City of Winnipeg
Water and Waste Department

PHASE 2 Technical Memorandum for Red and Assiniboine Ammonia Criteria Study

Technical Memorandum # RH2.0

Phase 2 Other Stressors Workstream:

Resource Harvesting Program Report for 1999

May, 2000
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TetrES CONSULTANTS INC.

In Association With:

North / South Consultants

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PREAMBLE

This Technical Memorandum (T.M.) is intended for internal discussion. It is not intended as a report representing policy or direction of the City of Winnipeg.

EXECUTIVE SUMMARY

This Phase 2 "Other Stressors – Resource Harvesting" Workstream Technical Memorandum provides an investigation of the relative importance of localized fish-harvesting pressure on the health and productivity of the urban (and downstream) sport and bait fisheries. This information assists in establishing the extent of sport and bait fishing pressures in relation to apparent influences of potential ecological stressors, like ammonia, on the health and sustainability of fish populations in the study area.

Sport fishing information was obtained through on-site angler surveys conducted along the Red and Assiniboine rivers on May 16, 1999 and from angler questionnaire surveys conducted at the Mid-Canada Boat Show (March 3-7) and at the Winnipeg Fish Festival (July 3). Bait fishing information was obtained by interviewing bait fishers licenced to bait fish in the Red River. No licenced bait fishing activities occur on the Assiniboine River within the study area. Relevant information regarding fishing activities on the Red and Assiniboine rivers was also obtained from previous studies.

The southern area of Manitoba, which includes the Red and Assiniboine rivers, experiences the highest angler frequency in terms of percentage of angler-days (30.1% in 1995) than any other Manitoba Conservation designated sport fishing area in Manitoba. Of the total days spent fishing by anglers in Manitoba in 1995 (2.19 million days) it is estimated that 14% and 2.3% of those days were spent fishing on the Red and Assiniboine rivers, respectively.

Results of this study's resource harvesting investigation in 1999 indicate that the survey area at Lockport on the Red River has a much higher rate of sport fish harvesting pressure in terms of number of anglers, frequency of use, angler effort and catch rate, than the urban reaches of the Red and Assiniboine Rivers within the study area.

The majority of sport fishing occurred from May to August in 1998 on the Red (57%) and Assiniboine (74%) rivers according to questionnaire respondents. The majority of bait fishers' catch is caught in June with October being the least important month during the May to October bait fishing season.

Walleye and catfish are the types of fish preferred by the majority of anglers who indicated a species preference. However, a high percentage of anglers interviewed along the Red and Assiniboine rivers (45% to 82%) did not have a species preference. Catfish species other than channel catfish were the most common types of fish caught by anglers during on-site angler surveys along the Red and Assiniboine rivers in May 16, 1999. Catfish and freshwater drum were the most commonly caught fish during on-site anglers surveys conducted during a 1994 study of the Red and Assiniboine rivers. Over 80% of anglers from this 1999 study and other studies usually release the fish they catch. Therefore, although estimates available for 1995 indicate that approximately 544,000 fish were caught on the Red River and 99,500 caught on the Assiniboine River, only approximately 20% of those fish caught were removed from the river. However, the proportion of fish that do not survive after being caught then released is not known.

For the 1998 fishing season, the majority of anglers who completed a questionnaire indicated that fishing was either good or excellent along the Red and Assiniboine rivers (65% and 53%, respectively). During on-site angler surveys in 1999, most anglers thought their fishing success had either increased or stayed about the same on the Assiniboine River and Red River at Lockport (71% and 68%, respectively), with half the anglers surveyed along the Red River in the City indicating that their fishing success had increased or stayed about the same. The majority of bait fishers on the Red River thought their fishing success has stayed about the same or generally increased over the years they have bait fished.

Although fishers generally have a positive view of the quality of fishing on the Red and Assiniboine rivers, the perception of poor water quality persists among many anglers. This perception of poor water quality among anglers appears to be decreasing. Of anglers who were asked their reasons for not eating the fish they keep in this study's 1999 questionnaire and in a 1995 questionnaire, 55% fewer anglers cited pollution or other water quality concerns in 1999 than in 1995.

This study's assessment of angler and bait fishers' perceptions of their fishing success over time suggests that there is no overall negative trend in fishing success even though many anglers remain concerned about river water quality. In general, the "health" of the fishing industry appears to be stable, suggesting that fish populations are also generally stable.

Overall, the results of this resource harvest study of the Red and Assiniboine rivers indicate that the sport and bait fisheries of the study area appear healthy and display no patterns which could be attributed to potential stresses such as ammonia discharge from the City's Water Pollution Control Centres.

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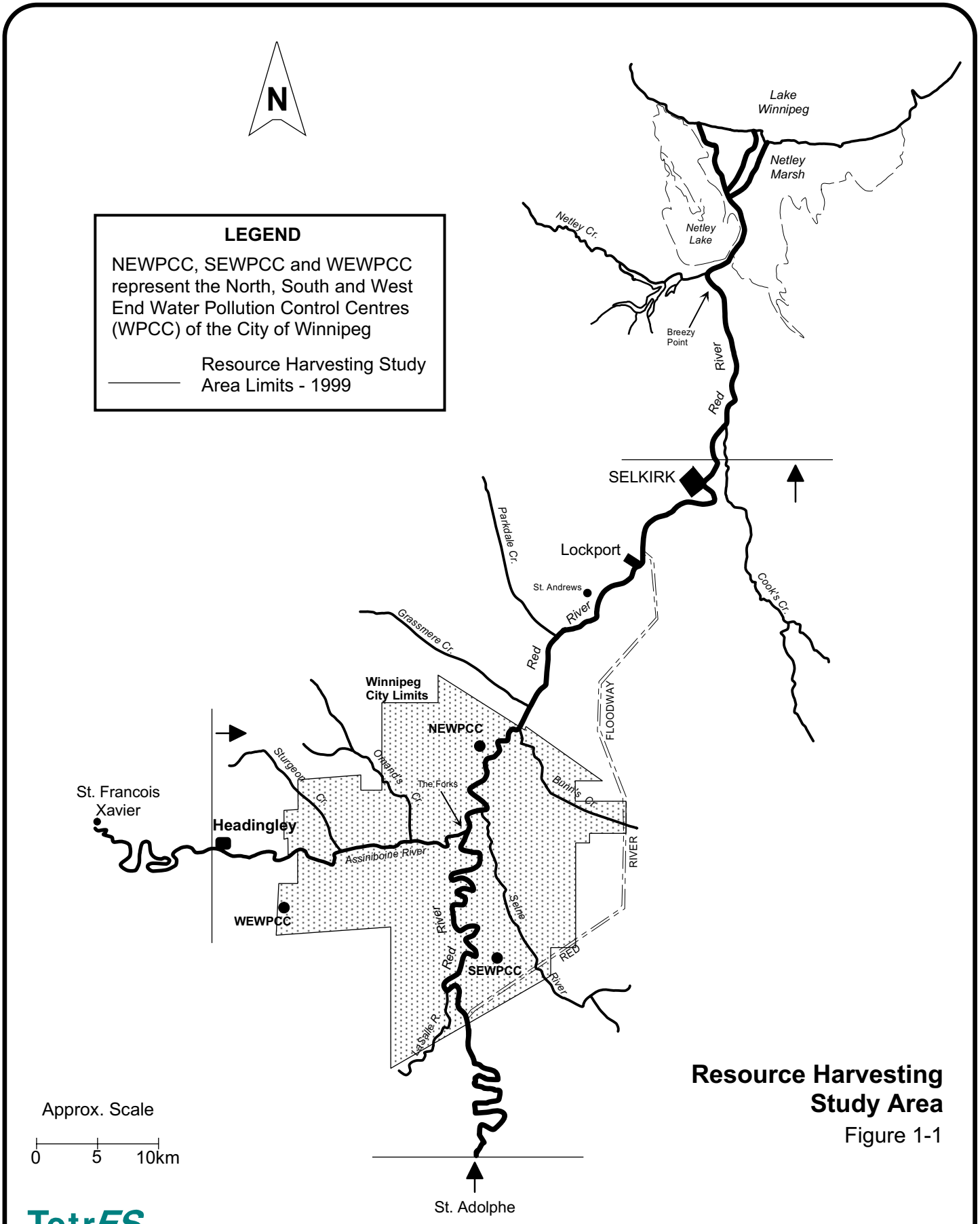
1. INTRODUCTION

The City of Winnipeg is undertaking a comprehensive assessment of the basis for regulating ammonia in the Winnipeg reaches of the Red and Assiniboine rivers to help determine the need, costs, impacts, and benefits of controlling ammonia in effluent from its Water Pollution Control Centres. The study is comprised of 13 integrated workstreams.

This Phase 2 "Other Stressors – Resource Harvesting" Workstream Technical Memorandum is a follow-up to the Phase 1 Technical Memorandum No. RH1.1 produced in April 1999 (Tetr*ES* 1999) which provided an introduction to this investigation of the ecological and socio-economic significance of resource harvesting on the Red and Assiniboine rivers within the study area (cf. Figure 1-1).

The primary objective of this Other Stressors – Resource Harvesting Workstream is to determine the relative importance of localized fish-harvesting pressure on the health and productivity of the urban (and downstream) sport and bait fisheries. This information will assist in establishing the extent of bait and sport fishing pressures in relation to apparent influences of potential ecological stressors, like ammonia, on the health and sustainability of fish populations in the study area.

Information on the socio-economic importance of the sport and bait fisheries is provided to assist in quantifying the effects of any possible ammonia control program on these activities.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LEGEND
NEWPCC, SEWPCC and WEWPCC represent the North, South and West End Water Pollution Control Centres (WPCC) of the City of Winnipeg
Resource Harvesting Study Area Limits - 1999
Lake Winnipeg
Netley Marsh
Netley Cr.
Netley Lake
Breezy Point
Red River
SELKIRK
Parkdale Cr.
Lockport
St. Andrews
Red River
Grassmere Cr.
Cook's Cr.
FLOODWAY
Winnipeg City Limits
NEWPCC
Sturgeon Cr.
Omand's Cr.
The Forks
Bunn's Cr.
St. Francois Xavier
Headingley
Assiniboine River
RIVER
WEWPCC
Red River
Seine
SEWPCC
RED River
La Salle R.
St. Adolphe
Approx. Scale
0 5 10km
Resource Harvesting Study Area
Figure 1-1
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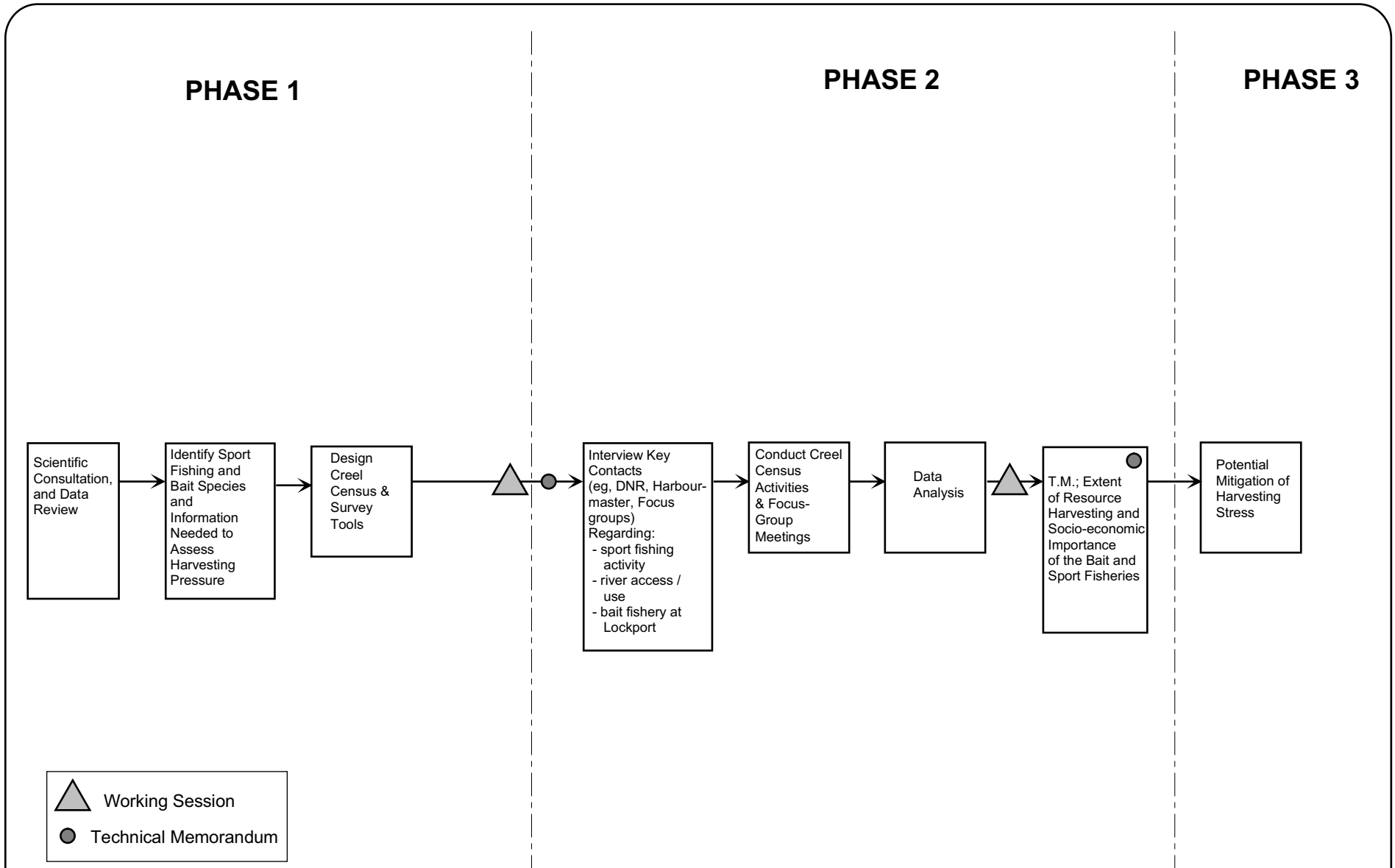
2. OVERVIEW OF THE RESOURCE HARVESTING PROGRAM

2.1 ORIGINAL PROGRAM

The original program for the Resource Harvesting studies was described in the February 1999 Draft Workplan and was presented at the Ammonia Study Workshop on February 18 and 19, 1999. An overview of the original activities associated with the Resource Harvesting Workstream is shown in Figure 2-1. Details of the original proposed Resource Harvesting study program were provided in the Phase 1 Technical Memorandum (T.M.) # RH1.1 (Tetr*ES* 1999).

2.2 FINAL 1999 PROGRAM

As the Ammonia Study progressed and evolved throughout 1999, some components of the original program detailed in the Phase 1 Resource Harvesting T.M. (Tetr*ES* 1999) became more focussed to allow a redistribution of effort to other study workstreams. A comparison of the original activities proposed, and the activities performed in 1999 are provided in Table 2-1. The Resource Harvesting study results have provided valuable information regarding the significance of sport and bait fishing impacts on the Red and Assiniboine River Fisheries, including information on the socio-economic importance of these activities.



Original Overview: Other Stressors - Resource Harvesting Workstream

Figure 2-1

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TABLE 2-1

COMPARISON OF THE ORIGINAL AND FINAL COMPONENTS OF THE RESOURCE HARVESTING PROGRAM, 1999

ORIGINAL PROGRAM: Phase 1 T.M. (Tetr*ES* 1999)	**FINAL PROGRAM**
Sport Fishing Assessment	
Angler Questionnaire Surveys:	**Angler Questionnaire Surveys:**
• Mid-Canada Boat Show (March 3-7)	• Mid-Canada Boat Show (March 3-7)
• Winnipeg Fish Festival (July 3)	• Winnipeg Fish Festival (July 3)
On-site Angler Surveys:	**On-Site Angler Surveys:**
• performed over 9 days (May 15-17, July 2-4, Sept. 4-6)	• performed during one day (May 16)
Bait Fishing Assessment	
Contact all licenced Bait Fishers within the Study Area – Conduct phone interview surveys	Contacted all available licenced Bait Fishers within the Study Area – Conducted phone interview surveys of bait fishers who were willing to participate in the survey

3. METHODS

3.1 SPORT FISHING ASSESSMENT

3.1.1 On-Site Angler Surveys

On-site angler surveys were conducted on Sunday, May 16, 1999 (opening weekend for sport fishing) along the Assiniboine River (from "The Forks" west to Headingley; ref. Figure 1-1), the Red River within the City of Winnipeg (hereafter the City) and at Lockport, MB.

The method of angler survey used is termed a "roving" survey whereby the survey clerks intercept and interview anglers while they are fishing. This type of survey is necessary for "diffuse-access" fisheries where anglers arrive, fish, then leave along any of a number of access points within the survey area (ref. Pollock *et al*. 1994). The definition of "angler" used in this survey is anyone actively fishing with a line in the water, or preparing to fish with line and tackle present. A copy of the on-site angler survey form is provided in Appendix A.

As with any creel survey method, there are certain biases and assumptions associated with the roving survey design (ref. Pollock *et al*. 1994; Phippen and Bergersen 1991). The following are the assumptions that would likely have had the most influence on survey results (ref. Section 4.0):

- anglers actually fished for the full time they indicated to the survey clerk;
- the catch rate estimated for the incomplete fishing trip up to the time of interviews is an unbiased estimate of the catch rate for the complete trip; and
- anglers provided accurate numbers and species identification for the fish they caught.

Angler surveys were conducted by a two-person team by car and foot along the Assiniboine River. Angler surveys were conducted by boat along the Red River within the City by a second two-person team. The Lockport area survey along the Red River was conducted on foot by a single survey clerk.

The survey team for the Assiniboine River area completed one pass of the survey route (from The Forks west to Headingley) between 0800 hours and 1345 hours. All key angler access points were visited. The team then completed a second pass of the survey route (from Headingley east to The Forks) from 1415 hours to 1730 hours to interview any additional anglers. A third and final pass of the survey route was conducted from The Forks west to Headingley from 1830 hours to 2030 hours.

For the Red River survey within the City of Winnipeg, the second survey team began the survey at the South Floodway Control Structure at 0900 hours and ended the survey at the North Perimeter Bridge at 1400 hours. Due to the length of the Red River within the City of Winnipeg, one pass of the survey area was completed.

At the Lockport area survey site, the survey began at 0930 hours and ended at 1900 hours. The survey clerk made continuous rounds of the Lockport area (east and west sides of the river) from the downstream side of the St. Andrews Locks north approximately 0.5 km to the North Floodway Control Structure on the east side of the river and the "Cats on the Red" outfitter business and boat launch/docking facility on the west side of the river. Binoculars were used to record numbers of anglers arriving and leaving throughout the survey day. Anglers fishing from boats were counted but the majority were not interviewed since they typically arrived before the survey began and remained on the water beyond the end of the survey day. The number of anglers in all boats observed were counted.

3.1.2 Angler Questionnaires

Additional sport fishing information was acquired from anglers contacted at two popular sport fishing-related events in Winnipeg; the Mid-Canada Boat Show (March 3-7, 1999) and the Winnipeg Fish Festival at The Forks (July 3, 1999).

Anglers who fished on the Red or Assiniboine rivers within the study area (ref. Figure 1-1) in 1998 were asked to complete angler questionnaire forms (ref. Appendix B). The questionnaire form included questions regarding overall fishing effort, seasonal and locational fishing effort, and economic value of fishing activities on the Red and Assiniboine rivers.

3.1.3 Review of Previous Sport Fishing Studies

Information regarding previous sport fishery studies on the Red and Assiniboine Rivers (ref. Table 3-1) was obtained and reviewed. Information relevant to sport fishery pressure/impacts and socio-economic value of the Red and Assiniboine fishery within the study area was used to assist in the interpretation of this study's on-site angler survey and angler questionnaire results (ref. Section 4.0).

Most questions asked in this study's angler survey and questionnaire forms (ref. Appendices A and B) were the same or similar to survey questions from previous angler studies (ref. Tetr*ES* 1999) which has enabled the comparison of this study's results to these previous studies.

Relevant results of previous angler studies have been incorporated into this report and compared to this study's results where applicable (ref. Section 4.1).

3.2 BAIT FISHERY ASSESSMENT

Phone interviews were conducted of six of the eight bait fishers listed by Manitoba Conservation (formerly the Department of Natural Resources or "DNR") as having licences for bait-fish blocks that include the Red River area. Of the two bait fishers not interviewed, one refused to participate in the study and the other could not be contacted (not available). Bait fishing by licenced bait fishers does not occur along the mainstream of the Assiniboine River within the study area (Scaife *pers. comm.* 1999).

Phone interviews were conducted during April and May 1999. Information regarding each bait fishers' total seasonal catch, fishing locations, species caught, value of catch, etc., was obtained. A copy of the bait fisher interview script is provided in Appendix C.

TABLE 3-1

ADDITIONAL INFORMATION FOR SPORT FISHING ON THE RED AND ASSINIBOINE RIVERS IN MANITOBA

Reference/Program	Source	Date(s), Data Obtained	Key Data Available
SPORT FISHING INFORMATION			
"Sport Fishing in Manitoba" document series	DNR[a]/DFO	1985, 1990, 1995	• Numerous data for 1990 and 1995 (e.g., angler days fished, total fish caught and kept by species, etc.) • Limited data for 1985
Fish Stock Monitoring Program (Winnipeg city limits)	DNR	1995, 1996	• 1997 and 1998 data currently being compiled by DNR • Net set catches during July and September
Urban Fishing Plan: a) Sport Fishing Survey b) Licensed Angler Survey* c) Fish Consumption Survey (Scaife 1995)	DNR	1994	a) documents residents' sport fishing attitudes and activities b) documents needs, attitudes and demographic characteristics of resident anglers* c) which local sport fish are eaten, annual servings of freshwater fish, where fish is obtained for consumption, preferences and concerns regarding fish consumption
B.A. Thesis "A Spatial Analysis of an Urban Fishery: A Case Study of Winnipeg, Manitoba" (Kitch 1994)	University of North Dakota	1994	• 269 on-site angler interviews • mail-in licensed angler survey documenting needs, attitudes and demographic characteristics of resident anglers

*Information originally from Kitch (1994)

[a] = Manitoba Department of Natural Resources; presently "Manitoba Conservation"

4. RESULTS

The following results are based primarily on information acquired in 1999 from 164 on-site angler surveys and 236 completed angler questionnaires (ref. Section 2.2). Comparisons of this study's results with previous angler studies on the Red and Assiniboine rivers are provided where possible.

4.1 SPORT FISHERY

The results of all questions asked in both the on-site angler surveys and the angler questionnaires are provided in Appendices D to G. In addition to questions asked that pertained directly to angling effort (duration, location and season), catch and socio-economic value, other questions were asked that provided information regarding anglers' fishing preferences and experience, perception of the fishery, and water quality. The results of these types of additional questions provided insight into the general health of the Red and Assiniboine rivers fishery as perceived by surveyed anglers (ref. Section 4.1.4). Also, many of the questionnaire and survey questions were the same or similar to questions asked in previous surveys conducted by, or in cooperation with, Manitoba Conservation (ref. Tetr*ES* 1999), thereby contributing to the existing database for this fishery.

4.1.1 Harvesting Pressure on the Red and Assiniboine Rivers

Information from this 1999 study from both on-site angler surveys and angler questionnaires suggest that the survey area at Lockport on the Red River has a much higher rate of sport fish harvesting pressure in terms of number of anglers, frequency of use, angler effort and catch rate, than the urban section of the Red and Assiniboine Rivers within the study area (ref. Section 4.1.1.1 to 4.1.1.3).

4.1.1.1 Number of Anglers

For May 16, 1999, the total number of anglers surveyed during the roving on-site angler survey along the Assiniboine River was 46 anglers. Of these anglers surveyed, all were residents of Manitoba and 44 (96%) resided in Winnipeg (ref. Appendix F, Table F-2). It is estimated that the survey clerk interviewed approximately 45% of all anglers present along the Assiniboine River survey area on May 16, 1999 (estimate explanation given in Appendix H). Therefore, an estimate of the total number of anglers who fished along the Assiniboine River within the survey area (24 km length of river) on May 16, 1999, was approximately 71 anglers during a 12.5 hours survey period. An "angler pressure index" for that reach of the Assiniboine River on May 16th during that survey time is 0.24 anglers/hour/km. It should be noted that this index number is not meant to indicate observed "density" of anglers since angler distribution is typically "clumped" rather than randomly distributed along areas surveyed in this study.

The number of anglers surveyed on May 16, 1999, during a 9.5 hour survey period at Lockport on the Red River was 78 anglers. Of these anglers surveyed, 95% were residents of Manitoba. Of the Manitoba residents, 62 (85%) resided in Winnipeg (ref. Appendix D, Table D-2). It is estimated by the survey clerk interviewed, that approximately 60% of all anglers present at Lockport on May 16, 1999 (estimate explanation given in Appendix I). Therefore, an estimate of the number of anglers who fished the 0.5 km reach of river at Lockport on May 16, 1999, during a 9.5 hour survey period was approximately 170 anglers, giving an "angler pressure index" of 35.79 anglers/hour/km. Therefore, in general, the angler pressure (in terms of number of anglers fishing per hour per kilometre length of river) was approximately 143 times greater on the Red River at Lockport than along the surveyed reach of the Assiniboine River on May 16, 1999.

The 40 anglers were surveyed on May 16, 1999, during a five-hour period along the 45-km reach of the Red River from the South Floodway Control Structure to the North Perimeter Bridge. An estimate of the total number of anglers that were actually fishing along that reach on that day during the survey time cannot be estimated due to the extensive length of the survey area (ref. Appendix J for elaboration). It is expected that the number of anglers per hour per kilometre would again be much less than for the Lockport area, and is anticipated to be similar

to the Assiniboine River area, based on the number of anglers surveyed on the single pass through the survey area.

Results of a previous angler study on the Red and Assiniboine rivers within the City (Kitch 1994) provide some comparison of the relative number of anglers on the Red River and the Assiniboine River within Winnipeg. Kitch noted that during a spring and summer survey of the Assiniboine and Red rivers within the City of Winnipeg in 1994, similar numbers of anglers were interviewed within the north and south sections of the Red River compared to the Assiniboine River within the City (ref. Table 4-1). However, Kitch did not indicate survey effort (i.e., which days surveyed, area surveyed each day or length of each survey). Therefore, the number of anglers per hour per kilometre cannot be calculated from this information.

TABLE 4-1

NUMBER OF ANGLERS INTERVIEWED IN SPRING OF 1994 ALONG THE RED & ASSINIBOINE RIVERS IN WINNIPEG (after; KITCH 1994)

	NORTH RED RIVER (14 km) (Forks to N. Perimeter Bridge)		South Red River (23 km) (Forks to S. Perimeter Bridge)		Assiniboine River (19 km) (Forks to W. Perimeter Bridge)	
TIMING	**WEEKDAY**	**WEEKEND**	**WEEKDAY**	**WEEKEND**	**WEEKDAY**	**WEEKEND**
SEASON:						
Spring	21	23	21	31	22	26
Summer	21	25	18	24	18	19

Results of a mail-in anglers questionnaire study conducted by DNR in 1994 indicated that of the 225 respondents to the questionnaire, 71 (32%) fished within the City of Winnipeg perimeter (Scaife 1995).

Results of a joint DNR/DFO (Federal Department of Fisheries and Oceans) mail-in questionnaire survey estimated that 30,388 licenced anglers fished on the Red River in 1995, with approximately 81% fewer anglers (5,641) fishing on the Assiniboine River in 1995 (Sonsini *pers. comm.* 2000). The results of that survey also estimated that 157,004 licenced anglers fished in Manitoba in 1995. Therefore, approximately 23% of licenced anglers fished on the Red and/or Assiniboine Rivers in 1995, with 19% of these licenced anglers spending some time fishing on the Red River and 3.6% spending some time fishing on the Assiniboine River.

4.1.1.2 Angling Frequency

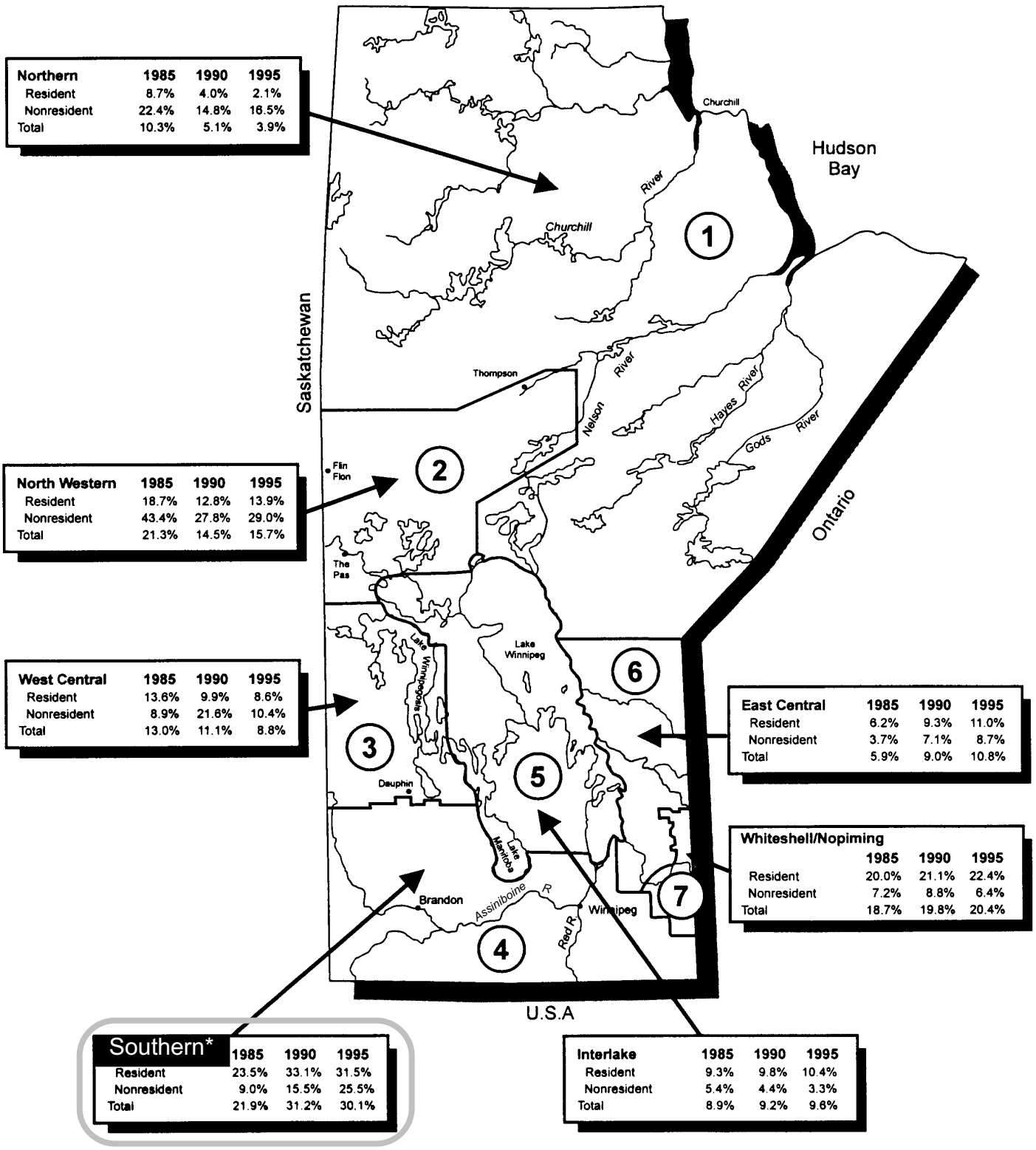
Manitoba Conservation (formerly DNR) in conjunction with the DFO, has conducted a questionnaire survey of licenced adult anglers in Manitoba every five years since 1985. The 1995 report "Sport Fishing in Manitoba" (DNR 1995) provides the most recent angling information for seven fishing areas in Manitoba, with the Red and Assiniboine rivers included in "southern area #4" (ref. Figure 4-1). As indicated in Figure 4-1, the southern area, which includes the Red and Assiniboine rivers, experiences the highest angling frequency in terms of percentage of angler-days (30.1% in 1995) than any other Manitoba Conservation designated sport fishing area in Manitoba. A total of 2.19 million days were estimated to have been spent fishing in Manitoba by an estimated total of 157,000 anglers (DNR 1995). An estimated 16.3% of those days were spent fishing on the Red and/or Assiniboine rivers with 14% (314,298 days) fished on the Red River and 2.3% (49,986 days) fished on the Assiniboine River (Sonsini *pers. comm.* 2000; Wall *pers. comm*. 1999). Therefore, it is estimated that approximately 84% fewer days were fished on the Assiniboine River than the Red River in 1995 (i.e., 6.3 times more angling days on the Red River than the Assiniboine River).

