total pressure was estimated to be 4,328 hours in 1989 (two streams = 4.8 mi); 2,382 hours in 1997 (six streams = 27.6 mi); 15,941 hours in 2002 (12 streams = 48.4 mi); and 13,603 hours in 2013 (32 streams = 131.5 mi; only streams with observed pressure in 2013 are shown). 67

Figure 12. Temporal patterns in the number of stream miles open to winter angling (solid line; January 1 – March 31) and total angling pressure (dashed line) during winter in southeast Minnesota. 68

Figure 13. Age distribution of men aged 16 years and older statewide in Minnesota in 2012-2013 and for anglers fishing the winter trout season, January 1 to March 31, in 2013. Statewide data for Minnesota from Suburbanstats (2014). 70

Figure 14. Percent frequency distribution of angler responses to the question “How satisfied were you with the overall fishing experience today” in a winter creel survey (January 1 – March 31) in 2013 for streams grouped as having been open to winter angling since 1999 (i.e., older streams = cross-hatched bars) versus streams opened after 2002 (i.e., new streams = solid black bars). 71

List of Appendices

Appendix A. Trout streams open for winter angling, area, clerk and specific spots surveyed in southeast Minnesota during the winter creel survey from January 1 to March 31, 2013. 72

Appendix B. Example of a daily activity report used to document creel clerk activities (letter surveys distributed, time schedule, etc.) during the winter trout stream creel in southeast Minnesota, January 1 to March 31, 2013. 77

Appendix C. Letter survey distributed to possible anglers by clerks during the winter trout stream creel in southeast Minnesota, January 1 to March 31, 2013.. 78

Appendix D. State Park letter survey distributed at the front desk of three state parks (Whitewater State Park, Forestville State Park, Beaver Creek Valley State Park) in southeast Minnesota for the winter trout stream creel, January 1 to March 31, 2013.. 79

Appendix E. Cover letter accompanying park letter surveys distributed at the front desk of three state parks (Whitewater State Park, Forestville State Park, Beaver Creek Valley State Park) in southeast Minnesota for the winter trout stream creel, January 1 to March 31, 2013.. 80

Appendix F. Comments from anglers written on surveys fishing the winter trout season in southeast Minnesota, January 1 to March 31, 2013. 81

Introduction

Southeast Minnesota supports an important trout fishery in over 800 miles (1,280 km) of coldwater streams. Statewide trout stamp sales, that partially support this fishery, have been variable and declining over the past decade. Overall, trout stamp sales have declined at an average annual rate of 1.22% from 2000 to 2012 (MNDNR License Center data). This suggests a continuing need to gather information describing the current angling constituency and factors influencing their satisfaction as well as trying different management approaches to attract new and maintain current anglers.

The trout fishery in southeast Minnesota encompasses four seasons: a winter catch-and-release season (January 1 to March 31, catch-and-release, barbless hooks, selected streams only), an early spring catch-and-release season on all streams, a summer season (harvest allowed with the exception of a few selected streams) and an early fall catch-and-release season (all streams) (Table 1). With these seasons in mind, numerous constraints have been suggested to influence angler participation with implications to fisheries management (Ritter et al. 1992). One of the constraints often cited is a lack of angling opportunities or access (Shelby et al. 1989, Sutton 2007, Schroeder et al. 2008).

To expand angling opportunities and improve angler satisfaction, streams open for winter angling have been expanded four times since 1988 (Table 2). A winter creel survey was conducted in 2002, prior to the latest season expansion in 2003, in part to quantify angler demographics and to provide baseline estimates of angler pressure that could be used for future comparisons (Nelson 2002). Angler pressure across all 12 streams open to winter angling in 2002 (48.2 total miles) was estimated to be 15,941 angler-hours. In 2003, winter angling opportunities were expanded to portions of 32 streams (131.6 total miles) and all were included in this 2013 winter trout stream creel (Table 3).

The Minnesota Department of Natural Resources (MNDNR) Lanesboro and Lake City Fisheries offices have received numerous comments from trout anglers regarding an interest in again increasing winter trout angling opportunities in southeast Minnesota (Houston, Fillmore, Mower, Dodge, Olmsted, Winona, Wabasha and Goodhue counties). Consequently, a proposal to change and improve some trout stream regulations has been forwarded to MNDNR Central Office by the MNDNR Lanesboro and Lake City Fisheries offices (Table 4). Those proposed changes include the opening of all designated trout streams in southeast Minnesota to winter trout angling. A public input period was provided (Spring 2010) as required by law and comments were extremely favorable for implementing this proposal. Fisheries managers would like to determine if the expansion of winter angling opportunities will result in the addition of new anglers to this fishery, or if it will simply re-distribute the current angling clientele. Thus, the objectives of this creel were to determine (1) characteristics and (2)

satisfaction levels of winter anglers in 2013 and (3) provide current estimates of angler pressure, catch and catch rates. It was also important to (4) compare all of this information with previous winter creel surveys (e.g., Nelson 2002). If the proposed expansion of the current winter season is adopted, this new information will be important for temporal comparisons with future creel surveys.

In addition, this creel will aid in guiding several action items in the Fisheries Long-Range Plan for Trout Stream Resource Management in Southeast Minnesota 2010-2015 and Progress Report (MNDNR 2010). Those specific action items are Action Item 6 under Goal 1.3 – Fishing Regulations, Action Item 22 under Goal 3.2 – Angler Use and Anglers Attitudes and Action Item 23 under Goal 3.2 – Angler Use and Anglers Attitudes. This plan has been used successfully to direct management actions in the MNDNR Lanesboro and Lake City Fisheries management areas.

Methods

Survey design-

To gather information on angler characteristics, satisfaction, angling pressure and catch rates, we intercepted anglers using a roving-roving survey design with progressive counts following methods in Pollock et al. (1994) and similar to counts used in Nelson (2002). The winter angling season (January 1 to March 31, 2013) across all 32 streams was stratified into three stream areas (Areas- A, B, C; Table 5; Figure 1) and seven biweekly strata, with each biweekly time period further stratified by day type (weekday vs. weekend/holiday).

Each of the three stream areas represented a group of streams that could be surveyed in one day by a single creel clerk. Financial resources allowed the hiring of two creel clerks. The survey schedule was designed for one clerk to conduct one progressive count through an entire stream area in a single day. Based on angler pressure estimates in previous creel surveys, one clerk was assigned to sample stream Areas A and B (administered by the Lanesboro Fisheries Office) while the second clerk sampled Area C exclusively (administered by the Lake City Fisheries Office). Within each stream area, streams (and sites along each stream; Appendix A) were identified and surveyed along a route (Tables 6, 7 and 8). All angler access sites were on lands accessible to the general public such as state angling easements and state parks. The sequence of sample sites within Areas A and B was alternated by either starting at the top of the route (head end) or the end of the route (tail end). Sites within Area C were also surveyed along a route, on which the starting point alternated between random selections of the three watersheds (Garvin Brook, Hay Creek and Whitewater) (Table 8). Checkpoint times were

established for each site to ensure clerks stayed on a schedule to minimize length-of-stay biases inherent in roving creel surveys (Pollock et al. 1994).

To conform with contractual obligations with our creel clerks, all weekend/holidays and three randomly selected weekdays within each 5-day work week were sampled. Three holidays occurred during this survey (January 1 – New Years, January 21 – Martin Luther King Jr. Day and February 18 – Presidents’ Day). Two of these holidays occurred on a Monday, so one weekday was removed from those weeks. For Areas A and B (Clerk #1), selection for areas and routes were completed for weekdays and weekends/holidays separately. Area selection was random without replacement (A and B each received 50% of the sampling). Route selection was random with replacement (head end or tail end). For Area C (Clerk #2), selection of routes was completed for weekdays and weekends/holidays separately. Area C received 100% of the sampling attention from Clerk #2. Route selection was random with replacement. Thus, the sample schedule was developed by randomizing the specific area to survey (only for Areas A and B; Area C was always sampled), followed by the day of the survey and then the starting location. This design targeted a sample size of 5-13 angler counts per month per stream area for weekdays and 4-10 counts per month per stream area for weekends and holidays (Table 9). These represent samples for 45 to 100% of the days available in each stratum.

Upon arriving at each stream site, clerks noted the number of parked cars and visible anglers, and recorded their arrival time, air temperature, weather conditions and any other observations deemed important on a daily activity report (Appendix B). Any anglers or cars encountered at these sites received a letter survey (Appendix C) and a prepaid envelope allowing the owner of the car to fill out the survey and mail it to us. Each letter survey was marked with the stream location where it was left to help determine return rates by stream. The clerk then recorded the number of surveys left on the daily activity report. Car counts were assumed to be instantaneous counts. The objectives of the letter survey included a determination of (1) the proportion of cars counted that were anglers; (2) the mean number of anglers per car; (3) the mean fishing trip length; (4) the home location of anglers; (5) angler age and gender; (6) reason for angling at that location; (7) gear type; (8) satisfaction; and (9) the numbers and sizes of fishes caught. The latter was used to help estimate angler catch rates. Catch rates were only estimated from anglers fishing longer than one hour to ensure variance estimators were not influenced by extreme catches that happen by chance from short angling trips (Pollock et al. 1994).

To secure additional information, letter surveys were left at the front counter of three state parks (Whitewater State Park, Forestville State Park and Beaver Creek Valley State Park) (Appendix

D). These surveys were typically used by anglers coming into the park headquarters building to purchase their annual state park permit. These letter surveys were also accompanied with a prepaid envelope for anglers to mail to us. The parks survey also included a short letter explaining to anglers that they should complete any letter surveys left on their cars that day instead of the parks survey they just received (Appendix E).

Analysis-

Angler characteristics and satisfaction levels were simply summarized from returned letter surveys, whereas angler pressure and catch rates were analyzed following two similar methods. Method 1 explicitly followed calculations in Nelson (2002) to ensure a more appropriate comparison of angler pressure to the 2013 survey. Using the same methods and calculations between these two time periods allows the best assessment of whether overall angler pressure increased after opening more streams in 2003, or whether anglers simply re-distributed themselves among the new streams that were opened. However, the calculations in Nelson (2002) were mainly developed by Minnesota Department of Natural Resources staff for roving creel surveys of central Minnesota lakes and may not be the best representation of pressure for streams and rivers. Also, there were no calculations presented in Nelson (2002) that allowed estimates of angler catch and catch rates. Thus, we also used calculations (i.e., Method 2) following the more widely used methods in Pollock et al. (1994) which also included calculations for catch and catch rate. Both methods should provide complementary estimates and should serve to cross-validate each other.

To estimate angler pressure (angler-hours) following Method 1 (see Nelson 2002 for specific formulas for angler metrics and their standard errors), we first calculated the proportion of observed cars recorded that were anglers. The proportion was calculated from returned surveys for each stream across all months and day types combined and ranged from 0.17 to 1.00. This proportion was then multiplied by the mean number of anglers per car (i.e., mean party size) to get an estimate of the mean number of anglers per day per stratum. Mean party size was estimated for each stream across all months and day types combined. Overall pressure was then calculated per stratum (i.e., per month and day type) as the product of the mean number of anglers per day times the number of days times mean day length (daylight hours). Mean day length estimates were taken from Nelson (2002) and were 10.3 hours in January, 11.5 hours in February and 12.9 hours in March. These calculations resulted in pressure estimates for each stream, month and day type combination to better test for angler re-distribution patterns, but were summed for an overall estimate of angler pressure.

Angler pressure for Method 2 was calculated independently for each of the clerk areas (A/B combined and C) and for weekdays and weekend/holiday strata and then summed for a total estimate. Daily pressure was calculated as:

$$\frac{\text{(Number of cars determined to be anglers)}}{\text{(Sampling probability for each stream area) x (mean party size/car) x (available daylight in each month)}}$$

To determine the number of cars that were anglers, raw counts of cars for each creel day were corrected by the proportion of cars observed that were anglers. These proportions were again determined from returned surveys (as in Method 1) but were expressed by each stream area (Area A = 0.91, B = 0.67, C = 0.68) over the entire winter survey. The sampling probability for each stream area (Area A and B = 0.50, Area C = 1.00) was used to extrapolate the daily estimate. Mean party size in each car was determined from returned surveys for Area A/B combined (1.46 anglers/car) and Area C (1.49 anglers/car) independently (Note: some surveys were collected without Area A/B/C information and therefore are not included in these calculations). Available daylight hours in each month (January = 10.3 hours, February = 11.5 hours, March = 12.9 hours) was again taken from Nelson (2002). The daily estimates were simply summed for all weekend/holiday days to get a total estimate for this stratum because all were sampled. An estimate of mean daily pressure was calculated and extrapolated to all weekdays in the 2013 winter season because not all weekdays were sampled. Variance estimates followed calculation in Pollock et al. (1994) and were converted to standard errors.

To determine catch and catch rates for each day (i.e., the statistical replicates), five different scenarios were addressed (Table 10 and 11):

- 1) No surveys were left on cars because no cars were found on the route for the day (or the creel was cancelled for the day due to dangerous driving conditions).
- 2) Surveys were left on cars but none were returned for that day.
- 3) Surveys were left on cars but only some of them were returned for that day.
- 4) Surveys were left on cars and all were returned for that day. However information was not completed that pertains to species caught.
- 5) Surveys were left on cars and all were returned for that day. Information was complete.

For scenario 1 above, catch was calculated as zero and these scenarios were not used in the calculation of catch rate. For scenario 2 and 3, a correction factor for surveys handed to anglers and non-anglers was made during the pressure calculations thus information can be extrapolated into these calculations.

For scenario 4, only information regarding total trout caught was used. Species catch and catch rates were not calculated for any scenario.

Results

During this winter trout stream creel, two clerks distributed 602 letter surveys to possible anglers in southeast Minnesota. An additional 105 park surveys were picked up at Whitewater State Park (91 surveys) and Forestville State Park (14 surveys). No anglers picked up surveys at Beaver Creek Valley State Park. Return rates varied widely among streams (Table 12 and 13). Distribution of each letter survey to a possible angler required 1.73 hours of clerk time.

There were 62 letter surveys returned that were from non-anglers (19.75% of the total returned). Most of these were in Beaver Creek Valley State Park and involved hikers. The proportion of cars occupied by anglers ranged from 17% (excluding all streams with no survey distribution due to never finding an angler) to 100% (Table 13).

Questions pertaining to angler satisfaction were obtained from 252 letter and park surveys. Overall return rate for surveys distributed by clerks was 44.0% (Table 13). Park letter survey return rate was 32.7% (Table 12).

Angler characteristics -

The winter angling constituency in 2013 was almost exclusively male (97.6%; Table 14) but represented a broad age group. Angler age ranged from 1 to 83 years old for the 2013 winter season with most anglers (90%) being between 20 and 69 years old (Figure 2). Mean and median ages were the same at 43 years old. The age distribution of anglers was different in 2013 as compared to a winter creel survey conducted in 1997 in southeast Minnesota (Hendrickson 1998) (Figure 3). Angler age groups that were under-represented in 2013, compared to 1997 (Hendrickson 1998), were 16-44 years old whereas 45-65+ year olds were over represented.

Winter trout anglers came from across Minnesota and the Midwest to fish southeast Minnesota trout streams during the 2013 winter season (Table 15 and 16). Minnesota residents composed 95.2% of anglers surveyed, while Wisconsin and Iowa residents composed 2.9% and 1.3% of anglers, respectively. The farthest distance traveled by anglers surveyed was by two residents of Lincoln, Nebraska (approximately 425 miles one way) who reportedly fish the winter trout season in southeast Minnesota at least once each year (Table 16). These numbers were very similar to previous winter surveys where Minnesota residents composed 93% of total anglers in 2002 (Nelson 2002) and 95.5% in

1997 (Hendrickson 1998). In 2002, non-resident anglers were from Wisconsin (5%), Iowa (1%) and Illinois (<1%).

Similar to previous winter surveys, the distances anglers drove to fish southeast Minnesota streams exhibited two distinct modes (Figure 4). The first mode represented traveled distances of less than 50 miles, where about 41.4% of anglers traveled this distance in 2013, while about 63% of anglers traveled this distance in 2002. The second mode peaked at about 100 miles in 2002 and represented mostly greater Minneapolis/St. Paul metropolitan anglers. About 28% of winter anglers in 2002 traveled between 50 and 100 miles and in 2013, only about 19.5% of anglers traveled this distance. Instead, the second mode in 2013 peaked at about 120 miles but still represented mostly metropolitan anglers.

Anglers were also categorized by grouping selected counties of residence. Local anglers were defined as those living in the eleven counties surrounding the Lanesboro and Lake City management area (Houston, Fillmore, Mower, Dodge, Olmsted, Winona, Wabasha, Goodhue, Rice, Freeborn and Steele counties) and were 41.1% of anglers surveyed (Table 17). Metropolitan anglers were defined as those living in the eight counties surrounding Minneapolis/St. Paul (Dakota, Ramsey, Washington, Anoka, Scott, Carver, Hennepin and Wright). Those anglers consisted of about 33.1% of anglers surveyed (Table 18). In 1997, local anglers comprised 50% and metropolitan anglers 41% of all anglers surveyed.

Angling gear -

The angling season in southeast Minnesota has historically been, and continues to be dominated by anglers using fly fishing gear (Table 19; Figure 5). In the first winter seasons in 1988 and 1989, fly anglers were dominant and constituted more than 60% of all anglers fishing on the Middle Branch and South Branch Whitewater River (Hayes 1990). Fly angling has continued to increase in popularity constituting 73% of winter anglers in 1997 (Hendrickson 1998) and 76.4% in 2013. Lure and bait angling have decreased slightly (Figure 5). In 2013, bait anglers consisted of only 2% of all anglers surveyed, lure anglers 16.4% and mixed method anglers 5.2% (bait/lure and lure/fly).

Among age groups in 2013, fly fishing was the most dominant method used by all age categories especially for those between 40-49 (87.5%), 60-69 (88.1%) and 70-79 (90%) years old (Table 20). Fly fishing was least used by those less than 20 years old relative to other ages, however, it was the most dominate gear choice for that age category (50%) as well. Anglers in the 50-59 year old category used the most diverse methods while trout angling (Table 21). Bait angling was dominated by those in the 50-59 year old category while lure anglers were most likely in the 30-39 (36.6%) year old category. Fly

angler age was most spread out though dominated by those in the 30-39 (22.6%) and 50-59 (24.2%) year old category. Mixed method angling was most commonly used by 20-29 year olds.

Anglers from all three Minnesota resident categories (Metro, Local and Other) were composed of mostly anglers using fly fishing gear (Table 22). Though anglers using bait were relatively rare during the winter season, the largest percentage of anglers with that gear choice came from the Metro Area. Local anglers were the most diversified in their gear choice. Local anglers were dominated to a lesser extent by anglers using fly fishing equipment (66.1%) than the other two categories (Metro 84.2% and Other 84.6%). Lures were the second most frequently used gear type among local anglers (25.7%).

Party size and trip length –

Winter trout fishing is mostly a solitary activity. Most anglers fishing southeast Minnesota trout streams during the winter of 2013 traveled by themselves (57.8% of those surveyed) (Table 23). Traveling with two in the car occurred 35.5% of the time. The occurrence of three or more anglers in each car was relatively rare (6.8%). Mean party size among streams ranged from 1.00 to 3.00 (Table 24). Overall mean party size in winter 2013 was 1.51 anglers/car compared with 1.40 anglers/car in 2002 (Nelson 2002).

On average, anglers fished for 3.5 hours on streams in Area A/B and 3.9 hours in Area C. For Area A, angler trip length was most commonly in the category of 2.5-3.0 hours or 4.5-5.0 hours and for Area B, angler trip length was most commonly in the category of 2.0-2.5 hours or 4.5-5.0 hours (Table 25). Area C had a much wider distribution of angler trip lengths but the most common category was 2.5-3.0 hours.

