An Assessment of Angler Attitudes Towards Fisheries Management in Northwestern Ontario

by

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ABSTRACT

The Ontario Ministry of Natural Resources has introduced new management plans for the Northwestern Ontario Region. The plans are intended to maintain or improve the quality of fishing to the year 2000. The plans include regulations for the selective harvest of certain species. Since anglers have a tremendous impact on the fish population in the region it was important to determine their opinions.

The objectives of this study were to determine the attitudes of anglers and lodge owners toward management practices in the region. This study which was conducted from September 1990 to May 1990 was commissioned by the Ontario Ministry of Natural Resources (OMNR), Northwestern Region, Fish and Wildlife Branch.

The attitudes were determined using a mail-out questionnaire. Of the 1,950 anglers surveyed from Northwestern Ontario 67% returned a completed questionnaire. In general, the anglers accepted new regulations and catch-and-release angling for the region. However, not all the practices were as widely accepted. The need for the Ontario Ministry of Natural Resources to educate and inform the public on the management practices is important.

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Chapter I

INTRODUCTION

1.1 OVERVIEW

In 1987, the Ontario Ministry of Natural Resources, Northwestern Region, introduced new fishery management plans intended to guide them through the year 2000. In addition to long term management directives, short term five year management strategies were also introduced.

These plans were developed by each of the six districts within the region; Kenora, Red Lake, Dryden, Fort Frances, Sioux Lookout, and Ignace (Figure 1). The management plans provided a more detailed outline of the strategies and objectives for each respective area. In addition, the plans provide guidelines for all aspects of fishing in the district including; commercial harvests, commercial bait fishing, sport fishing and subsistence fishing (native harvests).

One important reason for the development of the management plans is an expected 25% increase in the number of non-resident anglers for the region from 1980 to 2000. The number of anglers who purchased licences in the Northwestern region for the 1988 season was 469,676, of which approximately 80% were non-residents (Bruce Ranta pers. comm.). The expected increase will represent a significant increase in angling pressure. New regulations have been introduced to help maintain or enhance fishing quality for the entire Northwestern region. To accommodate local variations some regulations differ for various lakes.