On-Site Angler Survey Results

Of the anglers interviewed along the Assiniboine River on May 16, 1999, 65% (n = 46) of respondents fished more than 20 times per year on that river, with a similar proportion of respondents (67%) also fishing more than 20 times per year on the Red River (n = 33 respondents; ref. Figures 4-2a, b). Approximately 28% of respondents did not fish on the Red River.

Of the anglers interviewed at Lockport, 43% (n = 78 respondents) of respondents fished more than 20 times per year on the Red River (ref. Figure 4-3a). Only 21% of respondents indicated that they also fished on the Assiniboine River. Of the Lockport survey respondents who also fish on the Assiniboine River, 31% fish more than 20 times per year, with the majority (63%) fishing only 1 to 5 times per year (n = 16 respondents; ref. Figure 4-3b).

Of the anglers interviewed along the Red River, 82% (n = 40 respondents) fish more than 20 times per year on the Red River (ref. Figure 4-4a). Of the anglers from whom information was



* Includes Red & Assiniboine Rivers

DNR Designated Sport Fishing Areas Indicating Percentage of Angler-days Expended by Anglers in Each Area

Figure 4-1

angldays
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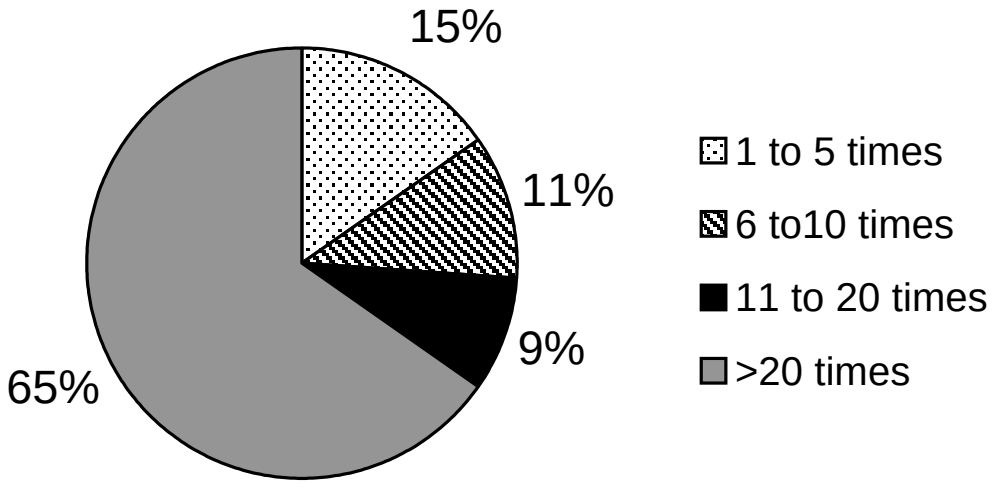

Figure 4-2a Frequency of Fishing on the Assiniboine River Each Year (n= 46 respondents)

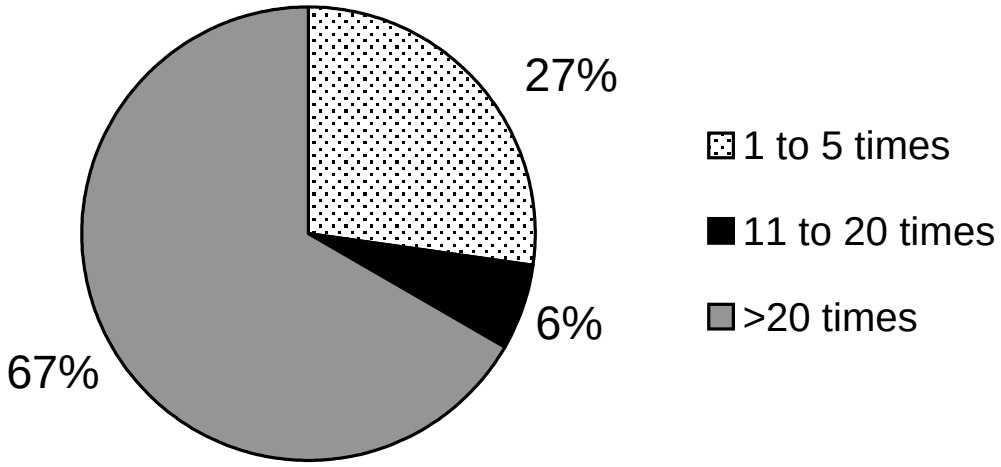

Figure 4-2b Frequency of Fishing on the Red River Each Year (n = 33 responents)

Assiniboine River Survey Respondents' Frequency of Fishing on the Assiniboine River and on the Red River Each Year

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Figure 4-2

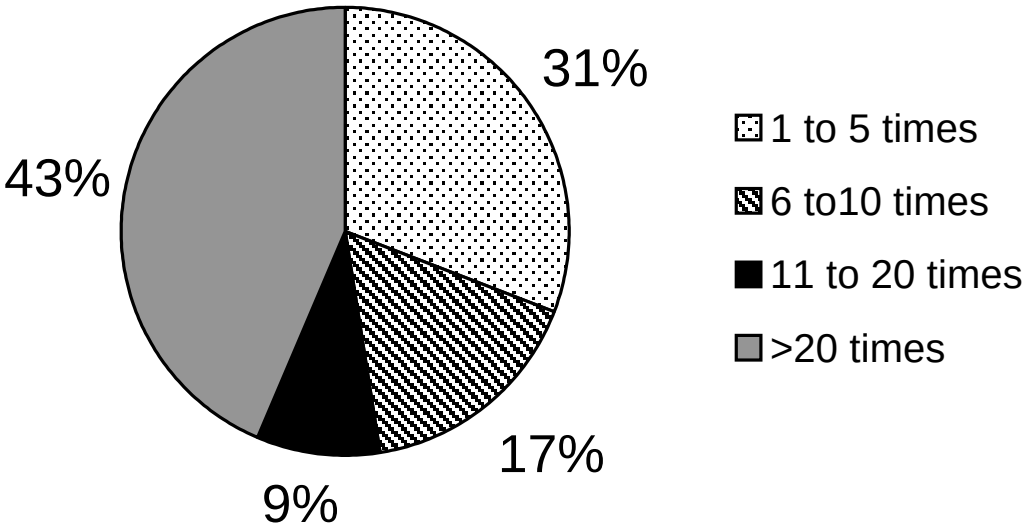

Figure 4-3a Frequency of Fishing on the Red River at Lockport Each Year (n= 78 responents)

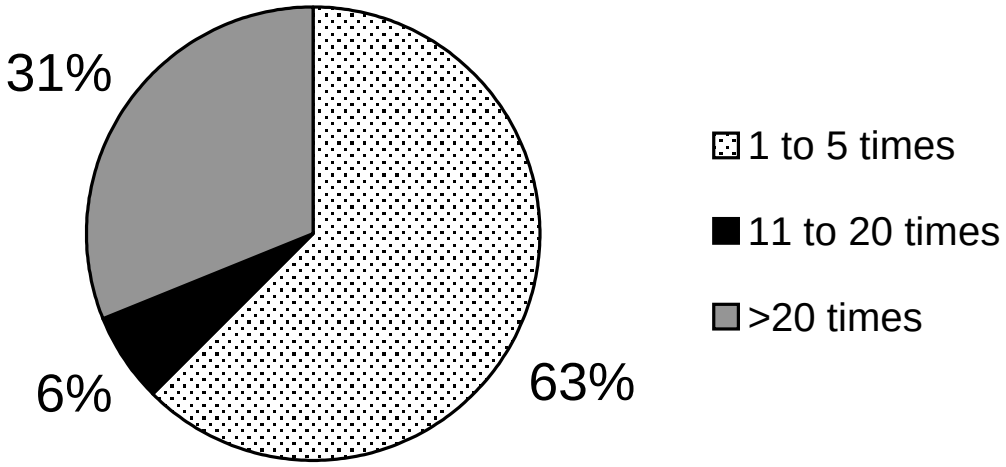

Figure 4-3b Frequency of Fishing on the Assiniboine River Each Year (n = 16 respondents)

Lockport Survey Respondents' Frequency of Fishing on the Red River at Lockport and on the Assiniboine River Each Year

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Figure 4-3

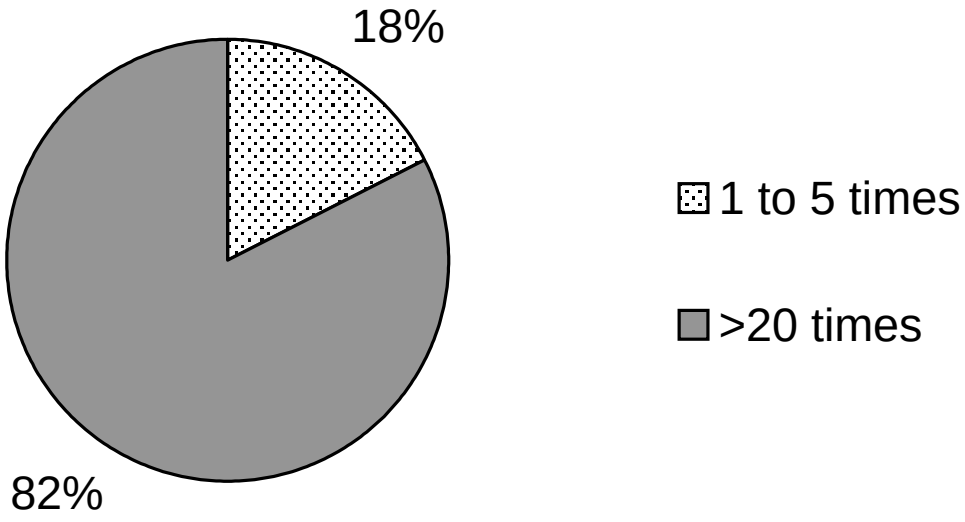

Figure 4-4a Frequency of Fishing on the Red River Each Year
(n= 40 responents)

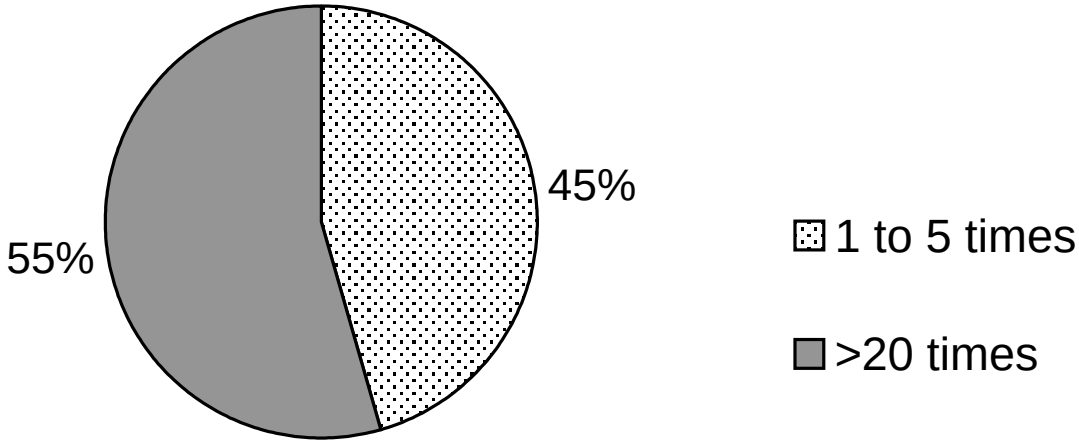

Figure 4-4b Frequency of Fishing on the Assiniboine River Each Year (n = 11 respondents)

Note: This number of respondents does not indicate total number of Red River survey respondents that fish both the Red and Assiniboine Rivers.

Red River Survey Respondents' Frequency of Fishing on the Red River and on the Assiniboine River Each Year

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Figure 4-4

obtained regarding their angling frequency on the Assiniboine River, 55% (n = 11 respondents) indicated that they also fish more than 20 times per year on the Assiniboine River, with the remaining 45% only fishing 1 to 5 times per year on the Assiniboine River (ref. Figure 4-4b).

Angler Questionnaire Results

Of the anglers who completed an angler questionnaire form (ref. Appendix B) at the Mid Canada Boat Show and the Winnipeg Fish Festival, 64% (n = 233 respondents) spent more than 20 days fishing in Manitoba in 1998 (ref. Figure 4-5a). The majority of these respondents (73%) spent 20 days or less fishing on the Red and/or Assiniboine rivers in 1998, with only 27% fishing more than 20 days during the year (n = 231 respondents; ref. Figure 4-5b). Of the 27% who spend >20 days fishing on the Red and/or Assiniboine rivers, 45% (n = 28 respondents) spent more than 50 days fishing on the Red and/or Assiniboine rivers in 1998.

Of those respondents who spent 100% of their time fishing in Manitoba on the Red and/or Assiniboine rivers (n = 37 respondents), 38% (n = 14 respondents) spent more than 20 days fishing in 1998 (ref. Figure 4-5c).

4.1.1.3 Angler Effort, Catch Rate and Total Catch

Estimates for angler effort, catch rate, and total catch for all anglers surveyed and the estimated total number of anglers along the Assiniboine River, Red River and at Lockport, are given in Table 4-2. Methods used to calculate these estimates are provided in Appendices H, I and J. Data used to calculate these estimates are provided in Appendices D, E and F.

It should be noted that the estimated catch rates and total catches are greatly influenced by the number of anglers surveyed and the time into each angler's fishing trip at which each angler was surveyed. The percentage of anglers that were less than one-half hour into their fishing trip at the time they were surveyed was 17% for Assiniboine River anglers, 4% for Lockport anglers, and 43% for Red River anglers (ref. Appendices J, H and I; Tables J-1, H-1 and I-1).

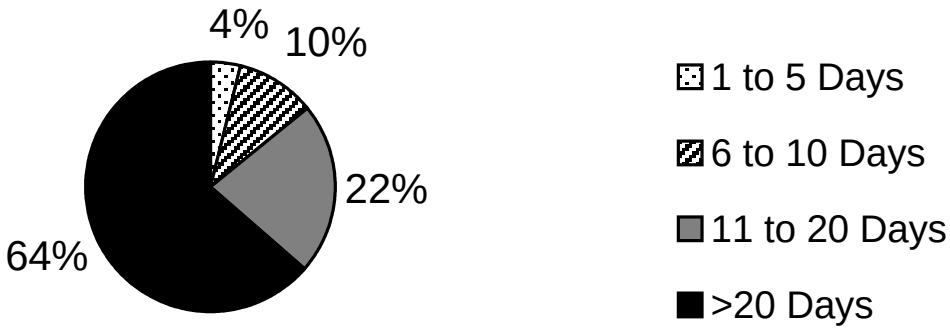

Figure 4-5a Time Spent Fishing in Manitoba (n= 233 respondents)

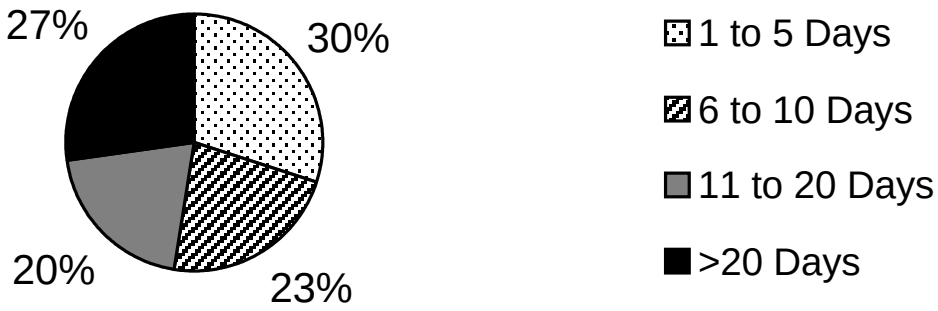

Figure 4-5b Time Spent Fishing on Red and/or Assiniboine Rivers
(n = 231 respondents)

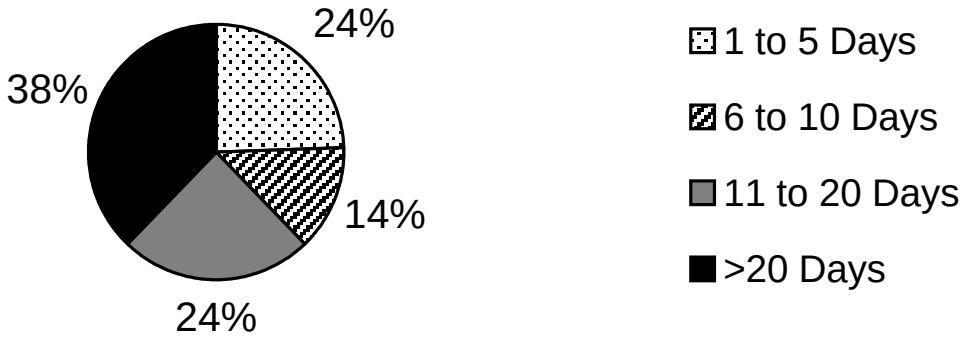

Figure 4-5c Time Spent Fishing on Red and/or Assiniboine Rivers of Those Respondents Who Spent 100% of Fishing Time on the Red and/or Assiniboine Rivers (n = 37 respondents)

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Time Spent Fishing in 1998
Figure 4-5

TABLE 4-2

ESTIMATES OF ANGLER EFFORT, CATCH RATE AND TOTAL CATCH FOR SURVEYED AREAS OF THE ASSINIBOINE RIVER, RED RIVER AND LOCKPORT AREA (MAY 16, 1999)[a]

	ANGLER EFFORT (Angler-Hours)	CATCH RATE (Fish per hour)	TOTAL CATCH (Number of Fish)
ASSINIBOINE RIVER			
Surveyed Anglers (n=46 anglers)	158	0.94	148
Estimated Total Anglers (n=71 anglers)	244	0.94	228
RED RIVER			
Surveyed Anglers (n=40)[b]	94	0.65	61
LOCKPORT AREA			
Surveyed Anglers (n=78)	338	1.6	631
Estimated Total Anglers (n=170)	739	1.6	1,376

[a]refer to Appendices J, H and I for calculation methods and Appendices D, E and F for survey data.

[b]an estimate for the total number of anglers along the Red River is not available (ref. Appendix J).

Target Species and Species Caught

Results of the on-site angler surveys for this study (May 16, 1999) indicate that the majority of anglers surveyed at Lockport (51%, n = 84 responses) and along the Assiniboine River (82%, n = 49 responses) are not targeting any particular species (ref. Table 4-3). A high percentage of anglers surveyed along the urban reach of the Red River for this study (45%, n = 51 responses) and along urban reaches of the Red and Assiniboine rivers during on-site angler surveys in 1994 (26% to 36%, n = 269 respondents; Kitch 1994) were also not targeting any particular species (ref. Table 4-3).

For this study, of those anglers interviewed during on-site angler surveys who indicated a species preference, catfish and walleye were the preferred target species at all three survey sites (ref. Table 4-3). Walleye and catfish were also the most preferred target species indicated during on-site angler surveys of Winnipeg's rivers in 1994 (Kitch 1994; ref. Table 4-3).

Questionnaire results for this study and for a mail-in questionnaire conducted by DNR in 1994 (Scaife 1995) show that questionnaires respondents are less likely to indicate "no preference" regarding which species they prefer to fish for (ref. Table 4-3). Of those respondents who indicated a species preference, walleye was the preferred species indicated in both questionnaires studies (ref. Table 4-3). The next most preferred type of fish, according to this study's questionnaire results, was catfish (ref. Table 4-3). Whereas results of the 1994 DNR questionnaire indicate both catfish and goldeye are the next most preferred fish followed closely by northern pike (ref. Table 4-3).

Results of on-site angler surveys for this study (May 16, 1999) indicate that catfish other than channel catfish (i.e., bullheads and stonecats) were caught most often along the Red and Assiniboine rivers within the City (ref. Table 4-4). Almost half of all fish caught at Lockport (47%) were catfish other than channel catfish (ref. Table 4-4).

These results contrast significantly with the on-site angler surveys conducted along urban reaches of the Red and Assiniboine rivers during spring and summer in 1994 where the most commonly caught species along the Red River was freshwater drum, followed closely by channel catfish (Kitch 1994; ref. Table 4-4). For that study, results for the urban Assiniboine

Table 4-3 Species of Fish Anglers Prefer to Catch

SPECIES	PERCENT OF RESPONSES							
	Tetr*ES* On-Site Angler Survey May 16, 1999			Kitch (1994) Winnipeg On-Site Angler Survey			Tetr*ES* Angler Questionnaire 1999[a]	DNR Mail-In Questionnaire 1994[b]
	Red River In City	Red River at Lockport	Assiniboine River	North Red River	South Red River	Assiniboine River		
Walleye	16%	18%	8%	38%	49%	45%	31%	28%
Any Species (No Preference)	45%	51%	82%	29%	36%	26%	4%	12%
Catfish (general)	20%	19%	8%	-	-	-	26%	14%
Channel Catfish	-	-	-	20%	10%	19%	-	-
Northern Pike	2%	4%	-	8%	3%	1%	9%	13%
Freshwater Drum	4%	5%	2%	2%	2%	2%	8%	9%
Goldeye	8%	-	-				14%	14%
White Bass		1%	-	2%	0%	5%	0.5%	-
Carp	6%	2%	-	1%	0%	2%	2%	4%
Perch	-	-	-	-	-	-	5%	7%
Other	-	-	-	-	-	-	2%	-
Total Responses	51	84	49	n/a	n/a	n/a	553	173
Total Respondents	40	78	46	90	94	85	236	71

a = along the Red and Assiniboine Rivers
b = Information from those repondents who fished on the Red and/or Assiniboine River in Winnipeg (Scaife 1995)
n/a = information not available

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Table 4-4 Species of Fish Caught Most Frequently by Anglers

SPECIES	PERCENT OF RESPONSES									
	Tetr*ES* On-Site Angler Survey May 16,1999			Kitch (1994) Winnipeg On-Site Angler Survey (May 30 - Aug. 15)			Tetr*ES* Angler Questionnaire 1999[a]	Joint DNR/DFO Mail-In Questionnaire 1995[b]		DNR Mail-In Questionnaire 1994[c]
	Red River In City	Red River at Lockport	Assiniboine River	North Red River	South Red River	Assiniboine River		Red River	Assiniboine River	
Walleye	0%	0.2%	6%	7%	10%	7%	26%	20%	25%	7%
Channel Catfish	4%	8%	5%	38%	27%	37%				
Catfish (other)	89%	47%	73%	2%	1%	6%				
Catfish (general)							24%	28%	37%	34%
Northern Pike	0%	3%	8%	1%	2%	0%	10%	6%	7%	4%
Freshwater Drum	0%	23%	0%	40%	40%	34%	14%			34%
Goldeye	0%	0%	0%	0%	0%	1%	13%			13%
White Bass	0%	7%	0%	7%	11%	4%				
Carp	4%	11%	3%	5%	7%	9%	1.5%			7%
Perch							6%	5%	5%	1%
Other	4%	1%	5%	0%	2%	2%	7%	42%	25%	0%
Total Responses	28	484	77	n/a	n/a	n/a	566	n/a		101
Total Respondents	40	78	46	90	94	85	236	245	45	71

a = along the Red and Assiniboine Rivers

b = data estimates based on 1730 angler questionnaires, with 245 respondents fishing on the Red River and 45 respondents fishing on the Assiniboine River in 1995 (Sonsini *pers. comm. 2000*).

c = Information from those repondents who fished on the Red and/or Assiniboine River in Winnipeg; "fish caught" data from 1993; (Scaife 1995)

n/a = information not available

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River reach indicate that channel catfish were caught most often, followed closely by freshwater drum (ref. Table 4-4). The seemingly high proportion of channel catfish caught by anglers in the 1994 study may be artificially high due to catfish species misidentification as noted by Kitch (1994).

Results of 236 completed angler questionnaires in 1999 indicate that anglers fishing along the Red and/or Assiniboine rivers caught mostly walleye (26%) and catfish (24%) (ref. Table 4-4). These results are similar to the results for a joint DNR/DFO (Department of Fisheries and Oceans) mail-in questionnaire conducted in 1995 where catfish and walleye were also caught most frequently (Wall *pers. comm.* 1999; ref. Table 4-4). Mail-in questionnaire results from a 1994 DNR study indicated that both catfish and freshwater drum were caught most frequently (34%) along the Red and Assiniboine rivers, with a marked decrease in the proportion of walleye caught (7%) compared to other questionnaire study results (ref. Table 4-4). This may be a function of small sample size for that study (n = 71 respondents) or timing of the questionnaire survey since proportion of species caught varies with season (ref. Kitch 1994) and respondents may recall their most recent catch proportions.

The Kitch (1994) angler survey in the City of Winnipeg provides information on the proportion of fish species caught seasonally along urban reaches of the Red and Assiniboine rivers in 1994 (ref. Table 4-5). These results may indicate a seasonal change in activity for those species caught on the Red and Assiniboine rivers in Winnipeg in 1994. Notably, the proportion of freshwater drum caught increased from spring to summer, however, the proportion of white bass caught decreased considerably from spring to summer in all three areas surveyed (ref. Table 4-5). The proportion of walleye caught in all three areas surveyed also decreased from spring to summer (ref. Table 4-5).

Catch and Release Frequency

Angler questionnaire respondents for this study typically released their catches, with 40% indicating that they always release and 41% indicating that they usually release (n = 234 respondents; ref. Figure 4-6). This high proportion of anglers who usually or always release their catches (81%) is 11 to 18% lower than the “catch and release” results found for a survey of

TABLE 4-5

PROPORTION OF FISH CAUGHT SEASONALLY DURING AN ANGLER SURVEY OF THE RED AND ASSINIBOINE RIVERS IN WINNIPEG IN 1994 (after; Kitch 1994)

	NORTH RED RIVER (Forks to N. Perimeter Bridge)		SOUTH RED RIVER (Forks to S. Perimeter Bridge)		ASSINIBOINE RIVER (Forks to W. Perimeter Bridge)	
	Spring	Summer	Spring	Summer	Spring	Summer
freshwater drum	37%	41%	29%	53%	29%	42%
channel catfish	27%	48%	25%	28%	36%	27%
walleye	13%	0%	18%	3%	6%	0%
white bass	9%	5%	17%	5%	10%	3%
carp	9%	4%	6%	7%	6%	14%
bullhead	5%	0%	1%	0%	8%	2%
northern pike	0%	2%	0%	4%	0%	0%
other	0%	0%	4%	0%	3%	2%
goldeye	0%	0%	0%	0%	2%	0%
Total Respondents	90		94		85	

Note: date categories for spring and summer not provided (Kitch 1994)

anglers on the Red and Assiniboine River in Winnipeg in 1994 where 98% of surveyed anglers released their catches on the Assiniboine River and an average of 95% of anglers released their catches on the Red River (Kitch 1994; ref. Table 4-6). However, the angler questionnaire results (81% release) are very similar to the estimated proportion of fish released on the Red (86%) and Assiniboine (81%) rivers by all anglers fishing in Manitoba in 1995 (data estimates generated from a 1995 joint DNR/DFO mail-in angler questionnaire survey; (Wall *pers. comm.* 1999; ref. Table 4-7). The 1995 joint DNR/DFO estimates for all anglers fishing in Manitoba in 1995 also indicate that the proportions of fish kept and released vary by species caught and from which river they were caught (ref. Table 4-7). Results of a DNR questionnaire survey in 1994 indicated that 96% (n = 66) of respondents who fish on Winnipeg's rivers (n = 71) practice "catch and release" fishing (Scaif 1995).

TABLE 4-6

PERCENTAGE OF ANGLERS WHO PRACTICED "CATCH AND RELEASE" ON THE RED AND ASSINIBOINE RIVERS IN 1994 (after; Kitch 1994)

	"YES"	"NO"
North Red River (Forks to N. Perimeter Bridge)	99%	1%
South Red River (Forks to S. Perimeter Bridge)	91%	8%
Assiniboine River (Forks to W. Perimeter Bridge)	98%	2%

n = 269 respondents (Kitch 1994)

The question "do you practice catch and release" was not asked during on-site angler interviews in 1999; this information was obtained indirectly through the question "Do you eat the fish you keep; if no, why?" For on-site angler survey respondents fishing along the Assiniboine River and the Red River at Lockport, 15% of anglers indicated that they practice "catch and release" as a reason for not eating the fish they keep (n = 7 of 46 Assiniboine River respondents; n = 12 of 38 Red River respondents). For survey respondents fishing on the Red River within the City, 48% (n = 19 of 40 respondents) specifically indicated that they practice "catch and release". These results should be compared with caution to the angler questionnaire results since the

TABLE 4-7

TOTAL ESTIMATED NUMBERS OF FISH CAUGHT AND RELEASED FROM THE RED AND ASSINIBOINE RIVERS IN 1995[a]

	WALLEYE	NORTHERN PIKE	CATFISH	PERCH	OTHER	TOTALS
RED RIVER						
Number caught	106,892	32,881	150,308	26,540	227,342	543,963
Number kept	28,867	2,030	3,975	14,923	26,123	75,918
Percent released	73%	94%	97%	44%	89%	86%
ASSINIBOINE RIVER						
Number caught	19,377	5,579	28,679	4,184	19,683	99,502
Number kept	8,353	1,911	1,806	1,181	1,322	14,572
Percent released	57%	66%	97%	72%	93%	81%

a = Wall *pers. comm.* 1999: from a 1995 joint DNR/DFO mail-in angler questionnaire and are estimates based on an estimated population of 157,004 anglers who fished in Manitoba in 1995, with an estimated 30,388 anglers fishing on the Red River and 5,641 anglers fishing on the Assiniboine River (Sonsini *pers. comm*. 2000).

angler survey respondents were not directly asked if they practice “catch and release” (ref. Section 4.1.4.2 and Appendix A).