Stream specific motivations –

Anglers fished the stream they were surveyed on for a number of reasons. Though asked to pick one of the five possible choices many anglers circled two or more choices for the question, “Why did you decide to fish here today?”. The following information reflects any time they chose a reason, whether by itself or with other reasons (Table 26). Overall, anglers fished a stream most often because it was easily accessible (32.0%). The second most frequent reply was “Favorite winter stream” (31.0%) followed by “Live close by” (23.3%). “Numbers of fish” and “Size of fish” were chosen least with 10.6% and 3.3%, respectively.

The answer “Favorite stream” was frequently given when on streams in the Whitewater watershed (Table 27). The Middle Branch Whitewater River received this answer the most frequently at

32.5%. The South Branch Root River was also a favorite at 15.6% of anglers. The answer “Live close by” was also most commonly used for streams in the Whitewater watershed (Table 28). Hay Creek tied with Middle Branch Whitewater River for the most common stream fished with this answer (27.4%). For streams with the answer, “Easy access” it was apparent that the Middle Branch Whitewater River dominated the other streams with 44.2% of the answers (Table 29).

Streams fished with the answer, “Number of fish” was again most commonly used for streams in the Whitewater watershed (Table 30). The Middle Branch Whitewater River was the most frequently fished stream with this answer (25.0%). However, Hay Creek was the only stream in the winter 2013 creel where anglers were primarily there because of the “numbers of fish”. “Size of fish” was least frequently used then any of the five possible answers (Table 31). The South Branch Root River was the most frequently fished stream when this answer was given (22.2%).

Angler satisfaction and factors associated with satisfaction -

For the first of three satisfaction questions in this letter survey, “How satisfied are you with the overall fishing experience today?”, anglers responded mostly in a favorable way (Table 32). “Very Satisfied” was used 37.7% of the time with “Satisfied” being used 49.2% of the time. Few anglers responded as being “Dissatisfied” with their overall fishing experience with only 1.6% being “Very Dissatisfied”.

The second satisfaction question, “How satisfied are you with the size of the trout you caught today?”, resulted in a similar set of answers (Table 33). “Very Satisfied” was chosen 14.1% of the time with “Satisfied” chosen 53.2% of the time. Again few anglers were dissatisfied (6.9%) or very dissatisfied (2.4%).

For the third satisfaction question, “How satisfied are you with the number of trout you caught today?”, anglers responded with 19.8% being very satisfied and 45.6% being satisfied (Table 34). Few anglers were “dissatisfied” (9.7%) or “very dissatisfied” (3.2%) but a larger portion used these answers than in the first two satisfaction questions regarding overall experience and size of trout caught.

When angler satisfaction was examined with their gear choice some distinctions became apparent (Table 35). For their overall fishing experience all gear choices indicated that most anglers were either “very satisfied” or “satisfied” (Figure 6). The answer “neither” was most used by mixed method and lure anglers as was “dissatisfied”. Mixed method anglers were most “very dissatisfied”.

For the comparison of gear choice and the size of trout in their catch, answers were less distinct (Table 36; Figure 7). Fly anglers answered “neither” 35.1% of the time while bait and lure anglers

responded with this answer 20.0% and 22.0%, respectively. Bait anglers were most “satisfied” and “very satisfied” in the size of their catch.

Numbers of trout and gear choice comparisons resulted in all gear choices being mostly satisfied and very satisfied (Table 37; Figure 8). A relatively large percentage of fly (19.5%), lure (23.5%) and mixed method (16.7%) anglers responded with “neither”. Twenty five percent of the mixed method anglers were “dissatisfied”.

Several factors may influence angler satisfaction. First, all three satisfaction questions were highly correlated with each other (Table 38) suggesting that anglers that were satisfied with their overall fishing experience were likely to be satisfied with the numbers and sizes of trout caught as well. Satisfaction with the overall fishing experience and, not surprisingly, satisfaction with the numbers of trout caught, were also significantly correlated with catch rates. However, the preponderance of satisfied and very satisfied anglers made it difficult to identify strong relationships. For example, coefficients of determination between angler satisfaction and trout catch rates ranged from 0.06-0.19 suggesting that catch rates by themselves explained less than 20% of angler satisfaction. A closer examination of the association between catch rates and overall angler satisfaction indicates that when catch rates were < 2.0 trout/hour, anglers could be satisfied or dissatisfied (Figure 9). However, anglers that were dissatisfied, very dissatisfied, or neither almost always caught fewer than 2.0 trout/hour. Mean daily air temperature was not significantly correlated with satisfaction with the overall angling experience and though significantly associated with numbers of trout caught, only explained about 2% of that variation (Table 38).

The time anglers participated in the act of fishing was associated with catch rates but not with mean daily air temperature (Table 38). Catch rates were negatively correlated with the total time all anglers in each party fished (Figure 10). Anglers that caught more than 5 trout/hour generally spent less time fishing than anglers that caught fewer trout per hour.

Angler pressure (Method 1) –

Total winter angling pressure across all streams in 2013 was estimated to be 13,603 angler-hours following calculations in Nelson (2002) (Table 39). Pressure estimates in 2013 declined on all streams open to winter angling in 2002 except two, the Middle Branch Whitewater River and Main Branch Whitewater River (Table 39). However, the streams originally open to winter angling in 2002 still accounted for 84% of all the winter pressure in 2013. Of the 19 streams that were newly opened in 2003, only eight had some angling pressure recorded during winter 2013: Bee Creek, Crooked Creek,

Garvin Brook, Pine Creek, Rush Creek, South Fork Root River, West Beaver Creek and Wisel Creek (Table 39). No one was observed or reported angling on the other 11 streams.

Overall, three streams accounted for about half of all winter pressure: Middle Branch Whitewater River, Main Branch Whitewater and South Branch Root River. The addition of three more streams (North Branch Whitewater, South Branch Whitewater and Hay Creek) accounted for about 76% of all the winter angling pressure in 2013. Angling pressure, expressed as angler-hours/mile/day (excluding streams with no pressure observed), ranged from a low of 0.23 hours (i.e., \approx 14 minutes/mile/day) on Beaver Creek in the Whitewater watershed to a high of 3.60 hours/mile/day on the South Branch Whitewater River. Based on these data, overall angling pressure did not increase between 2002 and 2013, suggesting that the opening of new streams likely did not result in the addition of new anglers to this fishery. Instead, patterns among stream-specific estimates indicate that the opening of new streams in 2003 has resulted in a modest redistribution of anglers among streams open to winter angling in southeast Minnesota (Figure 11).

Angler pressure (Method 2) -

Total winter angling pressure across all streams estimated with Method 2 (i.e., Pollock et al. 1994) was 12,311 angler-hours (Table 40), an estimate very similar to the 13,603 hours estimated with Method 1 (Nelson 2002). This indicates good precision between the two methods. There was almost twice as much pressure estimated in Area C (7,920 angler-hours) than in Area A/B (4,391 angler-hours) (Table 40). Angling pressure was higher on weekdays (4,858 angler-hours) than on weekends-holidays (3,062 angler-hours) in Area C, but nearly equivalent in Area A/B.

Angler catch and catch rate –

Catch rate for Area A/B was estimated to be 1.45 trout/hour for weekends and holidays and 1.49 trout/hour for weekdays. For Area C, angler catch rate was estimated to be 1.36 trout/hour for weekends and holidays and 1.21 trout/hour for weekdays. The overall winter creel angler catch rate was 1.38 trout/hour.

All three species of trout present in southeast Minnesota streams (Brown Trout, Rainbow Trout and Brook Trout) were caught during this creel survey. Total catch of trout for Area A/B on weekends/holidays was estimated to be 1,637 trout with an estimate of 849 trout on weekdays. For Area C, the estimated total trout catch on weekends/holidays was 2,106 trout and 1,656 trout on

weekdays. The overall winter creel catch was 5,978 trout. One angler reported catching a White Sucker.

Discussion

One of the primary reasons for implementing this winter creel was to determine if the opening of new streams to winter angling results in an increase in overall angling pressure (possibly due to the addition of new anglers) or whether angling pressure remains the same and anglers simply re-distribute themselves to newly opened streams. Winter angling opportunities in southeast Minnesota have been expanded four times since 1988 (Table 2). Based on sporadic winter creels, these expansions appear to have produced mixed results (Figure 11). When winter stream miles were expanded from 4.8 miles in 1989 to 27.6 miles in 1997, total angling pressure dropped from 4,328 to 2,382 angler-hours and anglers appeared to re-distribute themselves among newly opened streams (Figure 11; Figure 12). However, only six streams covering 27.6 miles and almost all within the Whitewater Wildlife Management Area, were open to winter angling at this time. An additional 20.8 miles were added in 1999 and included portions of streams in other areas of southeast Minnesota such as the South Branch Root River in Lanesboro and East Beaver Creek in Beaver Creek Valley State Park near Caledonia. Total angler pressure in 2002 increased dramatically from the 2,382 angler-hours in 1997 to 15,941 angler-hours (Nelson 2002) indicating that expansion substantially increased overall angling pressure. However, Nelson (2002) noted that the winter of 2002 was mild with a noticeable lack of snowfall. Lack of snow allowed anglers easy access to winter streams, prompting Nelson (2002) to speculate that the increase in pressure may have been an unusual event. Stream expansion in 2003 opened up an additional 82.6 miles across 32 streams, but this creel in 2013 did not show another increase in total pressure (Figure 11). Instead, winter pressure dropped on most streams and expanded to other streams not previously open during the last creel. This strongly suggests that winter anglers again merely re-distributed themselves among streams.

To explain differences in angler-hours relative to Nelson (2002) and this creel it should be noted that weather conditions in winter 2002 were much different than the winter of 2013. Average high temperatures were higher in January, February and March 2002 than in 2013 (Table 41). Also average low temperatures were lower those same months in 2013 than 2002. Snowfall totals were also much higher overall in winter 2013 than winter 2002 (Table 42). All of these factors most likely contribute to total angler-hours during the winter trout season.

From another perspective, the relative similarity of total winter angling pressure estimates between 2002 and 2013 may indicate that the numbers of core anglers for this fishery are fully maximized and if a full use of the winter resource is desired, new angling groups may need to be attracted. The current winter angling constituency has remained essentially the same since the inception of the winter fishery in southeast Minnesota almost 30 years ago in 1988. Based on past and current creel surveys, it has always been dominated by mostly middle-aged male anglers using fly fishing gear that resided either locally in southeast Minnesota or the Twin Cities metropolitan area.

Although age distributions have changed slightly between 1997 and 2013, where age groups 45-65+ have become more common (Figure 3), this likely simply reflects the aging of our core angler group. For example, as 1997 was 16 years ago, the 25-44 year old age groups then would now be aged 41 to 60 years old in 2013. Although overall age distributions differed between 1997 and 2013, including 16-34 year olds (Figure 3), the age distribution of winter anglers in 2013 closely represented the age distribution of men in the greater Minnesota population in 2012-2013 (Figure 13; Suburbanstats 2014). Thus, the winter angling constituency in 2013 is probably reflecting the broader age distribution of potential anglers in the state.

Even if the core angling constituency might be fully maximized, it is still imperative to understand their angling motivations and maintain high satisfaction rates to ensure continued participation in and support for the winter trout fishery. Overall satisfaction with this group was high in 2013 with about 87% of anglers being either satisfied or very satisfied. Angler satisfaction was not specifically assessed in previous winter creels in 1988-1989 (Hayes 1990), 1997 (Hendrickson 1998), or 2002 (Nelson 2002), but a general survey of southeast Minnesota trout anglers in 2001 found overall angler satisfaction to be exactly the same at 87% being either satisfied or very satisfied (Vlaming and Fulton 2003).

Another objective of expanding winter angling opportunities to new streams was to improve angler satisfaction. Comparison of the percent frequency of overall satisfaction responses on older streams (i.e., streams open to winter angling since 1999) versus newer streams that were opened in 2003 indicated slight differences (Figure 14). Anglers fishing the newer streams were never “very dissatisfied”, were less likely to characterize their trip as “neither” and were slightly more likely to have answered “very satisfied”. This suggests that opening new streams does improve angler satisfaction.

Overall angler satisfaction was associated with satisfaction with both numbers and sizes of fish caught but this only suggests that satisfied anglers were satisfied with every aspect of their fishing trip. Surprisingly, satisfaction was not associated with weather conditions and was only weakly associated

with catch rates. Weak associations between overall satisfaction and catch rates corroborated angler motivations to fish in general. Both quality fish responses to why anglers fished each stream (i.e., because of the numbers and sizes of fish present) were the lowest rated responses given. Consequently, this suggests that most anglers rarely fished streams in winter because of the trout populations present. Instead, over half the winter anglers fished a particular stream because it was easily accessible or because it was close by. Such responses justify the continued interest in increasing angling opportunities either by acquiring more fishing easements on streams (i.e., to make them easily accessible) or by opening more streams to winter angling to increase chances that anglers will live “close by” a stream to fish. Aprahamian et al. (2010) similarly found that increases in angler participation in a salmonid fishery in England were less dependent on fish abundance and instead more dependent on programs to expedite angling activities.

About a third of anglers were motivated to fish a particular stream because it was their “favorite stream”. Earlier winter creel surveys noted concerns with angler crowding on the small number of stream originally opened in the late 1980s and early 1990s (Hayes 1990; Hendrickson 1998) which prompted the opening of more streams in the 2000’s. However, Nelson (2002) noted that even though more stream miles were open in 2002, angler pressure still dominated on a small number of streams, mostly in the Whitewater watershed. Such patterns continued in the present 2013 creel, especially on the Middle Branch Whitewater River, but it is unknown if these angler patterns continue to result in crowding because no questions were asked in the 2013 survey to measure this. This also suggests that opening more streams may not result in an increase in overall pressure because many anglers will continue to focus their efforts on a few “favorite” streams. Future human dimensions surveys will need to discover what characteristics of streams make them a “favorite”.

If the current core group of winter anglers is maximized, suggesting that new additions of anglers from this demographic will only represent modest gains, then new anglers will likely have to come from different angling demographics such as gender, non-residents, younger ages, or different gear types. Female anglers have long been known to be significant modifiers of angling participation, frequently representing a large percentage of recent dropout or inactive anglers (Fedler and Ditton 2001). However, Sutton (2007) noted that female anglers in recreational fisheries in Australia reported fewer constraints to fishing participation than male anglers and Schroeder et al. (2008) found that gender was unrelated to intended future fishing participation in urban fisheries in the Twin Cities metropolitan area. Clearly, more information is needed to identify what, if any, constraints prohibit greater female angler participation in the winter trout fishery in southeast Minnesota.

Similarly, non-resident anglers have always comprised a small proportion of winter anglers and almost nothing is known about their motivations or constraints. From the limited information in this survey, non-resident anglers were all males between 21 and 71 years old and fished the particular stream that day for a variety of reasons. Interestingly, about a third of them (27%) fished with either live bait or artificial lures. Additions of younger ages (16-34 years old) may represent only modest gains as well because current age distributions in both the winter fishery and the broader Minnesota population mimic each other. Still, when considering fishing gear and age groups, it was apparent that fly fishing was least common for anglers less than 20 years old, whereas mixed methods were most common among 20-29 year olds and lure angling among 30-39 year olds.

Alternatively, examination of factors associated with dissatisfied or very dissatisfied anglers may offer other insights on management actions to increase angler participation. Gear choice again appeared to influence overall satisfaction responses. Mixed method anglers were most likely to respond “neither” or “very dissatisfied” whereas lure anglers were most likely to characterize dissatisfaction with their overall winter fishing experience. Winter anglers fishing with artificial lures and bait have both declined since the 1997 survey representing 16.4% and 2.0% of 2013 anglers, respectively. In a summer creel survey in southeast Minnesota in 2005, lure anglers represented 21% and bait anglers 37% of all fishing participants (Snook and Dieterman 2005). A more general trout angler survey conducted in 2001 found that 34% of anglers used live bait and 14% used primarily artificial lures (Vlaming and Fulton 2003). Clearly, their presence is more profound in other seasons and years and they are conspicuously absent from the winter fishery in southeast Minnesota perhaps due to motivations for angling.

Examination of the association between catch rates and overall angler satisfaction indicated that when catch rates were < 2.0 trout/hr, anglers could be satisfied or dissatisfied (Figure 9). This might have been because anglers that caught few trout, yet were still satisfied or very satisfied, may have simply been fishing to enjoy the outdoors in a general sense. However, anglers that were dissatisfied, very dissatisfied, or neither almost always caught fewer than 2.0 trout/hr. Stated differently, this means that anglers that caught 2.0 or more trout per hour were never dissatisfied or very dissatisfied. This might suggest a threshold for managers to strive for to ensure fishing quality, as defined by angler satisfaction, is maintained.

Catch rates were also associated with participation time, where anglers catching more than five trout per hour often fished for shorter time periods than anglers that caught fewer trout per hour (Figure 10). Such patterns are more common in harvest-based fisheries where high catch rates often indicate anglers that rapidly caught their legal limit of fish to harvest and then stop fishing. There was

no harvest during the winter angling season in southeast Minnesota so anglers might instead be fishing to fulfill some level of satisfaction. If so, then anglers that catch a lot of trout may fulfill their daily satisfaction requirement quicker than anglers that catch fewer trout.

Several important assumptions were made throughout this creel. The first was that while creel clerks drove their daily route it was assumed that the specific spots on the route were the only ways to access open water. There could have been several instances where landowners accessed the trout stream from their private property however due to the weather, access for anglers and clerks was easiest at our assigned contact spots.

At times during severe winter weather the creel survey was cancelled for the day. We made the assumption that because of this weather, anglers would not be out fishing. No surveys were handed out and therefore no anglers were fishing. This could of course affect angling pressure and total catch if this assumption was incorrect.

The assumption was also made that anglers would be fishing any time during daylight hours. This was different for January (10.5 hours), February (11.5 hours) and March (12.9 hours). In order to extrapolate estimates to times when the clerk was not on a specific stream or in contact with a specific spot some form of standardization was necessary. This most likely caused an increase in the estimate of actual angling pressure and thus total catch.

Management Implications -

- 1) Repeat the winter creel survey in approximately five years (2018) to verify angler re-distribution trends, especially if all streams are opened to winter angling and to continue monitoring angler satisfaction with the winter trout season.
- 2) Maintain the high satisfaction levels and interest of the current core angling constituency of middle-aged, white, male fly anglers. To maintain satisfaction, managers should consider opening more streams to winter fishing because satisfaction responses were slightly higher on streams opened more recently (i.e., “new” streams) and because this will address two of the top three motivations for fishing a particular stream (i.e., because it was either “easily accessible” or it was “close by”).
- 3) Conduct more detailed human-dimension surveys to better identify factors leading anglers to identify a stream as a “favorite” stream. Are any of these factors something that can be amenable to management manipulation?

- 4) Conduct more detailed human-dimension surveys to ascertain constraints and motivations for winter angling of under-utilized demographic groups including females, non-residents and especially lure and bait anglers. Such demographic groups may hold the greatest potential for attracting new anglers to the winter fishery.

Acknowledgements

We would like to thank the creel clerks, Travis Viker and Austin Jevne, for completing a challenging driving course around southeast Minnesota, at times during hazardous winter conditions. Dan Spence administered the creel in the Lake City management area. Melissa Peterson assisted with the administration of the creel in the Lanesboro management area and provided review of creel design. Park staff at each of the state parks assisted with the distribution of angling surveys to their customers. Their help was much appreciated. Data regarding weather comparisons between the winter of 2002 and 2013 was provided by Randy Brock (KTTC Chief Meteorologist). Keith Reeves, John Hoxmeier and Nick Schlessler provided important review and helpful advice on design and analysis.