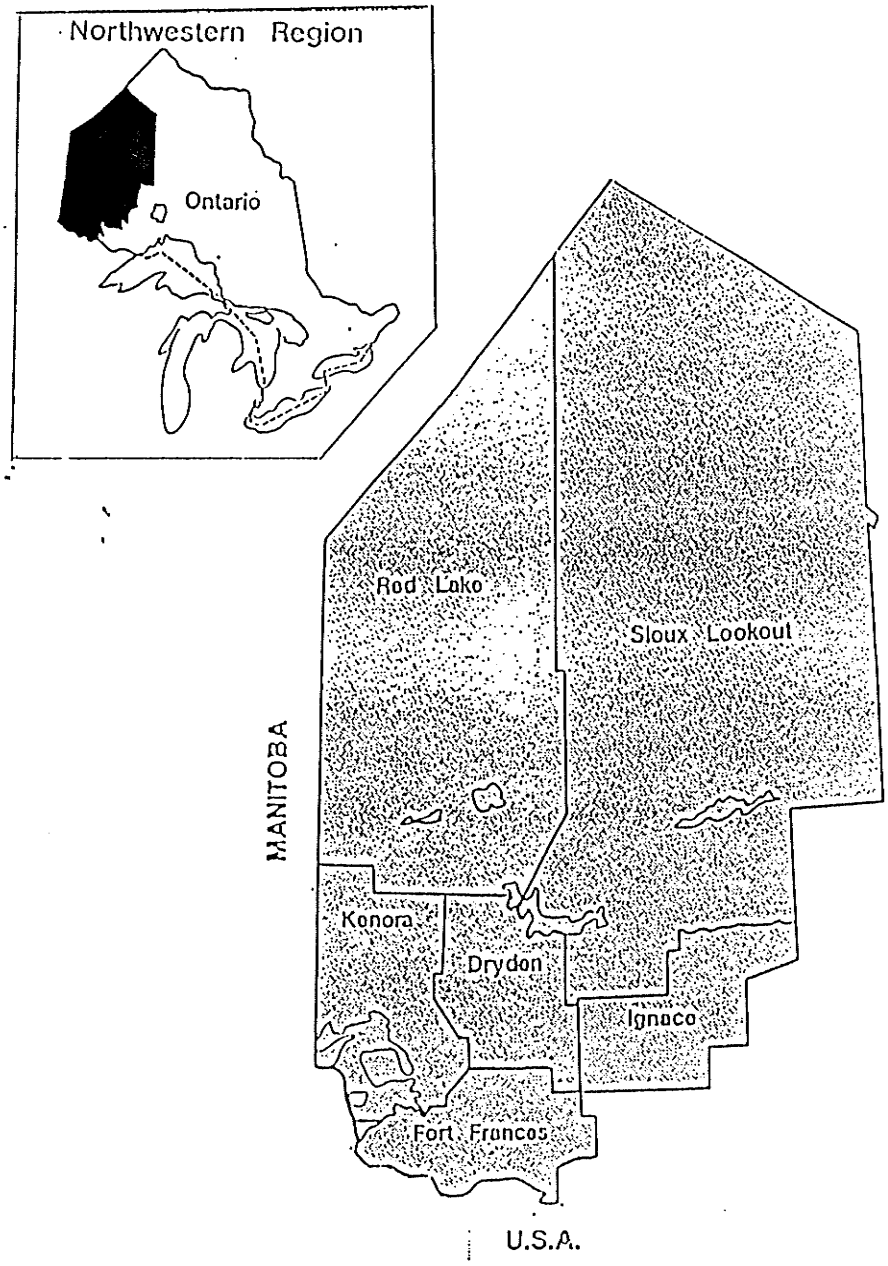

Figure 1: The Northwestern Ontario Region

The greatest angling pressure is on walleye (Stizostedion vitreum), northern pike (Esox lucius), muskellunge (Esox musquinongy), and lake trout (Salvelinus namaycush). To attempt to change the structure of the harvest, new size limit and other regulations have been introduced.

For the 1989 season, new catch and possesion limits were introduced. For lake trout the limit was reduced from three fish to two. For muskellunge, a daily catch limit of one with a possession limit of two with a minimum size limit (dependent on the lake fished) was also introduced. In the 1990 season, new size limit regulations for walleye and northern pike will be introduced. The limit for these species has been set so that only one walleye in the daily catch and possession limit of six can be greater than 50 centimeters in length, and only one northern pike may be over 70 centimeters in the daily catch and possession limit of six. These regulations may vary according to the lake fished. Increased effort will be made to educate anglers on the merits of selective harvest which will emphasize catch-and-release. Catch-and-release of certain segments of the fish stock is intended to ensure that enjoyment of angling is continued, including harvest and consumption, while maintaining fish populations. Shifting angling pressure to the less sought after species is also a desired objective.

1.2 PROBLEM STATEMENT

Since a large part of fisheries management involves people management, the overall success of improving sport fishing in Northwestern Ontario is influenced by angler satisfaction. In order to judge the effectiveness of the Northwestern Regional Fisheries

management objectives and strategies proposed by the Ontario Ministry of Natural Resources District Fisheries Plan, a study was conducted to determine angler response. By conducting this survey of anglers currently using the Region, information was available to assess their attitudes, perceptions, behaviours and judge their satisfaction.

1.3 OBJECTIVES

For the purpose of this study, demographic information such as sex, age, and place of residence was used to analyze the anglers use of fish resources in the region. By using this information the following objectives were considered:

1. To determine the profile of anglers in Northwestern Ontario;
2. To assess the acceptance of management practices by anglers in the Region;
3. To determine lodge owners' perceptions of anglers in the Region;
4. To develop recommendations toward management of sport fishing in Northwestern Ontario.

1.4 IMPORTANCE OF SPORT FISHING IN NORTHWESTERN ONTARIO

Northwestern Ontario is dependent on the tourism industry for much of its economic activity. Of this, sport fishing accounts for a significant proportion of the tourism dollar.

In Canada, it is estimated that, in 1985, anglers spent $4.4 billion on goods and services directly related to sport fishing. Of this amount, $520 million was spent by non-Canadian anglers during 1985 (Department

of Fisheries and Oceans, 1986). Over one half of this money was spent in Ontario.

Cox and Straight (1975) estimated that non-resident angler expenditure was estimated at $33,760,000 on fishing related activities in Northwestern Ontario. These activities included food and lodging, transportation, fish tackle and bait, guide fees, boat rentals and licences. Resident angler expenditure was estimated at $5,848,000 in the same study. In order to assure continued economic benefits accrued through sport fishing a good quality fishery is essential.