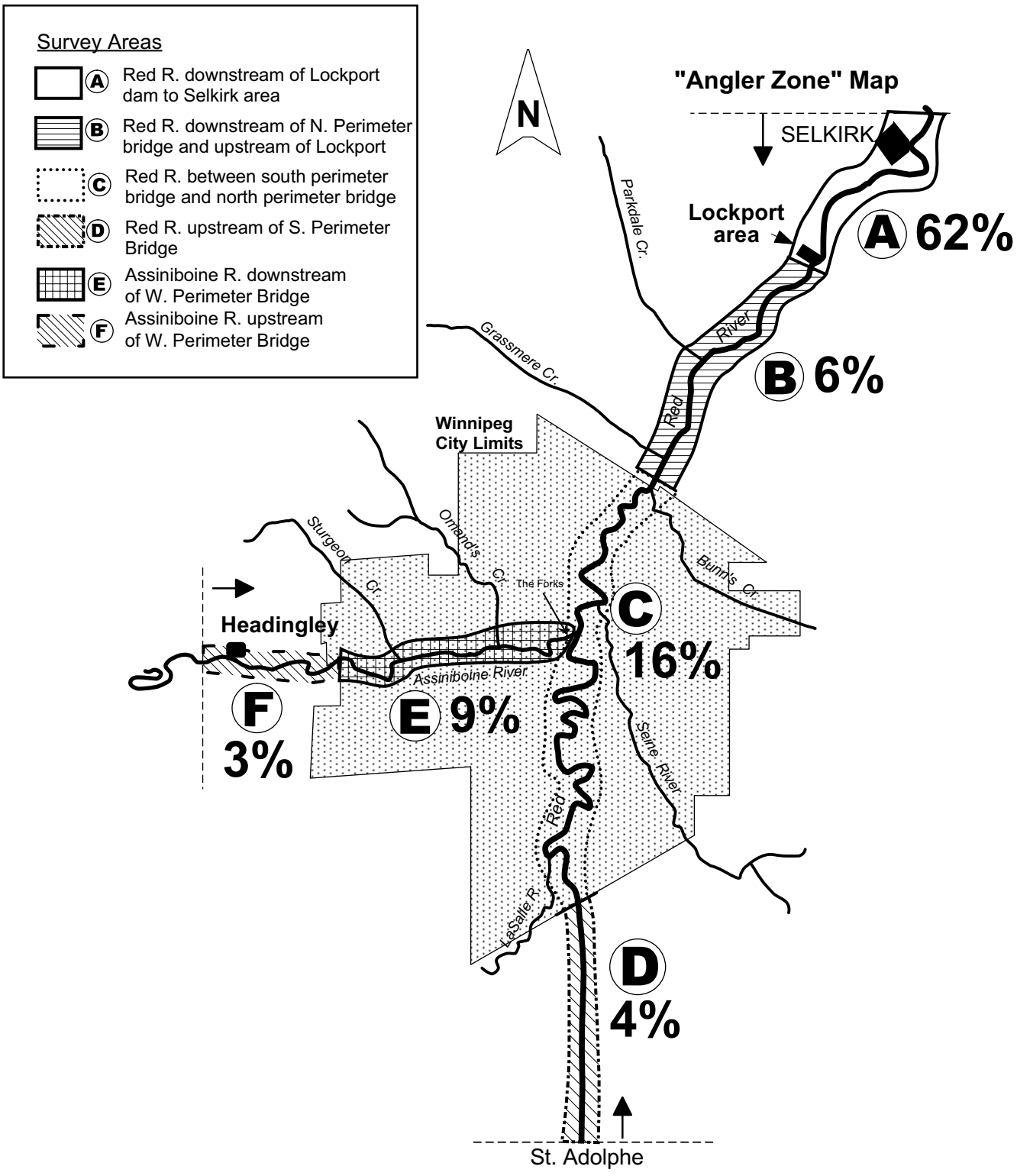
4.1.2 Spacial Distribution of Angling Effort

As indicated by the 1999 on-site angler survey results in Section 4.1.1, the majority of angling effort within the study area is concentrated on the Red River in the Lockport area. This finding is further supported by the results of 218 completed angler questionnaires which indicated that anglers who fish on the Red and/or Assiniboine rivers in 1998 spent an average of 62% of their angling time in the Lockport area (ref. Figure 4-7). The reach of Red River within the City limits was the second most frequented area with anglers spending an average 16% of their time there (ref. Figure 4-7).

Results of a 1994 DNR mail-in angler questionnaire (n = 225 respondents) indicated that 32% of respondents (n = 71) fished within the City of Winnipeg perimeter (Scaife 1995). Of the anglers interviewed during on-site angler surveys on the Red and Assiniboine rivers within the City of Winnipeg in 1994, most spent at least 60% of their total angling time fishing in Winnipeg (n = 269 respondents; ref. Kitch 1994).

Results from the on-site angler surveys on May 16, 1999, indicate that half of the anglers surveyed on the Red River within City limits were fishing upstream of both the South and North WPCCs (ref. Figure 4-8 and Appendix E, Table E-10). Twenty percent of Red River urban area anglers were fishing downstream of the NEWPCC, with 30% of urban anglers fishing downstream of the SEWPCC but upstream of the NEWPCC (ref. Figure 4-8).

Of the anglers who fish on the Red and/or Assiniboine rivers, the angler questionnaire results from 1999 indicate that only an average of 12% of respondents’ angling time is spent along the Assiniboine River, with in the reach within the City limits (from The Forks west to the west Perimeter Bridge) being more frequently fished (9%) than the area west of the City limits to Headingley (3%; ref. Figure 4-8).



n = 218 respondents

Average Percent Fishing Time in Each Angler Zone in 1998

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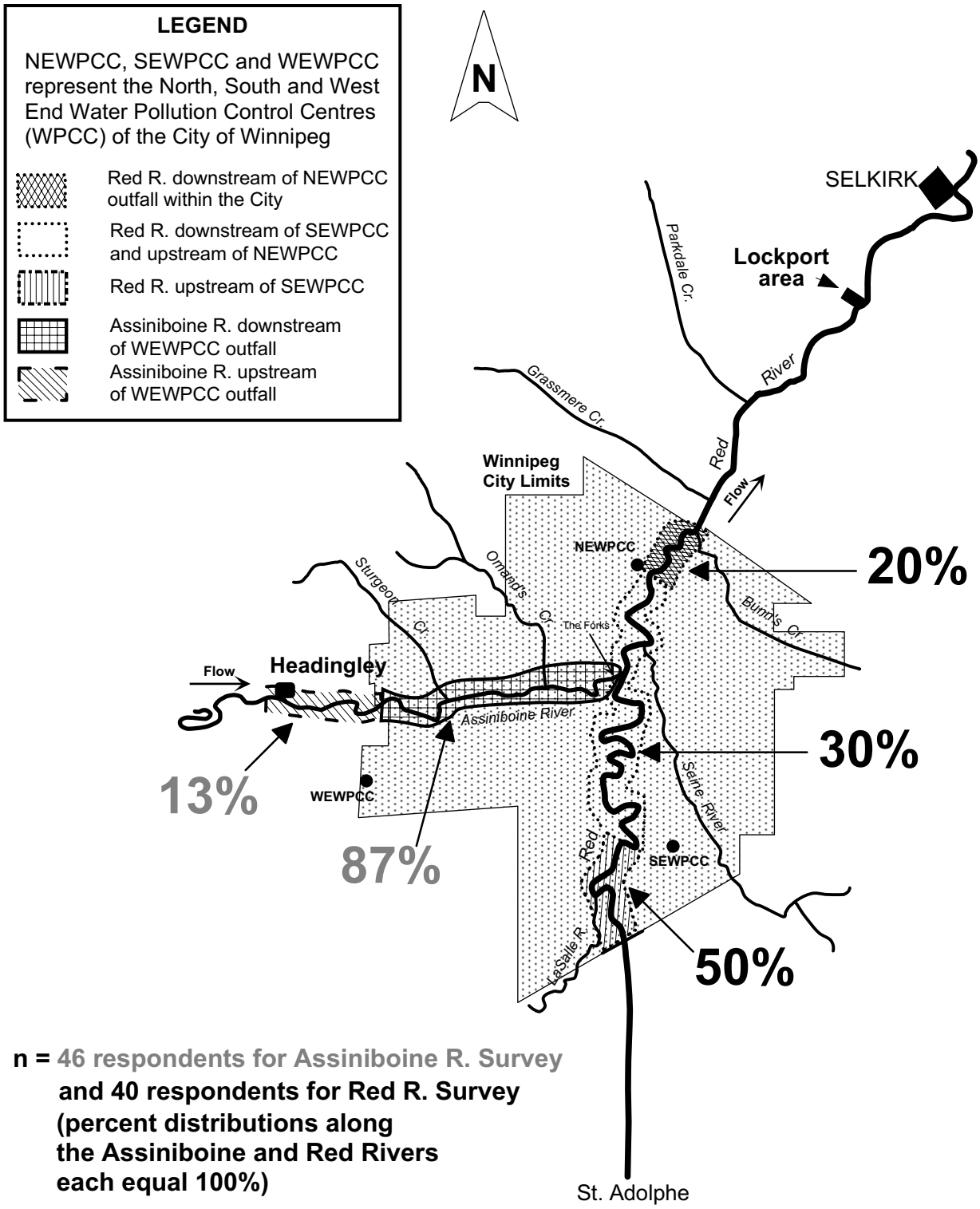
Figure 4-7



n = 46 respondents for Assiniboine R. Survey and 40 respondents for Red R. Survey (percent distributions along the Assiniboine and Red Rivers each equal 100%)

Distribution of Anglers Surveyed Along the Red and Assiniboine Rivers Within the City of Winnipeg on May 16,1999

Figure 4-8

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Results from the on-site angler survey on the Assiniboine River on May 16, 1999, indicate that the majority (87%) of anglers were fishing downstream of the WEWPCC outfall along the Assiniboine River (ref. Figure 4-8 and Appendix F, Table F-10).

It should be noted that number of anglers and angler distribution along the Red and Assiniboine rivers within the City of Winnipeg is primarily influenced by ease and convenience of access to the riverbank areas rather than perceived water quality issues (ref. Kitch 1994).

4.1.3 Seasonal Distribution of Angling Effort

Results of the angler questionnaires from 1999 indicate that the majority of anglers fished during the spring and summer seasons on the Red (57%) and the Assiniboine rivers (74%; ref. Figure 4-9). During times of colder water temperatures and lower flows (i.e., fall and winter), more anglers fish during the fall on the Red and Assiniboine rivers (29% and 23%, respectively) compared to during the winter on these rivers (14% and 3% respectively; ref. Figure 4-9). These results are similar to those obtained from a 1994 angler questionnaire study (Scaife 1995) which indicated that 71% of fishing effort takes place during the spring and summer with 28% during the fall on the Red and Assiniboine rivers in the City (n = 151 responses from 71 respondents).

4.1.4 Angler Perception of the Sport Fishery

4.1.4.1 Angling Success/Quality of Fishing

During on-site angler surveys in 1999, when anglers were asked about their general fishing success on the river they were fishing (ref. Appendix A, Question #9), the majority of anglers on the Assiniboine River (71%; n = 46 respondents) indicated that they thought their fishing success had either increased or stayed about the same (ref. Table 4-8).

Anglers fishing on the Red River at Lockport indicated a similar level of fishing success with 68% (n = 78 respondents) indicating fishing had either increased or stayed about the same (ref.

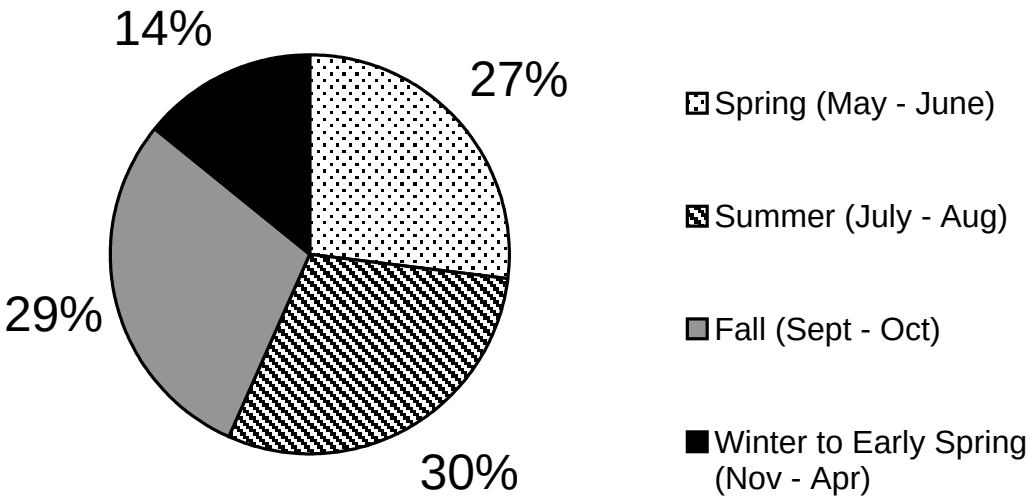

Figure 4-9a Seasons During Which Fishing Took Place on the Red River (n = 532 responses)
Number of people who responded to this question= 226

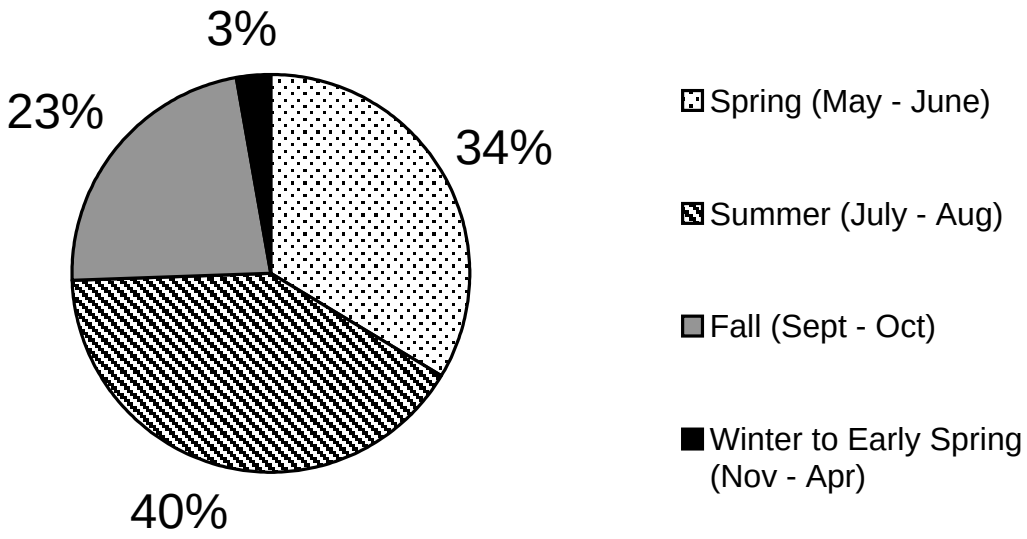

Figure 4-9b Seasons During Which Fishing Took Place on the Assiniboine River (n = 173 responses)
Number of people who responded to this question= 99

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Seasons During Which Fishing Took Place in 1998
Figure 4-9

TABLE 4-8

RESPONDENTS' OPINIONS REGARDING THEIR FISHING SUCCESS ON THE RED AND ASSINIBOINE RIVERS (DATA FROM ON-SITE ANGLER SURVEYS IN 1999)

RESPONDENT LOCATION (RIVER IN QUESTION)	OPINION REGARDING FISHING SUCCESS				NUMBER OF RESPONDENTS
	INCREASED	DECREASED	ABOUT THE SAME	NO OPINION	
Urban Reach of Red River	32%	30%	18%	20%	40
Red River at Lockport	28%	13%	40%	19%	78
Assiniboine River	26%	9%	45%	20%	46

Table 4-8). The owner and operator of a prominent sport fishing outfitter/guide business at Lockport since 1988 indicated that fishing success has been stable, in general, over the past 11 years (McKay *pers. comm*. 2000). Only half of the anglers surveyed along the Red River within the City indicated their fishing success had increased or stayed about the same (n = 40 respondents; ref. Table 4-8).

Respondents to the angler questionnaires in 1999 were asked to rate fishing along the Red and Assiniboine Rivers (ref. Appendix B, Questions #7 and #8). The majority of respondents (65%, n = 230 respondents) indicated that fishing was either good or excellent along the Red River (ref. Figure 4-10a). Just over half of respondents (53%, n = 102) indicated that fishing was either good or excellent along the Assiniboine River (ref. Figure 4-10b).

Results from a 1994 survey of anglers on the Red and Assiniboine rivers in Winnipeg indicated that the majority of anglers fishing on these rivers thought that the fishing was either good or excellent (57% to 64% of 269 respondents; Kitch 1994). Results for this same question from the 1994 DNR mail-in angler questionnaire indicated that 62% (n = 44) of respondents (total respondents = 71) thought that fishing on Winnipeg's rivers was either good or excellent (Scaife 1995).

Respondents to the angler questionnaire from this 1999 study were also asked their opinions regarding the quality of fishing on the rivers in the City (includes the Red and/or Assiniboine rivers; ref. Appendix B, Question #11). Of the 230 people who responded to this question, 70% indicated that the quality of fishing on the rivers in the City had been increasing or staying about the same (ref. Table 4-9). In contrast, angler questionnaire results from a 1994 survey indicated that 47% (n = 32) of 68 respondents thought the quality of fishing on the rivers in the City had been increasing or staying the same (Scaife 1995; ref. Table 4-9).

Table 4-10 compares the percentage of questionnaire respondents from this 1999 study who indicated that the quality of fishing was either increasing or decreasing on the rivers in the City to respondents' opinions of their fishing expertise and their number of years fishing on these rivers. Figure 4-11 summarizes the perceived level of fishing experience for all respondents who answered this question (ref. Appendix B, Question #17).

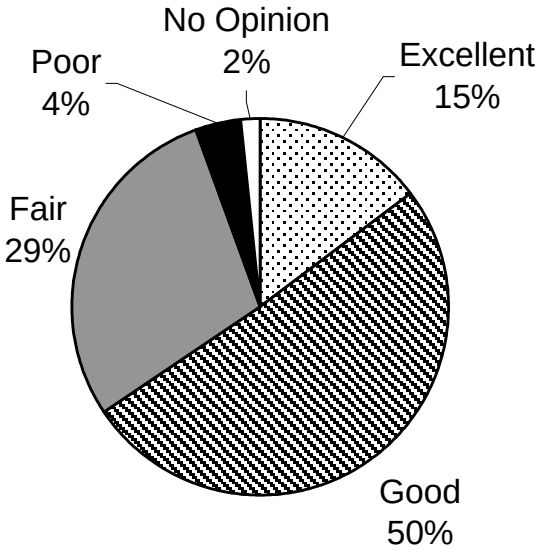

Figure 4-10a Opinions of Fishing Along the Red River
(n = 230 respondents)

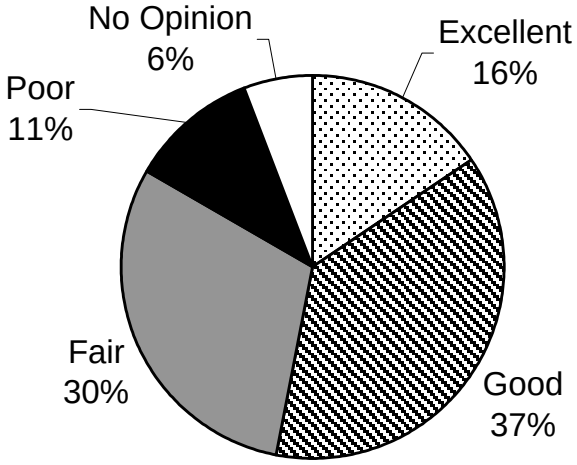

Figure 4-10b Opinions of Fishing Along the Assiniboine River
(n = 102 respondents)
Note: Five of six respondents who indicated "no opinion" did not indicate whether they fished on the Red or Assiniboine Rivers

Questionnaire Respondents' Opinions of Fishing Along the Red and Assiniboine Rivers During 1998

Figure 4-10

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TABLE 4-9

QUESTIONNAIRE RESPONDENTS' OPINIONS REGARDING THE QUALITY OF FISHING ON THE RIVERS IN THE CITY OF WINNIPEG

	NUMBER AND % OF RESPONDENTS	
QUALITY OF FISHING	**1999 ANGLER QUESTIONNAIRE (THIS STUDY)**	**1994 DNR ANGLER QUESTIONNAIRE[a]**
Increased	62 (27%)	7 (10%)
Decreased	23 (10%)	24 (35%)
Stayed About the Same	99 (43%)	25 (37%)
No Opinion	46 (20%)	12 (18%)
Total Respondents	230	68

[a] = Scaife 1995

TABLE 4-10

ANGLER QUESTIONNAIRE RESPONDENTS' OPINIONS REGARDING QUALITY OF FISHING VERSUS ANGLER EXPERTISE AND EXPERIENCE[a]

OPINION REGARDING QUALITY OF FISHING	ANGLER EXPERTISE			AVERAGE ANGLER EXPERIENCE (YEARS)
	EXPERIENCED OR VERY EXPERIENCED	AVERAGE	BEGINNER	
INCREASING (n = 63 respondents)	57% (n = 36)	41% (n = 26)	3% (n = 1)	14 (n = 63 respondents)
DECREASING (n = 23 respondents)[b]	48% (n = 11)	39% (n = 9)	0%	23 (n = 20 respondents)

[a] = data from 1999 questionnaire survey
[b] = 13% (n = 3) did not answer the angler expertise question (refer to Appendix G for data)

4.1.4.2 Fish Consumption/Perception of Water Quality

For both the on-site angler surveys and the angler questionnaire survey conducted in 1999, a question was asked regarding whether anglers ate the fish they kept and to give a reason if fish were not usually eaten (ref. Appendices A and B). Results of this question provided insight into anglers perception of water quality and also provided information on "catch and release" practices (ref. Section 4.1.1). Information on angler's perception of water quality in the City's rivers has also been provided by previous angler studies.

On-Site Angler Survey Results

Of the 46 anglers interviewed along the Assiniboine River on May 16, 1999, approximately 27% eat the fish they keep (ref. Appendix F, Table F-6). Of the anglers who did not eat the fish they keep (n = 35 or 73%), 20% (n = 7) indicated that they practice "catch and release". Excluding those anglers who practice "catch and release", or did not give a reason for not eating the fish (n = 5), the majority of anglers who don't eat the fish they keep cited perceived pollution or water quality concerns (78%, n = 18). The remaining three anglers (13%) indicated that they prefer to eat only walleye.

Of the 78 anglers interviewed at Lockport along the Red River on May 16, 1999, approximately 40% (n = 35) eat the fish they keep (ref. Appendix D, Table D-5). Of the anglers who responded that they do not eat the fish they keep (n = 53 or 60%), 23% (n = 12) indicated that they practice "catch and release". Excluding those respondents who practice "catch and release", Table 4-11 summarizes Lockport anglers' reasons for not eating the fish they keep. Note that 34% of anglers (n = 14) cited perceived pollution or other water quality concerns.

Of the 38 responses to this question from the 40 anglers interviewed along the Red River within the City, approximately 24% (n = 9) eat the fish they keep (ref. Appendix E, Table E-6). Of the anglers who responded that they do not eat the fish they keep (n = 29 or 74%), 79% (n = 19) indicated that they practice "catch and release". Of the remaining 10 respondents, 2 people (20%) did not give a reason for not eating the fish and 8 people (80%) indicated perceived water quality or pollution concerns.

TABLE 4-11

LOCKPORT SURVEY RESPONDENTS' REASONS FOR NOT EATING FISH KEPT

REASONS FOR NOT EATING FISH KEPT[a]	NUMBER OF RESPONSES	% OF RESPONSES
Pollution/water quality concerns	14	34%
Depends on species caught[b]	14	34%
Don't like/don't eat fish	11	27%
Too time-consuming or don't like to fillet	1	2%
Regulations for large catfish don't permit	1	2%
TOTALS	41	100%

[a] = excluding those anglers who practice "catch and release"
[b] = seven respondents will eat only walleye

Results from a survey of anglers on the Red and Assiniboine rivers within Winnipeg in 1994 indicated that a slightly higher proportion of anglers on both rivers did not eat the fish they kept (57% to 59%; Kitch 1994; ref. Table 4-12).

For this 1994 study, anglers on the north section of the Red River responded most strongly that "pollution" was the reason they don't eat the fish (98%), followed by anglers on the south section of the Red River (84%), then anglers on the Assiniboine River (68%) (Kitch 1994).

During this same survey (Kitch 1994), anglers along the Red and Assiniboine rivers were asked to rank the importance of a list of nine items that would "improve your enjoyment of fishing in Winnipeg's rivers". The "improve water quality" selection was given the highest importance rank (i.e., 5 = important, 0 = not important) by approximately 76% to 88% of respondents (n = 269). This same question was included in a mail-in angler questionnaire conducted by DNR in 1994 (Scaife 1995). The "improve water quality" selection was again ranked as the most important factor in improving angler enjoyment of fishing on Winnipeg's rivers (total respondents = 71; ref. Scaife 1995).

Angler Questionnaire Results

For the angler questionnaire survey conducted in 1999, responses to the question "do you eat the fish you keep?" indicated that 76% of respondents (n = 141) eat the fish they keep and 24% (n = 45) do not. Compared to the results of a 1994 angler survey (Kitch 1994; ref. Table 4-12), it appears that significantly more anglers now eat the fish they keep.

For the 1999 study, 35% of respondents who provided a reason for not eating the fish they keep (n = 15) cited perceived water quality or pollution concerns (ref. Table 4-13). Table 4-14 lists other reasons respondents gave for not eating the fish they keep.

Results of a mail-in questionnaire survey conducted by DNR in 1994 indicated that 74% of respondents do not eat the fish they catch (total respondents = 70; Scaife 1995). Of those respondents who gave a reason for not eating the fish they caught (n = 47) 11% (n = 5) indicated they practice "catch and release". Table 4-14 lists other reasons the remaining 42 respondents gave for not eating the fish they caught in Winnipeg's rivers.

TABLE 4-12

RESPONSES TO THE QUESTION "DO YOU EAT THE FISH YOU CATCH" FROM A 1994 SURVEY OF ANGLERS IN THE CITY OF WINNIPEG (after; Kitch 1994)

	"YES"	"NO"
North Red River (Forks to N. Perimeter Bridge)	41%	59%
South Red River (Forks to S. Perimeter Bridge)	43%	57%
Assiniboine River (Forks to W. Perimeter Bridge)	42%	58%

n = 269 respondents (Kitch 1994)

TABLE 4-13

ANGLER QUESTIONNAIRE RESPONDENTS'
REASONS FOR NOT EATING THE FISH THEY KEEP[a]

REASONS FOR NOT EATING FISH CAUGHT[b]	NUMBER OF RESPONSES	% OF RESPONSES
Pollution/water quality concerns	15	35%
Don't like/don't eat fish	10	23%
Won't eat/don't like fish from Red River	8	19%
Too time-consuming or don't like to fillet	3	7%
Can't fillet	3	7%
Mercury concerns in fish	2	5%
"Need more information"	1	2%
Unsure of regulations	1	2%
TOTALS	43	100%

[a] = data from questionnaire survey conducted from this study in 1999
[b] = excluding those anglers who practice "catch and release"

TABLE 4-14

DNR 1994 ANGLER QUESTIONNAIRE RESPONDENTS'
REASONS FOR NOT EATING THE FISH THEY KEEP (Scaife 1995)

REASONS FOR NOT EATING FISH CAUGHT[a]	NUMBER OF RESPONSES	% OF RESPONSES
Pollution/water quality concerns	27	64%
Concerned about quality of fish	7	17%
Fish species you can catch in City's rivers not desirable	4	10%
Don't like/don't eat fish	2	5%
Don't know how to prepare fish	2	5%
TOTALS	**42**	**100%**

[a] = excluding those anglers who practice "catch and release"

Results of the mail-in questionnaire survey conducted by DNR in 1994 also indicated that of the 68% of licenced angler respondents who did not fish within the City of Winnipeg perimeter (total respondents = 225), 61% cited concern about the rivers' water quality (Scaife 1995).

4.1.5 Economic Importance of the Red and Assiniboine River Sport Fisheries

Results of the angler questionnaires from 1999 indicate that approximately 31% ($71,826) of total fishing-related expenditures ($231,621) were spent fishing on the Red and Assiniboine rivers by people who spent some time fishing in 1998 within the survey area (ref. Figure 4-8 for survey areas; ref. Table 4-15 and Appendix G, Table G-12).

Results of this study's 1999 angler questionnaire indicate an average of $1,182 was spent per angler on fishing in Manitoba in 1998 (ref. Table 4-15).

Results of a joint DNR/DFO mail-in questionnaire survey conducted in 1995 indicated a much lower average resident angler expenditure amount on fishing in Manitoba ($397; DNR 1995). Data regarding the number of respondents who answered expenditure questions for that survey is not available, nor is information available on the proportion of expenditures related to fishing on the Red and/or Assiniboine rivers. However, results from this study's angler questionnaire indicate that an average of $368 was spent per angler on fishing in the Red or Assiniboine rivers in 1998 (ref. Table 4-15).

4.2 BAIT FISHERY

The following results include bait fishing information from six of the eight bait fishers licenced to commercially fish for bait from the Red River. Most of the bait fishers on the Red River are the same fishers that have renewed their licences year after year for at least the past ten years. Therefore, the bait fishing effort on the Red River likely hasn't changed significantly during at least the past decade (Scaife *pers. comm*. 1999). There are no licenced bait fishers fishing for bait fish along the mainstream of the Assiniboine River.

TABLE 4-15

ANGLER QUESTIONNAIRE RESPONDENTS' EXPENDITURES ON FISHING

	1998 EXPENDITURES ON FISHING PER HOUSEHOLD	
	In Manitoba (Total)	**Only on the Red and/or Assiniboine Rivers**
Total	$231,621	$71,826
Average	$ 1,182	$ 368

n = 196 respondents

4.2.1 Harvesting Pressure on the Red River

4.2.1.1 Bait Fishing Effort

In terms of bait fishing effort (days spent bait fishing each year), the six bait fishers interviewed spent a total of 412 days bait fishing on the Red River between May and October each year (ref. Appendix K, Table K-1). Additionally, three bait fishers had employees fishing from a separate boat at the same time, thereby doubling the effort of these individual bait fishers. Therefore, the total bait fishing effort for all bait fishers including employees' efforts was 639 bait fishing days each year (ref. Appendix K, Table K-1).

To provide an estimate for the total number of bait fishing days for all licenced bait fishers on the Red River, the number of bait fishing days for the two remaining bait fishers not interviewed can be estimated by assuming the two bait fishers fished approximately the average number of bait fishing days spent by the six interviewed bait fishers (and assuming no additional employee-run boats for the remaining bait fishers). The average number of days spent bait fishing on the Red River for the six interviewed bait fishers is 69 days. Therefore, an estimate of the total number of bait fisher days for all licenced bait fishers on the Red River is approximately 777 days.

4.2.1.2 Total Catch

The total production (number of 170g cartons) from the Red River in 1998 of the six interviewed bait fishers was 108,825 cartons of bait fish (ref. Appendix K, Table K-2). The average number of bait fish per carton is approximately 45 fish (Kaplan *pers. comm*. 2000). Therefore, an estimate of the total number of bait fish caught in 1998 by the six bait fishers interviewed was 4,897,125 fish (ref. Appendix K, Table K-2).

To provide a total catch estimate for all licenced bait fishers on the Red River for 1998, the total catch for the two other bait fishers not interviewed can be estimated by assuming the other two bait fishers caught the average number of fish caught by the six interviewed bait fishers. Therefore, an estimate of the total Red River catch for all licenced bait fishers in 1998 is 6,529,500 bait fish.