Literature Cited

Aprahamian, M. W., P. Hickley, B. A. Shields, and G. W. Mawle. 2010. Examining changes in participation in recreational fisheries in England and Wales. *Fisheries Management and Ecology* 17:93-105.

Fedler, A. J., and R. B. Ditton. 2001. Dropping out and dropping in: a study of factors for changing recreational fishing participation. *North American Journal of Fisheries Management* 21:283-292.

Minnesota Department of Natural Resources. 2010. Fisheries Long-Range Plan for Trout Stream Resource Management in Southeast Minnesota 2010-2015 and Progress Report.

Hayes, M. 1990. Evaluation of special regulations for a winter trout season on the Middle and South Branches of the Whitewater River. Study IV Completion Report Job 179, Minnesota Department of Natural Resources, Section of Fisheries.

Hendrickson, D.L. 1998. 1997 winter season creel survey of five Whitewater watershed streams. Minnesota Department of Natural Resources, Completion Report (Job 443).

Nelson, R.T. 2002. Angler use of the winter trout fishery in southeast Minnesota, January 1 to March 31, 2002. Minnesota Department of Natural Resources, Completion Report.

Pollock, K.H., C.M. Jones, and T.L. Brown. 1994. Angler survey methods and their application in fisheries management. American Fisheries Society Special Publication 25.

Ritter, C., R.B. Ditton, and R.K. Riechers. 1992. Constraints to sport fishing: implications for fisheries management. *Fisheries* 17:16-19.

Schroeder, A., D.C. Fulton, M.L. Nemeth, R.E. Sigurdson and R.J. Walsh. 2008. Fishing in the Neighborhood: understanding motivations and constraints for angling among Minneapolis/St. Paul, Minnesota metro residents. Pages 77-95 *in* R.T. Eades, J.W. Neal, T.J. Lang, K.M. Hunt and P. Pajak, editors. Urban and community fishing programs: development, management and evaluation. Symposium 67, American Fisheries Society, Bethesda, Maryland.

Shelby, B., J.J. Vaske, and T.A. Heberlein. 1989. Comparative analysis of crowding in multiple locations: results from fifteen years of research. *Leisure Sciences* 11:269-291.

Snook, V.A., and D.J. Dieterman. 2005. A roving creel survey of selected southeast Minnesota trout streams – 2005. Job 737, Minnesota Department of Natural Resources, St. Paul.

Suburbanstats. 2014. Minnesota population, demographics by age, race and gender 2012-2013. Available: <http://suburbanstats.org/population/how-many-people-live-in-minnesota>. (Accessed January 23, 2014).

Sutton, S.G. 2007. Constraints on recreational fishing participation in Queensland, Australia, *Fisheries* 32:73-83.

Vlaming, J., and D.C. Fulton. 2003. Trout angling in southeastern Minnesota: A study of trout anglers. Interim Report prepared for Minnesota Department of Natural Resources.

Table 1. Trout angling seasons in southeast Minnesota (Houston, Fillmore, Mower, Dodge, Olmsted, Winona, Wabasha, and Goodhue counties) during January 1 to December 31, 2013.

Season	Dates (2013 Example)
Winter trout stream angling, barbless hooks only	January 1 to March 31
Trout catch-and-release, barbless hooks only	April 1 to April 12
Trout angling (multiple gear and harvest regulations)	April 13 to September 14
Trout catch-and-release, barbless hooks only	September 15 to September 30
Trout angling closed	October 1 to December 31

Table 2. History of the number of stream miles open to winter trout angling in southeast Minnesota. All winter trout seasons were from January 1 to March 31.

Stream name	1988-1990	1991-Feb 1997	March 1997-1998	1999-2001	2002-2013
Whitewater River, M. Br.	2.9	2.9	4.2	4.2	13.0
Whitewater River, S. Br.	1.9	1.9	3.8	3.8	3.8
Beaver Creek (Whitewater)		3.9	6.3	6.3	6.5
Hay Creek		3.9	4.2	4.2	10.2
Whitewater River, Main			6.9	6.9	13.3
Whitewater River, N. Br.			2.2	2.2	8.4
Beaver Creek, East				2.4	2.4
Camp Creek				3.5	3.5
Duschee Creek				5.3	5.3
Root River, S. Br. (Lanesboro)				3.0	2.8
Root River, S. Br. (Forestville)				3.8	2.9
Forestville Creek				1.0	2.6
Canfield Creek				1.6	1.6
Root River, S. Fork					7.4
Crooked Creek					6.4
Pine Creek					5.8
Rush Creek					4.6
Diamond Creek					4.4
Wisel Creek					4.0
Gribben Creek					3.5
Money Creek, W. Br.					3.1
Daley Creek					2.4
Beaver Creek, West					2.0
Torkelson Creek					1.9
Bee Creek					1.6
Garvin Brook					1.4
Trout Valley Creek					1.3
Trout Run Creek (Whitewater)					1.3
Ferguson Creek					1.3
Crooked Creek, S. Fork					1.1
Swede Bottom Creek					0.8
Hemmingway Creek					0.8
Coolridge Creek					0.2
Total	4.8	12.6	27.6	48.2	131.6

Table 3. Thirty two trout streams in southeast Minnesota that were included in a winter trout season creel surveyed from January 1 to March 31, 2013 with kittle number, county and assigned area.

Stream	Kittle Number	County
Beaver Creek (Whitewater)	M-031-006	Houston
Bee Creek	I-006	Houston
Camp Creek	M-009-025-003	Fillmore
Canfield Creek	M-009-025-010	Fillmore
Coolridge Creek	M-009-017-005-005	Winona
Crooked Creek	M-004	Houston
Daley Creek	M-009-012	Houston
Diamond Creek	M-009-023	Fillmore
Duschee Creek	M-009-025-001	Fillmore
East Beaver Creek	M-009-010-003-008	Houston
Ferguson Creek	M-009-017-012	Winona
Forestville Creek	M-009-025-009	Fillmore
Garvin Brook	M-026-001	Winona
Gribben Creek	M-009-024	Fillmore
Hay Creek	M-046	Goodhue
Hemmingway Creek	M-009-017-005-006	Winona
Middle Branch Whitewater River	M-031-019	Winona, Olmsted
North Branch Whitewater River	M-031-018	Winona, Olmsted
Pine Creek	M-009-017-005	Winona
Rush Creek	M-009-017	Winona
South Branch Root River	M-009-025	Fillmore
South Branch Whitewater River	M-031-017	Winona
South Fork Crooked Creek	M-004-009	Houston
South Fork Root River	M-009-010	Fillmore
Swede Bottom Creek	M-009-010-001	Houston
Torkelson Creek	M-009-026	Fillmore
Trout Run Creek (Whitewater)	M-031-019-002	Winona
Trout Valley Creek	M-031-001	Wabasha, Winona
West Beaver Creek	M-009-010-003-009	Houston
West Branch Money Creek	M-009-011-008	Winona
Wisel Creek	M-009-010-010	Fillmore
Whitewater River	M-031	Winona

Table 4. Trout stream improved regulations proposal forwarded by Minnesota Department of Natural Resources Lanesboro and Lake City Fisheries offices in 2013 for southeast Minnesota (Houston, Fillmore, Mower, Dodge, Olmsted, Winona, Wabasha, and Goodhue counties).

Regulation
1) Remove all barbless hook regulations in all trout seasons on all trout streams (currently required during the winter and catch-and-release seasons)
2) Bring all designated trout streams into the current winter season (January 1 to March 31)
3) Extend the current fall catch-and-release season to October 15 (currently ends September 30)
4) Allow angling (Catch-and-Release) on designated trout streams in three state parks (Whitewater State Park, Forestville State Park, and Beaver Creek Valley State Park) from Oct 16 to Dec 31

Table 5. Trout streams open for winter angling, area, clerk and number of specific spots surveyed in southeast Minnesota during the winter creel survey from January 1 to March 31, 2013.

Stream	Area	Clerk	Number of specific spots
Camp Creek	A	1	2
Canfield Creek	A	1	1
Diamond Creek	A	1	2
Duschee Creek	A	1	7
Forestville Creek	A	1	1
Gribben Creek	A	1	5
South Branch Root River	A	1	16
South Fork Root River	A	1	5
Torkelson Creek	A	1	2
Wisel Creek	A	1	1
Bee Creek	B	1	2
Coolridge Creek	B	1	1
Crooked Creek	B	1	6
Daley Creek	B	1	7
East Beaver Creek	B	1	1
Ferguson Creek	B	1	1
Hemmingway Creek	B	1	1
Pine Creek	B	1	6
Rush Creek	B	1	5
South Fork Crooked Creek	B	1	1
Swede Bottom Creek	B	1	2
West Beaver Creek	B	1	2
West Branch Money Creek	B	1	3
Beaver Creek (Whitewater)	C	2	4
Garvin Brook	C	2	5
Hay Creek	C	2	10
Middle Branch Whitewater River	C	2	12
North Branch Whitewater River	C	2	6
South Branch Whitewater River	C	2	3
Trout Run Creek (Whitewater)	C	2	1
Trout Valley Creek	C	2	2
Whitewater River	C	2	11

Table 6. Alternating running orders for Area A streams surveyed by a creel clerk in the southeast Minnesota winter trout stream creel January 1 to March 31, 2013.

Stream	Arrival Time
Leave Office	9:45 am
South Branch Root River (Vreeman's)	10:30 am
Canfield Creek	10:45 am
Forestville Creek	11:00 am
South Branch Root River (Park)	11:10 am
Break	11:45 – 12:00 pm
Camp Creek	12:00 pm
Duschee Creek	12:35 pm
Torkelson Creek	1:15 pm
Lunch	1:35 – 2:05 pm
South Branch Root River (Lanesboro)	2:10 pm
Diamond Creek	2:50 pm
Gribben Creek	3:10 pm
Break	3:30 – 3:45 pm
South Fork Root River (Long-term Monitoring)	3:55 pm
Wisel Creek (Chickentown)	4:15 pm
South Fork Root River (Million Dollar Bridge)	4:25 pm
Arrive at Office	5:00 pm

Alternating with:

Leave Office	10:00 am
South Fork Root River (Million Dollar Bridge)	10:30 am
Wisel Creek (Chickentown)	10:45 am
South Fork Root River (Long-term Monitoring)	11:05 am
Gribben Creek	11:20 am
Diamond Creek	11:40 am
Break	12:00 – 12:15 pm
South Branch Root River (Lanesboro)	12:20 pm
Torkelson Creek	12:45 pm
Lunch	1:00 – 1:30 pm
Duschee Creek	1:50 pm
Camp Creek	2:30 pm
South Branch Root River (Park)	3:15 pm
Forestville Creek	3:25 pm
Break	3:35 – 3:50 pm
South Branch Root River (Loop B)	3:55 pm
Canfield Creek	4:05 pm
South Branch Root River (Vreeman's)	4:20 pm
Arrive at Office	5:15 pm

Table 7. Alternating running orders for Area B streams surveyed by a creel clerk in the southeast Minnesota winter trout stream creel January 1 to March 31, 2013.

Stream	Arrival Time
Leave Office	9:30 am
Bee Creek	10:30 am
Crooked Creek & South Fork Crooked Creek	11:20 am
East Beaver Creek	11:45 am
Break	11:55 – 12:10 pm
West Beaver Creek	12:25 pm
Swede Bottom Creek	1:05 pm
Lunch	1:15 – 1:45 pm
Daley Creek	2:00 pm
West Branch Money Creek	2:40 pm
Rush Creek	3:05 pm
Ferguson Creek	3:25 pm
Break	3:30 – 3:45 pm
Pine Creek	4:00 pm
Hemmingway Creek	4:25 pm
Coolridge Creek	4:30 pm
Arrive at Office	5:00 pm

Alternating with:

Leave Office	10:00 am
Coolridge Creek	10:30 am
Hemmingway Creek	11:20 am
Pine Creek	10:40 am
Ferguson Creek	11:15 am
Rush Creek	11:20 am
Break	11:45 – 12:00 pm
West Branch Money Creek	12:15 pm
Daley Creek	12:45 pm
Lunch	1:20 – 1:50 pm
Swede Bottom Creek	1:55 pm
West Beaver Creek	2:30 pm
East Beaver Creek	2:55 pm
Break	3:00 – 3:15 pm
Crooked Creek & South Fork Crooked Creek	3:20 pm
Bee Creek	4:15 pm
Arrive at Office	5:30 pm

Table 8. Routes randomly selected with replacement for Area C during the southeast Minnesota winter trout stream creel survey January 1 to March 31, 2013. Whitewater watershed included Middle Branch Whitewater, Trout Run Creek, North Branch Whitewater, South Branch Whitewater, Main Branch Whitewater, Beaver Creek and Trout Valley Creek.

Name of Route	Watershed order
R1	Garvin Brook, Whitewater, Hay Creek
R2	Hay Creek, Garvin Brook, Whitewater
R3	Hay Creek, Whitewater, Garvin Brook
R4	Whitewater, Garvin Brook, Hay Creek

Table 9. Total number of days available (number sampled), by month and stream area strata, southeast Minnesota winter trout stream creel survey, January 1 to March 31, 2013.

Days	Month			
	Total	January	February	March
Total number of days	90 (65)	31 (22)	28 (20)	31 (23)
Number of week days	61 (36)	21 (12)	19 (11)	21 (13)
Number of weekend/holidays	29 (29)	10 (10)	9 (9)	10 (10)

Days	Stream Area			
	Total	A	B	C
Total number of days	90 (65)	90 (32)	90 (33)	90 (65)
Number of week days	61 (36)	61 (17)	61 (19)	61 (36)
Number of weekend/holidays	29 (29)	29 (15)	29 (14)	29 (29)

Table 10. All weekend/holiday survey days from the southeast Minnesota winter trout stream creel from January 1 to March 31, 2013 and which of five scenarios they fit into based on data collected.

Scenario	Area A/B	Area C
	N	N
1) No surveys were left on vehicles because no vehicles were found on the route for the day (or the creel was cancelled for the day due to dangerous driving conditions).	9	2
2) Surveys were left on vehicles but none were returned for that day.	5	7
3) Surveys were left on vehicles but only some of them were returned for that day.	12	17
4) Surveys were left on vehicles and all were returned for that day. However, information was not completed that pertains to species caught.	2	1
5) Surveys were left on vehicles and all were returned for that day. Information was complete.	1	2
Total days	29	29

Table 11. All weekday survey days from the southeast Minnesota winter trout stream creel from January 1 to March 31, 2013 and which of five scenarios they fit into based on data collected.

Scenario	Area A/B	Area C
	N	N
1) No surveys were left on vehicles because no vehicles were found on the route for the day (or the creel was cancelled for the day due to dangerous driving conditions).	14	6
2) Surveys were left on vehicles but none were returned for that day.	10	8
3) Surveys were left on vehicles but only some of them were returned for that day.	8	17
4) Surveys were left on vehicles and all were returned for that day. However, information was not completed that pertains to species caught.	0	0
5) Surveys were left on vehicles and all were returned for that day. Information was complete.	3	5
Total days	35	36

Table 12. Survey distribution by state parks with resulting return rate for the southeast Minnesota winter trout stream creel survey, January 1 to March 31, 2013.

State Park	Number of surveys taken by anglers from State Parks	Number of surveys returned from State Parks	Return rate (%)
Forestville State Park	14	5	35.7
Whitewater State Park	91	27	29.7
Beaver Creek Valley State Park	0	0	-
Park Total	105	32	32.7

Table 13. Survey distribution from clerks by stream with resulting return rate for the southeast Minnesota winter trout stream creel survey, January 1 to March 31, 2013.

Stream	Surveys distributed	Surveys returned	Surveys returned that were anglers	Overall return rate (%)
Beaver Creek (M-031-006)	13	4	2	31
Bee Creek	3	3	2	100
Camp Creek	17	8	8	47
Canfield Creek	2	1	1	50
Coolridge Creek	0	0	0	-
Crooked Creek	7	2	2	29
Daley Creek	2	0	0	0
Diamond Creek	1	0	0	0
Duschee Creek	7	5	5	71
East Beaver Creek	13	6	1	46
Ferguson Creek	0	0	0	-
Forestville Creek	1	1	0	100
Garvin Brook	2	2	2	100
Gribben Creek	1	0	0	0
Hay Creek	74	38	32	51
1. Upstream regulations	5	3	1	60
2. Nelson HI	38	20	20	53
3. Rebuffoni's	9	6	6	67
4. State Trail	4	1	1	25
5. Hay Creek (Town)	1	1	1	100
6. Stephani's	2	1	1	50
7. State Forest	2	1	1	50
8. State Forest Bridge	2	0	0	0
9. State Forest	3	2	1	67
10. State Forest, Downstream	8	3	0	38
Middle Branch Whitewater River	208	105	68	51
1. County 9	12	12	12	100
2. Round Barn	5	5	4	100
3. Quincy Bridge	27	20	19	74
4. Group Camp Park	12	5	3	42
5. Hwy 74 Bridge	4	3	1	75
6. Trout Run parking	64	21	5	33
7. Park HQ	69	33	18	48
8. Lazy D	8	3	3	38
9. Elba	9	3	3	34
North Branch Whitewater River	68	29	26	43
1. WMA parking	30	12	10	40
2. Fairwater Upstream	15	6	5	40
3. Fairwater Downstream	12	3	3	25
4. LTM	3	0	0	0
5. Bridge	7	7	7	100
6. Hwy 74 Bridge	1	1	1	100

(Continued)

Table 13 (continued).

Stream	Surveys distributed	Surveys returned	Surveys returned that were anglers	Overall return rate (%)
Pine Creek (M-009-017-005)	5	2	2	40
1. Pine Creek mouth	1	0	0	0
2. Brekke's	0	0	0	-
3. Kopperud's	0	0	0	-
4. Jacobson's	0	0	0	-
5. Jacobson's	1	1	1	100
6. Anderson's	4	1	1	25
Rush Creek	11	5	5	45
South Branch Root River	37	23	21	62
1. Vreeman's	0	0	0	-
2. Loop B Park	2	1	1	50
3. Forestville Creek mouth	2	2	1	100
4. Forestville Creek mouth	1	0	0	0
5. Historic Forestville	1	0	0	0
6. Historic Forestville	5	1	0	20
7. Lanesboro Dam	6	6	6	100
8. Hwy 8 Bridge	1	0	0	0
9. Lanesboro Fire Station	4	0	0	0
10. BBQ	3	2	2	67
11. Hwy 250 Bridge	3	3	3	100
12. Sales Barn	0	0	0	-
13. Hwy 16	0	0	0	-
14. Mini-Madison	8	7	7	88
15. Sand Beach	1	1	1	100
16. Hwy 250 near confluence	0	0	0	-
South Branch Whitewater River	55	23	22	42
South Fork Crooked Creek	2	0	0	0
South Fork Root River	8	3	3	38
1. WMA	2	0	0	0
2. Bonfe's	0	0	0	-
3. LTM Bridge	2	1	1	50
4. Million Dollar Bridge	3	1	1	33
5. Wunderlich's Slab Bridge	1	1	1	100
Swede Bottom Creek	0	0	0	-
Torkelson Creek	0	0	0	-
Trout Valley Creek	4	2	0	50
West Beaver Creek	3	1	1	33
West Branch Money Creek	1	0	0	0
Wisel Creek	1	1	1	100

(Continued)

Table 13 (continued).