1.5 DELIMITATIONS

This study was limited in scope. The project was a mail-out survey of resident and non-resident anglers in Northwestern Ontario in order to assess the attitudes of anglers towards new regulations. It did not involve a creel census and was not intended to determine the economics of sport fishing in the region. The survey was also limited to only those anglers purchasing licences for the 1989 season. Therefore, those under the age of 18 and over 65 years old were not included in the study. Similarly, commercial fishermen and subsistence harvesters were not included. Because of the sampling technique used, those anglers fishing in the region but not purchasing their licences in the region were not sampled

Chapter II

REVIEW OF RELATED LITERATURE

2.1 INTRODUCTION

In order to properly understand the methodology used in achieving the objectives it was necessary to examine the pertinent literature as it relates to survey sampling, including questionnaire development. In addition, a review of the regulations and programs that affect sport fishing in Ontario is also conducted in this chapter

2.2 SURVEY RESEARCH METHODS

A number of sampling techniques are available to conduct a successful survey. These include; the mail-out questionnaire, the telephone interview and the personal interview or a combination of the different techniques. Whatever the chosen method may be, surveys are frequently conducted for the purpose of making descriptive assertions about a population.

The choice of the survey technique depends on a number of aspects including; costs, time constraints, desired response rates and information required. This in turn influences the design of the survey.

As can be expected the response rates or the number of surveys completed and returned differs depending on the selected survey method.

Yu and Cooper (1983) found the response rates of mail-out surveys to be considerably lower than the personal interview or telephone survey. They determined postal surveys had an average return rate of 47.3% and a response rate of 72% for telephone interviews. Personal interviews had the highest response rate at 81.7%. However, Hoinville and Jowell (1978) found that the level and quality of postal survey responses is often as good if not better than the level achieved by personal interviews.

The major disadvantages and advantages of the mail-out survey were outlined by Wallace (1954).

Disadvantages

1. Nonreturns - response rates of mail-outs are often below 50% when conducted by unskilled persons.

   - a number of follow-ups are required to increase the returns.

2. Respondents may vary significantly from the nonrespondents, thus biasing the sample. This is because the nonrespondents are a collection of which little is known even if special efforts are made to minimize this group.

Advantages

1. Allows a wider range of coverage at minimal costs.
2. Can contact people who would otherwise be difficult to reach.
3. Greater coverage may prove to be more accurate because of a greater sample size.
4. More accurate answers can be attained because of the extra time available to answer the questionnaire.
5. Respondent is given greater autonomy
6. Greater uniformity in the way the questions are asked.

As shown by Wallace (1954) the greatest problem facing mail surveys is the nonrespondents. The findings of a survey are representative of a population only if those people who did not respond are not significantly different than those who did. This is difficult to determine without finding a way of contacting the nonrespondents. In a study by Harris and Bergensen (1985) the difference in angling behaviour of the original respondents and the nonrespondents varied greatly. The initial returns fished an average of 24 days while the average days fished by nonrespondents was only 2 days a year.

Hoinville et al. (1974), Dillman (1984), and Fowler (1984), all recommend a follow-up. A follow-up is a reminder for the individual sampled to return the completed survey or a reminder with another survey which they could return. Other follow-ups may include telephone calls if the resources are available.

The number of returns that can be expected depends on the number of follow-up steps taken by the interviewer. Kanuck and Berenson (1978)

examined the response rates from single follow-ups. They found the returns achieved levels of about 50%, while two and three step follow-ups attained a return rate as high as 98%. Sudman (1976) determined that the probability of response for inital nonrespondents on subsequent mail-outs is about the same as the initial rate of return. That is if 50% of the questionnaires were returned each subsequent follow-up could expect 50% of the nonrespondents to respond or 25% of the original sample size.

A number of additional considerations may help to increase the number of respondents. These include survey sponsorship, quality and layout of the survey and length of the survey.

2.3 THE QUESTIONNAIRE

2.3.1 Questionnaire Length

Intuitively, the longer the survey the lower one would expect the response to be. However, Linskey (1973) indicates there is little evidence to support this claim. That is not to say there is no difference in the return rate of long surveys as opposed to shorter ones but the difference occurs with surveys of considerable length.

Dillman (1984) states that mail-out questionnaires greater than 11 pages or 125 questions can expect a significant decline in the number of responses. Similarly, Jackson (1984) recommends a postal survey should have no more than 60 questions but recommends the shorter the survey the better. Further discussions about questionnaire design are provided in Chapter 3.

2.3.2 Questionnaire Design

The questionnaire design may be dependent on the type of information to be obtained. Due to the large number of sample units a closed questionnaire was chosen. Mason (1983) outlined the advantages and disadvantages of the closed questionnaire format.