4.2.1.3 Frequency of Species Caught

The proportion of different species caught by bait fishers is not typically known with a reasonable degree of certainty. Three of the interviewed bait fishers identified either all or the majority of their catch as "shiners" (ref. Appendix K, Table K-3). One bait fisher identified all of his catch as sand shiners, with another bait fisher identifying all of is catch as emerald shiners. These two bait fishers fished the same areas in similar proportions although they each used different gear (ref. Appendix K, Tables K-1 and K-3). Also, the proportion of each type of minnows caught only in the Red River is not known. Therefore an estimate of the numbers of each species caught in the Red River cannot be provided. The one bait fisher who identified the proportions of his catch to species spent 80% of his time fishing in the Red River and caught 90% emerald shiners, 7% spottail shiners and 3% tullibee (ref. Appendix K, Tables K-1 and K-3). Given the range and habitat preference of these species (ref. Scott and Crossman 1985), it is likely that emerald shiners and spottail shiners make up the majority of bait fishers catch in the areas of the Red River fished by bait fishers.

4.2.2 Spacial Distribution of Bait Fishing Effort

All of the six interviewed bait fishers fish the reach of the Red River north of Selkirk with two of the six bait fishers fishing from Breezy Point north to Lake Winnipeg (ref. Appendix K, Table K-1 and Figure 1-1). The average percentage of total bait fishing time spent on the Red River was 70% (range = 45% to 100%) for the six interviewed bait fishers (ref. Appendix K, Table K-1). The remaining bait fishing time for all bait fishers is typically spent on Lake Winnipeg, with one bait fisher occasionally fishing on Fairford River (up to 25% of time, depending on the year).

4.2.3 Seasonal Distribution of Bait Fishing Effort

Bait fishing season typically extends from May through to October each year. All of the six bait fishers interviewed indicated that the majority of their catch was caught in June (i.e., June was ranked #1 in terms of "importance"; ref. Table 4-16). The next most important month for bait fishing was May with the least important month for bait fishing being October. The month of

TABLE 4-16

THE RELATIVE IMPORTANCE OF EACH MONTH FOR BAIT FISHING ON THE RED RIVER

BAIT FISHER #	IMPORTANCE RANK FOR EACH MONTH[a]					
	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
1	2	1	5	3	4	6
2	5	1	5	2	3	6
3	2	1	2	3	3	4
4	2	1	2	3	3	4
5	2	1	3	3	4	6
6	1	1	4	3	2	6
Totals	**14**	**6**	**21**	**17**	**19**	**32**
Average	**2.3**	**1.0**	**3.5**	**2.8**	**3.2**	**5.3**

[a] = where 1 is most important and 6 is least important (note that some respondents gave the same rank to more than one month)

July is the second least important month for bait fishing with most bait fishers noting during the interviews that most minnows move to deeper, cooler water during mid-summer.

4.2.4 Bait Fisher Perception of the Bait Fishery

Although not specifically indicated on the bait fisher phone interview script (ref. Appendix C), bait fishers were asked about their bait fishing success on the Red River over the years they have been bait fishing. Opinions were variable regarding bait fishers harvesting success over the years they have bait fished (ref. Table 4-17). However, three of the five bait fishers that were asked about their trend in fishing success indicated that their bait fishing success has remained about the same. One bait fisher who has been bait fishing annually for 55 years indicated that his bait fishing success has generally improved over the years he has been bait fishing. Two of five bait fishers indicated that fishing success depended on water levels and weather/water temperatures (ref. Table 4-17).

4.2.5 Economic Importance of the Red River Bait Fishing Industry

The total revenue obtained from bait fishing on the Red River in 1998 by the six bait fishers interviewed was $130,055, with the average income being $21,676 (range: $55 to $72,500; ref. Appendix K, Table K-2).

The total revenue from all bait fishers who fish on the Red River can be estimated by assuming the other two bait fishers not interviewed earned the average revenue calculated from the six bait fishers interviewed (ref. Appendix K, Table K-2). Therefore, an estimate of the total revenue obtained from bait fishing on the Red River in 1998 is approximately $173,400.

The estimated total revenue for bait sales in all of Manitoba for the 1998/99 fiscal year was $688,500 (includes sales of live and frozen bait fish, and leaches; Scaife *pers. comm*. 2000). Therefore, the estimiated bait fishing revenue generated on the Red River within the study area is approximately 25% of the total estimated bait fishing revenue in Manitoba.

TABLE 4-17

BAIT FISHERS' PERCEPTION OF THEIR BAIT FISHING SUCCESS ON THE RED RIVER

BAIT FISHER SURVEY #	GENERAL OPINION OF BAIT FISHING SUCCESS			YEARS BAIT FISHING	COMMENTS
	INCREASING	DECREASING	STAYING ABOUT THE SAME		
1		√		9	First 3 to 4 years good. After that, not so good. Has been dropping off gradually over past 9 years.
2			√	15	Staying about the same over past 15 years.
3	√			55	Has improved over past 55 years in general; never any shortage of minnows.
4		√	√	12	Last 3-4 years productivity has been down a bit but depends on water levels and weather; previous years, no real trend, plenty of minnows.
5			√	10	Has been staying about the same, really depends on water level changes and water temperatures.

Note: Did not speak directly to bait fisher #6 (survey questions from Appendix C were answered by his wife. Therefore, an opinion on bait fishing success was not obtained from bait fisher #6).

5. IMPLICATIONS OF RESULTS

5.1 RELATIVE IMPACT TO FISH POPULATIONS

Angler questionnaire results show that the reach of the Red River within the study area (ref. Figure 1-1) receives approximately 6 to 7 times more harvesting pressure in terms of angler-days with the majority of angler-days (approximately 62%) spent in the Lockport area 20 km downstream of the City of Winnipeg (data from this study and DNR 1995; ref. Figure 4-7). This disproportionate number of angler-days spent on the Red River correlates with a significantly larger proportion of fish angled from the Red River compared to the Assiniboine River. Manitoba Conservation data from a questionnaire survey of anglers conducted in 1995 estimate that approximately seven times more fish are caught in the Red River than the Assiniboine River (Wall *pers. comm.* 1999). Regarding forage fish species, licenced bait fishing only occurs upstream of Lockport within the study area.

Although proportionally more fish are caught in the Red River compared to the Assiniboine River each year, the Red River also provides significantly more fish habitat area within the study area and therefore likely supports much larger fish populations, although estimate ranges of total fish populations in the two rivers within the study area cannot be accurately determined with existing data (Remnant *pers. comm.* 2000).

Although a certain proportion of the fish populations in both rivers are caught each year by anglers, it is unlikely that all fish caught are removed from the populations since certain proportions of fish caught are subsequently released. Results of this and other studies indicate that, overall, the majority of fish caught by anglers on the Red and Assiniboine rivers are released (approximate range 81% to 86%; refer to this study's angler questionnaire results and DNR/DFO 1995 questionnaire data [Wall *pers. comm.* 1999 in Section 4.1.1.3]). Observations of anglers during on-site angler surveys along these rivers suggest that most fish are immediately released rather than held in live wells since approximately 81% to 94% of anglers along these rivers fish from shore, docks or other structures rather than boats (ref. Appendices D to F and Kitch 1994) and do not have live well storage with them as opposed to some fishing boats. Immediate release of angled fish may increase probability of released fish survival. A

certain proportion of fish that are caught then released by angling likely die as a result of injury and stress.

The few studies that have investigated mortality rates resulting from catch and release angling suggest that mortality rates vary considerable and are influenced by factors such as fish species, size of fish, type of bait (especially size and type of hook), angling time, season and air temperature (e.g., Carbines 1999; Thompson *et al*. 1999; Bettoli and Osborne 1998; Lukacovic and Uphoff 1998; Nelson 1998). Therefore, the mortality rates for fish caught and released in the Red and Assiniboine rivers cannot be accurately estimated. Although all forage fish species caught by bait fishers are removed from the population, no population studies of forage fish in the Red River are available. Therefore the proportion of forage fish removed annually from the Red River cannot be estimated.

There is also a species bias regarding fish that are removed from the Red and Assiniboine rivers by angling and bait fishing practices. Anglers catch proportionately more catfish species, walleye and freshwater drum than any other fish species. Walleye are more commonly kept than the other most commonly caught species (ref. Section 4.1.1.3 and Tables 4-4 and 4-7). Bait fishers primarily remove two species of forage fish (emerald shiners and spottail shiners; ref. Section 4.2.1). Since the various fish species that occur in the Red and Assiniboine river systems occupy different “niches” in these two riparian ecosystems it is likely that any “significant” disruption or shift in any one species population will likely affect other species populations to varying degrees. Results of the various Red and Assiniboine river angler surveys that have been done to date provide no evidence to suggest any significant impact has occurred to fish populations as a result of sport or bait fishing.

5.2 RELATIVE HEALTH OF THE FISHING INDUSTRY

It is assumed that any significant decrease in key fish species populations would affect the numbers of anglers and bait fishers willing to spend time and other resources fishing on these rivers and would thus negatively affect the overall perceived “health” of the fishing industry. The relative “health” of the fishing industry on the Red and Assiniboine rivers is closely related to the

overall "health" of fish populations and is gauged primarily by changes in overall fishing effort each year and sport and bait fishers' perceptions of their fishing success over time.

Regarding the sport fishing industry on the Red and Assiniboine rivers, results of Manitoba Conservation angler surveys conducted every five years since 1985 have indicated increased angler effort (in terms of angler-days) during the 1990s in the southern designated sport fishing area of Manitoba which includes the Red and Assiniboine rivers (ref. Figure 4-1). Bait fishing efforts by licenced bait fishers on the Red River have remained relatively stable over the past 10 years (Scaife *pers. comm*. 1999).

In general, angler perceptions of their fishing success and the quality of fishing along the Red and Assiniboine rivers since 1994 have been primarily described as "increasing or staying about the same" for fishing success and "good" to "excellent" for quality of fishing (ref. Section 4.1.4.1). Only one bait fisher indicated an overall decrease in bait fishing success with four bait fishers indicating an overall increase in success, or their bait fishing success has remained about the same (ref. Table 4-17).

This study's assessment of angler and bait fishers' perception of their fishing success over time suggests that there is no overall negative trend in fishing success even though many anglers remain concerned about river water quality (ref. Section 4.1.4.2). In general, the "health" of the fishing industry appears to be stable, suggesting that fish populations are also generally stable.

5.3 IMPLICATIONS REGARDING AMMONIA CONTROL

Although no conclusions can be made regarding possible effects of ammonia discharges from City WPCCs on fish populations or angler and bait fishing success, results of this study and previous angler surveys indicate that key sport and bait fish populations have remained relatively stable for at least the past six years.

Overall, the results of this resource harvesting study of the Red and Assiniboine rivers indicate that the sport and bait fisheries of the study area appear healthy and display no patterns which could be attributed to potential stresses such as ammonia discharges from the City's WPCCs.

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6.2 PERSONAL COMMUNICATIONS

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APPENDIX A

ON-SITE ANGLER SURVEY FORM

SECTION 3 - ANGLER INFORMATION:

15. Resident of Manitoba? Yes ☐ No ☐

If Yes, resident of Winnipeg? Yes ☐ No ☐

16. How many years have you been fishing on the Red and/or Assiniboine Rivers?

_____ years

17. How would you describe your level of fishing expertise?

Very experienced ☐ Experienced ☐

Average ☐ Beginner ☐

Thank you for your Input!

Please return your completed questionnaire to the Urban Angling Partnership booth located on the 1st floor by the stage area.

If for any reason you cannot complete this questionnaire today, please complete it within the next few days and return to:

City of Winnipeg
Angler Survey
c/o TetrES Consultants Inc.
603 - 386 Broadway
Winnipeg, MB
R3C 3R6

City Logo

Self-addressed stamped envelopes are available on request.

CITY OF WINNIPEG
ANGLER QUESTIONNAIRE
FOR THE RED & ASSINIBOINE RIVERS

We are interested in your fishing experiences **ON THE RED AND/OR ASSINIBOINE RIVERS** in 1998:

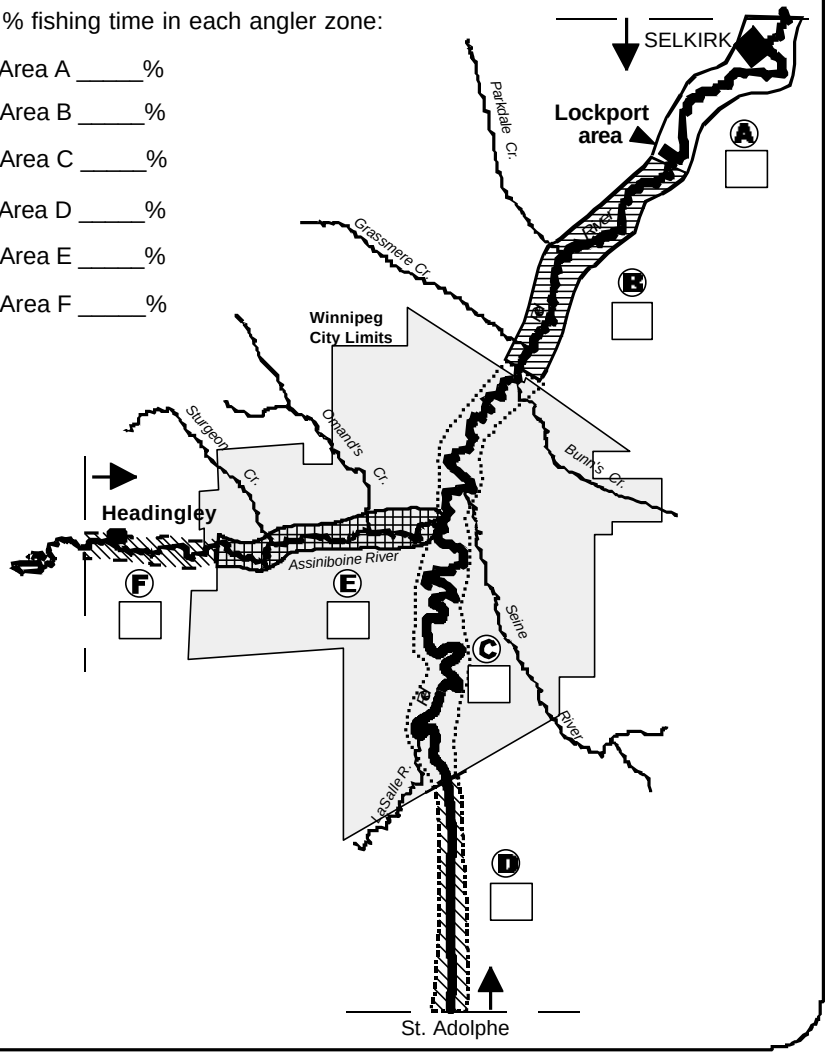
SECTION 1 - ANGLER EXPERIENCE:

1. Using the "Angler Zone" map, check the boxes corresponding to the "Angler Zones" in which you've fished during 1998.

2. % fishing time in each angler zone:

Area A _____%
Area B _____%
Area C _____%
Area D _____%
Area E _____%
Area F _____%

"Angler Zone" Map



City Logo

3. On Average, how many days do you spend fishing in Manitoba each year?
_____days

4. # of days spent fishing on the Red and/or Assiniboine rivers within the "Angler Zone" map area in 1998: _____days

5. During which seasons do you fish on the Red River?

Spring (May-June) ☐ Summer (July-Aug) ☐

Fall (Sept-Oct) ☐ Winter to early Spring (Nov-Apr) ☐

6. During which seasons do you fish on the Assiniboine River?

Spring (May-June) ☐ Summer (July-Aug) ☐

Fall (Sept-Oct) ☐ Winter to early Spring (Nov-Apr) ☐

7. How would you rate fishing along the Red River?

Excellent ☐ Good ☐ Fair ☐ Poor ☐ No opinion ☐

8. How would you rate fishing along the Assiniboine River?

Excellent ☐ Good ☐ Fair ☐ Poor ☐ No opinion ☐

9. Which species do you usually fish for?

Walleye ☐ Catfish ☐ Goldeye ☐ Pike ☐

Perch ☐ Freshwater drum (silver or sheepshead bass) ☐

Other species _____ No preference (any species) ☐

10. Which species did you usually catch in 1998?

Walleye ☐ Catfish ☐ Goldeye ☐ Pike ☐

Perch ☐ Freshwater drum (silver or sheepshead bass) ☐

Other species _____

11. In your opinion, the quality of fishing on the rivers in the City is:

Increasing ☐ Decreasing ☐

Staying about the same ☐ No opinion ☐

12. How often do you practice "catch-and-release"?

Always release ☐ Usually ☐

Sometimes ☐ Rarely, I usually keep my catch ☐

13. Do you eat the fish you keep?

Yes ☐ No ☐

If No, why? _____

SECTION 2 - ECONOMIC ASSESSMENT:

14. How much did you and other members of your household spend **IN MANITOBA** for recreational fishing in 1998?

What percentage of those amounts would you attribute to your time spent fishing on the Red and/or Assiniboine rivers?

1998 EXPENDITURES ON FISHING	AMOUNT SPENT IN MANITOBA ($)	% ATTRIBUTED TO FISHING ON RED AND/OR ASSINIBOINE RIVERS
Accommodation (hotel, motel, etc.)		
Campsite fees (private, provincial, etc.)		
Food (groceries, restaurant meals, alcoholic beverages)		
Travel costs within Manitoba for recreational fishing vehicle expenses (including gas, repairs, rentals, etc.)		
Personal boating costs (gas, repairs, launch/ramp fees, moorage, insurance, etc.)		
Boat rentals		
Fishing supplies (bait, line, tackle, etc.)		
Guide services		
Fishing licence fees		

APPENDIX B

ANGLER QUESTIONNAIRE

CITY OF WINNIPEG

AMMONIA STUDY

ON-SITE ANGLER SURVEY FORM

Sample # _____

Survey Area: _____ Date: _____ Clerk: _____

Angler location: _____

Number in Party: _____ Sex: M _____ F _____

Age: <16 _____ 16-20 _____ 21-30 _____ 31-40 _____ 41-50 _____ 51-65 _____ >65 _____

Fishing From: Shore _____ Boat _____ Other _____

Angler/boat description: _____

Interview Start Time _____

Good morning/afternoon. We're doing a survey for the City of Winnipeg and I'd like to ask you some questions about your fishing trip.

1. Are you a resident of Manitoba? Yes No

   If yes, where do you live in Manitoba? _____

2. When did you start your fishing trip today? _____

3. When do you expect to finish your fishing trip today? _____

4. What species are you primarily fishing for?

   Walleye Catfish Pike Perch

   Freshwater drum (silver or sheepshead bass)

   Other species _____ No preference (any species)

5a. How many fish and what kind of fish have you caught so far today? (***Clerk fills out table provided)***

5b. Which ones did you release, and which did you keep?

SPECIES	# KEPT	# RELEASED	TOTAL

6. Do you eat the fish you keep? Yes No

If no, why? _____

7. How often do you usually fish on this river each year?

1 to 5 times _____ 6 to 10 times _____ 11 to 20 times _____>20 times _____

8. How often do you usually fish on the (Assiniboine/Red River) each year?

1 to 5 times _____ 6 to 10 times _____ 11 to 20 times _____>20 times _____

9. In your opinion, would you say your fishing success on this river has:

Increased Decreased Stayed about the same

no opinion

Thank you for Taking the Time to Answer These Questions.
HAVE A GOOD DAY FISHING!

Interview end time _____

Comments: _____

_____

_____

_____

APPENDIX C

BAIT FISHER PHONE INTERVIEW SCRIPT

CITY OF WINNIPEG
AMMONIA STUDY

BAIT FISHER PHONE INTERVIEW SCRIPT

DATE: _____ **TIME:**_____ **PERSON CONTACTED** _____

INTERVIEWER _____ **PHONE NUMBER** _____

Hello. May I speak with (Mr.) _____ please?

My name is _____, and I'm working with the City of Winnipeg regarding a study they're doing of the Red and Assiniboine Rivers. I received your name from the Department of Natural Resources who gave me permission to contact you to ask you about bait fishing. I understand you do some bait fishing on the Red River. Would you have time to answer a few questions about bait fishing on the Red River? The information you provide will be used by the City of Winnipeg as part of a larger study of Red and Assiniboine river conditions (e.g., water quality, state of the sport and bait fishery, etc.). Your name won't be associated with the information you give me.

***NOTE**: If person seems to be reluctant, remind him of the importance of the study and that only about eight people bait fish on the Red River so his input is very important*.

1. How many years have you been bait fishing? _____

2. About how many days do you spend bait fishing each year? _____

3. What percentage of your bait fishing time is spent fishing in the Red River? _____

4. a) Do you have any employees that bait fish on the Red River for you?

   Yes € No €

   b) If yes, how many days do they spend bait fishing on the Red River each year?

   _____

5. Approximately where do you fish on the Red River? _____

***NOTE**: Remind the bait fisher that the remaining questions can be answered for their entire catch, not just the catch from the Red River (if they fish in other waterbodies as well as the Red River)*.

6. What was your total production for last year? (January 1st to December 31, 1998)

_____ cartons

7. What percentage of your total production was from the Red River?

8. What inventory did you have left as of December 31st, 1998? _____ cartons

9. Total revenue from your catch? _____

10a. During which months do you catch your bait fish? _____

10b. Do you know approximately what percent of your total production is captured each of those months? Jan ____%, Feb ____% Mar ____%, Apr _____%, May _____%, June _____%, July _____%, Aug _____%, Sept _____%, Oct _____%, Nov _____%, Dec _____%

11. What method do you use to catch bait fish? _____

_____

12. What types of bait-fish do you typically catch?

TYPES OF BAIT FISH CAUGHT?	% OF TOTAL CATCH

Thank-you very much for taking the time to answer these questions!

APPENDIX D

DATA FROM LOCKPORT ANGLER SURVEY: MAY 16, 1999 (0930 to 1900 hours)

Table D-1 Lockport Angler Identification Data

Survey #	Number In Party*	# Male	# Female	Age of Participants							Fishing From:			Interview Start Time	Interview End Time	Length of Interview (mins)
				<16	16-20	21-30	31-40	41-50	51-65	>65	Shore	Boat	Other			
1	3	1			1						1			10:58	11:00	0:02
2	3	1			1						1			11:01	11:03	0:02
3	3	1			1						1			10:57	11:00	0:03
4	2	1				1					1			11:04	11:06	0:02
5	2	1				1					1			11:06	11:08	0:02
6	1	1						1			1			11:25	11:26	0:01
7	2	1					1				1			11:55	11:56	0:01
8	2		1				1				1			11:56	11:57	0:01
9	1	1					1				1			12:09	12:10	0:01
10	4	4						4				4		12:38	12:40	0:02
11	2	1	1			2					2			13:14	13:16	0:02
12	1	1				1							1	13:38	13:40	0:02
13	1	1		1							1			13:43	13:45	0:02
14	1	1					1				1			13:48	13:50	0:02
15	1		1			1					1			13:51	13:55	0:04
16	1	1					1				1			14:00	14:06	0:06
17	1	1					1				1			14:09	14:19	0:10
18	1	1			1						1			14:21	14:23	0:02
19	1	1		1							1			14:25	14:25	0:00
20	1	1		1							1			14:28	14:29	0:01
21	1	1				1					1			14:53	14:55	0:02
22	1	1				1					1			14:56	14:57	0:01
23	1	1									1			15:03	15:04	0:01
24	3	3		2			1				3			15:07	15:09	0:02
25	1	1				1					1			15:20	15:21	0:01
26	1	1			1						1			15:44	15:45	0:01
27	1	1			1						1			15:47	15:48	0:01
28	1	1			1						1			15:55	15:56	0:01
29	1	1			1						1			15:57	15:58	0:01
30	1	1			1						1			15:59	16:00	0:01
31	1	1			1						1			16:01	16:02	0:01
32	5	4	1		5						5			16:08	16:11	0:03

Survey #	Number In Party*	# Male	# Female	Age of Participants							Fishing From:			Interview Start Time	Interview End Time	Length of Interview (mins)
				<16	16-20	21-30	31-40	41-50	51-65	>65	Shore	Boat	Other			
33	1	1			1								1	16:13	16:14	0:01
34	1		1		1								1	16:17	16:19	0:02
35	1	1			1								1	16:21	16:22	0:01
36	1	1			1								1	16:24	16:25	0:01
37	1	1			1								1	16:26	16:27	0:01
38	1	1			1						1			16:48	16:50	0:02
39	1	1			1						1			16:51	16:52	0:01
40	1	1					1				1			16:57	16:58	0:01
41	1	1				1					1			16:59	17:00	0:01
42	2	1	1			2					2			17:08	17:09	0:01
43	3	3		2		1					3			17:24	17:25	0:01
44	1	1			1						1			17:31	17:33	0:02
45	1	1			1						1			17:35	17:36	0:01
46	3	3		2		1					3			17:39	17:40	0:01
47	2	2		2							2			17:43	17:44	0:01
48	1	1			1								1	17:50	17:51	0:01
49	1	1			1								1	17:48	17:48	0:00
50	1	1		1									1	17:57	17:59	0:02
51	1	1		1									1	17:59	18:00	0:01
52	2	2		1				1					1	18:05	18:06	0:01
53	1	1						1			1			18:15	18:16	0:01
54	1	1							1		1			18:19	18:20	0:01
55	3	1	2			3					3			18:23	18:24	0:01
56	3	1	2	1	1	1					3			18:28	18:30	0:02
57	1		1		1						1			18:33	18:35	0:02
Totals	**-**	**67**	**11**	**15**	**28**	**18**	**8**	**7**	**1**	**0**	**62**	**4**	**11**	**-**	**-**	**-**
Average																0:01

*** note that some anglers were interviewed as one party and some were interviewed separately**

Table D-2 Data From Lockport Angler Survey Question # 1

Survey #	Resident of Manitoba?		Where do you live in MB?	
	Yes	No	Winnipeg	Other
1	1		1	
2	1		1	
3	1		1	
4	1		1	
5	1		1	
6	1		1	
7	1		1	
8	1		1	
9	1		1	
10		4		
11	2		2	
12	1			1
13	1			1
14	1		1	
15	1		1	
16	1		1	
17	1		1	
18	1			1
19	1			1
20	1			1
21	1		1	
22	1		1	
23	1		1	
24	3		3	
25	1			1
26	1		1	
27	1		1	
28	1		1	
29	1		1	
30	1		1	
31	1		1	
32	5		5	
33	1			1
34	1			1
35	1			1
36	1		1	
37	1		1	
38	1		1	
39	1		1	
40	1		1	
41	1		1	
42	2		2	
43	3		3	
44	1		1	
45	1		1	
46	3		3	
47	2		2	
48	1			1

Survey #	Resident of Manitoba?		Where do you live in MB?	
	Yes	No	Winnipeg	Other
49	1			1
50	1		1	
51	1		1	
52	2		1	
53	1		1	
54	1		1	
55	3		3	
56	3		3	
57	1		1	
Totals	**74**	**4**	**62**	**11**

Table D-3 Data From Lockport Angler Survey Question #'s 2 and 3

Survey #	Start Time of Fishing Trip	Expected End Time of Fishing Trip	Expected Length of Fishing Trip (hours:mins effort per angler)	Number of Anglers surveyed	Total Angler Effort (hours)
1	9:00	12:00	3:00	1	3.00
2	9:00	12:00	3:00	1	3.00
3	9:00	12:00	3:00	1	3.00
4	6:03	11:04	5:01	1	5.00
5	6:00	11:00	5:00	1	5.00
6	9:00	17:00	8:00	1	8.00
7	10:00	12:00	2:00	1	2.00
8	10:00	12:00	2:00	1	2.00
9	9:15	12:10	2:55	1	3.00
10	9:00	18:00	9:00	4	36.00
11	11:00	13:15	2:15	2	4.50
12	12:45	14:45	2:00	1	2.00
13	13:00	15:00	2:00	1	2.00
14	12:00	17:00	5:00	1	5.00
15	12:00	21:00	9:00	1	9.00
16	7:00	21:00	14:00	1	14.00
17	7:30	21:00	13:30	1	13.50
18	8:00	19:30	11:30	1	11.50
19	9:30	14:25	4:55	1	5.00
20	8:15	20:00	11:45	1	11.75
21	14:00	18:00	4:00	1	4.00
22	14:00	18:00	4:00	1	4.00
23	14:00	16:00	2:00	1	2.00
24	11:30	16:00	4:30	3	13.50
25	15:00	16:00	1:00	1	1.00
26	8:30	16:30	8:00	1	8.00
27	14:00	17:00	3:00	1	3.00
28	14:00	16:30	2:30	1	2.50
29	9:00	18:00	9:00	1	9.00
30	14:00	16:30	2:30	1	2.50
31	14:00	16:00	2:00	1	2.00
32	15:00	16:30	1:30	5	7.50
33	12:30	17:00	4:30	1	4.50
34	12:30	16:30	4:00	1	4.00
35	12:30	16:30	4:00	1	4.00
36	16:00	18:00	2:00	1	2.00
37	16:00	18:00	2:00	1	2.00
38	15:00	18:00	3:00	1	3.00
39	15:00	18:00	3:00	1	3.00
40	15:00	18:00	3:00	1	3.00
41	15:00	18:00	3:00	1	3.00
42	14:30	19:00	4:30	2	9.00
43	15:15	17:25	2:10	3	6.50
44	14:00	18:30	4:30	1	4.50
45	14:00	18:30	4:30	1	4.50
46	15:15	18:30	3:15	3	9.75

Survey #	Start Time of Fishing Trip	Expected End Time of Fishing Trip	Expected Length of Fishing Trip (hours:mins effort per angler)	Number of Anglers surveyed	Total Angler Effort (hours)
47	13:00	17:40	4:40	2	9.25
48	16:45	18:30	1:45	1	1.75
49	16:45	18:30	1:45	1	1.75
50	16:00	18:00	2:00	1	2.00
51	16:00	18:00	2:00	1	2.00
52	9:45	19:00	9:15	2	18.50
53	15:00	18:30	3:30	1	3.50
54	17:30	18:30	1:00	1	1.00
55	16:00	20:00	4:00	3	12.00
56	15:00	19:00	4:00	3	12.00
57	15:00	20:00	5:00	1	5.00
Totals	**-**	**-**	**-**	**78**	**338.75**
Average	**-**	**-**	**4:22 (or about 4.4 hours)**	**-**	**-**

Table D-4 Data From Lockport Angler Survey Question # 4

Survey #	Species Fishing For?							
	Walleye	Catfish	Pike	Perch	Drum	No Preference	Other (count)	Other (species list)
1	1		1					
2		1						
3	1		1					
4						1		
5						1		
6		1						
7						1		
8						1		
9	1							
10		4						
11	2							
12						1		
13						1		
14						1		
15						1		
16					1		1	carp
17					1		1	carp
18						1		
19						1		
20			1					
21		1						
22		1						
23						1		
24						3		
25		1						
26		1						
27						1		
28						1		
29	1							
30						1		
31						1		
32	5							
33	1							
34	1							
35	1							
36						1		
37						1		
38		1						
39		1						
40						1		
41						1		
42						2		
43						3		
44					1			
45	1							

Survey #	Species Fishing For?							
	Walleye	Catfish	Pike	Perch	Drum	No Preference	Other (count)	Other (species list)
46						3		
47						2		
48						1		
49						1		
50		1			1		1	White Bass
51						1		
52						2		
53						1		
54						1		
55						3		
56		3						
57						1		
Totals	**15**	**16**	**3**	**0**	**4**	**43**	**3**	