Stream	Surveys distributed	Surveys returned	Surveys returned that were anglers	Overall return rate (%)
Whitewater River	56	3	3	6
1. Elba	13	2	2	15
2. Parking lot	13	0	0	0
3. Parking lot	5	0	0	0
4. Canoe launch	2	0	0	0
5. Hwy 30 Bridge	4	1	1	25
6. Parking lot (Dns Beaver)	1	0	0	0
7. Parking lot	7	0	0	0
8. Parking lot	8	0	0	0
9. Parking lot	0	0	0	-
10. Parking lot	3	0	0	0
Totals	602	267	207	44

Table 14. Gender of anglers surveyed on trout streams open to winter angling between January 1 and March 31, 2013 in southeast Minnesota.

Gender	Percent (Number in category)
Male	97.6 (364)
Female	2.4 (9)

Table 15. Hometown, zip code, and number of anglers from Minnesota residents encountered on trout streams open to winter angling between January 1 and March 31, 2013.

City	Zip code	Number of anglers
Rochester	55901, 55902, 55904, 55906, 55093	75
Minneapolis	55401, 55404, 55406, 55408, 55409, 55417, 55419, 55422, 55411, 55416	42
St. Paul	55104, 55105, 55108, 55112, 55116, 55124	29
Northfield	55057	11
St. Charles	55972	9
Winona	55987	9
Bloomington	55425, 55435, 55438	8
Altura	55910	6
Austin	55912	6
Edina	55423, 55436, 55439	6
Minnetonka	55345	6
Plainview	55964	6
Prior Lake	55372	6
Duluth	55804, 55807, 55812	5
Hopkins	55305, 55343	5
Racine	55967	5
Burnsville	55306, 55337	4
Chaska	55318	4
Eagan	55122, 55123	4
Eyota	55934	4
Fountain	55935	4
Owatonna	55060	4
Rollingstone	55969	4
Wayzata	55391	4
Brooklyn Center	55429	3
Chatfield	55923	3
Ely	55731	3
Excelsior	55331	3
Hastings	55033	3
La Crescent	55947	3
Minnesota City	55959	3
New Prague	56071	3
Oronoco	55960	3
Plymouth	55446, 55447	3
Redwing	55066	3
Beaver Bay	55601	2
Brainerd	56401	2
Buffalo	55313	2
Chisago City	55013	2
Circle Pines	55014	2

(Continued)

Table 15 (continued).

City	Zip code	Number of anglers
Delano	55328	2
Dodge Center	55927	2
Eden Prairie	55344, 55347	2
Elk River	55330	2
Golden Valley	55426	2
Inver Grove Heights	55076	2
Lakeville	55044	2
Lanesboro	55949	2
Lewiston	55952	2
Lino Lakes	55110	2
Maplewood	55106, 55119	2
Medicine Lake	55441	2
Mound	55364	2
Oakdale	55128	2
Osseo	55369	2
Preston	55965	2
Rushford	55971	2
Shakopee	55379	2
St. Anthony	55418	2
Arden Hills	55126	1
Clear Lake	55319	1
Columbia Heights	55421	1
Crystal	55427	1
Dover	55929	1
Farmington	55024	1
Ham Lake	55304	1
Harmony	55939	1
Hermantown	55811	1
Houston	55943	1
Lake City	55041	1
Mankato	56003	1
Mayer	55360	1
Mendota Heights	55118	1
Newport	55055	1
Savage	55378	1
St. Bonifacius	55375	1
St. Peter	56082	1
Stewartville	55976	1
Wabasha	55981	1

(Continued)

Table 15 (continued).

City	Zip code	Number of anglers
Waconia	55387	1
West St. Paul	55107	1
Woodbury	55125	1

Table 16. Hometown, zip code, and number of returned letter surveys from non-residents encountered on trout streams open to winter angling between January 1 and March 31, 2013 in southeast Minnesota.

City	State	Zip code	Number in zip code
La Crosse	WI	54601	4
Greene	IA	50636	2
Fountain City	WI	54629	2
Dougherty	IA	50433	1
Garner	IA	50438	1
Hager City	WI	54014	1
New Richmond	WI	54017	1
Prescott	WI	54021	1
Lincoln	NE	68503	1
Lincoln	NE	68516	1
SUM			15

Table 17. Number of anglers that returned their surveys in the winter trout stream creel, January 1 to March 31, 2013 in southeast Minnesota that were "Local" (Fillmore, Goodhue, Houston, Olmsted, Wabasha, Winona, Dodge, Freeborn, Mower, Steele counties).

County	Number of returned angler surveys	Percent of "Local" total
Dodge	1	0.8
Fillmore	13	10.2
Freeborn	0	0
Goodhue	3	2.4
Houston	1	0.8
Mower	10	7.9
Olmsted	59	46.5
Steele	2	1.6
Wabasha	6	4.7
Winona	32	25.2

Table 18. Number of anglers that returned their surveys in the winter trout stream creel, January 1 to March 31, 2013 in southeast Minnesota that were “Metro” (Dakota, Ramsey, Washington, Hennepin, Anoka, Scott, Carver counties).

County	Number of returned angler surveys	Percent of “Metro” total
Anoka	6	6.1
Carver	6	6.1
Dakota	16	16.2
Hennepin	38	38.4
Ramsey	25	25.3
Scott	4	4.0
Washington	4	4.0

Table 19. Percent answer to the question, “What angling gear were you using on this trip?” taken from letter surveys of anglers fishing the winter trout season in southeast Minnesota from January 1 to March 31, 2013.

Gear type		Percent (Number in category)
Bait		2.0 (5)
Lure		16.4 (41)
Fly		76.4 (191)
Mixed	Bait/Lure	0.4 (1)
	Lure/Fly	4.8 (12)

Table 20. Age by angling gear choice in percent from letter surveys of anglers fishing 32 trout streams in southeast Minnesota open to winter angling from January 1 to March 31, 2013.

Age (years)	Bait	Fly	Lure	Mixed	n
10-19	0.0	50.0	33.3	16.7	6
20-29	0.0	66.7	16.7	16.7	36
30-39	1.6	70.5	24.6	3.3	61
40-49	0.0	87.5	12.5	0.0	32
50-59	3.3	75.4	14.8	6.6	61
60-69	0.0	88.1	11.9	0.0	42
70-79	10.0	90.0	0.0	0.0	10

Table 21. Angling gear choice by age in percent from letter surveys of anglers fishing 32 trout streams in southeast Minnesota open to winter angling from January 1 to March 31, 2013.

Gear	Age (years)							n
	10-19	20-29	30-39	40-49	50-59	60-69	70-79	
Bait			25.0		50.0		25.0	4
Fly	1.6	12.6	22.6	14.7	24.2	19.5	4.7	190
Lure	4.9	14.6	36.6	9.8	21.9	12.2		41
Mixed	7.7	46.2	15.4		30.8			13

Table 22. Gear choice by percent of Minnesota resident anglers fishing the winter trout season in southeast Minnesota, January 1 to March 31, 2013. Local anglers are those with home zip codes in Dodge, Fillmore, Goodhue, Houston, Mower, Olmsted, Steele, Wabasha and Winona counties. Metro anglers are those with home zip codes in Anoka, Carver, Dakota, Hennepin, Ramsey, Scott and Washington counties.

Area	Fly Fishing	Lure	Bait	Mixed	n
Metro	84.2	7.9	4.0	4.0	101
Local	66.1	25.7	0.9	7.3	109
Other	84.6	15.4	0	0	26

Table 23. Number and percent answers to the question, “How many anglers traveled in this vehicle to the stream today?” as reported in the winter trout stream angler creel in southeast Minnesota, January 1 to March 31, 2013.

Number of anglers	Number of angler survey replies in category	Percent of angler survey replies in category
1	145	57.8
2	89	35.5
3	14	5.6
4	2	0.8
5	0	0
6	1	0.4
	251	

Table 24. Proportion of cars counted that were angling and mean party size estimates used in calculations to estimate angler pressure for Method 1 (Nelson 2002) in southeast Minnesota, January 1 to March 31,2013. Proportions and mean party sizes were based on returned angler surveys (N).

Stream	Proportion of cars angling (N)	Mean party size
Beaver Creek	0.50 (4)	1.33
Bee Creek	0.67 (3)	1.50
Camp Creek	1.00 (8)	1.25
Canfield Creek	1.00 (1)	1.00
Crooked Creek	1.00 (2)	2.00
Duschee Creek	1.00 (5)	1.60
East Beaver Creek	0.17 (6)	1.00
Garvin Brook	1.00 (2)	2.00
Hay Creek	0.84 (38)	1.34
Middle Branch Whitewater	0.65 (105)	1.53
North Branch Whitewater	0.90 (29)	1.38
Pine Creek	1.00 (2)	2.00
Rush Creek	1.00 (5)	1.40
South Branch Root River	0.91 (23)	1.42
South Branch Whitewater	0.96 (23)	1.52
South Fork Root River	1.00 (3)	1.67
West Beaver Creek	1.00 (1)	2.00
Wisel Creek	1.00 (1)	3.00
Whitewater (Main Branch)	1.00 (3)	2.21
Overall	0.78 (267)	1.51

Table 25. Angler trip length by Area (A, B and C) and overall in percent of responses collected from anglers fishing the winter trout season in southeast Minnesota, January 1 to March 31, 2013. Information below includes park letter surveys and clerk distributed letter surveys.

Trip length (Hours)	Trip length (Minutes)	Area A (%) (n = 40)	Area B (%) (n = 17)	Area C (%) (n = 188)	Overall (%)
0.0-0.5	1-30	2.6		1.1	1.2
0.5-1.0	31-60		5.9	2.1	2.0
1.0-1.5	61-90		5.9	4.3	3.6
1.5-2.0	91-120	10.3	11.8	12.8	12.4
2.0-2.5	121-150	12.8	23.5	6.9	8.8
2.5-3.0	151-180	28.2	5.9	22.3	21.9
3.0-3.5	181-210	5.1		4.8	4.4
3.5-4.0	211-240	15.4	11.8	11.2	12.0
4.0-4.5	241-270		5.9	4.8	4.4
4.5-5.0	271-300	20.5	23.5	12.8	15.5
5.0-5.5	301-330			0.5	0.4
5.5-6.0	331-360	2.6		5.3	4.8
6.0-6.5	361-390			0.5	0.4
6.5-7.0	391-420	2.6		3.2	2.8
7.0-7.5	421-450			0.5	0.4
7.5-8.0	451-480			4.8	3.6
8.0-8.5	481-510				
8.5-9.0	511-540				
9.0-9.5	541-570			1.1	0.8
9.5-10.0	571-600				
10.0-10.5	601-630			0.5	0.4
10.5-11.0	631-660			0.5	0.4

Table 26. Percent answer to the question, “Why did you decide to fish here today?” taken from letter surveys of anglers fishing the winter trout season in southeast Minnesota from January 1 to March 31, 2013 (Note that some surveyed chose multiple reasons. Ex. ABE).

Answer	Percent responses in category (Number)
A. Favorite stream	31.0 (85)
B. Live close by	23.3 (64)
C. Easy access	32.0 (88)
D. Numbers of fish	10.5 (29)
E. Size of fish	3.3 (9)

Table 27. Rank of streams fished with answer “Favorite stream” to question, “Why did you decide to fish here today?” taken from letter surveys of anglers fishing the winter trout season in southeast Minnesota from January 1 to March 31, 2013 (Note that some surveyed chose multiple reasons). N = 77

Rank	Stream	Percent answer
1	Middle Branch Whitewater River	32.5
2	South Branch Root River	15.6
3	Hay Creek/South Branch Whitewater River	10.4
5	Whitewater River	9.1
6	Camp Creek/North Branch Whitewater River	5.2
8	Beaver Creek (WW)/Trout Run (WW)	2.6
10	Bee Creek/Duschee Creek/Forestville Creek/Pine Creek/Rush Creek	1.3

Table 28. Rank of streams fished with answer “Live close by” to question, “Why did you decide to fish here today?” taken from letter surveys of anglers fishing the winter trout season in southeast Minnesota from January 1 to March 31, 2013 (Note that some surveyed chose multiple reasons). N = 62

Rank	Stream	Percent answer
1	Hay Creek/Middle Branch Whitewater River	27.4
3	North Branch Whitewater River	11.3
4	South Branch Whitewater River	9.7
5	South Branch Root River/Whitewater River	6.5
7	Camp Creek	4.8
8	Bee Creek/Canfield Creek/Pine Creek/Rush Creek	1.6

Table 29. Rank of streams fished with answer “Easy access” to question, “Why did you decide to fish here today?” taken from letter surveys of anglers fishing the winter season in southeast Minnesota from January 1 to March 31, 2013 (Note that some surveyed chose multiple reasons). N = 86

Rank	Stream	Percent answer
1	Middle Branch Whitewater River	44.2
2	North Branch Whitewater River	11.6
3	South Branch Whitewater River	9.3
4	Hay Creek/South Branch Root River	7.0
6	Rush Creek	4.7
7	Camp Creek/Duschee Creek	3.5
9	Whitewater River	2.3
10	Crooked Creek/E. Beaver Creek/Garvin Brook/S. Fork Root River/Wisel Creek	1.2

Table 30. Rank of streams fished with answer “Number of fish” to question, “Why did you decide to fish here today?” taken from letter surveys of anglers fishing the winter season in southeast Minnesota from January 1 to March 31, 2013 (Note that some surveyed chose multiple reasons). N = 28

Rank	Stream	Percent answer
1	Middle Branch Whitewater River	25.0
2	Hay Creek/North Branch Whitewater River	14.3
4	South Branch Root River	10.7
5	Duschee Creek/South Branch Whitewater River/ South Fork Root River	7.1
8	Rush Creek/Garvin Brook/Whitewater River/Crooked Creek	3.6

Table 31. Rank of streams fished with answer “Size of fish” to question, “Why did you decide to fish here today?” taken from letter surveys of anglers fishing the winter season in southeast Minnesota from January 1 to March 31, 2013 (Note that some surveyed chose multiple reasons). N = 9

Rank	Stream	Percent answer
1	South Branch Root River	22.2
2	Hay Creek/Rush Creek/Crooked Creek/M. Br. Whitewater River/N. Br. Whitewater River/S. Br. Root River/ S. Br. Whitewater River	11.1

Table 32. Number and percent answer to the question, “How satisfied are you with the overall fishing experience today?” taken from letter surveys of anglers fishing 32 trout streams in southeast Minnesota open to winter angling from January 1 to March 31, 2013.

	Number	Percent
Very Satisfied	95	37.7
Satisfied	124	49.2
Neither	19	7.5
Dissatisfied	10	4.0
Very Dissatisfied	4	1.6

Table 33. Number and percent answer to the question, “How satisfied are you with the size of the trout you caught today?” taken from letter surveys of anglers fishing 32 trout streams in southeast Minnesota open to winter angling from January 1 to March 31, 2013.

	Number	Percent
Very Satisfied	35	14.1
Satisfied	132	53.2
Neither	58	23.4
Dissatisfied	17	6.9
Very Dissatisfied	6	2.4

Table 34. Number and percent answer to the question, “How satisfied are you with the number of trout you caught today?” taken from letter surveys of anglers fishing 32 trout streams in southeast Minnesota open to winter angling from January 1 to March 31, 2013.

	Number	Percent
Very Satisfied	49	19.8
Satisfied	113	45.6
Neither	54	21.8
Dissatisfied	24	9.7
Very Dissatisfied	8	3.2

Table 35. Percent answer to the question, “How satisfied are you with you overall fishing experience today?” relative to gear methods used taken from letter surveys of anglers fishing 32 trout streams in southeast Minnesota open to winter angling from January 1 to March 31, 2013.

Gear	Very Satisfied	Satisfied	Neither	Dissatisfied	Very Dissatisfied
Bait	80.0	20.0	0.0	0.0	0.0
Fly	37.3	53.3	5.3	1.3	2.7
Lure	34.3	47.1	10.5	7.6	0.5
Mixed	35.7	28.6	21.4	7.1	7.1

Table 36. Percent answer to the question, “How satisfied are you with the size of the trout you caught today?” relative to gear methods used taken from letter surveys of anglers fishing 32 trout streams in southeast Minnesota open to winter angling from January 1 to March 31, 2013.

Gear	Very Satisfied	Satisfied	Neither	Dissatisfied	Very Dissatisfied
Bait	60.0	20.0	20.0	0.0	0.0
Fly	21.1	35.1	35.1	5.3	3.5
Lure	12.5	51.0	22.0	13.0	1.5
Mixed	4.5	77.3	9.1	4.5	4.5

Table 37. Percent answer to the question, “How satisfied are you with the number of the trout you caught today?” relative to gear methods used taken from letter surveys of anglers fishing 32 trout streams in southeast Minnesota open to winter angling from January 1 to March 31, 2013.

Gear	Very Satisfied	Satisfied	Neither	Dissatisfied	Very Dissatisfied
Bait	40.0	60.0	0.0	0.0	0.0
Fly	14.6	48.8	19.5	12.2	4.9
Lure	20.3	45.5	23.5	8.0	2.7
Mixed	12.5	41.7	16.7	25.0	4.2

Table 38. Coefficients of determination (r^2) testing selected associations among angler satisfaction indices and other variables collected during a winter trout fishing creel between January 1 and March 31, 2013 in southeast Minnesota. A minus sign preceding a coefficient denotes a negative relationship; P -values and sample sizes shown in parentheses.

Variables	Satisfaction with		Participation time		Trout catch rate (#/hr)
	Overall experience	Numbers of trout caught	Trip length for each party	Total minutes the entire party fished	
Satisfaction with size of trout	0.29 (<0.01 ; 248)	0.50 (<0.01 ; 247)			
Satisfaction with numbers of trout	0.43 (<0.01 ; 248)				
Trout catch rate (#/hr)	0.06 (<0.01 ; 252)	0.19 (<0.01 ; 248)		-0.04 (<0.01 ; 252)	
Mean daily air temperature ($^{\circ}$ F)	0.01 (0.17; 246)	0.02 (0.03; 243)	<0.01 (0.34; 246)	<0.01 (0.75; 246)	0.01 (0.16; 246)

Table 39. Estimated fishing pressure by individual stratum (stream x month x day type), during southeast Minnesota winter fishing seasons 2002 and 2013 (January 1 to March 31). Data for 2002 from Nelson (2002).

Stream	Month	Day type	Fishing pressure (angler-hours \pm 1 SE)		Percent change	Angler-hrs /mile		Angler-hrs/ mile/day	
			2002	2013		2002	2013	2002	2013
Beaver Creek (Whitewater)	Jan.	Weekday	159(128)	33(30)					
		Weekend-Hol	466(411)	27(45)					
	Feb.	Weekday	73(48)	15(17)					
		Weekend-Hol	230(107)	15(28)					
	Mar.	Weekday	257(109)	42(32)					
		Weekend-Hol	163(91)	0(0)					
Total			1349(468)	132(92)	-90%	214	20	2.38	0.23
Bee Creek *New	Jan.	Weekday	na	0(0)					
		Weekend-Hol	na	21(49)					
	Feb.	Weekday	na	0(0)					
		Weekend-Hol	na	0(0)					
	Mar.	Weekday	na	77(87)					
		Weekend-Hol	na	0(0)					
Total			na	98(81)	+98%		63		0.70
Camp Creek	Jan.	Weekday	100(71)	45(46)					
		Weekend-Hol	213(93)	103(160)					
	Feb.	Weekday	38(38)	55(55)					
		Weekend-Hol	120(121)	181(210)					
	Mar.	Weekday	134(66)	0(0)					
		Weekend-Hol	239(200)	129(201)					
Total			844(272)	513(311)	-39%	241	144	2.68	1.60
Canfield Creek (South Branch Creek)	Jan.	Weekday	95(68)	72(46)					
		Weekend-Hol	58(58)	0(0)					
	Feb.	Weekday	72(48)	0(0)					
		Weekend-Hol	114(82)	0(0)					
	Mar.	Weekday	0(0)	0(0)					
		Weekend-Hol	32(33)	0(0)					
Total			370(134)	72(46)	-80%	231	47	2.57	0.53
Coolridge Creek *New	Jan.	Weekday	na	0(0)					
		Weekend-Hol	na	0(0)					
	Feb.	Weekday	na	0(0)					
		Weekend-Hol	na	0(0)					
	Mar.	Weekday	na	0(0)					
		Weekend-Hol	na	0(0)					
Total			na	0(0)	0%		0		0.00

*New stream opened to winter angling in 2003

Table 39. Continued.