Advantages of Closed Questions

- The responses are standardized and are easily comparable;
- The responses are easy to code which saves time and money;
- Meaning of questions is clearer when confronted with answer categories;
- Limited alternatives makes sensitive questions less sensitive;
- Easier for respondent to answer, therefore easier to maintain respondent cooperation.

Disadvantages of Closed Questions.

- It is easier to guess or answer randomly;
- Respondents may become frustrated if categories are inappropriate or unavailable;
- Differences in the interpretation of the questions go undetected;
- Questionnaires become lengthy and are prone to repetition of questions;
- Variation in responses is artificially eliminated;
- Misappropriate or incomplete alternatives increases the likelihood of error;

2.4 ANGLER SURVEYS

Angler surveys are undertaken by several provinces every five years; Manitoba, Newfoundland, British Columbia and Ontario to name a few. These surveys are conducted on a province wide basis to gather general information on sport fishing. These surveys also try to determine the expenditures of both resident and non-resident anglers.

The Ontario Ministry of Natural Resources conducted surveys of anglers in 1980 then again in 1985. The 1980 survey conducted by Bedi and Clifford (1980) was broken down according to regions and resident and non-resident anglers.

2.5 REGULATIONS

The Federal Fisheries Act gives power to the federal government to oversee certain aspects of fishery management in each province. The Act allows federal involvement in regulating the obstruction and pollution of water frequented by fish, and also conserves and protects spawning grounds. Under the same Act, the Ontario Ministry of Natural Resources has been given the authority to set fishery regulations. The fishery regulations in Ontario are administered through the Game and Fish Act (1961) and provides for the management, perpetuation, and rehabilitation of the wildlife resources in Ontario. It allows the Ministry of Natural Resources licencing power governing the number of licences, fees payable, duration, and terms and conditions. In addition, the Ministry has the power to regulate the number of licences issued in terms of non-resident and resident anglers.

In a cooperative effort to effectively manage the fisheries in the province of Ontario the Federal Provincial Strategic Planning of Ontario Fisheries Group was established. In the 1974 Preliminary Analysis of goals and issues the overall fisheries goal was cited as:

> "To provide from the living aquatic resources of Ontario opportunities for outdoor recreation and resource development for the continuous social and economic benefit of the people of Ontario and to encourage the administration, protection, and conservation of public lands and waters to ensure preservation of fisheries resources."

In the same report the subgoals relating to recreational fishing management were also stated. They include:

- Continuation of benefits to the economy of Ontario from non-resident anglers.
- Provide a wide variety of outdoor recreation fishing opportunities for the benefit of the people of Ontario.

The Strategic land Use Plan (Ontario Ministry of Natural Resources, 1980) provided a ranking of the allocation of the fisheries resources according to the strategic planning group. The ranking in order of importance was:

- All residents including future generations through maintenance and/or rehabilitation of the resources.
- Native people with treaty fishing rights.
- People with subsistence needs and/or traditional needs.
- Resident sport fishermen.
- Business enterprises - priority between commercial or sport fishing industries are to be decided on the basis of optimum benefit to other residents of Ontario.

2.5.1 Management Plans

In 1987 fisheries management plans were released from the six districts encompassing the Northwestern Region of Ontario; Kenora, Ignace, Dryden, Red Lake, Sioux Lookout, and Fort Frances. The management plans were written under the direction of the Northwestern Ontario Strategic Land Use Plan and the individual districts' land use guidelines.

Each district fisheries management plan provides the direction for fisheries management for the entire area. As well, more specific objectives for the individual zones under that districts' jurisdiction are outlined. In each of these zones specific species management can be achieved through special regulations such as, gear or size restrictions.

The underlying objective of the six district plans is to maintain or enhance fish populations. To achieve this objective the promotion of catch-and-release and selective harvest are emphasized. If catch-and-release programs are voluntarily accepted the enjoyment of catching fish can be maintained if not improved. Clark (1983) determined that voluntary catch and release practices were only beneficial to fish populations if more than 10% of the fish caught are properly released.

Prior to the development of the district management plans a number of programs that affected recreational anglers were already in place. In 1984, the Crown Land Camping Program was initiated to help increase the tourist economy. This program requires that any non-resident of Canada purchase a permit to camp on Crown lands and restricts access to certain areas in the region. A fee of $3.00 per individual or $5.00 per family

was initially charged but was recently raised to $3.50 and $6.00 respectively. There exist certain zones on crown land where non-residents of Canada are not allowed to camp. If using one of these zones, the non-residents must stay at a privately owned or commercial facility or day fish. In addition, a Border Waters Program was started in 1985. It charges non-resident anglers staying in the United States but fishing in Ontario waters a daily fee. These anglers must purchase a Border Water Tag before being allowed access to fish stock in Ontario waters.