Table D-5 Data From Lockport Angler Survey Question # 5

	Fish Caught			
Survey #	Species[a]	# Kept	# Released	Total
1	Bullhead		1	1
2	Bullhead		1	1
3	Bullhead		3	3
4	Bullhead		35	35
4	Carp		3	3
4	Channel Cat		5	5
5	Bullhead		35	35
5	Channel Cat		5	5
6				0
7	Catfish		2	2
8				0
9	Channel Cat		9	9
10	Channel Cat		4	4
11				0
12	Drum		5	5
13	Drum		1	1
13	N. Pike		1	1
14	Big Mouth Buffalo		1	1
14	Drum		4	4
15	Carp		2	2
16	Carp	3	17	20
16	Drum	10	15	25
16	Pike		2	2
16	White Bass	5	3	8
16	White Sucker	2		2
17	Carp	3	17	20
17	Drum	5	25	30
17	Pike	2	2	4
17	White Bass	5	5	10
18	Drum		8	8
18	Pike		3	3
18	Walleye		1	1
18	White Bass		4	4
19	Carp		1	1
19	Drum		8	8
19	Pike		2	2
20	Carp		1	1
20	Drum		8	8
20	Pike	2		2
21	Bullhead		3	3
22	Bullhead		1	1
23	Bullhead		1	1
24	Bullhead		1	1
24	Channel Cat		1	1
25				0
26	Channel Cat		4	4
26	Drum		2	2
26	White Bass		1	1
27	Perch		1	1
28	Drum		1	1

	Fish Caught			
Survey #	Species[a]	# Kept	# Released	Total
28	Pike		1	1
29	Channel Cat		6	6
29	Drum		6	6
29	White Bass		4	4
30				0
31				0
32	Drum	1		1
32	White Bass	5		5
33	Carp		2	2
33	Drum		5	5
34	Drum		2	2
35	Carp		1	1
35	Drum		4	4
35	Sucker		2	2
36				0
37				0
38	Channel Cat		3	3
39				0
40	Bullhead		2	2
41	Bullhead		1	1
41	Carp		1	1
42	Bullhead		4	4
42	Stonecat		2	2
43				0
44	Bullhead		20	20
45	Catfish (general)		15	15
45	Drum		1	1
46	Catfish (general)		1	1
47	Bullhead		28	28
47	Sauger		1	1
48				0
49	Stonecat		1	1
50	Stonecat		1	1
50	Bullhead		1	1
51	White Bass		1	1
52	Bullhead		64	64
52	Channel Cat		1	1
52	Drum		1	1
53	Bullhead		2	2
54				0
55				0
56	Carp		1	1
56	Stonecat		1	1
57				0
Total		**43**	**441**	**484**

a = note that bullheads, "catfish" and stonecats are catagorized as "Other Catfish" in the report

Table D-6 Data From Lockport Angler Survey Question # 6

	Do You Eat The Fish You Keep?		
Survey #	Yes	No	If No, Why?
1		1	Too much work to fillet
2		1	Dirty water
3		1	Water looks bad
4	1	1	Depends on species, will eat walleye
5	1	1	Depends on species
6		1	Water quality concerns
7		1	Don't like fish
8		1	Don't like fish
9	1		
10		4	catch & Release
11	2	2	depends on species
12		1	poor water quality
13		1	water quality (sewage)
14		1	catch & Release
15		1	water quality (pollution)
16	1		
17		1	poor water quality
18		1	Don't eat fish
19	1	1	depends on species
20	1	1	depends on species
21		1	Regulations for Catfish
22		1	catch & Release
23		1	poor water quality
24		3	Don't like fish
25	1		
26	1	1	eat only walleye
27		1	catch & Release
28	1	1	eat only walleye
29	1		
30		1	don’t like fish
31		1	allergic (don’t eat fish)
32	5		
33		1	poor water quality
34	1	1	depends on species
35		1	Pollution concerns
36		1	vegetarian (don't eat fish)
37		1	allergic (don't eat fish)
38		1	Water quality
39		1	Dirty water
40	1		
41		1	Water quality concerns
42	2		
43		1	
44	1	1	Depends on species
45	1		
46	3		
47	2		

	Do You Eat The Fish You Keep?		
Survey #	**Yes**	**No**	**If No, Why?**
48	1		
49	1		
50		1	don't like fish
51	1	1	eat only walleye
52		1	Water quality (muddy)
53		1	catch & Release
54		1	catch & Release
55	3	3	eat Walleye only
56		3	catch & Release
57	1		
Total	**35**	**54**	

Table D-7 Data From Lockport Angler Survey Question # 7

Survey #	How Often Do You Usually Fish On This River Each Year?			
	1 to 5 times	6 to10 times	11 to 20 times	>20 times
1			1	
2				1
3				1
4		1		
5		1		
6			1	
7	1			
8	1			
9				1
10	4			
11	2			
12				1
13				1
14	1			
15				1
16				1
17	1			
18				1
19				1
20				1
21				1
22				1
23		1		
24	3			
25				1
26		1		
27			1	
28	1			
29				1
30	1			
31		1		
32				5
33	1			
34	1			
35	1			
36				1
37				1
38				1
39				1
40		1		
41		1		
42				2
43		3		
44		1		
45				1
46	3			
47			2	
48			1	

Survey #	How Often Do You Usually Fish On This River Each Year?			
	1 to 5 times	6 to10 times	11 to 20 times	>20 times
49			1	
50		1		
51		1		
52				2
53	1			
54	1			
55				3
56				3
57	1			
Totals	**24**	**13**	**7**	**34**

Table D-8 Data From Lockport Angler Survey Question # 8

Survey #	How Often Do You Usually Fish On The Assiniboine Each Year?			
	1 to 5 times	6 to10 times	11 to 20 times	>20 times
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14	1			
15	1			
16	1			
17	1			
18				
19				
20	1			
21				
22				
23				
24				
25				
26				
27			1	
28				
29				
30				
31				
32				
33				
34				
35				
36	1			
37				
38				
39	1			
40				
41				
42				2
43				
44				
45				
46	3			
47				
48				

Survey #	How Often Do You Usually Fish On The Assiniboine Each Year?			
	1 to 5 times	6 to10 times	11 to 20 times	>20 times
49				
50				
51				
52				
53				
54				
55				
56				3
57				
Totals	**10**	**0**	**1**	**5**

Table D-9 Data From Lockport Angler Survey Question # 9

Survey #	Fishing Success on This River Has:			
	Increased	Decreased	Staying About the Same	No Opinion
1			1	
2			1	
3			1	
4			1	
5			1	
6			1	
7		1		
8		1		
9	1			
10				4
11				2
12			1	
13			1	
14			1	
15	1			
16			1	
17	1			
18	1			
19	1			
20	1			
21			1	
22			1	
23			1	
24			3	
25			1	
26				1
27	1			
28	1			
29	1			
30			1	
31	1			
32		5		
33	1			
34				1
35	1			
36			1	
37			1	
38	1			
39	1			
40			1	
41				1
42			2	
43			3	
44			1	
45			1	
46				3
47	2			

Survey #	Fishing Success on This River Has:			
	Increased	Decreased	Staying About the Same	No Opinion
48			1	
49			1	
50	1			
51	1			
52				2
53			1	
54	1			
55	3			
56		3		
57				1
Totals	**22**	**10**	**31**	**15**

APPENDIX E

DATA FROM RED RIVER ANGLER SURVEY: MAY 16, 1999 (0900 to 1400 hours)

Table E-1 Red River Angler Identification Data

Survey #	Number In Party*	# Male	# Female	Age of Participants							Fishing From:			Interview Start Time	Interview End Time	Length of Interview (mins)
				<16	16-20	21-30	31-40	41-50	51-65	>65	Shore	Boat	Other			
M1	2	2									2			8:55	9:00	0:05
M2(a)	4	4		3		1					4			9:10	9:15	0:05
M2(b)	1	1				1					1			9:16	9:20	0:04
M3	1	1				1					1			10:18	10:22	0:04
M4	2	2				2					2			11:59	12:01	0:02
M5	1	1		1							1			12:25	12:28	0:03
M6	1	1				1					1			13:23	13:26	0:03
B1	2	2					2				2			8:40	8:50	0:10
B2(a)	1	1				1					1			9:05	9:10	0:05
B2(b)	1		1			1					1			9:05	9:10	0:05
B3	2	2				2					2			9:20	9:25	0:05
B4	3	3				3								9:20	9:26	0:06
B5	1	1					1				1			10:10	10:15	0:05
B6	2	2		1			1				2			10:37	10:40	0:03
B7	1	1					1				1			11:35	11:40	0:05
B8	2	2					2				2			11:58	12:00	0:02
B9	3	3		1	2							3		12:05	12:10	0:05
B10	1	1			1						1			12:20	12:24	0:04
B11	1	1					1				1			13:00	13:05	0:05
B12	1	1							1		1			13:13	13:15	0:02
B13	2	2		1			1				2			13:28	13:31	0:03
B14	4										4			13:45	13:46	0:01
B15	1	1				1					1			13:45	13:50	0:05
Totals	**40**	**35**	**1**	**7**	**3**	**14**	**9**	**0**	**1**	**0**	**34**	**3**	**0**	**-**	**-**	**-**
Average	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0:04**

*** note that some anglers were interviewed as one party and some were interviewed separately**

Table E-2 Data From Red River Angler Survey Question # 1

Survey #	Resident of Manitoba?		Where do you live in MB?	
	Yes	No	Winnipeg	Other
M1	2		2	
M2(a)	4		4	
M2(b)	1		1	
M3	1		1	
M4	2		2	
M5	1		1	
M6	1		1	
B1	2			
B2(a)	1			
B2(b)	1			
B3	2			
B4	3			
B5	1			
B6	2		2	
B7	1		1	
B8	2		2	
B9	3		3	
B10	1		1	
B11	1		1	
B12	1		1	
B13	2		2	
B14	4		4	
B15	1		1	
Totals	**40**	**0**	**30**	**0**

Table E-3 Data From Red River Angler Survey Question #'s 2 and 3

Survey #	Start Time of Fishing Trip	Expected End Time of Fishing Trip	Expected Length of Fishing Trip (hours:mins effort per angler)	Effort per Angler (hours)	Number of Anglers Surveyed	Total Angler Effort (hours)
M1	8:40	12:00	3:20	3.33	2	11.09
M2(a)	7:45	11:00	3:15	3.25	4	10.56
M2(b)	9:15	11:00	1:45	1.75	1	3.06
M3	9:00	12:00	3:00	3.00	1	9.00
M4	9:00	13:00	4:00	4.00	2	16.00
M5	11:15	14:00	2:45	2.75	1	7.56
M6	13:00	15:00	2:00	2.00	1	4.00
B1	7:45	8:45	1:00	1.00	2	1.00
B2(a)	8:45	9:45	1:00	1.00	1	1.00
B2(b)	8:45	9:45	1:00	1.00	1	1.00
B3	9:15	10:15	1:00	1.00	2	1.00
B4	9:15	10:45	1:30	1.50	3	2.25
B5	7:40	11:10	3:30	3.50	1	12.25
B6	10:35	12:07	1:32	1.53	2	2.34
B7	10:40	16:00	5:20	5.33	1	28.41
B8	11:00	12:30	1:30	1.50	2	2.25
B9	11:00	13:00	2:00	2.00	3	4.00
B10	12:15	17:00	4:45	4.75	1	22.56
B11	12:30	19:00	6:30	6.50	1	42.25
B12	12:10	14:10	2:00	2.00	1	4.00
B13	13:30	15:30	2:00	2.00	2	4.00
B14	13:15	14:45	1:30	1.50	4	2.25
B15	13:45	15:45	2:00	2.00	1	4.00
Totals	**-**	**-**	**-**	**-**	**40**	**195.84**
Average	**-**	**-**	**2:31 (or about 2.5 hours)**	**-**	**-**	**-**

Table E-4 Data From Red River Angler Survey Question # 4

Survey #	Species Fishing For?							
	Walleye	Catfish	Pike	Perch	Drum	No Preference	Other (count)	Other (species)
M1		2						
M2(a)						4		
M2(b)						1		
M3						1		
M4		2					2	Goldeye
M5						1		
M6						1		
B1		2						
B2(a)	1	1						
B2(b)	1	1						
B3						2		
B4						3		
B5	1							
B6	2						2	Carp
B7	1		1					
B8							2	Goldeye
B9						3		
B10						1		
B11							1	Carp
B12						1		
B13	2	2			2			
B14						4		
B15						1		
Totals	**8**	**10**	**1**	**0**	**2**	**23**	**7**	**-**

Number of responses = 51

Table E-5 Data From Red River Angler Survey Question # 5

	Fish Caught			
Survey #	**Species[a]**	**# Kept**	**# Released**	**Total**
M1				0
M2(a)	Bullhead		6	6
M2(b)				0
M3	Stonecat		1	1
M4	Bullhead / Stonecat		3	3
M5	Catfish		2	2
"	Carp		1	1
M6	Stonecat		2	2
B1	Stonecat		1	1
"	Channel Cat		1	1
B2(a)				0
B2(b)				0
B3				0
B4				0
B5	Bullhead		1	1
"	Burbot		1	1
B6				0
B7	Bullhead		4	4
"	Stonecat		1	1
B8	Bullhead		2	2
"	Catfish		1	1
B9				0
B10				0
B11				0
B12	Catfish		1	1
B13				0
B14				0
B15				0
Total		**0**	**28**	**28**

a = note that bullheads, "catfish" and stonecats are catagorized as "Other Catfish" in the report

Table E-6 Data From Red River Angler Survey Question # 6

	Do You Eat The Fish You Keep?		
Survey #	**Yes**	**No**	**If No, Why?**
M1			
M2(a)		4	Catch & release
M2(b)		1	Catch & release
M3		1	Catch & release
M4		2	Catch & release
M5		1	Catch & release
M6		1	Catch & release
B1		2	
B2(a)		1	"look at the water"
B2(b)		1	river condition poor
B3	2		
B4	3		
B5		1	water quality
B6	2		
B7	1		
B8		2	don't know if safe
B9		3	"would you eat fish from this river?"
B10		1	Catch & release
B11	1		
B12		1	Catch & release
B13		2	Catch & release
B14		4	Catch & release
B15		1	Catch & release
Total	**9**	**29**	

Number of responses = 38

Table E-7 Data From Red River Angler Survey Question # 7

Survey #	How Often Do You Usually Fish On This River Each Year?			
	1 to 5 times	6 to10 times	11 to 20 times	>20 times
M1				2
M2(a)				4
M2(b)				1
M3				1
M4				2
M5				1
M6				1
B1				2
B2(a)				1
B2(b)				1
B3				2
B4				3
B5				1
B6				2
B7				1
B8				2
B9				3
B10				1
B11				1
B12				1
B13	2			
B14	4			
B15	1			
Totals	**7**	**0**	**0**	**33**

Number of responses = 40

Table E-8 Data From Red River Angler Survey Question # 8

Survey #	How Often Do You Usually Fish On The Assiniboine River Each Year?			
	1 to 5 times	6 to10 times	11 to 20 times	>20 times
M1				2
M2(a)	4			
M2(b)	1			
M3				
M4				2
M5				1
M6				
B1				
B2(a)				
B3				
B4				
B5				
B6				
B7				
B8				1
B9				
B10				
B11				
B12				
B13				
B14				
B15				
Totals	**5**	**0**	**0**	**6**

Number of reponses = 11

Table E-9 Data From Red River Angler Survey Question # 9

Survey #	Fishing Success on This River Has:			
	Increased	Decreased	Staying About the Same	No Opinion
M1		2		
M2(a)	4			
M2(b)			1	
M3				1
M4	2			
M5			1	
M6			1	
B1	2			
B2(a)			1	
B2(b)		1		
B3			2	
B4	3			
B5			1	
B6		2		
B7	1			
B8		2		
B9		3		
B10	1			
B11				1
B12				1
B13		2		
B14				4
B15				1
Totals	**13**	**12**	**7**	**8**

Number of reponses = 40

APPENDIX F

DATA FROM ASSINIBOINE RIVER ANGLER SURVEY: MAY 16, 1999 (0800 to 2030 hours)

Table F-1 Assiniboine River Angler Identification Data

Survey #	Number In Party*	# Male	# Female	Age of Participants							Fishing From:			Interview Start Time	Interview End Time	Length of Interview (mins)
				<16	16-20	21-30	31-40	41-50	51-65	>65	Shore	Boat	Other			
1	3	3		2			1				3			8:25	8:30	0:05
2	1	1					1				1			9:40	9:50	0:10
3a	1	1							1		1			11:15	11:16	0:01
3b	1	1						1			1			11:15	11:16	0:01
3c	1	1					1				1			11:20	11:25	0:05
3d	1	1					1				1			11:20	11:25	0:05
4	2	2		1				1			2			11:25	11:30	0:05
5	2	2		1					1		2			11:25	11:35	0:10
6	3	2	1	1			2				3			11:15	11:20	0:05
7a	1	1		1							1			12:15	12:19	0:04
7b	1	1			1						1			12:15	12:19	0:04
7c	1	1			1						1			12:15	12:19	0:04
7d	1	1			1						1			12:15	12:19	0:04
8a	1	1					1				1			13:10	13:12	0:02
8b	1	1					1				1			13:10	13:12	0:02
9a	1	1		1							1			13:15	13:22	0:07
9b	1	1				1					1			13:15	13:22	0:07
10a	1	1				1					1			13:25	13:27	0:02
10b	1		1								1			13:25	13:27	0:02
11	5	5		4			1				5			14:45	14:50	0:05
12	2	2		2							2			18:45	18:50	0:05
13	1	1			1						1			18:50	18:55	0:05
14	3	2	1				3				3			19:10	19:15	0:05
15	3	3		3							3			19:05	19:10	0:05
16	1	1		1							1			19:25	19:30	0:05
17	3	3		3							3			19:25	19:30	0:05
18a	1	1					1						1	19:50	19:55	0:05
18b	1	1					1						1	19:50	19:55	0:05
19	1	1				1							1	19:50	19:55	0:05
Totals	**46**	**43**	**3**	**20**	**4**	**3**	**14**	**2**	**2**	**0**	**43**	**0**	**3**	**-**	**-**	**-**
Average	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0:04**

*** note that some anglers were interviewed as one party and some were interviewed separately**

Table F-2 Data From Assiniboine River Angler Survey Question # 1

Survey #	Resident of Manitoba?		Where do you live in MB?	
	Yes	No	Winnipeg	Other
1	3		3	
2	1		1	
3a	1		1	
3b	1		1	
3c	1		1	
3d	1		1	
4	2		2	
5	2		2	
6	3		3	
7a	1		1	
7b	1		1	
7c	1		1	
7d	1		1	
8a	1		1	
8b	1		1	
9a	1			1
9b	1		1	
10a	1		1	
10b	1		1	
11	5		5	
12	2		2	
13	1		1	
14	3		3	
15	3		3	
16	1		1	
17	3		3	
18a	1		1	
18b	1			1
19	1		1	
Totals	**46**	**0**	**44**	**2**

Table F-3 Data From Assiniboine River Angler Survey Question #'s 2 and 3

Survey #	Start Time of Fishing Trip	Expected End Time of Fishing Trip	Expected Length of Fishing Trip (hours:mins effort per angler)	Number of Anglers Surveyed	Total Angler Effort (hours)
1	8:00	13:00	5:00	3	15.00
2	6:45	12:00	5:15	1	5.25
3a	10:15	13:15	3:00	1	3.00
3b	10:15	13:15	3:00	1	3.00
3c	9:30	16:30	7:00	1	7.00
3d	9:30	16:30	7:00	1	7.00
4	11:00	12:30	1:30	2	3.00
5	11:20	12:30	1:10	2	2.33
6	10:30	12:00	1:50	3	4.50
7a	12:15	16:30	4:15	1	4.25
7b	12:15	16:30	4:15	1	4.25
7c	12:15	16:30	4:15	1	4.25
7d	12:15	16:30	4:15	1	4.25
8a	11:30	16:00	4:30	1	4.50
8b	11:30	16:00	4:30	1	4.50
9a	12:00	14:30	2:30	1	2.50
9b	12:20	14:30	2:10	1	2.33
10a	13:25	16:00	2:35	1	2.58
10b	13:25	16:00	2:35	1	2.58
11	14:00	15:00	1:00	5	5.00
12	13:00	20:15	7:15	2	14.50
13	17:30	20:30	3:00	1	3.00
14	18:00	20:30	2:30	3	7.50
15	18:15	20:15	2:00	3	6.00
16	14:00	19:30	5:30	1	5.50
17	16:00	21:00	5:00	3	15.00
18a	14:00	20:30	6:30	1	6.50
18b	14:00	20:30	6:30	1	6.50
19	18:50	21:00	2:10	1	2.17
Totals	**-**	**-**	**-**	**46**	**157.74**
Average	**-**	**-**	**3:51 (or about 4 hours)**	**-**	**-**

Table F-4 Data From Assiniboine River Angler Survey Question # 4

Survey #	Species Fishing For?						
	Walleye	Catfish	Pike	Perch	Drum	No Preference	Other (count)
1						3	
2						1	
3a						1	
3b						1	
3c						1	
3d						1	
4						2	
5						2	
6						3	
7a	1	1					
7b	1	1					
7c	1	1					
7d	1						
8a						1	
8b						1	
9a		1					
9b						1	
10a						1	
10b						1	
11						5	
12						2	
13						1	
14						3	
15						3	
16						1	
17						3	
18a						1	
18b					1		
19						1	
Totals	**4**	**4**	**0**	**0**	**1**	**40**	**0**

Number of responses = 49

Table F-5 Data From Assiniboine River Angler Survey Question # 5

	Fish Caught			
Survey #	Species[a]	# Kept	# Released	Total
1	Catfish		1	1
1	Channel Cat		1	1
2	Catfish		17	17
2	Redhorse Sucker		1	1
2	Walleye		2	2
2	White Sucker		1	1
4				0
5				0
6				0
11	Channel Cat		1	1
12				0
13	Bullhead		15	15
14	Sauger		1	1
15	Bullhead		5	5
16	Bullhead		9	9
17	Bullhead		5	5
19	Walleye	1	1	2
10a				0
10b				0
18a	Carp		2	2
18a	Pike		6	6
18a	Rock Bass		1	1
18b				0
3a				0
3b	Walleye	1		1
3c				0
3d				0
7a				0
7b				0
7c				0
7d				0
8a	Channel Cat		2	2
8b				0
9a	Bullhead		4	4
9b				0
Total		**2**	**75**	**77**

a = note that bullheads, "catfish" and stonecats are catagorized as "Other Catfish" in the report

Table F-6 Data From Assiniboine River Angler Survey Question # 6

	Do You Eat The Fish You Keep?		
Survey #	**Yes**	**No**	**If No, Why?**
1	3	3	depends on species (walleye only)
2		1	Catch & Release
3a	1		
3b	1		
3c	1		
3d	1		
4		2	Catch & Release
5		2	
6		3	Poor water quality
7a		1	Poor water quality
7b		1	Poor water quality
7c		1	Poor water quality
7d		1	Poor water quality
8a	1		
8b	1		
9a		1	Poor water quality
9b	1		
10a	1		
10b	1		
11		5	
12		1	Poor water quality
13		1	Catch & Release
14		3	Poor water quality
15		3	Catch & Release
16		1	polluted water
17		3	dirty river, polluted
18a		1	Poor water quality
18b		1	Poor water quality
19	1		
Total	**13**	**35**	

Number of responses = 48

Table F-7 Data From Assiniboine River Angler Survey Question # 7

Survey #	How Often Do You Usually Fish On This River Each Year?			
	1 to 5 times	6 to10 times	11 to 20 times	>20 times
1				3
2				1
3a	1			
3b			1	
3c				1
3d				1
4				2
5	2			
6				3
7a				1
7b				1
7c				1
7d				1
8a			1	
8b			1	
9a	1			
9b				1
10a	1			
10b	1			
11		5		
12				2
13				1
14				3
15				3
16			1	
17				3
18a				1
18b				1
19	1			
Totals	**7**	**5**	**4**	**30**

Number of responses = 46

Table F-8 Data From Assiniboine River Angler Survey Question # 8

Survey #	How Often Do You Usually Fish On The Red River Each Year?			
	1 to 5 times	6 to10 times	11 to 20 times	>20 times
1				3
2				1
3a	1			
3b			1	
3c				1
3d				1
4				2
5				
6	3			
7a	1			
7b				
7c				
7d				
8a				1
8b				1
9a				1
9b				1
10a	1			
10b	1			
11				
12				
13			1	
14				3
15				3
16				1
17				3
18a	1			
18b				
19	1			
Totals	**9**	**0**	**2**	**22**

Number of reponses = 33

Table F-9 Data From Assiniboine River Angler Survey Question # 9

Survey #	Fishing Success on This River Has:			
	Increased	Decreased	Staying About the Same	No Opinion
1	3			
2			1	
3a			1	
3b			1	
3c			1	
3d			1	
4			2	
5			2	
6	3			
7a	1			
7b			1	
7c	1			
7d		1		
8a			1	
8b			1	
9a		1		
9b			1	
10a			1	
10b			1	
11				5
12			2	
13	1			
14	1	1	1	
15				3
16			1	
17	1	1	1	
18a			1	
18b				1
19	1			
Totals	**12**	**4**	**21**	**9**

Number of reponses = 46

Table F-10 Distribution of Anglers From Assiniboine River Angler Survey

Survey Number	Number of Anglers	Angler Location	General Area
1	3	River walk across from Edmonton St. (left bank)[a]	Between The Forks and WEWPPC[bc]
2	1	At Oman's Creek (left bank)	Between The Forks and WEWPPC[bc]
3	4	At footbridge, Sturgeon Creek (left bank)	Between The Forks and WEWPPC[bc]
4	2	At footbridge, Sturgeon Creek (left bank)	Between The Forks and WEWPPC[bc]
5	2	At Sturgeon Creek, upstream of footbridge (right bank)	Between The Forks and WEWPPC[bc]
6	3	At Sturgeon Creek / Assiniboine R. at footbridge (R. bank)	Between The Forks and WEWPPC[bc]
7	4	End of St. Charles St. (left bank)	Between The Forks and WEWPPC[bc]
8	2	Railway bridge W. of Taylor Bridge (right bank, Headingly)	Upstream of the WEWPPC to Headingly
9	2	By metal footbridge on Roblin Blvd. & Alboto St. (right bank, West of Taylor Bridge)	Upstream of the WEWPPC to Headingly
10	2	By metal footbridge on Roblin Blvd. & Alboto St. (right bank)	Upstream of the WEWPPC to Headingly
11	5	West Perimeter Bridge (left bank)	Between The Forks and WEWPPC[bc]
12	2	At Oman's Creek (left bank)	Between The Forks and WEWPPC[bc]
13	1	At Oman's Creek (left bank)	Between The Forks and WEWPPCbc
14	3	At Oman's Creek (right bank)	Between The Forks and WEWPPCbc
15	3	At Oman's Creek (left bank)	Between The Forks and WEWPPCbc
16	1	End of Ferry Rd. (left bank)	Between The Forks and WEWPPCbc
17	3	End of Ferry Rd. (left bank)	Between The Forks and WEWPPCbc
18	2	On Stugeon Creek foot bridge	Between The Forks and WEWPPCbc
19	1	On Stugeon Creek foot bridge	Between The Forks and WEWPPCbc

n = 46 anglers surveyed

a = looking downstream

b = WEWPCC = West End Water Pollution Control Centre

c = the WEWPCC outfall is approximately 1 km upstream towards Headingly from the the West Perimeter Bridge

APPENDIX G

DATA FROM ANGLER QUESTIONNAIRES

Table G-1 Data from Angler Questionnaire Questions #'s 1 and 2

Questionnaire #	% FISHING TIME IN EACH ANGLER ZONE AREA						
	A	B	C	D	E	F	Total
1	90	5	5	0	0	0	100
2	20	0	65	7.5	7.5	0	100
3	0	100	0	0	0	0	100
4	50	0	50	0	0	0	100
5	0	0	75	25	0	0	100
6	100	0	0	0	0	0	100
7	0	100	0	0	0	0	100
8	100	0	0	0	0	0	100
9	100	0	0	0	0	0	100
10	90	0	0	0	10	0	100
11	0	0	0	100	0	0	100
12	100	0	0	0	0	0	100
14	100	0	0	0	0	0	100
15	90	0	0	10	0	0	100
16	50	0	50	0	0	0	100
17	20	20	0	60	0	0	100
18	0	0	100	0	0	0	100
19	0	0	100	0	0	0	100
20	0	0	0	0	0	100	100
21	50	0	0	0	50	0	100
22	50	0	50	0	0	0	100
23	50	0	50	0	0	0	100
24	100	0	0	0	0		100
25	50	0	20	0	30	0	100
26	2	0	0	0	98	0	100
27	100	0	0	0	0	0	100
28	70	10	5	5	5	5	100
29	75	0	0	25	0	0	100
30	70	0	0	0	30	0	100
31	100	0	0	0	0	0	100
32	0	0	50	50	0	0	100
33	100	0	0	0	0	0	100
34	100	0	0	0	0	0	100
35	95	5	0	0	0	0	100
36	100	0	0	0	0	0	100
38	50	0	20	0	30	0	100
39	30	0	0	0	70	0	100
40	100	0	0	0	0	0	100
41	100	0	0	0	0	0	100
42	10	0	90	0	0	0	100
43	100	0	0	0	0	0	100
45	100	0	0	0	0	0	100
46	75	0	15	10	0	0	100
47	90	10		0	0	0	100
48	75	0	25	0	0	0	100
49	0	0	50	50	0	0	100
50	50	40	10	0	0	0	100
51	100	0	0	0	0	0	100

Questionnaire #	% FISHING TIME IN EACH ANGLER ZONE AREA						
	A	B	C	D	E	F	Total
52	44	0	22	0	22	12	100
53	50	50	0	0	0	0	100
54	20	0	70	0	10	0	100
55	100	0	0	0	0	0	100
56	100	0	0	0		0	100
57	0	0	0	0	100	0	100
58	100	0	0	0	0	0	100
59	100	0	0	0	0	0	100
60	100	0	0	0	0	0	100
61	100	0	0	0	0	0	100
62	0	0	100	0	0	0	100
63	20	0	70	10	0	0	100
64	80	0	20	0	0	0	100
65	100	0	0	0	0	0	100
66	100	0	0	0	0	0	100
67	25	0	75	0	0	0	100
68	100	0	0	0	0	0	100
69	0	0	100	0	0	0	100
70	0	0	0	0	1	99	100
71	15	0	0	0	10	75	100
72	33	0	67	0	0	0	100
73	0	0	50	0	50	0	100
74	100	0	0	0	0	0	100
75	50	0	30	10	10	0	100
76	25	0	75	0	0	0	100
77	90	0	0	0	10	0	100
78	80	0	20	0	0	0	100
79	100	0	0	0	0	0	100
80	100	0	0	0	0	0	100
81	100	0	0	0	0	0	100
82	92	8	0	0	0	0	100
83	92	8	0	0	0	0	100
84	0	0	100	0	0	0	100
85	100	0	0	0	0	0	100
86	60	0	40	0	0	0	100
87	0	0	45	55	0	0	100
88	99	0	0	0	1	0	100
89	0	0	0	0	0	100	100
92	20	0	0	0	80	0	100
93	15	80	0	0	5	0	100
94	25	0	75	0	0	0	100
95	1	0	99	0	0	0	100
96	0	0	100	0	0	0	100
97	0	0	25	0	75	0	100
98	60	0	40	0	0	0	100
99	100	0	0	0	0	0	100
100	60	20	10	0	10	0	100
101	70	0	15	15	0	0	100
102	0	0	75	0	25	0	100
103	100	0	0	0	0	0	100