Stream	Month	Day type	Fishing pressure (angler-hours \pm 1 SE)		Percent change	Angler-hrs /mile		Angler-hrs/ mile/day	
			2002	2013		2002	2013	2002	2013
Crooked Creek *New	Jan.	Weekday		0(0)					
		Weekend-Hol		165(162)					
	Feb.	Weekday		0(0)					
		Weekend-Hol		155(328)					
	Mar.	Weekday		0(0)					
		Weekend-Hol		0(0)					
		Total		320(177)	+320%		50		0.56
Daley Creek *New	Jan.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Feb.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Mar.	Weekday		0(0)					
		Weekend-Hol		0(0)					
		Total		0(0)	0%		0		0.00
Diamond Creek *New	Jan.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Feb.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Mar.	Weekday		0(0)					
		Weekend-Hol		0(0)					
		Total		0(0)	0%		0		0.00
Duschee Creek	Jan.	Weekday	177(78)	58(58)					
		Weekend-Hol	162(62)	66(87)					
	Feb.	Weekday	0(0)	70(71)					
		Weekend-Hol	128(128)	66(88)					
	Mar.	Weekday	48(48)	0(0)					
		Weekend-Hol	36(36)	41(88)					
		Total	551(173)	301(149)	-45%	100	57	1.11	0.63
East Beaver Creek	Jan.	Weekday	103(46)	0(0)					
		Weekend-Hol	47(48)	17(37)					
	Feb.	Weekday	29(30)	7(10)					
		Weekend-Hol	47(48)	13(30)					
	Mar.	Weekday	69(48)	6(9)					
		Weekend-Hol	186(96)	13(31)					
		Total	482(138)	57(70)	-88%	201	24	2.23	0.26
Ferguson Creek *New	Jan.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Feb.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Mar.	Weekday		0(0)					
		Weekend-Hol		0(0)					
		Total		0(0)	0%		0		0.00

Table 39. Continued.

Stream	Month	Day type	Fishing pressure (angler-hours \pm 1 SE)		Percent change	Angler-hrs /mile		Angler-hrs/ mile/day	
			2002	2013		2002	2013	2002	2013
Forestville Creek (North Branch Creek)	Jan.	Weekday	35(36)	0(0)		104	0	1.16	0.00
		Weekend-Hol	32(32)	0(0)					
	Feb.	Weekday	0(0)	0(0)					
		Weekend-Hol	0(0)	0(0)					
	Mar.	Weekday	0(0)	0(0)					
		Weekend-Hol	36(36)	0(0)					
Total			104(60)	0(0)	-104%				
Garvin Brook *New	Jan.	Weekday		0(0)			46	0.52	
		Weekend-Hol		0(0)					
	Feb.	Weekday		44(49)					
		Weekend-Hol		23(54)					
	Mar.	Weekday		0(0)					
		Weekend-Hol		0(0)					
Total				67(45)	+67%				
Gribben Creek *New	Jan.	Weekday		0(0)			0	0.00	
		Weekend-Hol		0(0)					
	Feb.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Mar.	Weekday		0(0)					
		Weekend-Hol		0(0)					
Total				0(0)	0%				
Hay Creek	Jan.	Weekday	670(324)	188(91)		725	123	8.06	1.37
		Weekend-Hol	1166(491)	221(161)					
	Feb.	Weekday	287(147)	271(98)					
		Weekend-Hol	480(268)	155(158)					
	Mar.	Weekday	109(70)	259(112)					
		Weekend-Hol	333(190)	160(145)					
Total			3043(693)	1254(396)	-59%				
Hemmingway Creek *New	Jan.	Weekday		0(0)			0	0.00	
		Weekend-Hol		0(0)					
	Feb.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Mar.	Weekday		0(0)					
		Weekend-Hol		0(0)					
Total				0(0)	0%				
Middle Branch Whitewater (including Trout Run in park)	Jan.	Weekday	251(87)	445(155)		345	219	3.83	2.44
		Weekend-Hol	155(156)	296(266)					
	Feb.	Weekday	254(151)	498(190)					
		Weekend-Hol	173(111)	376(175)					
	Mar.	Weekday	385(256)	991(306)					
		Weekend-Hol	229(161)	537(499)					
Total			1447(398)	3143(706)	+117%				

Table 39. Continued.

Stream	Month	Day type	Fishing pressure (angler-hours \pm 1 SE)		Percent change	Angler-hrs /mile		Angler-hrs/ mile/day	
			2002	2013		2002	2013	2002	2013
North Branch Whitewater	Jan.	Weekday	213(107)	165(85)		708	153	7.87	1.70
		Weekend-Hol	475(354)	115(119)					
	Feb.	Weekday	81(53)	243(68)					
		Weekend-Hol	416(211)	242(156)					
	Mar.	Weekday	48(48)	284(154)					
		Weekend-Hol	327(176)	239(190)					
Total			1558(466)	1287(406)	-17%				
Pine Creek *New	Jan.	Weekday		260(173)			73	0.81	
		Weekend-Hol		41(87)					
	Feb.	Weekday		73(73)					
		Weekend-Hol		52(109)					
	Mar.	Weekday		0(0)					
		Weekend-Hol		0(0)					
Total				425(123)	+425%				
Rush Creek *New	Jan.	Weekday		121(123)			104	1.15	
		Weekend-Hol		87(184)					
	Feb.	Weekday		102(103)					
		Weekend-Hol		72(155)					
	Mar.	Weekday		54(55)					
		Weekend-Hol		36(77)					
Total				472(247)	+472%				
South Branch Root River	Jan.	Weekday	428(n/a)	234(154)		345	263	3.82	2.92
		Weekend-Hol	466(n/a)	80(113)					
	Feb.	Weekday	190(n/a)	283(158)					
		Weekend-Hol	445(n/a)	215(235)					
	Mar.	Weekday	255(n/a)	410(147)					
		Weekend-Hol	560(n/a)	268(152)					
Total			2343(n/a)	1489(439)	-36%				
South Branch Whitewater	Jan.	Weekday	283(164)	169(99)		769	324	8.54	3.60
		Weekend-Hol	864(623)	105(117)					
	Feb.	Weekday	202(121)	159(109)					
		Weekend-Hol	544(230)	201(187)					
	Mar.	Weekday	665(247)	394(158)					
		Weekend-Hol	363(207)	206(184)					
Total			2921(766)	1234(354)	-58%				
South Fork Crooked Creek *New	Jan.	Weekday		0(0)			0	0.00	
		Weekend-Hol		0(0)					
	Feb.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Mar.	Weekday		0(0)					
		Weekend-Hol		0(0)					
Total				0(0)	0%				

Table 39. Continued.

Stream	Month	Day type	Fishing pressure (angler-hours \pm 1 SE)		Percent change	Angler-hrs /mile		Angler-hrs/ mile/day	
			2002	2013		2002	2013	2002	2013
South Fork Root River *New	Jan.	Weekday		120(123)					
		Weekend-Hol		69(147)					
	Feb.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Mar.	Weekday		151(154)					
		Weekend-Hol		86(117)					
		Total		426(210)	+426%		58		0.64
Swede Bottom Creek *New	Jan.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Feb.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Mar.	Weekday		0(0)					
		Weekend-Hol		0(0)					
		Total		0(0)	0%		0		0.00
Torkelson Creek *New	Jan.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Feb.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Mar.	Weekday		0(0)					
		Weekend-Hol		0(0)					
		Total		0(0)	0%		0		0.00
Trout Valley Creek *New	Jan.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Feb.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Mar.	Weekday		0(0)					
		Weekend-Hol		0(0)					
		Total		0(0)	0%		0		0.00
West Beaver Creek *New	Jan.	Weekday		87(87)					
		Weekend-Hol		0(0)					
	Feb.	Weekday		73(73)					
		Weekend-Hol		0(0)					
	Mar.	Weekday		0(0)					
		Weekend-Hol		52(108)					
		Total		211(77)	+211%		105		1.16
West Branch Money Creek *New	Jan.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Feb.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Mar.	Weekday		0(0)					
		Weekend-Hol		0(0)					
		Total		0(0)	0%		0		0.00

Table 39. Continued.

Stream	Month	Day type	Fishing pressure (angler-hours \pm 1 SE)		Percent change	Angler-hrs /mile		Angler-hrs/ mile/day	
			2002	2013		2002	2013	2002	2013
Wisel Creek *New	Jan.	Weekday		108(108)					
		Weekend-Hol		0(0)					
	Feb.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Mar.	Weekday		0(0)					
		Weekend-Hol		0(0)					
	Total			108(108)	+108%		27		0.30
Whitewater River (Main Branch)	Jan.	Weekday	71(53)	368(189)					
		Weekend-Hol	231(160)	319(296)					
	Feb.	Weekday	135(86)	386(134)					
		Weekend-Hol	43(44)	382(478)					
	Mar.	Weekday	350(260)	368(121)					
		Weekend-Hol	97(63)	171(190)					
	Total			928(331)	1994(637)	+115%	135	150	1.50
Grand Total			15,941 (1476)	13,603 (53)	-15%	329	103	3.65	1.15

Table 40. Estimated fishing pressure (angler hours \pm 1 SE) by month and day type strata for each of two areas in southeast Minnesota during a winter creel survey (January 1 to March 31) in 2013. Pressure estimate made following Method 2 calculations (see text and Pollock et al. 1994 for more information). See Figure 1 for a map showing exact sampling areas and streams.

Month	Day type	Pressure
<u>Area A/B</u>		
January	Weekends and Holidays	626 (\pm 229)
	Weekdays	968 (\pm 351)
February	Weekends and Holidays	750 (\pm 298)
	Weekdays	561 (\pm 281)
March	Weekends and Holidays	692 (\pm 198)
	Weekdays	795 (\pm 273)
Subtotals A/B	Weekends and Holidays	2,067 (\pm 409)
	Weekdays	2,324 (\pm 503)
Subtotal A/B		4,391 (\pm 649)
<u>Area C</u>		
January	Weekends and Holidays	856 (\pm 315)
	Weekdays	1,146 (\pm 361)
February	Weekends and Holidays	1,095 (\pm 282)
	Weekdays	1,284 (\pm 331)
March	Weekends and Holidays	1,111 (\pm 390)
	Weekdays	2,428 (\pm 645)
Subtotals C	Weekends and Holidays	3,062 (\pm 554)
	Weekdays	4,858 (\pm 1,124)
Subtotal C		7,920 (\pm 1,253)
Grand total		12,311 (\pm 1,411)

Table 41. Average high, average low, average and departure from normal temperature for winter 2002 and winter 2013.

Month	Average high temperature (°F)		Average low temperature (°F)		Average temperature (°F)		Departure from normal (°F)	
	2002	2013	2002	2013	2002	2013	2002	2013
January	31.6	26.3	16.9	8.8	24.3	17.5	+12.5	+1.8
February	34.1	26.6	17.8	12.3	25.9	19.4	+7.5	-0.9
March	33.4	31.7	17.5	16.0	25.5	23.8	-5.1	-8.6

Table 42. Total precipitation, departure from normal precipitation, and snowfall for winter 2002 and winter 2013.

Month	Total precipitation (inches)		Departure from normal precipitation (inches)		Snowfall (inches)	
	2002	2013	2002	2013	2002	2013
January	0.65	0.78	-0.29	-0.08	10.0	1.9
February	1.67	1.22	+0.93	+0.39	5.5	15.4
March	1.24	2.85	-0.64	+0.97	7.1	23.5
Overall					22.6	40.8

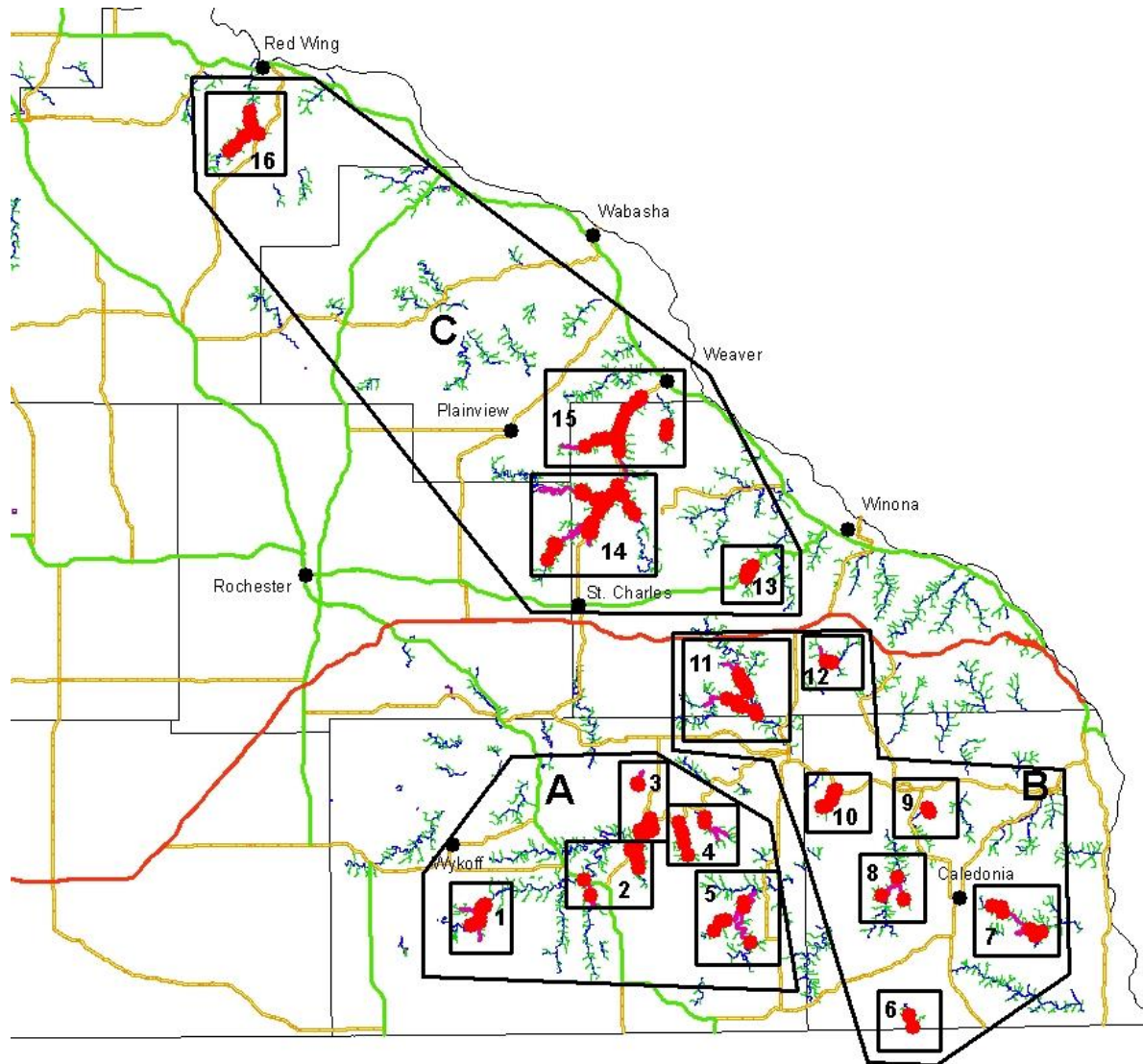


Figure 1. Map of stream areas (A, B, and C) surveyed in the winter trout stream creel January 1 to March 31, 2013 in southeast Minnesota. The number within each block of streams facilitated survey routes for creel clerks. 1) Forestville Creek, Canfield Creek, S. Br. Root River; 2) Duschee Creek, Camp Creek; 3) S. Br. Root River, Torkelson Creek; 4) Gribben Creek, Diamond Creek; 5) Wisel Creek, S. Fork Root River; 6) Bee Creek; 7) Crooked Creek, S. Fork Crooked Creek; 8) East Beaver Creek, West Beaver Creek; 9) Swede Bottom Creek; 10) Daley Creek; 11) Rush Creek, Pine Creek, Hemmingway Creek, Coolridge Creek; 12) W. Br. Money Creek; 13) Garvin Brook; 14) M. Br. Whitewater River, S. Br. Whitewater River, N. Br. Whitewater River; 15) Main Whitewater River, Beaver Creek (Whitewater), Trout Valley Creek; 16) Hay Creek.

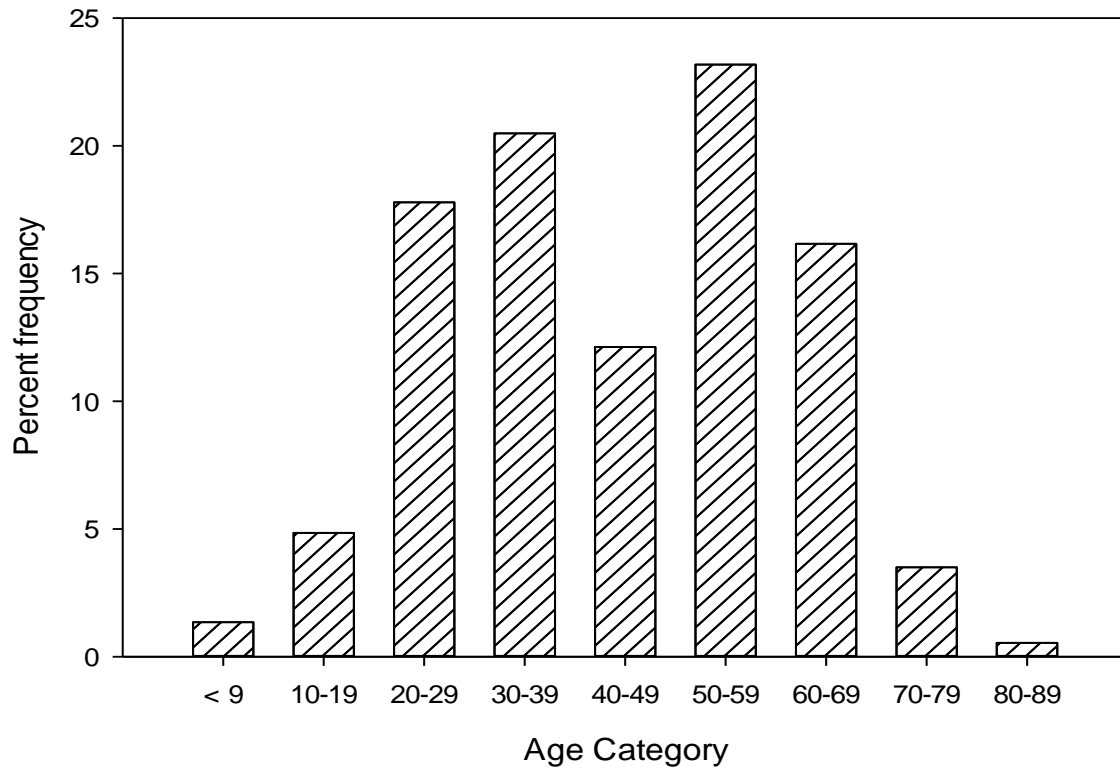


Figure 2. Age distribution of anglers fishing southeast Minnesota during the winter trout season in southeast Minnesota, January 1 to March 31, 2013.