2.5.2 Licencing

Prior to 1987, Ontario residents were exempt from purchasing a licence to fish in Ontario. However, beginning in 1987, the Province of Ontario required that its' residents purchase a licence for $10.00 per season or $5.00 for a four day licence.

Of the Ontario anglers that were surveyed about licencing practices, the majority agreed to pay the fee provided the revenue raised was reinvested to improve the fisheries (Ministry of Natural Resources, 1987a).

For the 1989 season, Ontario residents were still required to pay $10.00. Canadian residents outside Ontario paid the same price but required special tags for lake trout and muskellunge. Non-residents of Canada paid $11.00 for a 4 day tag, $22.00 for a 21 day tag and $33.00 for a seasonal licence, plus they required tags for lake trout and muskellunge.

Chapter III

METHODOLOGY

3.1 INTRODUCTION

The primary method of data collection for this research was a mail-out questionnaire. The questionnaire was a closed question survey. The sample was attained by using a randomized sampling technique.

The closed questioned survey (Appendix B) was chosen because of the large number of anglers that were surveyed. This survey design provided the respondents with a fixed number of choices, which in turn allowed for simpler analysis.

Initially there were 1,950 questionnaires mailed out. Within a month of mailing 971 questionnaires had been returned. This represented a return rate of 51%. A second questionnaire was sent to those who did not respond after a one month waiting period. Following a second mailing a total of 1272 surveys were received (67%).

3.2 SAMPLE SIZE

The percentages of licences sold in 1988 for each district were as follows:

Dryden	15%	Kenora	32%
Fort Frances	32%	Red Lake	7%
Ignace	7%	Sioux Lookout	7%

These numbers were used as a basis from which to determine the sample size required for each district. Because of the small percentage of licences sold in Ignace, Sioux Lookout, and Red lake, these districts were grouped together for statistical purposes.

The sample for each district was of equal size with 500 names chosen from each of the four areas; Kenora, Fort Frances, Northern (Sioux Lookout and Red Lake) and Eastern (Dryden and Ignace). The districts of Sioux lookout, Red Lake and Ignace were over sampled to ensure an adequate response rate in these districts. For the districts that were grouped the number of names selected was done proportionally. Because Red Lake and Sioux Lookout sold approximately the same number of licences, 250 names were chosen from each district. For the Eastern area, more names were selected from Dryden (340) than from Ignace (160). However because of the large return rate it was not necessary to group all of the districts. Only Ignace did not receive a sufficient number of returns to be analyzed separately. To this end, Ignace and Dryden were grouped together for statistical purposes.

3.3 SAMPLING

Difficulties arose in acquiring a representative sample for the population of anglers fishing in Northwestern Ontario. This was due to the large number of licences sold in the region annually (over 460,000). Although information was available from the province of Ontario, the information would have included anglers from all of Ontario, not just those who fish in Northwestern Ontario. In addition, the information would have generated names of those who fished in the region in previous years and may not have fully represented the 1989 anglers.

To compensate for these problems, each of the six districts within the region were directly sampled.

Each district office is responsible for the collection and storage of licences remitted by the licence issuers. Generally, the licences sold each month are to be remitted by the fifteenth day of the following month. The district office then stores their copies.

The method of storage depended on the office. The licences can be stored either alphabetically according to the issuer or randomly in a box. The issuer of the licences which are stored randomly in a box can be easily determined by referencing the issuers number on the licence.

According to one district manager approximately 90% of the licences sold annually are remitted by the middle of September. For this reason the sample collection occured during the first and second week of October.

The collection of names was random. The licences were stalked on top of each other to determine the the total length of the licences. Once the total length was determined the length was divided by the sample size to obtain the sample unit (angling licence). The systematic selection of the sample units was accomplished using the sampling interval. were stacked on top of each other and measurement on the For example, if the licences produced a pile 100 centimeters high and 50 licences were required a constant measurement of two centimeters was used. That is, the sample unit to be selected was chosen every second centimeter or every centimeter and a half depending on the district sampled. The variation in the constant measurement resulted from the difference in sample sizes required for each district.

3.4 SURVEY SCHEDULE

The collection of names occured during the first two weeks of October. Upon completion of the sample collection the questionnaires were mailed approximately three weeks later. Originally it was proposed that the second mailing should occur three weeks after the original mail-out. However, the responses continued to be returned in sufficient numbers as to warrant a later date for the second mailing. This helped to reduce costs and efforts required for a return mailing.