Questionnaire #	% FISHING TIME IN EACH ANGLER ZONE AREA						
	A	B	C	D	E	F	Total
104	0	0	0	0	75	25	100
105	100	0	0	0	0	0	100
106	100	0	0	0	0	0	100
107	25	0	0	0	75	0	100
108	25	0	0	0	75	0	100
109	50	0	50	0	0	0	100
110	100	0	0	0	0	0	100
111	50	0	0	30	20	0	100
112	75	0	25	0	0	0	100
113	80	20	0	0	0	0	100
114	80	20	0	0	0	0	100
115	25	0	75	0	0	0	100
116	100	0	0	0	0	0	100
117	30	0	0	0	70	0	100
118	10	0	0	0	90	0	100
119	75	0	25	0	0	0	100
120	0	0	0	0	100	0	100
121	60	0	40	0	0	0	100
122	0	0	0	0	100		100
123	90	0	5	0	5	0	100
124	100	0	0	0	0	0	100
125	100	0	0	0	0	0	100
126	100	0	0	0	0	0	100
127	100	0	0	0	0	0	100
128	100	0	0	0	0	0	100
129	50	0	25	0	25	0	100
130	90	0	0	0	10	0	100
131	40	10	10	10	30	0	100
132	80	20	0	0	0	0	100
133	15	0	0	0	60	25	100
134	100	0	0	0	0	0	100
135	100	0	0	0	0	0	100
136	75	25	0	0	0	0	100
137	0	0	100	0	0	0	100
138	90	0	0	0	5	5	100
139	0	0	0	0	100	0	100
140	100	0	0	0	0	0	100
141	100	0	0	0	0	0	100
142	20	80	0	0	0	0	100
143	90	0	0	0	0	10	100
144	70	0	0	0	30	0	100
145	50	25	25	0	0	0	100
146	100	0	0	0	0	0	100
147	100	0	0	0	0	0	100
148	20	0	80	0	0	0	100
149	100	0	0	0	0	0	100
150	100	0	0	0	0	0	100
152	100	0	0	0	0	0	100
153	85	0	0	0	0	15	100
154	100	0	0	0	0	0	100

Questionnaire #	% FISHING TIME IN EACH ANGLER ZONE AREA						
	A	B	C	D	E	F	Total
155	100	0	0	0	0	0	100
156	100	0	0	0	0	0	100
157	90	5	5	0	0	0	100
158	50	50	0	0	0	0	100
159	50	50	0	0	0	0	100
160	65	35	0	0	0	0	100
161	20	0	0	0	0	80	100
162	0	0	100	0	0	0	100
164	90	10	0	0	0	0	100
165	80	10	10	0	0	0	100
166	100	0	0	0	0	0	100
167	100	0	0	0	0	0	100
168	45	0	55	0	0	0	100
169	35	0	50	10	0	5	100
170	100	0	0	0	0	0	100
171	90	0	0	10	0	0	100
172	100	0	0	0	0	0	100
173	85	15	0	0	0	0	100
174	30	60	0	10	0	0	100
175	70	0	0	20	10	0	100
176	100	0	0	0	0	0	100
177	40	0	60	0	0	0	100
178	50	0	25	25	0	0	100
182	0	0	20	0	80	0	100
183	100	0	0	0	0	0	100
184	25	50	0	25	0	0	100
185	10	40	40	0	0	10	100
186	0	0	0	100	0	0	100
187	0	0	0	0	100	0	100
188	20	0	80	0	0	0	100
189	100	0	0	0	0	0	100
190	30	0	40	30	0	0	100
191	40	40	0	20	0	0	100
193	0	0	0	0	100	0	100
194	60	40	0	0	0	0	100
195	30	35	35	0	0	0	100
199	0	0	50	0	50	0	100
202	100	0	0	0	0	0	100
205	100	0	0	0	0	0	100
206	100	0	0	0	0	0	100
207	50	50	0	0	0	0	100
208	100	0	0	0	0	0	100
209	60	15	5	0	10	10	100
210	20	0	60	0	0	20	100
212	70	20	10	0	0	0	100
213	80	0	0	0	20	0	100
214	100	0	0	0	0	0	100
215	0	0	100	0	0	0	100
216	74	18	0	0	8	0	100
217	60	10	20	10	0	0	100

Questionnaire #	% FISHING TIME IN EACH ANGLER ZONE AREA						
	A	B	C	D	E	F	Total
218	100	0	0	0	0	0	100
219	100	0	0	0	0	0	100
220	0	100	0	0	0	0	100
221	50	0	40	0	0	10	100
222	50	0	50	0	0	0	100
223	100	0	0	0	0	0	100
224	90	0	10	0	0	0	100
225	32	0	32	36	0	0	100
226	100	0	0	0	0	0	100
227	75	0	25	0	0	0	100
228	100	0	0	0	0	0	100
229	100	0	0	0	0	0	100
230	30	0	0	0	30	40	100
231	100	0	0	0	0	0	100
232	100	0	0	0	0	0	100
233	100	0	0	0	0	0	100
234	100	0	0	0	0	0	100
235	100	0	0	0	0	0	100
236	100	0	0	0	0	0	100
237	100	0	0	0	0	0	100
Average	**62**	**6**	**16**	**4**	**9**	**3**	

Note: There were **236** "completed" questionnaires for this study. For this question, there were **218 responses.**

Table G-2 Data from Angler Questionnaire Questions #'s 3 and 4

Q3. On Average, how many days do you spend fishing in Manitoba each year?
Q4. # of days spent fishing on the Red and/or Assiniboine rivers within the "Angler Zone" map area in 1998

Questionnaire #	# Days Spent Fishing in Manitoba Each Year	# Days Spent Fishing in Angler Zone Areas in 1998	% Fishing Time in Angler Zone Areas in 1998
69	10		0%
83	30		0%
94	10		0%
145	175	3	2%
73	30	1	3%
198	60	2	3%
196	60	3	5%
211	100	5	5%
136	30	2	7%
146	150	10	7%
202	60	4	7%
236	100	7	7%
11	14	1	7%
229	70	5	7%
75	40	3	8%
66	53	5	9%
59	20	2	10%
84	30	3	10%
172	80	8	10%
179	100	10	10%
85	27	3	11%
232	25	3	12%
38	40	5	13%
209	80	10	13%
82	45	6	13%
156	30	4	13%
74	20	3	15%
201	20	3	15%
228	20	3	15%
65	155	25	16%
24	30	5	17%
43	12	2	17%
110	12	2	17%
149	60	10	17%
197	30	5	17%
223	60	10	17%
91	40	7	18%
185	40	7	18%
4	40	8	20%
56	15	3	20%
60	20	4	20%

Questionnaire #	# Days Spent Fishing in Manitoba Each Year	# Days Spent Fishing in Angler Zone Areas in 1998	% Fishing Time in Angler Zone Areas in 1998
68	50	10	20%
70	15	3	20%
99	30	6	20%
132	10	2	20%
154	50	10	20%
178	10	2	20%
183	15	3	20%
184	25	5	20%
191	50	10	20%
192	10	2	20%
194	50	10	20%
234	25	5	20%
147	140	30	21%
189	14	3	21%
159	45	10	22%
63	365	90	25%
27	20	5	25%
52	40	10	25%
77	40	10	25%
155	20	5	25%
181	12	3	25%
205	20	5	25%
206	20	5	25%
216	20	5	25%
221	20	5	25%
128	150	40	27%
225	30	8	27%
237	15	4	27%
101	50	14	28%
78	50	15	30%
141	200	60	30%
143	10	3	30%
180	10	3	30%
233	20	6	30%
224	13	4	31%
17	40	13	33%
45	15	5	33%
53	30	10	33%
79	30	10	33%
81	30	10	33%
87	30	10	33%
117	60	20	33%
134	15	5	33%
158	30	10	33%
161	45	15	33%
164	30	10	33%
170	30	10	33%
203	15	5	33%

Questionnaire #	# Days Spent Fishing in Manitoba Each Year	# Days Spent Fishing in Angler Zone Areas in 1998	% Fishing Time in Angler Zone Areas in 1998
220	60	20	33%
46	100	35	35%
135	20	7	35%
16	14	5	36%
150	70	25	36%
160	55	20	36%
44	40	15	38%
80	40	15	38%
125	8	3	38%
165	40	15	38%
195	40	15	38%
219	40	15	38%
20	25	10	40%
37	25	10	40%
97	10	4	40%
100	50	20	40%
104	50	20	40%
126	50	20	40%
131	25	10	40%
142	10	4	40%
157	10	4	40%
167	25	10	40%
204	150	60	40%
222	25	10	40%
14	7	3	43%
226	35	15	43%
230	70	30	43%
23	10	4.5	45%
114	20	9	45%
5	120	60	50%
13	20	10	50%
15	30	15	50%
28	20	10	50%
41	100	50	50%
42	20	10	50%
49	10	5	50%
64	20	10	50%
72	10	5	50%
90	30	15	50%
96	14	7	50%
103	40	20	50%
113	40	20	50%
118	60	30	50%
129	10	5	50%
139	200	100	50%
144	100	50	50%
151	40	20	50%
153	50	25	50%

Questionnaire #	# Days Spent Fishing in Manitoba Each Year	# Days Spent Fishing in Angler Zone Areas in 1998	% Fishing Time in Angler Zone Areas in 1998
168	50	25	50%
177	20	10	50%
186	10	5	50%
207	60	30	50%
212	60	30	50%
227	20	10	50%
34	30	16	53%
12	14	8	57%
19	50	30	60%
109	50	30	60%
171	30	18	60%
174	10	6	60%
208	25	15	60%
213	25	15	60%
231	50	30	60%
50	90	60	67%
51	30	20	67%
54	60	40	67%
67	75	50	67%
105	30	20	67%
111	30	20	67%
116	150	100	67%
124	30	20	67%
140	150	100	67%
188	30	20	67%
218	30	20	67%
182	20	14	70%
71	14	10	71%
133	30	22	73%
10	200	150	75%
30	100	75	75%
48	100	75	75%
55	20	15	75%
98	80	60	75%
137	100	75	75%
175	20	15	75%
200	60	45	75%
148	165	130	79%
2	75	60	80%
88	25	20	80%
92	50	40	80%
107	25	20	80%
108	50	40	80%
127	50	40	80%
190	30	24	80%
86	30	25	83%
89	60	50	83%
93	30	25	83%

Questionnaire #	# Days Spent Fishing in Manitoba Each Year	# Days Spent Fishing in Angler Zone Areas in 1998	% Fishing Time in Angler Zone Areas in 1998
166	12	10	83%
169	30	25	83%
122	40	35	88%
47	100	90	90%
95	100	90	90%
130	10	9	90%
215	90	85	94%
112	20	19	95%
119	20	19	95%
62	60	59	98%
138	60	59	98%
3	5	5	100%
6	20	20	100%
7	2	2	100%
8	15	15	100%
9	8	8	100%
21	20	20	100%
22	10	10	100%
25	20	20	100%
26	10	10	100%
29	5	5	100%
31	10	10	100%
32	5	5	100%
33	2	2	100%
35	15	15	100%
36	5	5	100%
39	200	200	100%
40	200	200	100%
57	130	130	100%
61	40	40	100%
76	5	5	100%
102	110	110	100%
106	30	30	100%
115	12	12	100%
120	3	3	100%
121	30	30	100%
123	200	200	100%
152	6	6	100%
162	20	20	100%
173	40	40	100%
176	3	3	100%
187	60	60	100%
193	60	60	100%
199	50	50	100%
210	15	15	100%
214	30	30	100%
217	100	100	100%
235	20	20	100%

Questionnaire #	# Days Spent Fishing in Manitoba Each Year	# Days Spent Fishing in Angler Zone Areas in 1998	% Fishing Time in Angler Zone Areas in 1998
Total	10766	5440.5	-
Average	46	24	51%
Std dev	47	33	31%

Number of responses for Q. 3 = 233
Number of responses for Q. 4 = 231

Table G-3 Data from Angler Questionnaire Question # 5

Q5. During Which Seasons Do You Fish On The Red River?

Questionnaire #	Season			
	Spring (May - June)	Summer (July - Aug)	Fall (Sept - Oct)	Winter to Early Spring (Nov - Apr)
1				
2	1	1	1	1
3	1	1		
4	1	1	1	1
5		1		1
6	1	1	1	
7		1	1	
8	1	1	1	
9	1	1	1	
10	1	1	1	
11		1		
12	1		1	
13	1			
14		1		
15	1		1	
16	1			
17		1	1	
18				
19		1	1	
20	1			
21	1	1		
22		1		
23	1	1		
24	1	1	1	
25		1		
26		1		
27			1	
28	1	1	1	1
29	1		1	
30	1	1	1	1
31	1	1	1	
32	1			
33		1		
34	1		1	1
35	1	1	1	
36		1	1	
37	1	1		
38	1	1		1
39	1	1	1	1
40	1	1	1	
41	1	1	1	1
42	1	1	1	1
43		1	1	
44	1		1	1

Questionnaire #	Season			
	Spring (May - June)	Summer (July - Aug)	Fall (Sept - Oct)	Winter to Early Spring (Nov - Apr)
45		1	1	1
46		1		1
47			1	1
48	1	1		
49			1	
50	1	1	1	
51	1		1	
52	1	1	1	1
53		1		1
54		1	1	
55				1
56			1	
57				
58			1	1
59	1		1	
60		1	1	
61			1	1
62	1	1	1	
63	1	1	1	1
64	1	1	1	
65	1	1	1	1
66			1	
67	1	1	1	1
68			1	1
69		1		
70				
71	1	1	1	
72	1		1	
73		1		
74		1		
75			1	1
76	1	1	1	1
77		1	1	1
78		1	1	
79	1	1		
80	1	1		
81			1	1
82	1	1	1	1
83	1	1	1	1
84		1	1	
85			1	
86	1	1	1	
87		1	1	
88		1	1	1
89				
90	1	1	1	
91	1	1		
92	1	1	1	1

Questionnaire #	Season			
	Spring (May - June)	Summer (July - Aug)	Fall (Sept - Oct)	Winter to Early Spring (Nov - Apr)
93	1	1		
94	1	1		
95	1	1		
96		1		
97	1	1		
98	1	1	1	1
99	1	1	1	1
100	1	1	1	1
101	1	1	1	
102	1	1	1	
103			1	1
104				
105	1	1	1	
106		1	1	
107	1	1	1	
108	1	1	1	1
109	1	1		
110			1	
111	1			
112	1	1	1	
113	1	1	1	
114			1	1
115	1	1	1	
116		1	1	1
117		1		1
118	1			
119		1		
120	1	1		
121	1	1	1	1
122				
123	1	1	1	
124			1	
125		1		
126	1	1		
127	1	1	1	1
128			1	1
129	1	1		
130		1		
131	1	1		
132	1	1	1	
133	1		1	1
134	1	1		1
135				1
136	1	1	1	1
137	1	1	1	
138	1	1		
139	1	1	1	
140	1	1	1	1

Questionnaire #	Season			
	Spring (May - June)	Summer (July - Aug)	Fall (Sept - Oct)	Winter to Early Spring (Nov - Apr)
141	1	1	1	1
142	1	1	1	1
143		1		
144	1	1	1	
145	1	1		
146	1		1	
147		1		1
148	1	1	1	
149		1	1	1
150	1	1	1	1
151	1	1	1	
152			1	
153	1	1	1	
154	1	1	1	
155				1
156				1
157	1	1	1	
158	1	1		
159	1			
160	1	1	1	
161		1		1
162	1	1	1	
163				
164			1	
165			1	
166				1
167			1	
168	1	1	1	
169	1	1	1	
170			1	
171	1	1	1	
172			1	1
173	1		1	1
174	1	1		
175	1	1		
176		1	1	
177		1	1	1
178	1	1	1	1
179	1	1	1	
180			1	
181	1	1	1	
182	1	1	1	
183	1	1	1	
184	1	1	1	1
185		1		
186	1			
187				
188	1	1	1	1

Questionnaire #	Season			
	Spring (May - June)	Summer (July - Aug)	Fall (Sept - Oct)	Winter to Early Spring (Nov - Apr)
189		1	1	
190	1	1	1	1
191	1	1	1	1
192		1		
193				
194	1		1	1
195			1	
196	1		1	
197	1			
198	1		1	
199	1	1		
200	1	1		
201				1
202	1		1	
203		1	1	
204	1	1	1	
205	1	1	1	
206	1	1	1	
207	1	1	1	
208	1		1	
209	1	1	1	
210	1	1		
211	1	1	1	1
212		1		1
213	1	1	1	
214			1	1
215	1	1	1	
216	1		1	
217	1	1	1	1
218	1	1		1
219			1	
220	1	1	1	
221	1	1		
222	1	1	1	
223	1	1		
224	1			1
225	1	1		
226			1	
227	1		1	
228			1	1
229				
230			1	
231			1	
232	1			
233			1	1
234				1
235	1	1	1	
236			1	1

Questionnaire #	Season			
	Spring (May - June)	Summer (July - Aug)	Fall (Sept - Oct)	Winter to Early Spring (Nov - Apr)
237	1	1	1	
Totals	**144**	**158**	**154**	**76**

Number of people who responded to this question = 226

Table G- 4 Data from Angler Questionnaire Question # 6

Q6. During Which Seasons Do You Fish On The Assiniboine River?

Questionnaire #	Season			
	Spring	Summer	Fall	Winter to Early Spring
	(May - June)	(July - Aug)	(Sept - Oct)	(Nov - Apr)
2	1		1	
10		1		
11		1		
13	1			
16		1		
19		1	1	
20	1			
21	1	1		
22		1		
25	1	1		
28	1			
30	1	1	1	
31	1	1		
32		1		
38	1	1		
39	1	1	1	
40	1	1	1	
44	1		1	1
52	1	1	1	
53		1		
54		1	1	
57	1	1	1	
70	1		1	
71	1	1	1	
73	1	1		
74			1	
77		1		
82		1		
83	1	1	1	1
88	1			
89	1	1	1	
90	1			
91		1		
92	1	1	1	
93	1	1		
95		1		
96	1	1		
100		1	1	
101			1	
102	1	1	1	
104	1	1		
107	1	1	1	

Questionnaire #	Season			
	Spring	Summer	Fall	Winter to Early Spring
	(May - June)	(July - Aug)	(Sept - Oct)	(Nov - Apr)
108	1	1	1	
111			1	
116			1	
117		1		
118		1		
120	1	1		
121	1			
122	1	1	1	
123	1	1	1	
129		1		
130		1		
131	1			
133	1			
136		1		
137	1			
138	1	1		
139	1	1		
143		1	1	1
144		1		
145		1		
146			1	
147				1
151	1			1
152	1			
156		1		
158	1	1		
161		1	1	
162	1	1	1	
169	1			
175	1	1		
178		1		
179	1	1	1	
181	1	1	1	
184		1		
185		1		
187	1	1	1	
190			1	
191	1			
193	1	1	1	
194		1		
195		1		
196	1			
199	1	1		
200	1	1		
201	1	1	1	
203		1		
204		1	1	

Questionnaire #	Season			
	Spring	Summer	Fall	Winter to Early Spring
	(May - June)	(July - Aug)	(Sept - Oct)	(Nov - Apr)
209	1	1	1	
210	1	1		
213	1	1	1	
216	1		1	
221		1		
223		1		
227	1			
228		1		
230	1			
231			1	
Totals	**58**	**71**	**39**	**5**

Number of people who responded to this question = 99

Table G-5 Data from Angler Questionnaire Question # 7

Q7. How Would You Rate Fishing Along The Red River?

Questionnaire #	Excellent	Good	Fair	Poor	No Opinion
2	1				
3				1	
4		1			
5	1				
6			1		
7			1		
8		1			
9		1			
10			1		
11		1			
12			1		
13	1				
14			1		
15	1				
16	1				
17		1			
19			1		
20			1		
21		1			
22					1
23			1		
24			1		
25		1			
27			1		
28			1		
29		1			
30	1				
31		1			
32		1			
33					1
34		1			
35		1			
36		1			
37		1			
38	1				
39		1			
40		1			
41		1			
42			1		
43		1			
44			1		
45	1				
46		1			
47			1		
48			1		
49		1			
50			1		
51		1			
52		1			

Questionnaire #	Excellent	Good	Fair	Poor	No Opinion
53		1			
54			1		
55	1				
56		1			
57	1				
58		1			
59			1		
60			1		
61		1			
62		1			
63		1			
64			1		
65		1			
66			1		
67		1			
68		1			
69				1	
70		1			
71		1			
72		1			
73					1
74			1		
75				1	
76		1			
77		1			
78		1			
79		1			
80	1				
81			1		
82				1	
83	1				
84			1		
85				1	
86		1			
87		1			
88			1		
90		1			
91	1				
92	1				
93		1			
94					1
95		1			
96		1			
97		1			
98			1		
99			1		
100		1			
101	1				
102		1			
103		1			
104		1			
105		1			
106		1			
107	1				

Questionnaire #	Excellent	Good	Fair	Poor	No Opinion
108	1				
109			1		
110			1		
111			1		
112		1			
113			1		
114			1		
115		1			
116		1			
117	1				
118	1				
119			1		
120			1		
121	1				
123	1				
124			1		
125		1			
126	1				
127		1			
128	1				
129		1			
130			1		
131			1		
132		1	1		
133			1		
134		1			
135		1			
136		1			
137	1				
138		1			
139		1			
140			1		
141			1		
142		1			
143			1		
144			1		
145			1		
146			1		
147		1			
148		1			
149		1			
150		1			
151		1			
152		1			
153			1		
154		1			
155		1			
156				1	
157		1			
158		1			
159			1		
160		1			
161		1			
162			1		

Questionnaire #	Excellent	Good	Fair	Poor	No Opinion
164		1			
165		1			
166			1		
167		1			
168	1				
169	1				
170			1		
171	1				
172		1	1		
173		1			
174			1		
175		1			
176		1			
177		1			
178		1			
179			1		
180			1		
181		1			
182	1				
183			1		
184		1			
185			1		
186		1			
188		1			
189		1			
190		1			
191		1			
192			1		
194		1			
195				1	
196		1			
197		1			
198	1				
199	1				
200		1			
201		1			
202		1			
203		1			
204		1			
205		1			
206		1			
207			1		
208			1		
209		1			
210		1			
211		1			
212			1		
213	1				
214		1			
215	1				
216		1			
217		1			
218		1			
219		1			

Questionnaire #	Excellent	Good	Fair	Poor	No Opinion
220		1			
221			1		
222	1				
223				1	
224	1				
225			1		
226		1			
227			1		
229			1		
230		1			
231		1			
232			1		
233		1			
234		1			
235		1			
236			1		
237				1	
Totals	**34**	**117**	**66**	**9**	**4**

Number of responses = 230

Table G-6 Data from Angler Questionnaire Question # 8

Q8. How Would You Rate Fishing Along The Assiniboine River?

Questionnaire #	Excellent	Good	Fair	Poor	No Opinion
2	1				
10				1	
11		1			
13	1				
16	1				
20			1		
21			1		
25			1		
28			1		
30	1				
31		1			
38			1		
39		1			
40	1				
52		1			
53		1			
54			1		
57	1				
59				1	
67			1		
70		1			
71	1				
73			1		
75				1	
77		1			
82				1	
83			1		
88			1		
89	1				
90			1		
91		1			
92	1				
93		1			
97		1			
100		1			
101			1		
102			1		
104		1			
107	1				
108	1				
109			1		
111		1			
116			1		
117		1			
118	1				
120		1			

Questionnaire #	Excellent	Good	Fair	Poor	No Opinion
121		1			
122		1			
123			1		
129			1		
130				1	
131					1
133		1			
137		1			
138		1			
139		1			
143		1			
144			1		
145			1		
149				1	
151		1			
153				1	
154			1		
156			1		
158			1		
161		1			
162			1		
169		1			
175		1			
178		1			
179	1				
180					1
181	1				
182			1		
185			1		
187	1				
190				1	
192			1		
193		1			
194			1		
195				1	
196		1			
197					1
198					1
199	1				
200		1			
201					1
202		1			
203			1		
204		1			
209		1			
210		1			
211					1
213				1	
216			1		
220		1			
221		1			

Questionnaire #	Excellent	Good	Fair	Poor	No Opinion
223				1	
227			1		
228		1			
230		1			
231			1		
Totals	**16**	**38**	**31**	**11**	**6**

Number of responses = 102

Table G-7 Data from Angler Questionnaire Question # 9

Q9. Which Species Do You Usually Fish For?

Questionnaire #	SPECIES PREFERENCE								
	Walleye	Catfish	Goldeye	Pike	Perch	Drum	No Preference	Other (count)	Other (species)
1									
2							1		
3	1		1	1					
4	1	1	1		1	1			
5	1								
6	1			1	1				
7							1		
8	1			1					
9							1		
10	1	1	1						
11			1						
12		1			1				
13	1	1							
14			1			1			
15	1	1				1			
16		1							
17	1	1	1					1	sauger
18									
19	1								
20	1								
21		1				1			
22				1					
23		1		1					
24				1					
25		1	1						
26		1	1			1		1	mooneye
27	1	1							
28	1			1	1				
29	1		1						
30	1	1							
31		1							
32	1	1	1	1	1				
33	1	1							
34	1		1						
35	1								
36	1		1	1					
37	1			1					
38	1	1	1						
39	1	1						1	carp
40	1	1	1						
41	1		1						
42	1	1		1	1	1			
43	1								
44	1	1	1			1			

Questionnaire #	SPECIES PREFERENCE								
	Walleye	Catfish	Goldeye	Pike	Perch	Drum	No Preference	Other (count)	Other (species)
45	1	1	1					1	white bass
46	1	1							
47	1								
48							1		
49	1			1					
50		1				1			
51	1	1	1						
52	1	1	1	1	1	1			
53	1	1	1						
54		1							
55	1	1							
56	1								
57	1		1	1					
58	1			1	1	1			
59	1			1					
60	1								
61	1								
62		1					1		
63		1		1				1	sturgeon
64	1								
65	1	1	1	1	1	1			
66	1	1							
67	1	1	1			1		1	sauger
68	1	1							
69							1		
70	1	1		1	1	1			
71	1								
72	1	1		1					
73		1		1					
74	1			1					
75	1			1	1				
76		1	1		1				
77	1	1	1						
78	1	1							
79	1								
80	1								
81	1								
82	1								
83	1	1	1	1					
84		1					1		
85	1			1					
86	1	1							
87		1							
88	1	1	1						
89		1						1	red horse sucker
90	1	1	1						
91		1	1					1	white bass
92	1								

Questionnaire #	SPECIES PREFERENCE								
	Walleye	Catfish	Goldeye	Pike	Perch	Drum	No Preference	Other (count)	Other (species)
93	1	1		1	1				
94	1	1		1					
95							1		
96		1							
97		1	1						
98	1	1	1	1					
99		1				1			
100	1	1				1			
101	1	1	1						
102							1		
103	1	1	1			1			
104		1	1			1			
105	1								
106	1	1							
107							1		
108	1	1	1					1	carp
109	1	1	1						
110	1	1	1						
111	1	1		1					
112		1				1			
113	1		1						
114	1			1	1				
115	1		1						
116	1	1	1	1	1	1			
117	1	1	1	1				2	carp, trout
118		1							
119	1								
120		1	1						
121	1	1						1	carp
122	1	1							
123	1	1	1						
124	1								
125	1	1	1	1	1				
126	1	1							
127	1								
128									
129	1	1	1						
130	1		1						
131		1	1		1				
132	1								
133	1	1	1						
134	1	1		1	1	1			
135	1			1					
136	1	1				1		1	sauger
137		1	1		1	1			
138		1	1	1	1	1			
139	1	1	1			1		2	carp, sauger
140	1	1				1		1	bullheads

Questionnaire #	SPECIES PREFERENCE								
	Walleye	Catfish	Goldeye	Pike	Perch	Drum	No Preference	Other (count)	Other (species)
141	1	1	1		1	1		1	bullhead
142	1			1					
143							1		
144	1	1				1			
145		1							
146	1			1					
147	1	1	1			1			
148	1	1	1	1		1		1	carp
149	1	1		1		1			
150	1	1				1			
151	1	1						1	bullhead
152	1								
153	1				1				
154	1								
155	1			1					
156	1			1					
157							1		
158		1				1			
159	1								
160		1				1		1	carp
161							1		
162		1							
163									
164	1								
165	1								
166	1								
167	1								
168	1	1							
169	1	1	1			1		1	sauger
170	1								
171	1	1							
172	1	1	1					1	sauger
173	1			1					
174							1		
175							1		
176	1	1	1						
177		1	1					1	carp
178	1		1		1				
179							1		
180	1								
181		1	1						
182		1							
183	1	1							
184	1	1	1						
185		1							
186	1	1							
187		1	1						
188	1	1				1			
189	1	1							

Questionnaire #	SPECIES PREFERENCE								
	Walleye	Catfish	Goldeye	Pike	Perch	Drum	No Preference	Other (count)	Other (species)
190	1	1	1			1			
191	1	1	1						
192	1			1					
193		1	1			1			
194	1	1							
195	1	1	1						
196		1							
197		1	1			1			
198	1	1	1	1	1				
199		1						1	carp
200		1	1						
201	1				1				
202	1	1		1		1			
203	1		1	1					
204	1	1		1					
205	1	1	1						
206							1		
207							1		
208	1	1	1						
209	1	1		1	1				
210	1		1						
211	1			1					
212	1	1							
213	1	1							
214	1	1							
215							1		
216	1			1	1	1			
217							1		
218	1		1						
219	1	1							
220	1								
221	1								
222	1	1	1			1			
223	1		1						
224	1	1							
225		1			1				
226	1								
227	1	1							
228	1				1	1			
229	1								
230	1	1							
231	1	1							
232	1	1							
233	1	1							
234	1		1	1					
235	1	1	1						
236	1								
237	1	1			1				
Totals	**169**	**138**	**78**	**52**	**30**	**42**	**20**	**24**	

Questionnaire #	SPECIES PREFERENCE								
	Walleye	Catfish	Goldeye	Pike	Perch	Drum	No Preference	Other (count)	Other (species)

Total responses = 553

Table G-8 Data from Angler Questionnaire Question # 10

Q10. Which Species Did You Usually Catch in 1998?