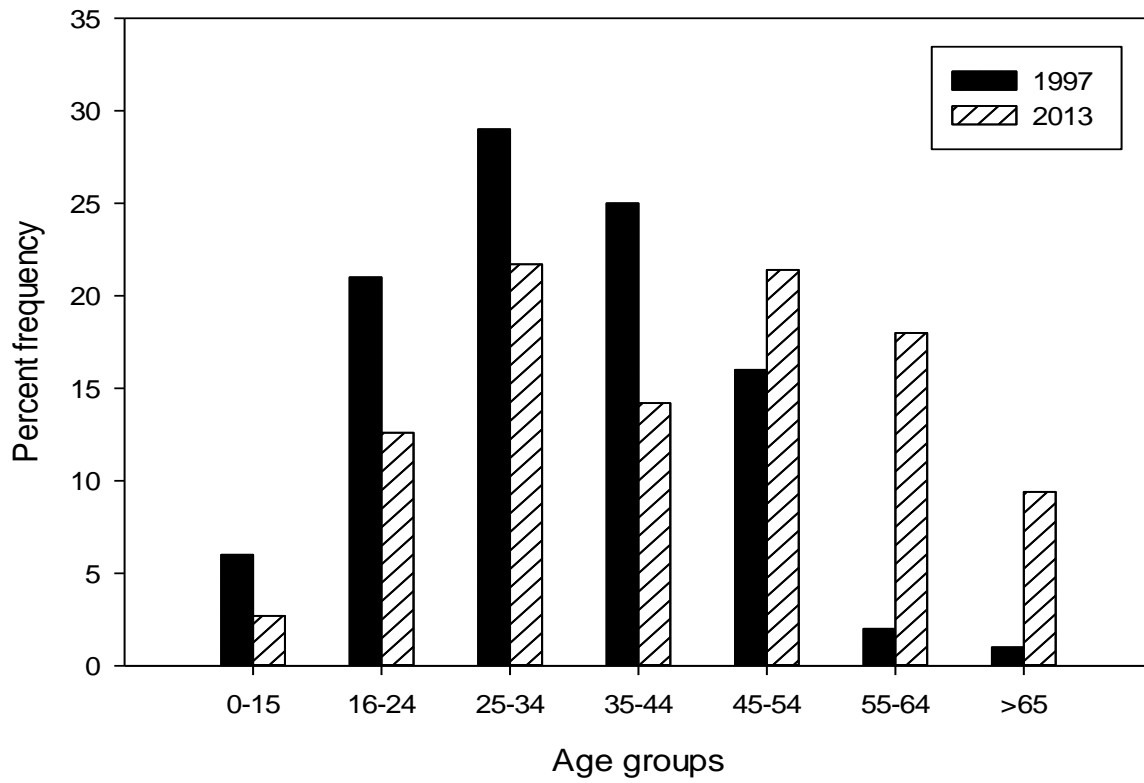


Figure 3. Age distribution of anglers fishing the winter trout season in southeast Minnesota, January 1 to March 31, in 1997 (Hendrickson 1998) and 2013.

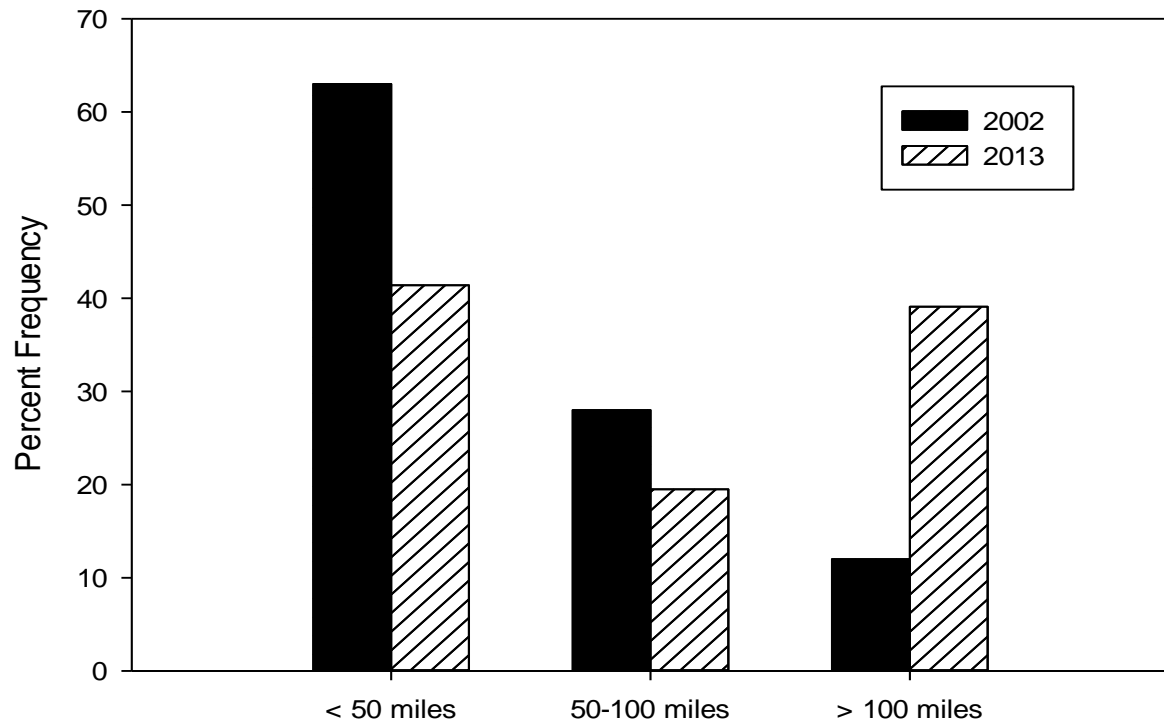


Figure 4. Distances anglers drove to fish southeast Minnesota stream during the winter trout season, January 1 to March 31, 2002 (Nelson 2002) and 2013.

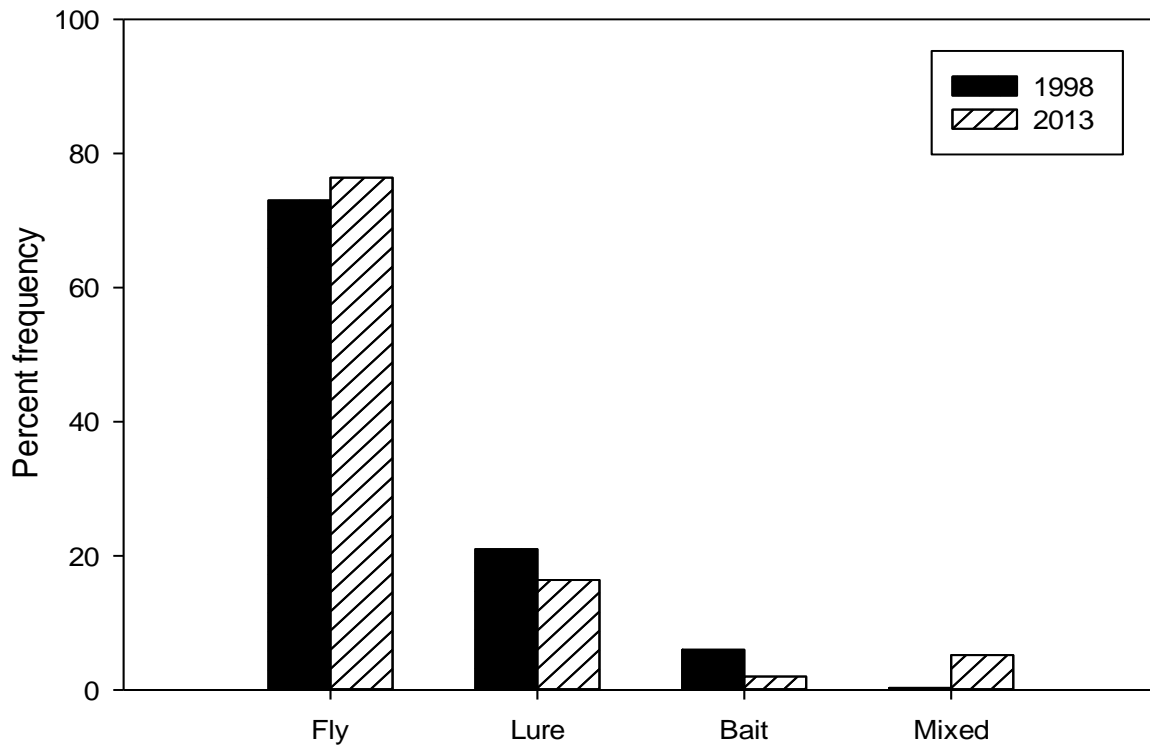


Figure 5. Gear use distribution of anglers fishing the winter trout season in southeast Minnesota, January 1 to March 31 in 1997 and 2013 (Data from Hendrickson 1998).

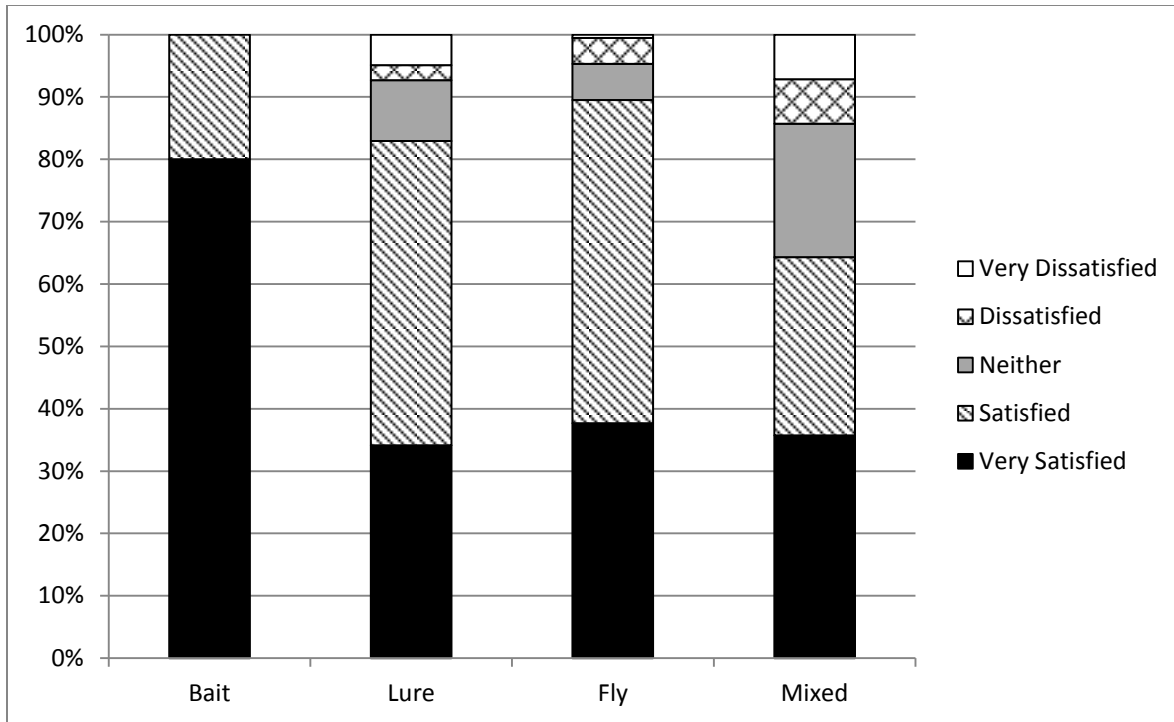


Figure 6. Overall fishing experience satisfaction taken from surveys of anglers fishing during the winter trout season in southeast Minnesota, January 1 to March 31, 2013.

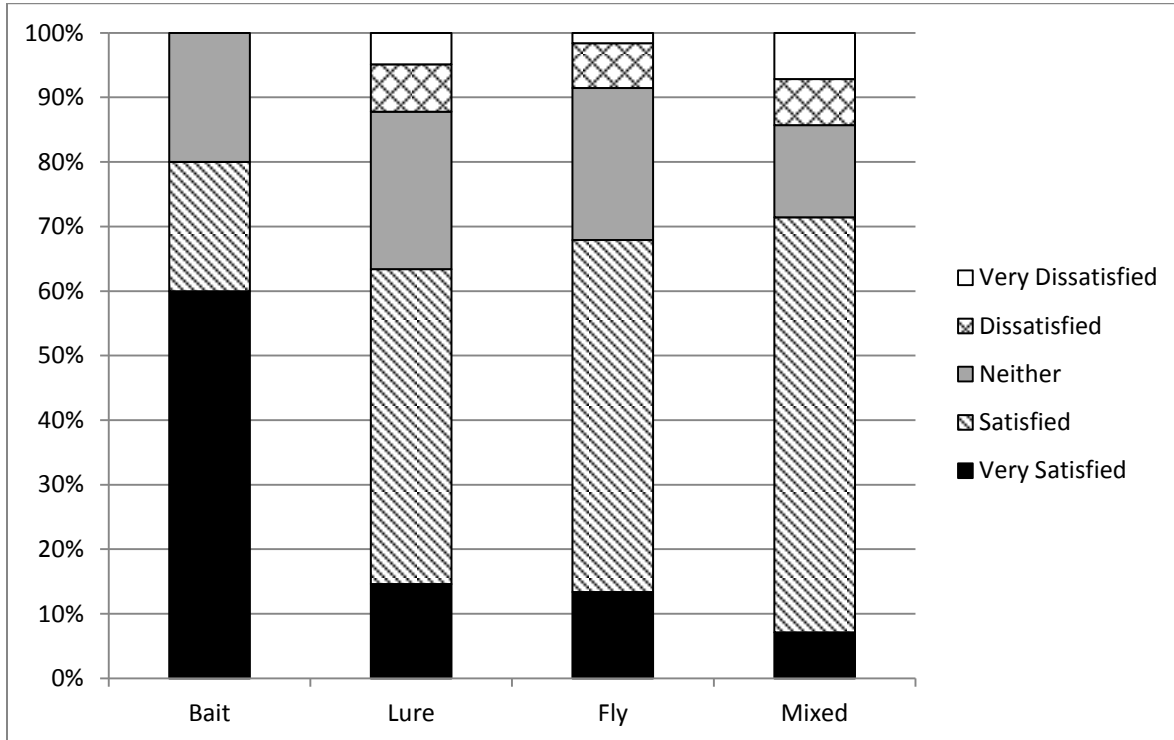


Figure 7. Satisfaction with the size of trout caught taken from surveys of anglers fishing during the winter trout season in southeast Minnesota, January 1 to March 31, 2013.

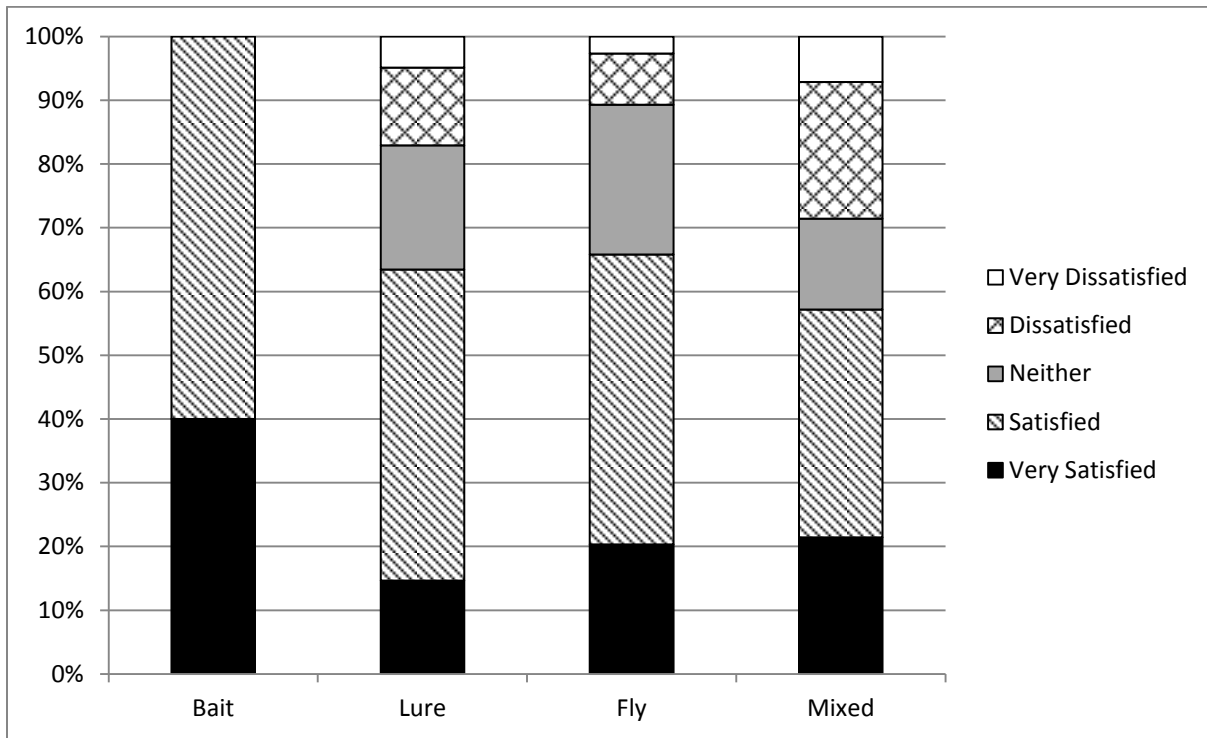


Figure 8. Satisfaction with the numbers of trout caught taken from surveys of anglers fishing during the winter trout season in southeast Minnesota, January 1 to March 31, 2013.

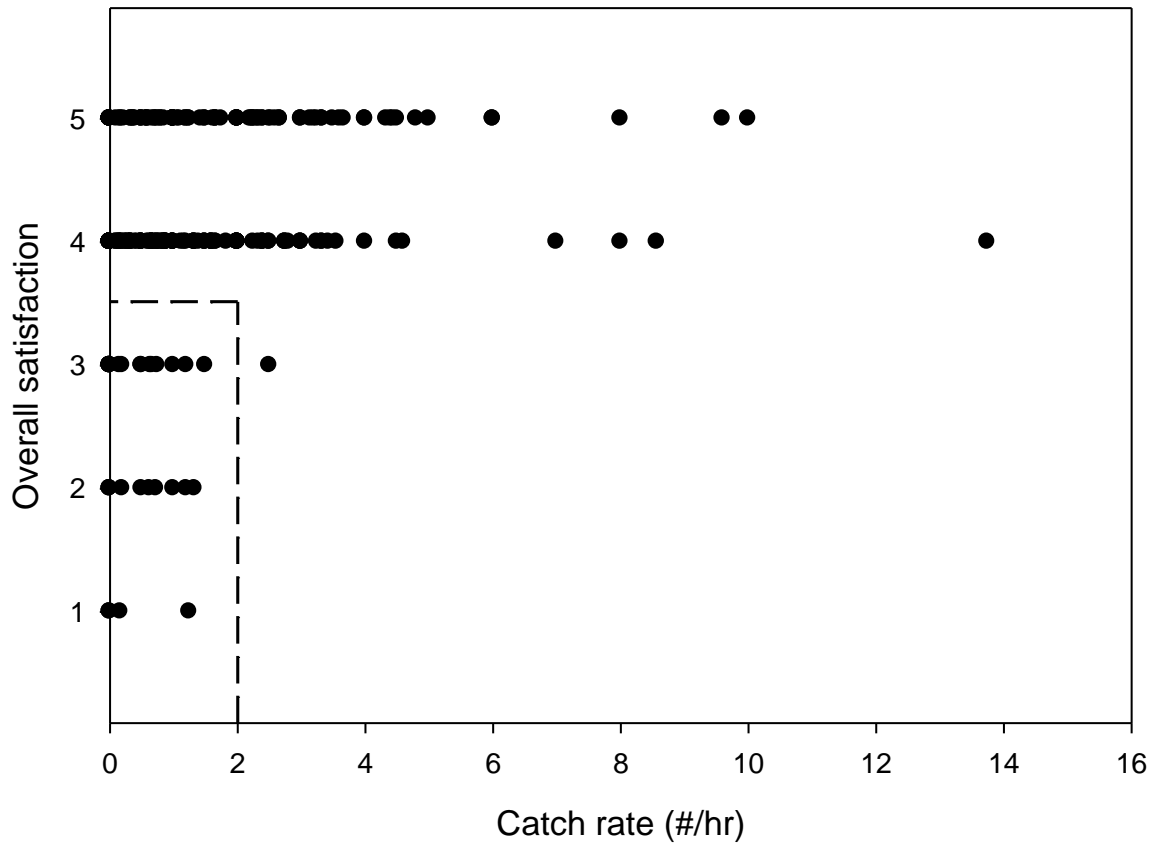


Figure 9. Relationship between satisfaction of the overall angling experience (1=very dissatisfied, 2=dissatisfied, 3=neither, 4=satisfied, and 5=very satisfied) and catch rates of trout for anglers fishing the winter trout season in southeast Minnesota, January 1 to March 31, 2013. Reference line at 2 trout/hour on the x-axis suggests a point at which anglers fishing for trout are never dissatisfied with their experience if they catch more than 2 trout/hr.