The final cut off date for returned surveys was January 26, 1990. It was necessary to choose a specific date because surveys could continue to arrive indefinitly and time constraints warranted a need to begin analysis.

3.5 LODGE OWNER SAMPLING

Lodge owners were not sampled in the same way as the anglers. The entire population of owners (managers) on the Ontario Ministry of Natural Resources files for 1988 received a questionnaire. The file may not have been exhaustive since only those lodges that were registered to sell licences were included. Each lodge owner was then asked in the cover letter (Appendix B) to fill out the questionnaire as he/she felt the majority of their guests would answer the various components.

3.6 THE FOLLOW-UP

As suggested in chapter 2 an important consideration when conducting a survey is the attitudes or behaviours of nonrespondents. To determine if any difference existed between the nonrespondents and the respondents, a follow-up of the original survey was undertaken. To accomplished this the same questionnaire was sent to those anglers who did not respond 28 days after the original mail-out. To determine who did and who did not respond after the first mailing the questionnaires were coded. In order to provide anonymity for the respondents and to increase the response rate the second mail-out was not coded.

By analyzing the differences between the original respondents and the respondents that were reminded, angler biases may be detected.

3.7 DATA ANALYSIS

The data collected from each survey were coded into a computer as each questionnaire were received. Once all the data were collected, it was analyzed using the SAS statistical package on the University of Manitoba's mainframe computer.

The information gathered from the survey was analyzed according to age, sex, place of residence, and district. If no significant differences were detected between the categories the information was pooled.

Firstly, the data were analyzed as an entire survey. Then a comparison was made between the respondents of the first and second mail-out. No significant difference was found. Therefore, the remainder of this study will consider the data to be of one homogeneous group, referred to as the base group.

Finally, the lodge owners questionnaires were compared to those of the base group to determine if there were any differences. Some differences did occur and will be discussed.

Chapter IV

RESULTS

4.1 THE QUESTIONNAIRE

The total number of questionnaires sent to Northwestern Ontario anglers was 1,950. Forty-six surveys were returned to sender because of wrong addresses. Therefore the total number of anglers receiving surveys was 1,904.

After the first mail-out 51% (971) of the surveys had been returned. This meant 933 anglers had to be sent a second survey. Three hundred and one anglers returned the second survey. Altogether 1,272 of the surveys were returned. This placed the rate of return for the entire project at 67%.

The mail-out to lodge owners consisted of 320 questionnaires being sent with 139 surveys returned. Of the 181 second mail-outs, an additional 40 questionnaires were returned setting the rate of return for lodge owners at 56% (179).

4.2 DEMOGRAPHICS

Three basic user groups were identified; Ontario residents, Canadian residents who were not residents of Ontario, and non-residents of Canada. Throughout this study they will be referred to as Ontario residents, Canadians and Americans respectively. Of the 1272 respondents; 11% were Ontario residents, 15% were Canadians and 74% were Americans.

Since Ontario regulations state that only anglers between the ages of 18 and 65 must purchase a licence, these were the only age groups listed on the questionnaire. When the results were tabulated it was noted that there were a minimal number of respondents who indicated that they did not belong to any of these age groups (Table 1). The highest frequency of anglers was in the 35-49 age group (38%) except for Ontario residents where the highest frequency was in the 18-35 age group (42%).

TABLE 1

Age Compostion of Anglers in Northwestern Ontario (%)

	ALL	Ont	Can	U.S.
n=	1237	138	183	916
UNDER 18	1	0	1	1
18-34	28	42	31	25
35-49	38	32	39	39
50-65	32	25	28	31
OVER 65	3	1	2	4

Differences are significant between groups if the proportions differ by about 10 percentage points (Appendix C)

The number of males who responded to this survey, (1027 or 85%), was far greater than the number of females (178 or 15%). It should be noted that this percentage was fairly consistent with the apparent number of females who received a questionnaire (17%). Ontario residents had the highest percentage of female anglers (27%) while Americans had the lowest percentage of females (13%) (Table 2).

TABLE 2

Sex Composition of Anglers in Northwestern Ontario (%)

	frequency (%)			
	All	ONTARIO	CANADIAN	AMERICAN
n=	202	133	179	890
MALE	85	73	84	87
FEMALE	15	27	16	13

Differences are significant between groups if proportions differ by about 10 percentage points (Appendix C).