Questionnaire #	SPECIES CAUGHT							
	Walleye	Catfish	Goldeye	Pike	Perch	Drum	Other (count)	Other (species)
1								
2	1	1	1	1	1	1		
3			1					
4	1		1			1		
5	1						1	Bullhead
6		1						
7						1		
8		1				1		
9	1	1				1		
10	1		1				1	Carp
11					1			
12		1						
13		1						
14						1		
15	1	1				1		
16		1						
17	1	1			1		1	sauger
18								
19		1						
20		1						
21		1	1			1		
22				1				
23								
24	1			1	1			
25		1	1					
26		1	1			1	1	mooneye
27	1	1						
28	1	1		1	1			
29	1		1					
30	1	1						
31			1					
32	1	1						
33	1	1				1		
34	1		1			1		
35	1	1				1		
36	1		1					
37	1							
38	1		1					
39	1	1						
40	1	1	1					
41	1		1					
42	1	1		1		1		
43	1							
44	1		1			1		

Questionnaire #	SPECIES CAUGHT							
	Walleye	Catfish	Goldeye	Pike	Perch	Drum	Other (count)	Other (species)
45	1	1	1			1	1	white bass
46	1	1						
47	1				1			
48	1	1	1			1	1	bullhead
49	1							
50		1				1		
51	1	1	1					
52	1	1	1	1	1			
53	1			1	1			
54		1						
55	1							
56	1					1		
57				1				
58	1							
59	1			1				
60	1							
61	1							
62		1						
63	1	1		1				
64		1			1			
65	1			1	1	1		
66	1	1		1	1			
67			1				1	sauger
68	1	1						
69				1				
70	1				1			
71	1	1	1			1		
72	1	1		1	1			
73	1	1		1	1			
74			1					
75	1			1	1			
76		1	1					
77	1	1						
78	1						1	sauger
79	1							
80	1						1	bullhead
81	1							
82	1			1				
83		1	1					
84		1						
85	1							
86	1	1						
87							1	sauger
88	1	1				1	1	burbot
89		1				1		
90	1	1				1		
91		1	1					
92	1	1	1	1	1	1	1	black crappie

Questionnaire #	SPECIES CAUGHT							
	Walleye	Catfish	Goldeye	Pike	Perch	Drum	Other (count)	Other (species)
93				1	1			
94		1						
95		1	1					
96		1						
97		1	1					
98	1							
99		1				1		
100	1	1				1		
101	1	1	1					
102	1	1	1			1		
103	1						1	sauger
104		1	1			1		
105	1	1		1			1	sucker
106	1	1						
107	1	1		1				
108	1	1					1	carp
109		1	1					
110	1			1				
111	1			1				
112		1				1	1	bullhead
113	1	1	1					
114	1				1			
115	1	1	1			1		
116	1	1	1	1	1	1		
117	1	1		1				
118		1						
119		1						
120								
121	1	1	1			1	1	carp
122	1	1	1					
123	1	1	1					
124	1					1		
125		1				1		
126	1	1	1					
127	1	1	1		1	1	1	carp
128	1	1	1			1		
129	1	1						
130			1					
131		1	1		1			
132	1							
133	1	1	1					
134	1	1						
135	1			1		1	2	burbot, sauger
136						1	1	sauger
137		1	1		1	1		
138		1		1	1	1	1	carp

Questionnaire #	SPECIES CAUGHT							
	Walleye	Catfish	Goldeye	Pike	Perch	Drum	Other (count)	Other (species)
139	1	1	1	1	1	1	4	carp, sucker, sauger, crappie
140	1	1	1	1	1	1	2	bullheads, burbot
141	1	1	1	1	1	1	1	bullhead
142	1			1				
143		1						
144	1	1	1			1		
145	1							
146						1		
147	1			1				
148	1	1	1	1		1		
149	1					1		
150	1	1		1		1		
151		1		1			1	bullhead
152	1							
153	1	1		1	1	1		
154	1							
155	1			1				
156	1							
157		1						
158		1				1		
159	1			1				
160							1	carp
161			1					
162			1					
163								
164	1					1	1	sauger
165	1	1						
166	1							
167	1							
168	1	1						
169	1	1	1			1		sauger
170	1			1		1		
171	1	1		1		1	1	smallmouth bass
172	1							
173	1			1		1		
174						1		
175		1	1			1		
176	1	1	1					
177		1	1	1			1	carp
178				1				
179	1	1		1				
180	1							
181		1	1					
182		1						

Questionnaire #	SPECIES CAUGHT							
	Walleye	Catfish	Goldeye	Pike	Perch	Drum	Other (count)	Other (species)
183		1						
184	1	1	1			1		
185		1						
186	1	1						
187		1	1					
188		1				1		
189	1	1						
190			1			1		
191	1	1	1	1		1		
192	1			1				
193		1	1			1		
194	1					1		
195	1		1			1		
196		1						
197		1						
198	1		1	1	1			
199		1						
200		1	1					
201	1				1			
202	1	1		1		1		
203	1	1	1	1	1	1		
204				1	1			
205		1	1					
206			1					
207		1				1		
208	1	1	1					
209		1		1	1			
210	1	1	1					
211	1			1				
212	1	1						
213		1						
214	1	1						
215		1	1			1	1	carp
216	1	1		1		1		
217	1	1	1	1		1		
218	1		1			1		
219	1							
220	1	1	1	1		1		
221						1		
222		1	1			1	1	bullhead
223							1	bass
224	1							
225		1			1			
226	1							
227	1	1		1				
228	1				1	1		
229	1							
230	1	1						
231	1			1	1			

Questionnaire #	SPECIES CAUGHT							
	Walleye	Catfish	Goldeye	Pike	Perch	Drum	Other (count)	Other (species)
232						1		
233	1							
234	1							
235	1	1	1					
236	1					1		
237				1				
Totals	**148**	**135**	**76**	**58**	**35**	**77**	**37**	

Total responses = 566

Table G-9 Data from Angler Questionnaire Question # 11

Q11. In your opinion, the quality of fishing on the rivers in the City is:

Questionnaire #	Increasing	Decreasing	About Same	No Opinion
1				
2	1			
3		1		
4			1	
5	1			
6		1		
7				1
8			1	
9	1			
10			1	
11			1	
12			1	
13	1			
14		1		
15				1
16	1			
17	1			
18				
19			1	
20			1	
21			1	
22		1		
23			1	
24			1	
25	1			
26				1
27			1	
28		1		
29			1	
30			1	
31	1			
32				1
33				1
34	1			
35				1
36				1
37			1	
38	1			
39	1			
40	1			
41				1
42			1	
43			1	
44	1			
45			1	
46				1

Questionnaire #	Increasing	Decreasing	About Same	No Opinion
47			1	
48			1	
49				1
50			1	
51			1	
52			1	
53	1			
54				1
55				1
56	1			
57	1			
58	1			
59			1	
60				1
61				
62	1			
63	1			
64			1	
65				
66			1	
67		1		
68				1
69				1
70			1	
71			1	
72	1			
73				1
74				
75				1
76		1		
77			1	
78		1		
79	1			
80				1
81				1
82			1	
83		1		
84			1	
85			1	
86			1	
87			1	
88				1
89		1		
90	1			
91			1	
92		1		
93			1	
94				1
95	1			
96			1	

Questionnaire #	Increasing	Decreasing	About Same	No Opinion
97		1		
98		1		
99			1	
100		1		
101			1	
102				1
103			1	
104	1			
105	1			
106				1
107			1	
108			1	
109			1	
110			1	
111	1			
112		1		
113			1	
114		1		
115			1	
116				1
117			1	
118	1			
119	1			
120	1			
121			1	
122	1			
123	1			
124	1			
125			1	
126			1	
127		1		
128			1	
129	1			
130		1		
131			1	
132			1	
133			1	
134				
135			1	
136			1	
137			1	
138			1	
139			1	
140			1	
141			1	
142				1
143			1	
144			1	
145	1			
146	1			

Questionnaire #	Increasing	Decreasing	About Same	No Opinion
147				1
148			1	
149				1
150	1			
151			1	
152	1			
153			1	
154	1			
155	1			
156	1			
157				1
158	1			
159			1	
160			1	
161	1			
162	1			
163				
164			1	
165			1	
166			1	
167			1	
168			1	
169			1	
170				1
171			1	
172				1
173				1
174			1	
175			1	
176				1
177			1	
178	1			
179	1			
180		1		
181				1
182				1
183			1	
184			1	
185	1			
186	1			
187	1			
188			1	
189				1
190	1			
191			1	
192				1
193	1			
194			1	
195		1		
196		1		

Questionnaire #	Increasing	Decreasing	About Same	No Opinion
197			1	
198	1			
199				1
200	1			
201			1	
202			1	
203	1			
204	1			
205			1	
206				1
207	1			
208			1	
209	1			
210	1			
211				1
212				1
213		1		
214				1
215	1			
216			1	
217			1	
218			1	
219				1
220	1			
221			1	
222			1	
223			1	
224	1			
225			1	
226			1	
227			1	
228	1			
229				1
230			1	
231			1	
232		1		
233			1	
234	1			
235	1			1
236				
237				1
Totals	**63**	**23**	**99**	**45**

Total responses = 230

Table G-10 Data from Angler Questionnaire Question # 12

Q12. How often do you practice "Catch-and-Release"?

Questionnaire #	Always Release	Usually	Sometimes	Rarely
1				
2		1		
3				1
4		1		
5	1			
6		1		
7	1			
8		1		
9			1	
10		1		
11	1			
12			1	
13	1			
14			1	
15		1		
16	1			
17		1		
18				
19		1		
20		1		
21	1			
22	1			
23		1		
24	1			
25	1			
26	1			
27	1			
28			1	
29			1	
30		1		
31	1			
32			1	
33	1			
34		1		
35		1		
36	1			
37		1		
38		1		
39		1		
40	1			
41	1			
42	1			
43		1		
44	1			
45		1		
46		1		

Questionnaire #	Always Release	Usually	Sometimes	Rarely
47	1			
48	1			
49	1			
50	1			
51			1	
52	1			
53		1		
54		1		
55			1	
56		1		
57		1		
58	1			
59	1			
60			1	
61				1
62	1			
63	1			
64	1			
65			1	
66	1			
67		1		
68		1		
69		1		
70	1			
71		1		
72		1		
73		1		
74		1		
75		1		
76		1		
77		1		
78	1			
79		1		
80			1	
81			1	
82			1	
83		1		
84			1	
85			1	
86	1			
87		1		
88			1	
89		1		
90		1		
91		1		
92		1		
93	1			
94		1		
95		1		
96	1			

Questionnaire #	Always Release	Usually	Sometimes	Rarely
97		1		
98			1	
99	1			
100		1		
101		1		
102	1			
103			1	
104		1		
105			1	
106		1		
107	1			
108	1			
109	1			
110			1	
111	1			
112			1	
113	1			
114		1		
115			1	
116		1		
117			1	
118	1			
119	1			
120	1			
121	1			
122	1			
123			1	
124		1		
125	1			
126	1			
127	1			
128	1			
129		1		
130		1		
131	1			
132		1		
133		1		
134		1		
135			1	
136			1	
137	1			
138	1			
139	1			
140		1		
141		1		
142		1		
143	1			
144	1			
145		1		
146		1		

Questionnaire #	Always Release	Usually	Sometimes	Rarely
147		1		
148			1	
149		1		
150	1			
151	1			
152	1			
153	1			
154	1			
155	1			
156		1		
157	1			
158		1		
159		1		
160	1			
161	1			
162	1			
163				
164	1			
165	1			
166	1			
167		1		
168		1		
169		1		
170			1	
171		1		
172		1		
173			1	
174			1	
175	1			
176	1			
177	1			
178			1	
179	1			
180	1			
181	1			
182	1			
183	1			
184		1		
185		1		
186		1		
187		1		
188	1			
189	1			
190		1		
191		1		
192			1	
193	1			
194	1			
195		1		
196	1			

Questionnaire #	Always Release	Usually	Sometimes	Rarely
197	1			
198			1	
199	1			
200		1		
201			1	
202	1			
203		1		
204		1		
205		1		
206		1		
207		1		
208	1			
209	1			
210			1	
211			1	
212		1		
213		1		
214		1		
215	1			
216			1	
217			1	
218		1		
219		1		
220	1			
221	1			
222	1			
223			1	
224		1		
225			1	
226	1			
227	1			
228		1		
229		1		
230		1		
231		1		
232	1			
233		1		
234			1	
235	1			
236		1		
237				1
Totals	**95**	**95**	**41**	**3**

Total responses = 234

Table G-11 Data from Angler Questionnaire Question # 13

Q13. Do you eat the fish you keep?

Questionnaire #	Yes	No	If No, Why?
2	1		
3		1	Can't fillet
4	1		
6	1		
8	1		
9	1		
10	1		
12		1	don't like fish
14	1		
15	1		
17		1	pollution concerns in Red R.
19	1		
20	1		
21		1	Water filthy
22		1	don't like fish from river
23		1	sport only
24		1	dirty
26		1	water quality & can't fillet
27		1	possible pollution
28		1	river is dirty
29		1	give it away
30	1		
32	1		
34	1		
35	1		
37	1		
38	1		
39	1		
43	1		
45	1		
46	1		
47		1	too lazy
48		1	fish contaminated (mercury)
50		1	don't like fish
51	1		
53	1		
54	1		
55	1		
56	1		
57	1		
58	1		
60	1		
61	1		
62		1	don't eat fish
63		1	dirty water

Questionnaire #	Yes	No	If No, Why?
64		1	don't like fish
65	1		
66	1		
67	1		
68	1		
69	1		
71	1		
72	1		
73	1		
74	1		
75	1		
76	1		
77	1		
78	1		
79	1		
80	1		
81	1		
82	1		
84		1	need more info
85	1		
86		1	smell
87	1		
88	1		
89	1		
90	1		
91	1		
92	1		
93		1	Doesn't like filleting, prefers sport fishing
94		1	not sure if we can
95		1	my neighbors eat them
97	1		
98	1		
99	1		
100	1		
101	1		
103	1		
104	1		
105	1		
106		1	
107	1		
109		1	won't eat fish from R.River
110	1		
111	1		
112	1		
114	1		
115	1		
116	1		
117	1		
119		1	pollution
123	1		
124	1		
125		1	it's the R.River!

Questionnaire #	Yes	No	If No, Why?
126		1	Red?
127	1		
128	1		
129	1		
130	1		
132	1		
133	1		
135	1		
136	1		
138	1		
140	1	1	pollution
141	1		
142	1		
143		1	dirty
145	1		
146	1		
147	1		
148	1		
149	1		
150		1	don’t like fish
151	1		
153	1		
155	1		
156		1	not from R. River
157		1	water unclean
158	1		
159	1		
160		1	member of family allergic
164		1	it's from the Red River
165		1	it's from the Red River
166	1		
167	1		
168	1		
169	1		
170	1		
171	1		
172	1		
173	1		
174	1		
178	1		
179		1	don't trust the water
180		1	don't like cleaning fish
184	1		
185	1		
186	1		
187	1		
189		1	pollution concerns
190	1		
191	1		
192	1		
195	1		
196		1	river fish
197		1	pollution concerns

Questionnaire #	Yes	No	If No, Why?
198	1		
200	1		
201	1		
202	1		
204	1		
205	1		
206	1		
207	1		
208	1		
209		1	mercury present
210	1		
211	1		
212	1		
213	1		
214	1		
216	1		
217	1		
218	1		
219	1		
220	1		
222		1	pollution
223	1		
224	1		
225		1	
228	1		
229	1		
230	1		
231	1	1	
232	1		
233	1		
234	1		
235	1		
236	1		
237		1	give them away
Totals	**141**	**45**	

Total responses = 186

Table G-12 Data from Angler Questionnaire Question # 14

Q14. Economic Assessment:

Questionnaire #	1998 Expeditures on Fishing in MB										Approx. % Spent on Red and/or Assin. R.	Approx. Total Spent on Red and/or Assin. R.
	Accommodations	Camp Fees	Food	Travel	Boating Supplies	Boat Rentals	Fishing Supplies	Guide Services	Fishing Licence	TOTAL		
86	$200		$100	$100					$15	$415	0	$0
232					$30				$15	$45	12	$5
236			$100				$50			$150	7	$11
70					$40				$15	$55	20	$15
37				$20			$20			$40	40	$16
24							$100			$100	17	$17
119							$20			$20	95	$19
225		$50	$100	$200	$20	$70	$150		$15	$605	27	$19
209			$60	$60			$50		$6	$176	13	$22
223		$50		$200			$20			$270	17	$22
69		$30	$200	$200			$20		$6	$456	5	$23
53							$70			$70	33	$23
176		$18							$6	$24	100	$24
145		$300	$100	$500	$200	$75	$500	$0	$60	$1,735	2	$30
120				$30						$30	100	$30
136		$75	$100	$100	$100		$50		$30	$455	7	$30
102							$25		$6	$31	100	$31
107							$30		$9	$39	80	$31
198	$300	$100		$200	$200		$150		$15	$965	3	$32
42		$20					$150		$26	$196	50	$33
22							$20		$15	$35	100	$35
49			$30	$10		$20			$15	$75	50	$38
59			$50	$100	$200				$50	$400	10	$40
178		$50	$50	$50	$50		$20		$12	$232	20	$40
228				$50	$50		$150		$18	$268	15	$40
211										$850	5	$43
146		$40	$100	$200		$100	$200		$20	$660	7	$44
118					$10		$20		$15	$45	100	$45

Questionnaire #	1998 Expeditures on Fishing in MB										Approx. % Spent on Red and/or Assin. R.	Approx. Total Spent on Red and/or Assin. R.
	Accommodations	Camp Fees	Food	Travel	Boating Supplies	Boat Rentals	Fishing Supplies	Guide Services	Fishing Licence	TOTAL		
199							$150		$12	$162	33	$53
227		$500		$200		$300	$100		$15	$1,115	50	$55
206		$50	$200		$100		$200		$15	$565	10	$57
12										$100	57	$57
192		$100		$110			$50		$30	$290	20	$58
20			$30	$50	$40		$30			$150	40	$60
181				$200	$10		$10		$24	$244	25	$61
38			$40	$200			$250			$490	13	$61
14										$150	43	$64
210							$50		$15	$65	100	$65
27	$200	$100	$100	$300	$300		$100		$30	$1,130	25	$70
32			$15	$5			$50			$70	100	$70
76			$20	$25			$20		$6	$71	100	$71
72		$20	$300	$200			$100		$12	$632	50	$72
161							$200		$17	$217	33	$72
6										$200	-	$75
29			$25				$25		$25	$75	100	$75
138			$10	$25			$30		$15	$80	98	$79
197		$85	$200	$350	$250		$200		$35	$1,120	17	$79
191		$150	$500	$500	$200		$50		$10	$1,410	20	$80
25				$50			$20		$15	$85	100	$85
75	$1,000	$100		$700			$200		$15	$2,015	8	$90
71							$100		$25	$125	75	$94
106							$75		$20	$95	100	$95
169							$100		$15	$115	83	$96
172		$100		$100			$750		$40	$990	10	$99
9										$100	100	$100
173		$50	$200	$450	$150		$50		$15	$915	100	$100
216										$400	25	$100
207		$500	$200		$200		$100		$6	$1,006	10	$101
215				$250	$500		$50		$18	$818	94	$104
36				$100					$9	$109	100	$109

Questionnaire #	1998 Expeditures on Fishing in MB										Approx. % Spent on Red and/or Assin. R.	Approx. Total Spent on Red and/or Assin. R.
	Accommodations	Camp Fees	Food	Travel	Boating Supplies	Boat Rentals	Fishing Supplies	Guide Services	Fishing Licence	TOTAL		
104		$30	$100	$200	$100		$100		$15	$545	20	$109
115		$150	$150	$200			$200	$200		$900	100	$110
43	$500		$100	$300		$300	$100		$15	$1,315	17	$112
17	$400	$60	$300	$160			$200		$20	$1,140	10	$114
109							$100		$15	$115	100	$115
183		$100	$300				$50		$10	$460	25	$115
74	$600	$40	$200	$150	$100		$50		$12	$1,152	10	$115
56	$500		$50	$100		$500	$200		$25	$1,375	20	$116
116			$50	$25			$100			$175	67	$117
129				$200			$25		$10	$235	50	$118
200							$150		$15	$165	75	$124
80		$150	$500	$500	$50		$100		$15	$1,315	38	$125
156	$150	$150	$200	$300		$50	$100		$17	$967	13	$129
26							$100		$30	$130	100	$130
122		$650	$300	$100			$150		$36	$1,236	88	$136
229										$2,000	7	$143
205		$50	$200	$200	$200		$150		$15	$815	25	$145
187											100	$149
111	$100		$500	$100			$50			$750	20	$150
131			$25		$200		$150			$375	40	$150
133		$20	$60	$100	$30		$200			$410	73	$150
148							$200			$200	79	$150
64		$50	$100	$100	$160		$100		$9	$519	50	$155
103			$60		$600		$75		$45	$780	20	$156
237	$400		$150				$50			$600	27	$160
143		$250	$100	$200					$20	$570	30	$171
85	$600	$40	$200	$300	$200		$200		$16	$1,556	11	$173
84			$1,300		$300		$50	$130		$1,780	10	$178
160		$20	$20	$100	$20	$120	$200		$10	$490	36	$178
182		$50		$200			$100		$10	$360	50	$180
204	$40		$70	$25	$200		$55		$60	$450	40	$180
99			$120	$500		$75	$200		$15	$910	20	$182

Questionnaire #	1998 Expeditures on Fishing in MB										Approx. % Spent on Red and/or Assin. R.	Approx. Total Spent on Red and/or Assin. R.
	Accommodations	Camp Fees	Food	Travel	Boating Supplies	Boat Rentals	Fishing Supplies	Guide Services	Fishing Licence	TOTAL		
44				$200	$250		$50		$9	$509	38	$191
95							$200		$18	$218	90	$196
55				$75	$150		$30		$30	$285	70	$200
8										$200	100	$200
45		$20	$200	$500	$200		$200		$15	$1,135	33	$200
46		$250	$250		$1,000		$5,000			$6,500	35	$200
168	$400		$100	$100	$50		$50		$25	$725	50	$200
221										$800	25	$200
150		$50	$200	$200			$100		$17	$567	36	$202
128		$100	$200	$300	$50		$100		$17	$767	27	$204
57							$200		$9	$209	100	$205
3				$100			$100		$6	$206	100	$206
88			$50	$100			$100		$10	$260	80	$208
174		$60	$100	$100	$25		$50		$14	$349	60	$209
65			$125	$375			$90		$15	$605	16	$215
79		$200	$300	$500	$200		$100		$15	$1,315	33	$225
130			$200	$40					$20	$260	90	$234
52		$200	$50	$400			$300		$15	$965	25	$241
159			$200	$200	$600	$25	$50		$25	$1,100	22	$244
224										$800	31	$246
177										$500	50	$250
226		$200	$500	$1,000	$1,500		$2,000		$15	$5,215	43	$250
149		$6	$200	$300	$800	$200	$17			$1,523	17	$254
96	$100		$100	$200	$50		$50		$15	$515	50	$258
194	$200		$100		$300		$200		$20	$820	20	$260
202		$100	$1,000	$1,000	$1,000		$1,000		$9	$4,109	7	$274
186											50	$290
60	$600	$360		$200	$200		$100		$32	$1,492	20	$298
78	$200	$50	$500	$500	$1,000	$50	$500		$15	$2,815	30	$300
152	$100		$100	$250	$200		$100		$10	$760	100	$300
208			$200	$500	$500		$250			$1,450	60	$300
213										$300	100	$300

Questionnaire #	1998 Expeditures on Fishing in MB										Approx. % Spent on Red and/or Assin. R.	Approx. Total Spent on Red and/or Assin. R.
	Accommodations	Camp Fees	Food	Travel	Boating Supplies	Boat Rentals	Fishing Supplies	Guide Services	Fishing Licence	TOTAL		
134		$100	$200	$250	$150		$200		$10	$910	33	$303
21			$200				$100		$9	$309	100	$309
114	$200	$50	$500	$300	$100	$200	$200		$10	$1,560	20	$312
31			$10	$100			$200		$10	$320	100	$320
170		$400	$1,500	$600	$700		$300		$100	$3,600	33	$340
63		$300	$200	$200	$300		$400		$20	$1,420	25	$350
47										$400	90	$360
101			$500	$500	$200		$100		$15	$1,315	28	$368
218	$150	$120		$100	$200		$50			$620	60	$372
112			$50	$100			$200		$24	$374	100	$374
2										$750	50	$375
10										$500	75	$375
67				$500	$25		$200		$13	$738	67	$375
157			$200	$300		$120	$300		$20	$940	40	$376
68	$200	$50		$550	$200		$100		$10	$1,110	20	$377
196	$2,000		$1,000	$1,000	$1,000	$1,000	$2,000		$30	$8,030	5	$402
117			$1,000	$500	$250		$500		$30	$2,280	33	$415
234		$200	$1,000	$500	$250		$175		$18	$2,143	20	$429
34			$200	$200	$300		$100		$9	$809	53	$431
35			$200				$250		$9	$459	95	$436
155		$100	$1,000	$500	$100		$50		$17	$1,767	25	$442
110	$60		$200	$100			$100			$460	100	$460
81		$300	$500	$200	$300		$100		$15	$1,415	33	$465
51			$200		$200		$300		$15	$715	67	$477
165				$2,000	$1,000		$200		$20	$3,220	38	$478
188					$500		$200		$40	$740	67	$493
100			$10,000	$1,000		$200	$500		$15	$11,715	40	$500
105	$200	$30	$400	$500	$500		$250		$40	$1,920	67	$500
166										$600	83	$500
214										$500	100	$500
4		$200	$200	$300		$800	$1,000		$24	$2,524	20	$505
135	$300	$100	$100	$700	$150		$100		$10	$1,460	35	$511

Questionnaire #	1998 Expeditures on Fishing in MB										Approx. % Spent on Red and/or Assin. R.	Approx. Total Spent on Red and/or Assin. R.
	Accommodations	Camp Fees	Food	Travel	Boating Supplies	Boat Rentals	Fishing Supplies	Guide Services	Fishing Licence	TOTAL		
233		$50	$300	$600	$200		$600		$14	$1,764	30	$529
123			$100	$300			$125		$15	$540	100	$540
77	$180	$60	$400	$200	$400		$300		$15	$1,555	25	$550
190			$100	$120	$1,750		$200		$15	$2,185	80	$550
147		$250	$400	$1,000	$400		$200	$450	$24	$2,724	21	$584
151				$300			$400		$45	$745	50	$595
231										$1,000	60	$600
16	$1,000	$200				$500			$15	$1,715	36	$613
125	$500	$75	$300	$300	$300		$150		$16	$1,641	38	$615
153	$100		$100	$500	$500	$50			$25	$1,275	50	$638
139			$100	$300			$1,000		$9	$1,409	50	$705
142		$30	$30	$1,000	$400		$200	$100	$20	$1,780	40	$712
82		$100	$2,000	$2,000	$1,000		$300		$20	$5,420	13	$723
97				$500	$1,000	$100	$250		$15	$1,865	40	$746
137										$1,000	75	$750
121	$200		$300		$100	$50	$100		$15	$765	100	$765
230										$2,000	43	$857
158	$1,000		$500	$500		$300	$300		$15	$2,615	33	$872
108			$200	$500	$200		$200		$9	$1,109	80	$887
30		$200	$200	$500	$200		$100		$12	$1,212	75	$909
98			$300	$600	$100		$200		$15	$1,215	75	$911
15	$100	$50	$400	$200		$1,000	$100		$18	$1,868	50	$934
87		$400	$500	$1,000			$1,000		$20	$2,920	33	$973
93		$200	$200	$500	$200		$50		$20	$1,170	83	$975
127			$300	$500			$400		$17	$1,217	90	$1,095
219	$800	$350	$500	$1,500	$1,000		$1,000		$15	$5,165	38	$1,200
54		$30	$1,000	$700			$100		$9	$1,839	67	$1,226
73	$1,000	$100	$200	$100	$100		$200		$16	$1,716	75	$1,287
92	$500		$200	$500			$400		$15	$1,615	80	$1,292
140		$100	$200	$1,000	$500		$200		$20	$2,020	67	$1,347
141		$100	$200	$1,500	$3,000		$300		$100	$5,200	30	$1,560
195		$500	$500	$2,000	$1,000		$400		$15	$4,415	38	$1,656

Questionnaire #	1998 Expeditures on Fishing in MB										Approx. % Spent on Red and/or Assin. R.	Approx. Total Spent on Red and/or Assin. R.
	Accommodations	Camp Fees	Food	Travel	Boating Supplies	Boat Rentals	Fishing Supplies	Guide Services	Fishing Licence	TOTAL		
41	$1,300	$200	$2,500	$1,000	$1,500		$250		$9	$6,759	25	$1,690
113		$100	$1,000	$500			$500		$30	$2,130	80	$1,704
162			$500	$500	$100		$600		$50	$1,750	100	$1,750
40		$100	$500	$1,000	$50	$150	$500		$15	$2,315	95	$2,199
235		$40	$200	$1,000	$500		$500		$30	$2,270	100	$2,270
62			$100	$2,500					$9	$2,609	98	$2,566
217		$250	$1,000	$1,000	$250	$100	$250		$15	$2,865	100	$2,865
58			$100	$100	$100		$100		$30	$430		
83		$100	$2,000	$2,000	$1,000		$300		$20	$5,420		
94			$50	$50			$30		$30	$160		
Totals	**$16,380**	**$11,429**	**$49,500**	**$56,405**	**$35,160**	**$6,455**	**$39,297**	**$880**	**$2,966**	**$231,621**	**-**	**$71,826**
Average	**$443**	**$138**	**$393**	**$415**	**$374**	**$248**	**$241**	**$176**	**$19**	**$1,182**	**51**	**$368**
Std. Dev.	**$417**	**$131**	**$953**	**$451**	**$458**	**$285**	**$469**	**$169**	**$14**	**$1,507**		**$472**

Number of questionnaire respondents who answered this question = 196

Note: three respondents did not provide information on the proportion of money spent on fishing on the Red and / or Assinboine River (totals provided only for total spent in Manitoba).

Table G-13 Data from Angler Questionnaire Questions # 15 and 16

Q15. Resident of Manitoba? If yes, resident of Winnipeg?
Q16. How many years have you spent fishing on the Red and/or Assiniboine Rivers?