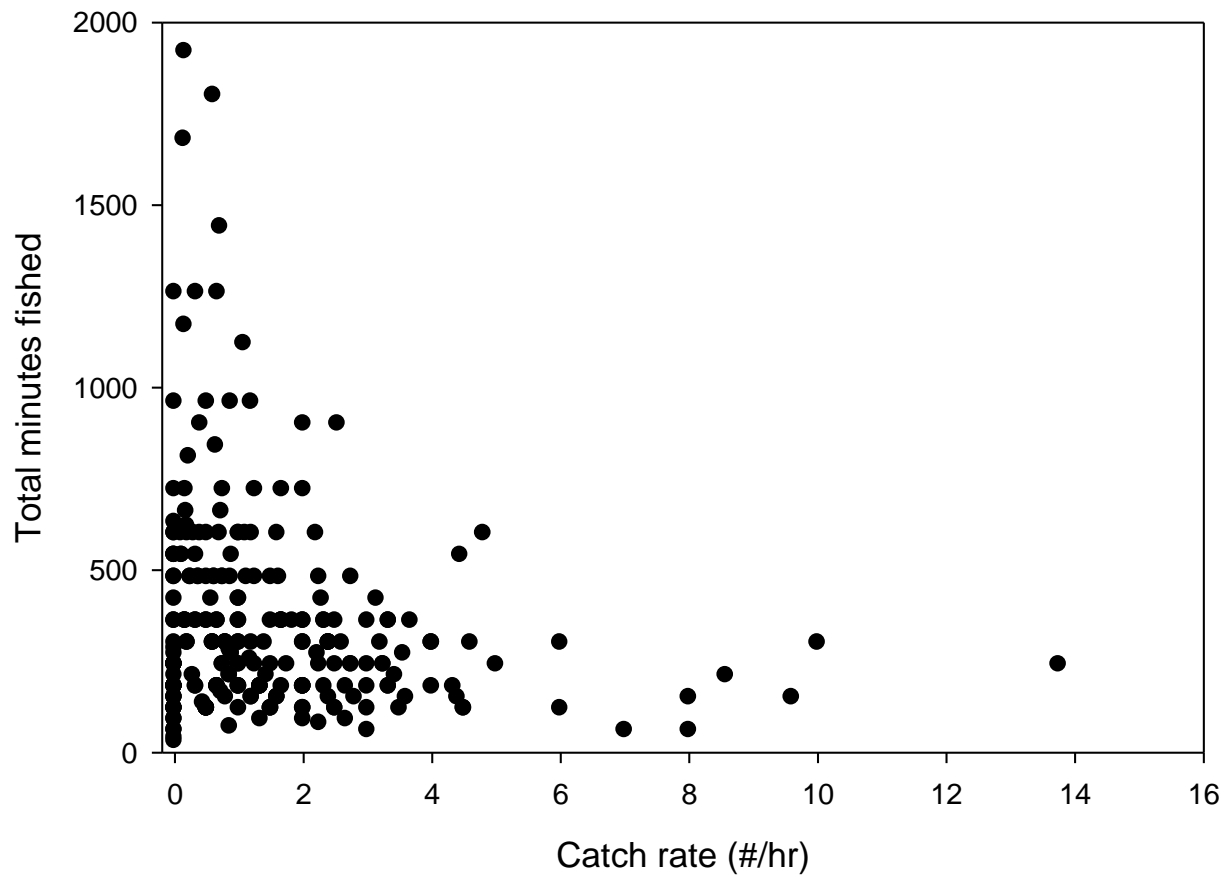


Figure 10. Relationship between the total minutes fished by each angling party (i.e., trip length x total number of anglers in the party) and their catch rate for anglers fishing the winter trout season in southeast Minnesota, January 1 to March 31, 2013.

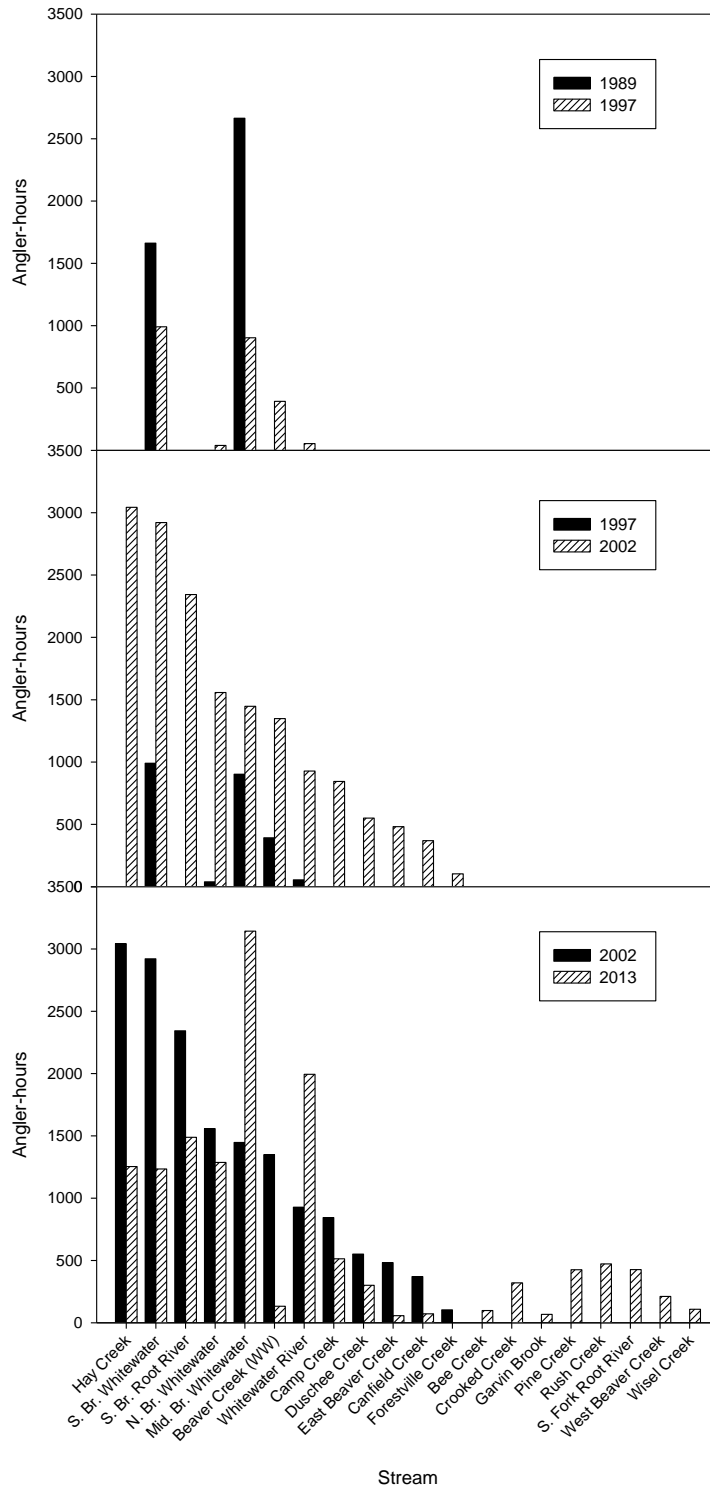


Figure 11. Temporal changes in estimates of angler pressure (angler-hours) for streams in the winter trout fishery (January 1 – March 31) in southeast Minnesota. Total pressure was estimated to be 4,328 hours in 1989 (two streams = 4.8 mi); 2,382 hours in 1997 (six streams = 27.6 mi); 15,941 hours in 2002 (12 streams = 48.4 mi); and 13,603 hours in 2013 (32 streams = 131.5 mi; only streams with observed pressure in 2013 are shown).

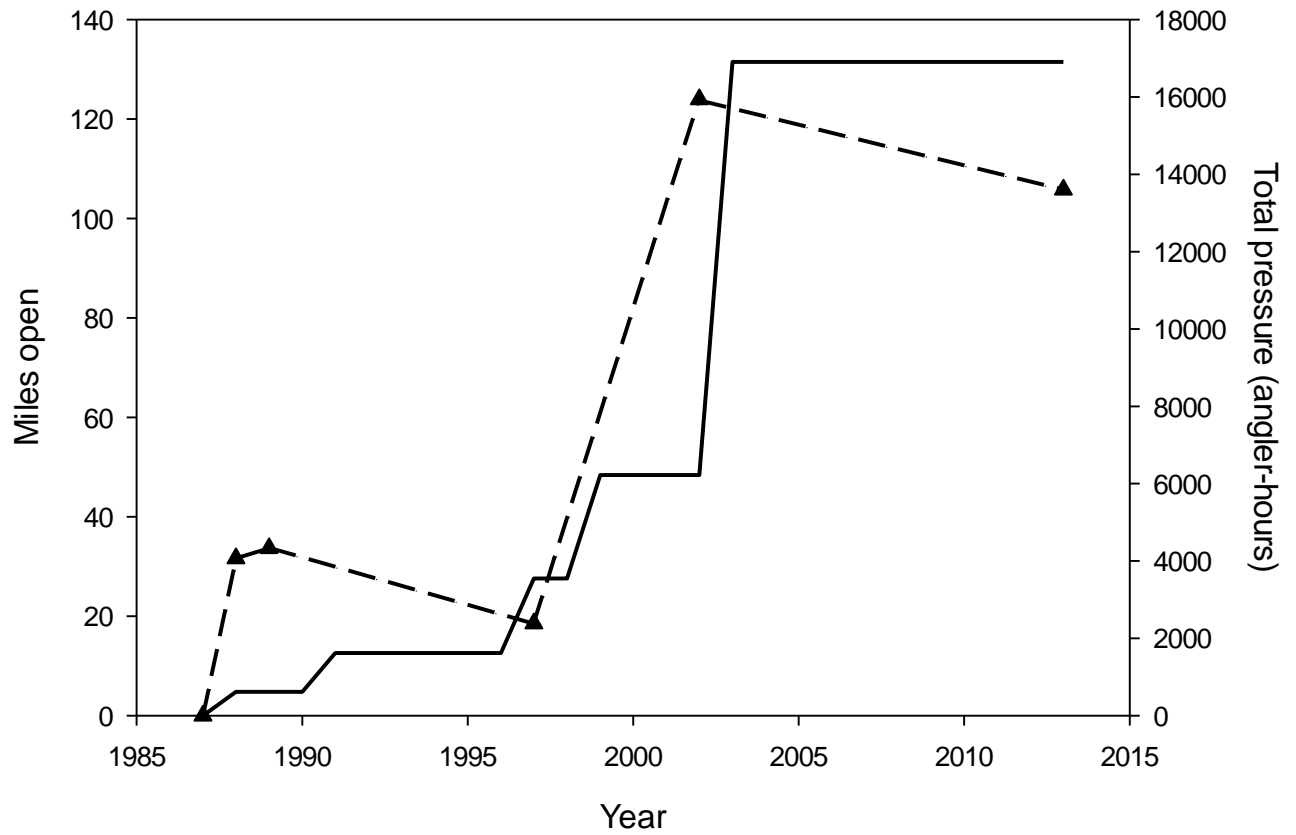


Figure 12. Temporal patterns in the number of stream miles open to winter angling (solid line; January 1 – March 31) and total angling pressure (dashed line) during winter in southeast Minnesota.

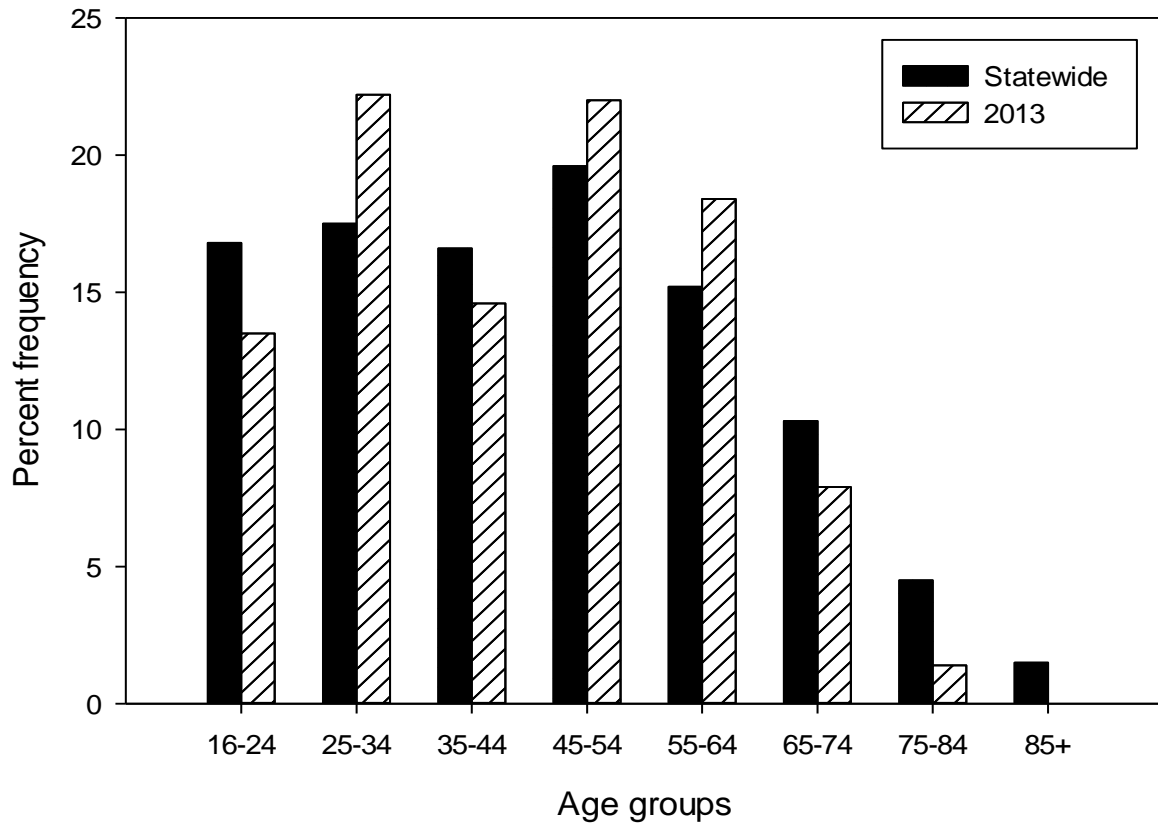


Figure 13. Age distribution of men aged 16 years and older statewide in Minnesota in 2012-2013 and for anglers fishing the winter trout season, January 1 to March 31, in 2013. Statewide data for Minnesota from Suburbanstats (2014).

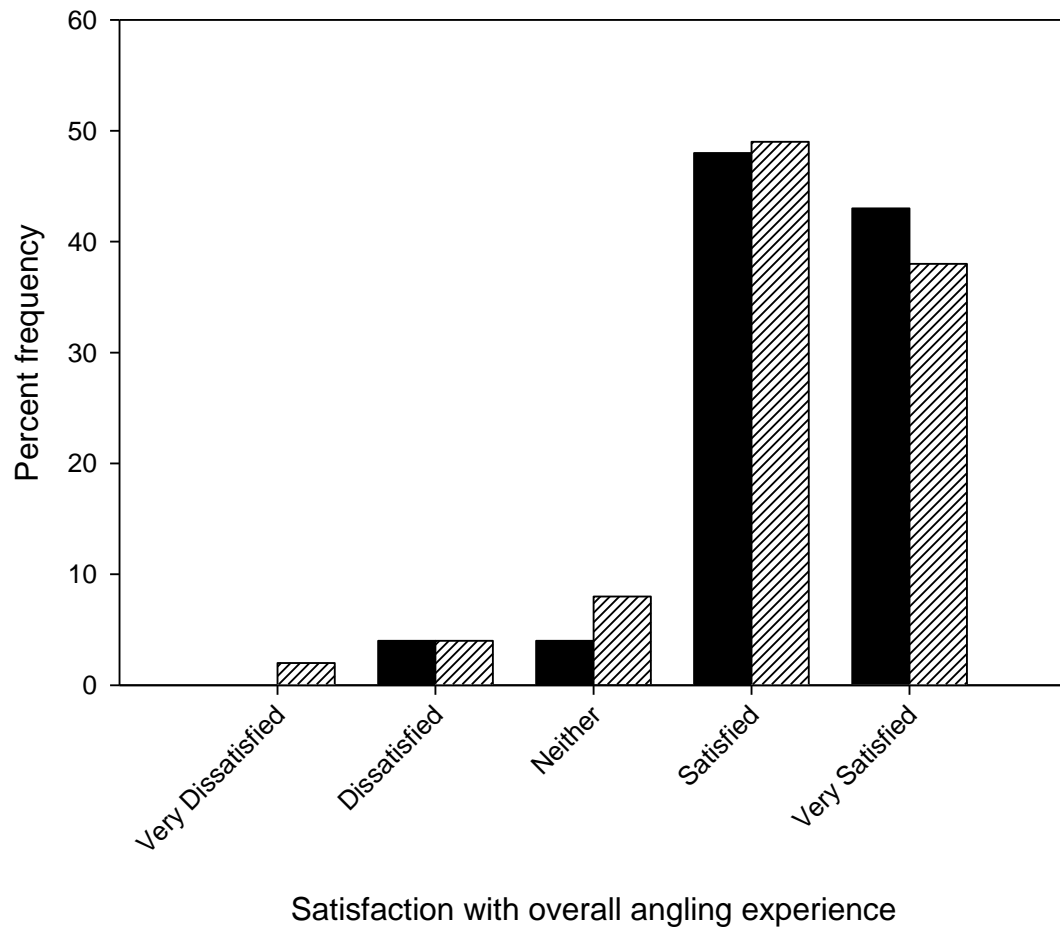


Figure 14. Percent frequency distribution of angler responses to the question “How satisfied were you with the overall fishing experience today” in a winter creel survey (January 1 – March 31) in 2013 for streams grouped as having been open to winter angling since 1999 (i.e., older streams = cross-hatched bars) versus streams opened after 2002 (i.e., new streams = solid black bars).

Appendix A. Trout streams open for winter angling, area, clerk and specific spots surveyed in southeast Minnesota during the winter creel survey from January 1 to March 31, 2013.