4.2.1 Angling Associations

The percentage of respondents who belonged to an angling association (8%) was considerably smaller than those who did not belong to any organization (92%) No differences were apparent due to age, sex or district. However, Ontario residents had the highest percentage (13%) of anglers who belonged to an angling association. The other two groups had only about 7% of the respondents belonging to an association (Table 3). However no significant differences were evident.

TABLE 3

Angling Association Members in Northwestern Ontario (%)

	frequency (%)			
	ALL	ONTARIO	CANADIAN	AMERICAN
n=	1202	133	179	890
Member	8	13	8	7
Nonmember	92	87	92	93

Differences are significant between groups if proportions differ by about 10 percentage points (Appendix C)

4.2.2 Districts in Northwestern Ontario

Few significant differences were apparent among districts other than response rate (Table 5). However, due to the mobility of anglers the response rate did not correspond to the numbers cited in the original mail-out (Table 4). Table 4 also shows the response rates of the first and second mail-outs. Remote districts such as Red Lake and Sioux Lookout had a higher than return rate (17%) than the sample size (12.5%). Fort Frances had a lower response rate (17%) compared to the sample population (25%). Kenora had the highest percentage of anglers (26%) for all three user groups and Ignace had the lowest (7%). The percentage of anglers fishing in Ignace was low, but the numbers were consistent with the size of the sample population from that district. It was also consistent with the percentages of licences sold in that region. It should be noted that 138 respondents did not specify which lake or town was nearest to where they were fishing. If only a lake was indicated the Ontario gazetter was used to determine the district.

TABLE 4

Sampling Numbers of Anglers in Northwestern Ontario

	frequency (%)					
	Original Sample Size	Response 1st Mailing	2nd Mail-out	Response 2nd Mailing	Total Response	Licences Sold
n=	1950	971	933	301	1272	
Kenora	25	27	20	24	26	32
Fort Frances	25	16	26	20	17	32
Sioux Lookout	12.5	16	13	16	16	7
Red Lake	12.5	17	15	21	18	7
Dryden	17	17	18	14	16	15
Ignace	8	7	8	6	7	7

Differences are significant between groups if proportions differ by 10 percentage points (Appendix C)

TABLE 5

Districts Fished by Anglers in Northwestern Ontario

	frequency (%)				
	ALL	ONTARIO	CANADIAN	AMERICAN	Licences Sold
District n=	1272	129	164	839	
Kenora	26	26	43	23	32
Fort Frances	17	20	12	17	32
Sioux Lookout	16	12	12	18	7
Red Lake	18	13	13	19	7
Dryden	16	23	15	15	15
Ignace	7	6	4	8	7

Differences are significant between groups if proportions differ by about 10 percentage points (Appendix C)

4.2.3 Accommodation

A large difference in the type of accommodation used by the various anglers was expected and observed. Ontario residents had the highest use of homes/cottages (78%) followed by Canadians (34%) and finally Americans (21%).

The main base lodge was the most commonly used form of accommodation by Americans (38%) and the second most commonly used form of accommodation by Canadians (23%).

In addition, Americans stayed at outpost camps at the same rate as they stayed in homes/cottages (21%). The two "other" responses most prevalent were houseboats and motels/hotels.

TABLE 6

Accommodations Used by Anglers in Northwestern Ontario

	Frequency (%)			
	ALL	ONT	CAN	U.S.
n=	1268	139	187	942
HOME/COTTAGE	29	78	34	21
OUTPOST CAMP	18	3	15	21
MAIN BASED LODGE	32	4	23	38
CROWN LAND	6	11	7	5
PROVINCIAL PARK	3	2	8	2
PRIVATE CAMPGROUND	10	2	12	10
OTHER	2	0	2	3

Differences are significant between groups if proportions differ by about 10 percentage points (Appendix C).

4.3 ANGLER PARTICIPATION

The highest average number of days fished per month in Northwestern Ontario for the 1989 season was in June (3.0 days) (Table 7). September recorded the lowest number (1.0 days).

The average number of days fished per month was lower than expected because a large number of respondents would fish for only a total of two or three days each season. The remaining months of the fishing season would be recorded as zero days. This is especially true for the American based angler. Therefore, Table 7 also shows the adjusted average number of days spent fishing only if the angler fished during

that month. If the angler did not fish in a specific month his/her observation was not included in the calculation.

Little difference is evident between the place of residence and the number of days fished each month. The adjusted number of days for Ontario residents is higher than the other two subgroups (Table 8).