Questionnaire #	Resident of Manitoba?		Resident of Winnipeg?		Years Fished on Red and / Assin. Rivers?
	Yes	No	Yes	No	
1					
2	1		1		5
3					
4	1		1		30
5	1			1	15
6	1		1		20
7	1			1	10
8	1		1		2
9	1		1		4.5
10	1		1		1
11	1		1		3
12	1		1		15
13	1		1		2
14	1		1		25
15	1		1		9
16	1		1		1
17	1		1		3
18	1		1		1
19	1		1		10
20	1		1		3
21					
22	1		1		10
23	1		1		15
24	1			1	7
25	1		1		3
26	1		1		1
27	1		1		30
28	1		1		20
29	1		1		5
30	1		1		30
31	1		1		2
32	1		1		2
33	1		1		5
34	1		1		45
35	1		1		3
36	1			1	8
37	1		1		3
38	1		1		3
39	1		1		35
40	1		1		5
41	1			1	20
42	1		1		20
43	1		1		4

Questionnaire #	Resident of Manitoba?		Resident of Winnipeg?		Years Fished on Red and / Assin. Rivers?
	Yes	No	Yes	No	
44	1		1		10
45	1		1		40
46	1		1		5
47	1		1		20
48	1		1		1
49	1		1		1
50	1		1		2
51	1		1		5
52	1		1		8
53	1		1		2
54	1		1		2
55	1		1		10
56	1		1		3
57	1		1		3
58	1		1		15
59	1		1		4
60	1		1		1
61	1		1		3
62	1		1		1
63	1		1		12
64	1		1		6
65	1		1		45
66	1			1	18
67	1		1		50
68	1		1		30
69	1		1		2
70	1		1		5
71	1		1		30
72	1		1		20
73	1			1	20
74	1		1		2
75	1			1	15
76	1			1	70
77	1		1		10
78	1		1		20
79	1		1		5
80	1		1		20
81	1		1		30
82	1			1	32
83	1			1	32
84	1		1		2
85	1			1	10
86	1		1		20
87	1				5
88	1		1		4
89	1		1		3
90	1		1		4
91	1		1		30
92	1		1		20

Questionnaire #	Resident of Manitoba?		Resident of Winnipeg?		Years Fished on Red and / Assin. Rivers?
	Yes	No	Yes	No	
93	1		1		15
94	1		1		10
95	1		1		2
96	1		1		5
97	1		1		8
98	1		1		25
99	1		1		18
100	1		1		20
101	1		1		35
102	1		1		8
103	1		1		20
104	1		1		40
105	1		1		20
106	1		1		15
107	1		1		3
108	1		1		30
109	1		1		20
110	1		1		30
111	1		1		18
112	1		1		30
113	1		1		20
114	1		1		25
115	1		1		4
116	1			1	3
117	1		1		5
118	1		1		18
119	1		1		25
120	1		1		10
121	1		1		30
122	1		1		1
123	1		1		2
124	1		1		25
125	1			1	25
126	1			1	10
127	1		1		40
128	1		1		40
129	1		1		50
130	1		1		10
131	1		1		25
132	1		1		10
133	1		1		15
134	1				25
135	1			1	5
136	1		1		40
137	1				5
138	1		1		15
139	1		1		25
140	1			1	20
141	1			1	43

Questionnaire #	Resident of Manitoba?		Resident of Winnipeg?		Years Fished on Red and / Assin. Rivers?
	Yes	No	Yes	No	
142	1		1		20
143	1		1		10
144	1			1	20
145	1		1		8
146	1		1		2
147	1		1		5
148	1				15
149	1			1	4
150	1		1		4
151	1		1		10
152	1		1		20
153	1		1		30
154	1		1		50
155	1		1		20
156	1		1		4
157	1		1		6
158	1			1	10
159	1		1		10
160	1		1		4
161	1			1	3
162	1		1		1
163					
164	1		1		8
165	1		1		15
166	1		1		12
167	1		1		12
168	1		1		5
169	1		1		25
170	1				20
171	1		1		20
172	1		1		15
173	1		1		30
174	1		1		15
175	1		1		10
176	1		1		10
177	1			1	
178	1		1		10
179	1		1		35
180					
181	1		1		20
182	1		1		2
183	1			1	5
184	1		1		6
185	1		1		14
186	1				20
187	1		1		30
188	1		1		29
189	1				3
190	1		1		25

Questionnaire #	Resident of Manitoba?		Resident of Winnipeg?		Years Fished on Red and / Assin. Rivers?
	Yes	No	Yes	No	
191	1		1		30
192	1			1	20
193	1		1		4
194	1		1		25
195					
196	1		1		15
197	1			1	25
198	1		1		25
199	1		1		5
200	1		1		10
201					
202	1			1	6
203	1		1		20
204	1		1		25
205	1		1		30
206	1			1	30
207	1		1		50
208	1			1	20
209	1			1	16
210	1		1		5
211	1		1		20
212	1		1		1
213	1		1		3
214	1		1		1
215	1				3
216	1		1		45
217	1		1		24
218	1			1	30
219	1		1		14
220	1				5
221	1		1		
222	1		1		25
223	1		1		25
224	1		1		20
225	1		1		4
226	1		1		15
227	1				10
228	1			1	5
229	1		1		
230	1		1		10
231	1				3
232	1		1		12
233	1			1	5
234	1		1		20
235	1		1		5
236	1		1		5
237	1			1	3
Totals	**230**	**0**	**185**	**34**	**3412.5**

Questionnaire #	Resident of Manitoba?		Resident of Winnipeg?		Years Fished on Red and / Assin. Rivers?
	Yes	No	Yes	No	
Average	-	-	-	-	15
Std. Dev.	-	-	-	-	13

Number of respondents who answered question # 15a (resident of MB?) = 230
Number of respondents who answered question # 15b (resident of Wpg?) = 219
Number of respondents who answered question # 16 = 227

Table G-14 Data from Angler Questionnaire Question # 17

Q17. How would you describe your level fishing expertise?

Questionnaire #	Very Experienced	Experienced	Average	Beginner
1				
2	1			
3				
4		1		
5			1	
6			1	
7			1	
8			1	
9			1	
10		1		
11				1
12			1	
13			1	
14			1	
15	1			
16	1			
17			1	
18				1
19	1			
20		1		
21				
22			1	
23			1	
24	1			
25		1		
26				1
27	1			
28		1		
29			1	
30	1			
31			1	
32				1
33			1	
34		1		
35			1	
36				
37	1			
38	1			1
39		1		
40	1			
41		1		
42	1			
43			1	
44			1	
45		1		
46	1			
47			1	
48				1

Questionnaire #	Very Experienced	Experienced	Average	Beginner
49				1
50				1
51			1	
52		1		
53		1		
54			1	
55		1		
56		1		
57		1		
58	1			
59			1	
60			1	
61			1	
62				1
63	1			
64			1	
65		1		
66		1		
67		1		
68	1			
69		1		
70				1
71		1		
72			1	
73			1	
74				1
75			1	
76			1	
77		1		
78	1			
79			1	
80		1		
81			1	
82		1		
83	1			
84			1	
85			1	
86			1	
87			1	
88			1	
89			1	
90		1		
91		1		
92		1		
93			1	
94			1	
95			1	
96			1	
97		1		
98	1			
99		1		
100	1			
101		1		

Questionnaire #	Very Experienced	Experienced	Average	Beginner
102			1	
103			1	
104		1		
105	1			
106			1	
107		1		
108	1			
109		1		
110		1		
111			1	
112		1		
113			1	
114			1	
115		1		
116	1			
117		1		
118	1			
119	1			
120			1	
121		1		
122			1	
123			1	
124			1	
125		1		
126		1		
127			1	
128	1			
129	1			
130			1	
131			1	
132			1	
133		1		
134			1	
135			1	
136			1	
137			1	
138		1		
139	1			
140	1			
141		1		
142		1		
143		1		
144			1	
145	1			
146		1		
147		1		
148			1	
149			1	
150			1	
151		1		
152		1		
153		1		
154	1			

Questionnaire #	Very Experienced	Experienced	Average	Beginner
155			1	
156	1			
157			1	
158		1		
159			1	
160			1	
161			1	
162			1	
163				
164			1	
165			1	
166				1
167			1	
168		1		
169		1		
170	1			
171	1			
172		1		
173			1	
174		1		
175	1			
176	1			
177		1		
178		1		
179			1	
180				
181			1	
182				1
183				1
184		1		
185	1			
186	1			
187			1	
188			1	
189			1	
190			1	
191		1		
192			1	
193			1	
194			1	
195				
196	1			
197		1		
198		1		
199			1	
200			1	
201				
202			1	
203		1		
204			1	
205		1		
206		1		
207			1	

Questionnaire #	Very Experienced	Experienced	Average	Beginner
208			1	
209			1	
210		1		
211		1		
212			1	
213		1		
214			1	
215		1		
216			1	
217	1			
218			1	
219	1			
220		1		
221		1		
222		1		
223		1		
224		1		
225			1	
226	1			
227				1
228		1		
229		1		
230		1		
231			1	
232			1	
233			1	
234		1		
235		1		
236			1	
237			1	
Total	**41**	**76**	**98**	**15**

Total responses = 230

APPENDIX H

DATA AND CALCULATIONS FOR ASSINIBOINE RIVER ANGLER STATISTICS

CALCULATIONS FOR ASSINIBOINE RIVER ANGLER STATISTICS

Notation:
E = total effort for the surveyed anglers
C = total catch for the surveyed anglers
R = catch rate for the surveyed anglers
E' = the total effort for the estimated total number of anglers along the Assiniboine River
C' = total catch for the estimated total number of anglers along the Assiniboine River
R' = catch rate for the estimated total number of anglers along the Assiniboine River
N = estimated total population fishing along the Assiniboine River during the survey time
n = number of anglers surveyed
c_i = the catch for the ith angler
L_i = length of the fishing trip at the time of interview. In a roving intercept survey, L_i represents an incomplete trip in most cases, unless the angler was interviewed at the time the trip was completed.

SURVEYED ANGLERS

Catch Rate Estimation for Surveyed Anglers

Catch rate is estimated with information from the incomplete trip interviews conducted, using the ratio of the means (Pollock et. al. 1994):

$$R = \frac{\sum_{i=1}^{n} c_i / L_i}{n} = \bar{R}$$

Where R is the catch rate calculated from incomplete trips.

Using data from Table X1:

$$R = \frac{\sum_{i=1}^{n} c_i / L_i}{n} = \frac{43.1407}{46} = 0.9378$$

Therefore, the estimated catch rate for the surveyed anglers was approximately 0.94 fish per hour.

Total Effort Estimation for Surveyed Anglers

The total effort estimation for the surveyed anglers was the total hours angled by all anglers surveyed which equals the sum of *e* from Table H-1. Therefore, the estimated effort (*E*) for surveyed anglers was approximately 158 angler-hours.

Total Catch Estimation for Surveyed Anglers (Pollock et. al. 1994)

The total expected catch for all anglers surveyed (after completion of their fishing trips) is estimated by :

$$C = E \times R$$

Therefore;

C = 157.75 angler hours x 0.9378 fish per angler hour
C = 147.9380 fish

Total estimated catch for the anglers surveyed was approximately 148 fish.

TOTAL ANGLERS

It is estimated that approximatley 45% of all anglers present along the Assiniboine River within the survey area during the time the survey was conducted were interviewed. This estimate is based on the number of persons interviewed, and a comment made by an angler fishing at the West Perimeter Bridge who noted that approximately 10 "groups" of anglers were fishing there before 11:00 hours (prior to the survey team's presence at that site). If it is assumed that there was an average of 2 people per "group", then approximatley 20 anglers would not have been interviewed at that site.

The survey clerks completed the survey route by 1345 hrs. They then covered key sites of the survey route twice before the end of the survey at 2030 hrs. The survey clerks are confident that few other anglers would have been missed (estimate: 5 additional missed anglers).

In total, it is estimated that approximately 25 additional anglers were not interviewed (i.e. approximately 45% of all anglers were interviewed). Therefore, an estimate of the total number of anglers who fished along the Assiniboine River within the survey area on May 16, 1999 during the time of the angling survey from 0800 to 2030 hrs was approximately 71 anglers (*N* = 71).

Therefore, the following are estimates for the catch rate, total effort and total catch for all anglers fishing along the Assiniboine River (from The Forks to Headingly) on May 16, 1999 from 0800 to 2030 hrs.

Catch Rate Estimation

The catch rate (R') for the estimated total number of anglers along the Assiniboine River is assumed to be approximately equal to the catch rate for the anglers surveyed (0.94 fish per hour).

Total Effort Estimation

Total effort (E') for the estimated total number of anglers along the Assiniboine River is calculated from the average effort (e) of the surveyed anglers multiplied by the total estimated angler population along the Assiniboine River (N).

$$E' = \frac{\sum_{i=1}^{n} e_i}{n} \; x \; N = \frac{157.7500}{46} \; x \; 71 = 243.4837$$

Therefore, total effort for the estimated angler population along the Assiniboine River was approximately 244 angler-hours.

Total Catch Estimation

Total catch (C') for the estimated total number of anglers along the Assiniboine River is calculated by dividing the total catch for the anglers surveyed (C) by the number of anglers surveyed (n) (getting an average catch per surveyed angler), then multiplying by the estimated total angler population (N).

$$C' = \frac{C}{n} \text{ x } N = \frac{147.9380}{46} \text{ x } 71 = 228.3391$$

Therefore, total catch for the estimated angler population along the Assiniboine River during the May 16, 1999 angler survey was approximately 228 fish.

Table H-1 Data Used to Calculate Angler Statistics for Anglers Surveyed Along the Assinboine River (From The Forks to Headingly, MB) May 16, 1999

Survey #	Angler # [a]	Catch per Angler Surveyed (c)[b]	Fishing Effort per Angler (e) (hours)	Length of Fishing Trip (hours) at Time of Interview (L)	c_i / L_i
1	1	1	5.00	0.42	2.3810
"	2	1	5.00	0.42	2.3810
"	3	0	5.00	0.42	0.0000
2	4	21	5.25	3.08	6.8182
3a	5	0	3.00	1.00	0.0000
3b	6	1	3.00	1.00	1.0000
3c	7	0	7.00	2.17	0.0000
3d	8	0	7.00	2.17	0.0000
4	9	0	1.50	0.42	0.0000
"	10	0	1.50	0.42	0.0000
5	11	0	1.17	0.08	0.0000
"	12	0	1.17	0.08	0.0000
6	13	0	1.50	0.75	0.0000
"	14	0	1.50	0.75	0.0000
"	15	0	1.50	0.75	0.0000
7a	16	0	4.25	0.17	0.0000
7b	17	0	4.25	0.17	0.0000
7c	18	0	4.25	0.17	0.0000
7d	19	0	4.25	0.17	0.0000
8a	20	2	4.50	1.67	1.1976
8b	21	0	4.50	1.67	0.0000
9a	22	4	2.50	1.25	3.2000
9b	23	0	2.33	1.83	0.0000
10a	24	0	2.58	0.01	0.0000
10b	25	0	2.58	0.01	0.0000
11	26	0.2	1.00	0.75	0.2667
"	27	0.2	1.00	0.75	0.2667
"	28	0.2	1.00	0.75	0.2667
"	29	0.2	1.00	0.75	0.2667
"	30	0.2	1.00	0.75	0.2667
12	31	0	7.25	5.75	0.0000
"	32	0	7.25	5.75	0.0000
13	33	15	3.00	1.33	11.2782
14	34	0.33	2.50	1.17	0.2821
"	35	0.33	2.50	1.17	0.2821
"	36	0.33	2.50	1.17	0.2821
15	37	1.67	2.00	0.83	2.0120
"	38	1.67	2.00	0.83	2.0120
"	39	1.67	2.00	0.83	2.0120
16	40	9	5.50	5.42	1.6605
17	41	1.67	5.00	3.42	0.4883
"	42	1.67	5.00	3.42	0.4883
"	43	1.67	5.00	3.42	0.4883
18a	44	9	6.50	5.83	1.5437

Survey #	Angler # [a]	Catch per Angler Surveyed (c)[b]	Fishing Effort per Angler (e) (hours)	Length of Fishing Trip (hours) at Time of Interview (L)	c_i / L_i
18b	45	0	6.50	5.83	0.0000
19	46	2	2.17	1.00	2.0000
Totals		**77.01**	**157.7500**	**71.97**	**43.1407**

a = Total number of anglers surveyed (n) = 46

b = For multiple anglers surveyed as one group, the average for each angler in that group is given

APPENDIX I

DATA AND CALCULATIONS FOR LOCKPORT ANGLER STATISTICS

CALCULATIONS FOR LOCKPORT ANGLER STATISTICS

Notation:
E = total effort for the surveyed anglers
C = total catch for the surveyed anglers
R = catch rate for the surveyed anglers
E' = the total effort for the estimated total number of anglers at Lockport
C' = total catch for the estimated total number of anglers at Lockport
R' = catch rate for the estimated total number of anglers at Lockport
N = estimated total population fishing at Lockport during the survey time
n = number of anglers surveyed
c_i = the catch for the ith angler
L_i = length of the fishing trip at the time of interview. In a roving intercept survey, L_i represents an incomplete trip in most cases, unless the angler was interviewed at the time the trip was completed.

SURVEYED ANGLERS

Catch Rate Estimation for Surveyed Anglers

Catch rate is estimated with information from the incomplete trip interviews conducted, using the ratio of the means (Pollock et. al. 1994):

$$R = \frac{\sum_{i=1}^{n} c_i / L_i}{n} = \bar{R}$$

Where R is the catch rate calculated from incomplete trips.

Using data from Table X1:

$$R = \frac{\sum_{i=1}^{n} c_i / L_i}{n} = \frac{123.5688}{78} = 1.5842$$

Therefore, the estimated catch rate for the surveyed anglers was approximately 1.6 fish per hour.

Total Effort Estimation for Surveyed Anglers

The total effort estimation for the surveyed anglers was the total hours angled by all anglers surveyed which equals the sum of *e* from Table I-1. Therefore, the estimated effort (*E*) for surveyed anglers was approximately 339 angler-hours.

Total Catch Estimation for Surveyed Anglers (Pollock et. al. 1994)

The total expected catch for all anglers surveyed (after completion of their fishing trips) is estimated by :

$$C = E \times R$$

Therefore;

C = 399 angler hours x 1.5824 fish per angler hour
C = 631.3776 fish

Total estimated catch for the anglers surveyed was approximately 631 fish.

TOTAL ANGLERS

It is estimated that approximately 60% of all anglers present at Lockport during the time the survey was conducted were interviewed. This estimate is based on the number of persons interviewed, number of anglers observed in boats, number of interview refusals and continuous casual observations of anglers arriving and departing. Therefore, an estimate of the total number of anglers who fished at Lockport on May 16, 1999 during the time of the angling survey from 0930 to 1900 hrs (9.5 hours) was approximately 170 anglers (170 = *N*).

Therefore, the following are estimates for the catch rate, total effort and total catch for all anglers fishing at Lockport on May 16, 1999 from 0930 to 1900 hrs.

Catch Rate Estimation

The catch rate (*R'*) for the estimated total number of anglers at Lockport is estimated to be approximately equal to the catch rate for the anglers surveyed (1.6 fish per hour) since a large portion of the total estimated angler population at Lockport was surveyed (i.e. 60%).

Total Effort Estimation

Total effort (E') for the estimated total number of anglers at Lockport is calculated from the average effort (e) of the surveyed anglers mulitiplyed by the total estimated angler population at Lockport (N).

$$E' = \frac{\sum_{i=1}^{n} e_i}{n} \; x \; N = \frac{338.8600}{78} \; x \; 170 = 738.54$$

Therefore, total effort for the estimated angler population at Lockport was approximately 739 angler-hours.

Total Catch Estimation

Total catch (C') for the estimated total number of anglers at Lockport is calculated by dividing the total catch for the anglers surveyed (C) by the number of anglers surveyed (n) (getting an average catch per surveyed angler), then multiplying by the estimated total angler population (N).

$$C' = \frac{C}{n} \text{ x } N = \frac{631.3776}{78} \text{ x } 170 = 1376.08$$

Therefore, total catch for the estimated angler population at Lockport during the May 16, 1999 angler survey was approximately 1376 fish.

Table I-1 **Data Used to Calculate Angler Statistics for Anglers Surveyed at Lockport, MB, May 16, 1999**

Survey #	Angler # [a]	Catch per Angler Surveyed (c)[b]	Fishing Effort per Angler (e) (hours)	Length of Fishing Trip (hours) at Time of Interview (L)	c_i / L_i
1	1	1	3.00	2.00	0.5000
2	2	1	3.00	2.00	0.5000
3	3	3	3.00	2.00	1.5000
4	4	43	5.00	5.00	8.6000
5	5	40	5.00	5.00	8.0000
6	6	0	8.00	2.42	0.0000
7	7	2	2.00	2.00	1.0000
8	8	0	2.00	2.00	0.0000
9	9	9	3.00	2.90	3.1034
10	10	1	9.00	3.60	0.2778
"	11	1	9.00	3.60	0.2778
"	12	1	9.00	3.60	0.2778
"	13	1	9.00	3.60	0.2778
11	14	0	2.25	2.25	0.0000
"	15	0	2.25	2.25	0.0000
12	16	5	2.00	0.89	5.6180
13	17	2	2.00	0.72	2.7778
14	18	5	5.00	1.80	2.7778
15	19	2	9.00	1.85	1.0811
16	20	57	14.00	7.00	8.1429
17	21	64	13.50	6.65	9.6241
18	22	16	11.50	6.35	2.5197
19	23	11	5.00	4.90	2.2449
20	24	11	11.75	6.25	1.7600
21	25	3	4.00	0.89	3.3708
22	26	1	4.00	0.93	1.0753
23	27	1	2.00	1.00	1.0000
24	28	2	4.50	3.62	0.5525
"	29	0.67	4.50	3.62	0.1851
"	30	0.67	4.50	3.62	0.1851
25	31	0	1.00	0.30	0.0000
26	32	7	8.00	7.25	0.9655
27	33	1	3.00	1.75	0.5714
28	34	2	2.50	1.00	2.0000
29	35	16	9.00	1.90	8.4211
30	36	0	2.50	2.00	0.0000
31	37	0	2.00	2.00	0.0000
32	38	1.2	1.50	1.10	1.0909
"	39	1.2	1.50	1.10	1.0909
"	40	1.2	1.50	1.10	1.0909
"	41	1.2	1.50	1.10	1.0909
"	42	1.2	1.50	1.10	1.0909
33	43	7	4.50	3.75	1.8667
34	44	2	4.00	3.75	0.5333
35	45	7	4.00	3.85	1.8182

Survey #	Angler # [a]	Catch per Angler Surveyed (c)[b]	Fishing Effort per Angler (e) (hours)	Length of Fishing Trip (hours) at Time of Interview (L)	c_i / L_i
36	46	0	2.00	0.40	0.0000
37	47	0	2.00	0.43	0.0000
38	48	3	3.00	1.80	1.6667
39	49	0	3.00	1.85	0.0000
40	50	2	3.00	2.00	1.0000
41	51	2	3.00	2.00	1.0000
42	52	3	4.50	2.63	1.1407
"	53	3	4.50	2.15	1.3953
43	54	0	2.20	2.20	0.0000
"	55	0	2.20	2.20	0.0000
"	56	0	2.20	2.20	0.0000
44	57	20	4.50	3.50	5.7143
45	58	16	4.50	3.58	4.4693
46	59	0.33	3.25	2.40	0.1375
"	60	0.33	3.25	2.40	0.1375
"	61	0.33	3.25	2.40	0.1375
47	62	14.5	4.63	4.63	3.1317
"	63	14.5	4.63	4.63	3.1317
48	64	0	1.75	1.10	0.0000
49	65	1	1.75	1.00	1.0000
50	66	2	2.00	2.00	1.0000
51	67	1	2.00	2.00	0.5000
52	68	33	9.25	8.30	3.9759
"	69	33	9.25	8.30	3.9759
53	70	2	3.50	3.25	0.6154
54	71	0	1.00	0.82	0.0000
55	72	0	4.00	2.38	0.0000
"	73	0	4.00	2.38	0.0000
"	74	0	4.00	2.38	0.0000
56	75	0.67	4.00	3.47	0.1931
"	76	0.67	4.00	3.47	0.1931
"	77	0.67	4.00	3.47	0.1931
57	78	0	5.00	3.55	0.0000
Totals			**338.8600**		**123.5688**

a = Total number of anglers surveyed (n) = 78

b = For multiple anglers surveyed as one group, the average for each angler in that group is given

APPENDIX J

DATA AND CALCULATIONS FOR RED RIVER ANGLER STATISTICS

CALCULATIONS FOR RED RIVER ANGLER STATISTICS

Notation:
E = total effort for the surveyed anglers
C = total catch for the surveyed anglers
R = catch rate for the surveyed anglers
n = number of anglers surveyed
c_i = the catch for the ith angler
L_i = length of the fishing trip at the time of interview. In a roving intercept survey, L_i represents an incomplete trip in most cases, unless the angler was interviewed at the time the trip was completed.

SURVEYED ANGLERS

Catch Rate Estimation for Surveyed Anglers

Catch rate is estimated with information from the incomplete trip interviews conducted, using the ratio of the means (Pollock et. al. 1994):

$$R = \frac{\sum_{i=1}^{n} c_i / L_i}{n} = \bar{R}$$

Where R is the catch rate calculated from incomplete trips.

Using data from Table X1:

$$R = \frac{\sum_{i=1}^{n} c_i / L_i}{n} = \frac{25.8148}{40} = 0.6454$$

Therefore, the estimated catch rate for the surveyed anglers was approximately 0.65 fish per hour.

Total Effort Estimation for Surveyed Anglers

The total effort estimation for the surveyed anglers was the total hours angled by all anglers surveyed which equals the sum of e from Table J-1. Therefore, the estimated effort (E) for surveyed anglers was approximately 94 angler-hours.

Total Catch Estimation for Surveyed Anglers (Pollock et. al. 1994)

The total expected catch for all anglers surveyed (after completion of their fishing trips) is estimated by :

$$C = E \times R$$

Therefore;

C = 93.8000 angler hours x 0.6454 fish per angler hour
C = 60.5385 fish

Total estimated catch for the anglers surveyed was approximately 61 fish.

TOTAL ANGLERS

The total number of anglers that would have been fishing along the Red River within the survey area on May 16, 1999 during the time of the survey can not be estimated. The survey began at the South Floodway Control Structure at 0900 hours and ended at the North Perimeter Bridge at 1400 hours. Due to the length of the Red River and the time required to complete the survey route (one-way) by boat, there was insufficient time to re-visit all key fishing areas (as was done for the survey of the Assiniboine River). Therefore, estimates of total effort, catch and catch rate for the total number of anglers fishing along the Red River on May 16, 1999 cannot be estimated.

Table J-1 Data Used to Calculate Angler Statistics for Anglers Surveyed Along the Red River (From the S. Floodway Control Structure to the North Perimeter Bridge, Winnipeg, MB) May 16, 1999

Survey #	Angler # [a]	Catch per Angler Surveyed (c)[b]	Fishing Effort per Angler (e) (hours)	Length of Fishing Trip (hours) at Time of Interview (L)	c_i / L_i
M1	1	0	3.33	0.25	0.0000
"	2	0	3.33	0.25	0.0000
M2(a)	3	1.5	3.25	1.58	0.9494
"	4	1.5	3.25	1.58	0.9494
"	5	1.5	3.25	1.58	0.9494
"	6	1.5	3.25	1.58	0.9494
M2(b)	7	0	1.75	0.02	0.0000
M3	8	1	3.00	1.30	0.7692
M4	9	1.5	4.00	3.00	0.5000
"	10	1.5	4.00	3.00	0.5000
M5	11	3	2.75	1.17	2.5641
M6	12	2	2.00	0.38	5.2632
B1	13	1	1.00	0.92	1.0870
"	14	1	1.00	0.92	1.0870
B2(a)	15	0	1.00	0.33	0.0000
B2(b)	16	0	1.00	0.33	0.0000
B3	17	0	1.00	0.08	0.0000
"	18	0	1.00	0.08	0.0000
B4	19	0	1.50	0.08	0.0000
"	20	0	1.50	0.08	0.0000
"	21	0	1.50	0.08	0.0000
B5	22	2	3.50	2.50	0.8000
B6	23	0	1.53	0.03	0.0000
"	24	0	1.53	0.03	0.0000
B7	25	5	5.33	0.91	5.4945
B8	26	1.5	1.50	1.00	1.5000
"	27	1.5	1.50	1.00	1.5000
B9	28	0	2.00	1.00	0.0000
"	29	0	2.00	1.00	0.0000
"	30	0	2.00	1.00	0.0000
B10	31	0	4.75	0.08	0.0000
B11	32	0	6.50	0.50	0.0000
B12	33	1	2.00	1.05	0.9524
B13	34	0	2.00	0.03	0.0000
"	35	0	2.00	0.03	0.0000
B14	36	0	1.50	0.50	0.0000
"	37	0	1.50	0.50	0.0000
"	38	0	1.50	0.50	0.0000
"	39	0	1.50	0.50	0.0000
B15	40	0	2.00	0.02	0.0000
Totals		**28**	**93.8000**	**30.77**	**25.8148**

a = Total number of anglers surveyed (n) = 40

b = For multiple anglers surveyed as one group, the average for each angler in that group is given

APPENDIX K

RESULTS OF BAIT FISHER PHONE INTERVIEWS

Table K-1 Responses of Bait Fishers to Survey Questions #1 to 5

Bait Fisher #	Experience Bait Fishing (Years)	Days Spent Bait Fishing Each Year	% of Time Spent Bait Fishing on Red River	Days Spent Bait Fishing on Red River	Employees Bait Fishing For You?	Days Employees Spend Bait Fishing?[a]	Employee Fishing Days on Red River	Approximately Where Do You Fish on the Red River Each Year?
1	9	120	100	120	Yes, but only assist: use the one boat	Assists bait fisher in his own boat (no additional days effort)	-	From St. Andrews to the mouth of Lake Winnipeg at Netley Creek (never usually above the Locks)
2	15	138	45	62	Yes, have two boats; boats stick together most of time	138	62	Breezy Point up to Selkirk (45% of bait fishing time on Red River, the rest of the time spent is on Lake Winnipeg)
3	55	180	80	144	Yes, two boats	180	144	Between Selkirk and Lake Winnipeg (80% of time on Red River, remaining 20% on Lake
4	12	80	75	60	No	-	-	About 80% of the time spent on Red River is between "new bridge" and "old bridge" in Selkirk; other 20% of time on Red in within area up to Lake Winnipeg. 25% of total time spent on Fairford River (depends on year)
5	10	30	70	21	Yes	30	21	Selkirk area on the Red River; remaining time spent on Lake Winnipeg
6	45	10	50	5	No	-	-	Breezy Point area to Lake Winnipeg
Total	**-**	**558**	**-**	**412**	**-**	**348**	**227**	**-**
Average	**24**	**93**	**70**	**69**	**-**	**116**	**76**	**-**

a = days per boat effort in addition to main bait fisher's total days effort from his boat

Table K-2 Responses of Bait Fishers to Survey Questions #6 to 9

Bait Fisher #	Total Production for Last Year (cartons)[ab]	% of Total Production Obtained From Red River	Total Production from Red River (cartons)	Estimate of Total # of Fish Caught from Red River[c]	Remaining Inventory as of Dec. 31, 1998 (cartons)	Total Revenue From Catch	Total Revenue of Catch from Red River
1	16,500	100	16,500	742,500	0	$22,500	$22,500
2	7500	50	3750	168,750	0	$20,000	$10,000
3	70,000	90	63,000	2,835,000	5000	$80,000	$72,000
4	15,000	75	11,250	506,250	1500	$20,000	$15,000
5	14,000	100	14,000	630,000	0	$10,500	$10,500
6	650	50	325	14,625	48	$109	$55
Total	**123,650**	**-**	**108,825**	**4,897,125**	**6548**	**$153,109**	**$130,055**
Average	**20,608**	**78**	**18,138**	**816,188**	**1,091**	**$25,518**	**$21,676**

a = from January 1 to December 31, 1998
b = a "carton" is a 6oz (170g) container of bait fish
c = approximately 45 fish per container

Table K-3 The Relative Importance of Each Month for Bait Fishing During the Bait Fishing Season (Question #10)

Bait Fisher #	Importance Rank For Each Month[a]					
	May	June	July	August	September	October
1	2	1	5	3	4	6
2	5	1	5	2	3	6
3	2	1	2	3	3	4
4	2	1	2	3	3	4
5	2	1	3	3	4	6
6	1	1	4	3	2	6
Totals	**14**	**6**	**21**	**17**	**19**	**32**
Average	**2.3**	**1.0**	**3.5**	**2.8**	**3.2**	**5.3**

a = where 1 is most important and 6 is least important (note that some respondents gave the same rank to more than one month)

Table K-4 Responses of Bait Fishers to Survey Questions #11 and 12

Angler #	Catch Method				Catch Description	
	Boat?	Net Type?	Number of Nets	Net Positions	Types of Bait Fish Caught	% of Total Catch
1	Yes	Sein nets in metal frame	2	Side of boat along shorelines	"regular shiners" "other shiners"	90 10
2	Yes	Sein nets in metal frame	2	Side of boat along shorelines	Sand shiners	100
3	Yes	Sein nets in metal frame	2	Side of boat along shorelines	Emerald shiners Spottail shiners Tullibee	90 7 3
4	Yes	Minnow screen	1	In front of boat (along shores)	"shiners"	100
5	Yes	Sein nets in metal frame	2	Side of boat along shorelines	"shiners" Spottail shiners	90 10
6	Yes	Push cage	1	In front of boat (along shores)	Emerald shiners	100