Stream	Area	Clerk	Spot #	UTM location
Camp Creek	A	1		
1. Maust's pasture access			1	576,192 – 4,833,671
2. Mouth access			2	575,444 – 4,835,633
Canfield Creek	A	1		
1. Park parking lot			1	562,649 – 4,830,387
Diamond Creek	A	1		
1. Minimum maintenance road access			1	590,230 – 4,842,466
2. Parking lot access			2	590,136 – 4,843,096
Duschee Creek	A	1		
1. Ruen's access			1	582,081 – 4,836,993
2. Brekke's access			2	581,969 – 4,837,985
3. Kiel's access			3	581,851 – 4,838,255
4. Road access			4	581,427 – 4,838,999
5. Office access			5	581,055 – 4,839,079
6. Grosbeak Road bridge access			6	581,507 – 4,839,402
7. Hwy 16 access			7	581,833 – 4,839,699
Forestville Creek	A	1		
1. Park horse crossing access			1	562,829 – 4,831,858
Gribben Creek	A	1		
1. Spring source access			1	588,133 – 4,838,523
2. Upstream bridge access			2	587,603 – 4,839,955
3. Downstream bridge access			3	587,380 – 4,840,987
4. Camping area access			4	587,392 – 4,841,449
5. Hwy 16 access			5	587,089 – 4,842,579
South Branch Root River	A	1		
1. Vreeman's			1	561,638 – 4,830,159
2. Loop B Park			2	562,781 – 7,830,927
3. Forestville Creek mouth			3	562,861 – 4,832,096
4. Parking Lot			4	563,062 – 4,832,260
5. Historic Forestville			5	563,279 – 4,832,324
6. Historic Forestville			6	563,331 – 4,832,493
7. Lanesboro Dam			7	582,338 – 4,840,958
8. Hwy 8 Bridge			8	582,288 – 4,841,410
9. Lanesboro Fire Station			9	582,304 – 4,841,503
10. BBQ			10	582,267 – 4,841,640
11. Hwy 250 Bridge			11	582,837 – 4,841,674
12. Sales Barn			12	582,986 – 4,841,522
13. Hwy 16			13	583,355 – 4,841,386
14. Mini-Madison			14	583,792 – 4,841,773
15. Sand Beach			15	583,640 – 4,842,269
16. Hwy 250 near confluence			16	583,482 – 4,843,050

Appendix A (continued).

Stream	Area	Clerk	Spot #	UTM location
South Fork Root River	A	1		
1. WMA			1	591,255 – 4,829,343
2. Bonfe's			2	592,124 – 4,830,383
3. LTM Bridge			3	592,778 – 4,830,562
4. Million Dollar			4	594,847 – 4,832,269
5. Wunderlich's			5	594,867 – 4,832,802
Torkelson Creek	A	1		
1. Mouth access			1	582,064 – 4,847,063
2. Bridge access			2	581,886 – 4,847,292
Wisel Creek	A	1		
1. Chickentown Bridge			1	595,778 – 4,827,891
Bee Creek	B	1		
1. Stenhoff's access			1	615,085 – 4,819,075
2. Border access			2	615,603 – 4,817,594
Coolridge Creek	B	1		
1. Same as Pine Creek #6			6	592,870 – 4,857,486
Crooked Creek	B	1		
1. Quarry access			1	625,223 – 4,832,325
2. R1 Trib access			2	626,313 – 4,832,299
3. Hwy 249 access			3	626,498 – 4,831,646
4. Road access			4	629,892 – 4,829,506
5. Road access			5	630,553 – 4,828,765
6. Road access			6	631,275 – 4,829,136
Daley Creek	B	1		
1. Upstream bridge access			1	604,419 – 4,844,480
2. Seive's access			2	604,986 – 4,844,686
3. Bridge access			3	605,482 – 4,845,254
4. Bridge access			4	605,605 – 4,845,429
5. Road access			5	605,835 – 4,845,897
6. Road access			6	605,978 – 4,846,472
7. Hwy 16 bridge access			7	606,276 – 4,846,544
East Beaver Creek	B	1		
1. Park parking lot access			1	614,462 – 4,833,136
Ferguson Creek	B	1		
1. Same as Rush Creek #1 (Wunderlich's)			1	594,243 – 4,860,612
Hemmingway Creek – same as Pine Creek #6	B	1		
1. Same as Pine Creek #6			6	592,870 – 4,857,486

Appendix A (continued).

Stream	Area	Clerk	Spot #	UTM location
Pine Creek	B	1		
1. Pine Creek mouth			1	596,493 – 4,855,751
2. Brekke's			2	596,114 – 4,856,248
3. Kopperud's			3	594,800 – 4,856,524
4. Jacobson's			4	594,151 – 4,856,783
5. Jacobson's			5	594,162 – 4,857,275
6. Anderson's			6	592,870 – 4,857,486
Rush Creek	B	1		
1. Wunderlich's access			1	594,243 – 4,860,612
2. Ahrensfeld Creek access			2	594,649 – 4,859,892
3. Road access			3	594,897 – 4,859,568
4. Upstream bridge access			4	595,227 – 4,859,163
5. Downstream bridge access			5	595,379 – 4,858,324
South Fork Crooked Creek – same as Crooked #4	B	1		
1. Same as Crooked Creek #4			4	629,892 – 4,829,506
Swede Bottom Creek	B	1		
1. Trib easement access			1	617,575 – 4,843,767
2. Bridge access			2	617,330 – 4,844,267
West Beaver Creek	B	1		
1. Konkel's walk-in			1	611,781 – 4,833,718
2. Minimum Maintenance Road			2	613,605 – 4,835,807
West Branch Money Creek	B	1		
1. O'Neil's			1	604,971 – 4,862,186
2. O'Neil's			2	605,473 – 4,861,999
3. O'Neil's			3	605,740 – 4,862,026
Beaver Creek (WW)	C	2		575,548 – 4,888,462
1. WMA turn around parking lot			1	577,010 – 4,889,196
2. WMA parking lot			2	577,976 – 4,889,288
3. Hwy 30 access			3	578,809 – 4,889,355
4. Hwy 30 bridge access			4	579,318 – 4,889,652
Garvin Brook	C	2		
1. Upstream end of Farmer's Community Park			1	595,195 – 4,872,343
2. Downstream end of Farmer's Community Park			2	595,187 – 4,872,675
3. Bridge access			3	595,485 – 4,873,111
4. Railroad bridge			4	595,466 – 4,873,325
5. State Forest parking lot			5	596,063 – 4,873,801

Appendix A (continued).

Stream	Area	Clerk	Spot #	UTM location
Hay Creek	C	2		
1. Upstream regulations			1	532,049 – 4,924,416
2. Twin Cities TU Coop Habitat Improvement			2	532,811 – 4,924,996
3. Rebuffoni's			3	533,756 – 4,926,194
4. State Trail			4	534,034 – 4,926,107
5. Hay Creek			5	535,740 – 4,926,552
6. Stephani's			6	534,971 – 4,927,282
7. State Forest			7	534,828 – 4,927,615
8. State Forest Bridge			8	534,709 – 4,927,806
9. State Forest			9	534,534 – 4,928,052
10. State Forest, Downstream			10	534,550 – 4,929,163
Middle Branch Whitewater River	C	2		
1. County 9			1	570,913 – 4,874,581
2. Round Barn			2	571,808 – 4,875,897
3. Quincy Bridge			3	571,722 – 4,876,404
4. Quincy Bridge			4	572,132 – 4,876,285
5. Group Camp Park			5	575,801 – 4,878,506
6. Hwy 74 Bridge			6	575,970 – 4,877,978
7. Trout Run parking			7	576,376 – 4,877,930
8. Park HQ			8	576,386 – 4,878,606
9. Park HQ			9	576,270 – 4,878,912
10. Park HQ			10	576,508 – 4,879,176
11. Park HQ			11	577,120 – 4,880,316
12. Lazy D			12	577,853 – 4,881,302
North Branch Whitewater River	C	2		
1. WMA parking			1	575,042 – 4,882,980
2. Fairwater Upstream			2	575,161 – 4,882,702
3. Fairwater Downstream			3	575,622 – 4,882,599
4. LTM			4	576,836 – 4,881,987
5. Bridge			5	577,638 – 4,881,964
6. Hwy 74 Bridge			6	578,241 – 4,881,821
South Branch Whitewater River	C	2		
1. Krodemacher's access			1	581,710 – 4,880,209
2. Snowmobile Bridge access			2	581,067 – 4,880,916
3. Bridge access			3	580,178 – 4,882,368
Trout Run Creek (WW)	C	2		
1. Same as Middle Branch Whitewater #7			7	576,376 – 4,877,930
Trout Valley Creek	C	2		
1. Upstream bridge access			1	585,489 – 4,889,895
2. Downstream bridge access			2	585,583 – 4,891,039

Appendix A (continued).

Stream	Area	Clerk	Spot #	UTM location
Whitewater River	C	2		
1. Elba			1	578,936 – 4,882,541
2. Parking lot			2	579,526 – 4,883,684
3. Parking lot			3	579,755 – 4,887,736
4. Canoe launch			4	579,571 – 4,888,853
5. Hwy 30 Bridge			5	579,577 – 4,889,082
6. Parking lot (Downstream Beaver)			6	579,596 – 4,890,047
7. Parking lot			7	579,888 – 4,890,847
8. Parking lot			8	580,136 – 4,891,800
9. Parking lot			9	580,688 – 4,892,841
10. Parking lot			10	581,819 – 4,893,863
11. Parking lot			11	582,422 – 4,894,391

Appendix B – Example of a daily activity report used to document creel clerk activities (letter surveys distributed, time schedule, etc.) during the winter trout stream creel in southeast Minnesota, January 1 to March 31, 2013.

Daily Activity Report Date: _____ Day: _____ Clerk: _____

Area B – Tail End

Stream	Time	Arrival Time	Surveys left	Air temp	Weather	Notes
Coolridge Creek	10:30 am					
Hemmingway Creek	10:35 pm					
Pine Creek	10:40 am					
Spot #6 (Hemmingway, Coolridge)						
Spot #5						
Spot #4						
Spot #3						
Spot #2						
Spot #1						
Ferguson Creek	11:15 am					
Rush Creek	11:20 am					
Spot #1 (Ferguson)						
Spot #2						
Spot #3						
Spot #4						
Spot #5						
-Break-	11:45 – 12:00 pm					
West Branch Money Creek	12:15 pm					
Spot #3						
Spot #2						
Spot #1						
Daley Creek	12:45 pm					
Spot #7						
Spot #6						
Spot #5						
Spot #4						
Spot #3						
Spot #2						
Spot #1						
-Lunch-	1:20 – 1:50 pm					
Swede Bottom Creek	1:55 pm					
Spot #2						
Spot #1						
West Beaver Creek	2:30 pm					
Spot #2						
Spot #1						
East Beaver Creek	2:55 pm					
Spot #1						
-Break-	3:00 – 3:15 pm					
South Fork Crooked Creek	3:20 pm					
Crooked Creek						
Spot #6						
Spot #5						
Spot #4 (SFCC)						
Spot #3						
Spot #2						
Spot #1						
Bee Creek	4:15 pm					
Spot #2						
Spot #1						

Appendix C. Letter survey distributed to possible anglers by clerks during the winter trout stream creel in southeast Minnesota, January 1 to March 31, 2013.

PLEASE COMPLETE AND MAIL EVEN IF YOU WERE NOT FISHING.

Thank you for participating in the Minnesota Department of Natural Resources Fisheries winter survey. We are conducting this survey to better understand trout angling in southeast Minnesota. Please answer the following questions and mail this survey in the envelope provided. If you were not fishing, only answer 1 and 2. Also, please complete this survey even if you have received another on a different date or location.

- Q1. Were you fishing for trout when we left this survey? YES NO
- Q2. How many anglers total traveled in this vehicle to the stream today? _____
- Q3. What is your (and passengers) home zip code(s)? _____
- Q4. a. What is your (and passengers) age(s)? _____
 b. Gender (and passengers)? Male _____ Female _____
- Q5. How long was your fishing trip today (time you left vehicle until you arrived back at vehicle)? _____
- Q6. Why did you decide to fish here today? (Choose only one)
 a. Favorite winter stream b. Live close by c. Easy access d. Numbers of fish e. Size of fish
- Q7. What angling gear were you using on this trip (Circle all that apply)
 a. Bait fishing b. Lure fishing c. Fly fishing

How satisfied or dissatisfied were you with...

- Q8. The overall fishing experience you had today?
 Very dissatisfied Dissatisfied Neither Satisfied Very satisfied
- Q9. The size of the trout you caught today?
 Very dissatisfied Dissatisfied Neither Satisfied Very satisfied
- Q10. The number of trout you caught today?
 Very dissatisfied Dissatisfied Neither Satisfied Very satisfied

If you caught any fish today please enter their lengths below?

	Species	Fish 1	2	3	4	5	6	7	8	9	10	11	12	Total
Trout	Brown													
	Brook													
	Rainbow													
Other														

For more information or questions regarding this survey, please contact the Lanesboro Area Fisheries Office at (507) 467-2442. www.dnr.state.mn.us/areas/fisheries/lanesboro/index.html

Office use only:

Area _____ Month _____ Day _____ Year _____ Time _____
 Stream/Spot # _____ Day – M Tu W Th F Sa Su Holiday – Y N

Appendix D. State Park letter survey distributed at the front desk of three state parks (Whitewater State Park, Forestville State Park, Beaver Creek Valley State Park) in southeast Minnesota for the winter trout stream creel, January 1 to March 31, 2013.

Thank you for participating in the Minnesota Department of Natural Resources Fisheries survey. We are conducting this survey to better understand winter trout angling in southeast Minnesota. Please answer the following questions and mail this survey in the envelope provided.

Q0: Date you fished: _____

The following questions pertain to the above date:

Q1: What stream(s) did you fish in the park today? _____

Q2. How many anglers total traveled in this vehicle with you to the stream today? _____

Q3. What is your (and passengers) home zip code(s)? _____

Q4a. What is your (and passengers) age(s)? _____ Q4b. Gender (and passengers)? M _____ F _____

Q5. How long was your fishing trip today (time you left vehicle until you arrived back at vehicle)? _____

Q6. Why did you decide to fish here today? (Choose only one)
 a. Favorite winter stream b. Live close by c. Easy access d. Numbers of fish e. Size of fish

Q7. What angling gear were you using on this trip? (Circle all that apply)
 a. Bait fishing b. Lure fishing c. Fly fishing

How satisfied or dissatisfied were you with...:

Q8. The overall fishing experience you had today?
 Very dissatisfied Dissatisfied Neither Satisfied Very satisfied

Q9. The size of the trout you caught today?
 Very dissatisfied Dissatisfied Neither Satisfied Very satisfied

Q10. The number of trout you caught today?
 Very dissatisfied Dissatisfied Neither Satisfied Very satisfied

If you caught any fish today, enter their lengths below?

Trout	Species	Length 1	2	3	4	5	6	7	8	9	10	11	12	Total
		Brown												
	Brook													
	Rainbow													
Other														

For more information or questions regarding this survey, please contact the Lanesboro Area Fisheries Office at (507) 467-2442. www.dnr.state.mn.us/areas/fisheries/lanesboro/index.html

Office use only:
 Area _____ Month _____ Day _____ Year _____ Time _____
 Stream/Spot # _____ Day – M Tu W Th F Sa Su _____ Holiday – Y N

Appendix E – Cover letter accompanying park letter surveys distributed at the front desk of three state parks (Whitewater State Park, Forestville State Park, Beaver Creek Valley State Park) in southeast Minnesota for the winter trout stream creel, January 1 to March 31, 2013.

Winter trout stream angler,

Please find attached a Minnesota Department of Natural Resources Fisheries survey. We are conducting this survey to better understand winter trout angling in southeast Minnesota.

When your angling trip is complete for the day we ask that you fill out the survey and return it to us in the postage paid envelope.

Know that there are several creel clerks also helping us with this survey in southeast Minnesota. They will be placing a similar survey letter on your vehicle if it is encountered parked on their route. Please complete the one you collected from the state park ONLY if you did not receive one on your vehicle today. The one on your vehicle should take precedence over the one collected at the state park. There is no need to fill both out.

If you have any questions you are more than welcome to call the DNR Lanesboro Area Fisheries Office at 507-467-2442. We will also eventually have additional information at... www.dnr.state.mn.us/areas/fisheries/lanesboro/index.html.

Thank you,

Lanesboro Area Fisheries Office

Appendix F – Comments from anglers written on surveys fishing the winter trout season in southeast Minnesota, January 1 to March 31, 2013

Date	Stream	Comment
Jan - 3	M. Br. Whitewater	It was 14F no wind and drop dead gorgeous. Thank you.
Jan - 4	Forestville Creek	Didn't catch any most of stream was frozen. Truly appreciate the opportunity to try!
Jan - 4	M. Br. Whitewater	We had a great day!
Jan - 5	Whitewater	I enjoy the winter fishing in...don't fish this spot in summer due to crowding and bait fishermen. Be nice to open this season in fall. Stretches out the fishing so less competition. Thanks
Jan - 6	S. Br. Root River	Will you please open more winter trout water
Jan - 6	S. Br. Whitewater	A great day!
Jan - 8	M. Br. Whitewater	Would like to see bass and other species as well
Jan - 8	Hay Creek	Glad you're doing this survey. Hay Creek is a challenge but easy drive from the Twin Cities. Would be happy to catch more and bigger fish but any trout in the winter an hour and a half from home makes for a good day.
Jan - 9	Whitewater	Total 16 brown trout between 7-10 inches
Jan - 9	M. Br. Whitewater	My friend caught 14 more fish
Jan - 11	Hay Creek	Sorry I didn't get this in sooner.
Jan - 11	S. Br. Whitewater	I had 2 other nice rainbows on for a good bit of the time but I did not land them.
Jan - 17	Whitewater River	Excellent day – lots of follows – fish were slow to strike – lots of fun however
Jan - 18	N. Br. Whitewater	Unusually colored brown, 14" rainbow lateral line coloring. Gorgeous metallic pink gill plate – hybrid?
Jan - 18	S. Br. Whitewater	I love having the winter season. I hope the proposed "extra" season from Sept 30 through Dec 31 of 2013 is approved. Thank you for all the work you do.
Jan - 19	Hay Creek	Other than the cold it was a good day
Jan - 25	M. Br. Whitewater	Also hooked but did not land 7 other fish. Two appeared to be in the 12-14 inch range. Cold but beautiful day.
Feb - 3	N. Br. Whitewater	Great Day!
Feb - 9	Whitewater	We were not fishing, we were small game hunting. Thank you.
Feb - 9	S. Br. Root River	Lot of ice in the river difficult to get in, some places shelf ice covered the stream. Park stretch appears to have filled in, mostly shallow flats I remember more pools in the past.
Feb - 13	S. Br. Root River	Fishing was very good in 2012. Water levels were low and clear. I caught 100's of fish – browns and rainbows up to 20" (clipped and wild) brook trout up to 9". Very seldom do I catch 0.
Feb - 18	Duschee Creek	Please add more winter trout water!!
Feb - 18	Camp Creek	All the fish appeared to be very healthy. 2 of the rainbows were close to 14". I have caught more browns in the past.
Feb - 18	S. Br. Root River	I have been fishing the south branch for over 35 years. It makes me sick to see the amount of trash that is in the stream since the canoe and tube rentals started.
Feb - 23	S. Br. Whitewater	Saw good numbers of trout, just couldn't find the right nymph pattern
Feb - 24	Hay Creek	Any plans to open other streams in area for winter season, e.g. Cold Spring, Mazeppa, etc. to relieve pressure on Hay Creek?
March 6	Whitewater	Thanks for all the work you guys do, I've fished SE MN for many years and it's an invaluable resource. Could you please open all the streams during winter season?
March 8	M. Br. Whitewater	Took my dogs for a walk in the lovely park!
March 21	S. Br. Root River	We caught 18 trout today. Mostly browns some rainbows. Sorry, we didn't measure them.
March 23	West Beaver Creek	I have some questions. Please call me at...