There was some differences in the distribution of angling days around the median (Tables 2 to 5). There was a greater separation of anglers from the median for Ontario anglers. American anglers varied the least from the median. This indicates that more American anglers spend a shorter number of days fishing each month than Ontario or even Canadian anglers. This probably results because more American anglers fish on package deals. In addition, four day licences are bought by many of the american anglers.

TABLE 7

Days Fished in Northwestern Ontario (Summer 1989)

	Average Days	Adjusted Average Days
MAY	1.4	5.3
JUNE	3.0	6.1
JULY	2.3	6.0
AUGUST	2.1	6.3
SEPTEMBER	1.0	5.4

TABLE 8

Adjusted Average Number of Days Fished: By Residence

	Ontario	Canadian	American
MAY	5.1	5.1	5.5
JUNE	7.1	6.0	5.9
JULY	7.3	4.9	5.8
AUGUST	6.9	5.9	6.2
SEPTEMBER	6.2	5.2	5.1

To better understand the current trends in angling each survey recipient was asked to indicate whether the amount of time he/she spent fishing in Northwestern Ontario has increased, decreased or remained about the same. Even though a greater number of anglers had increased their amount of time fishing (28%) than those who had decreased their time (11%), the majority of anglers stated that their time spent angling had remained about the same (61%).

Anglers were also asked what their fishing habits have been during the past four years. A large percentage of the Ontario residents had fished the year previous (89%). The majority of Canadians (72%) and Americans (64%) had also fished in 1988. Figures 6 and Figure 7 show these trends which were analyzed by both age and place of residence. On the days anglers fished, they spent an average of 7.6 hours per day.

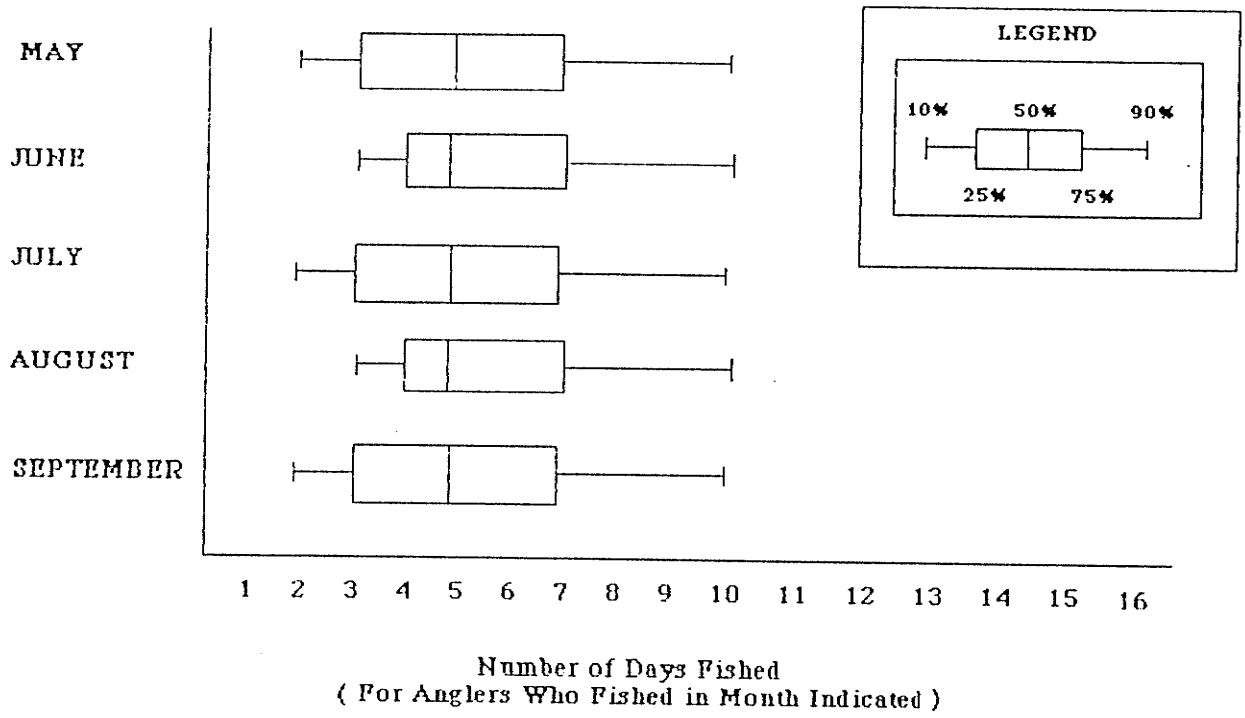

Figure 2: Distribution of Angler Days in N.W.O. (All Residents)

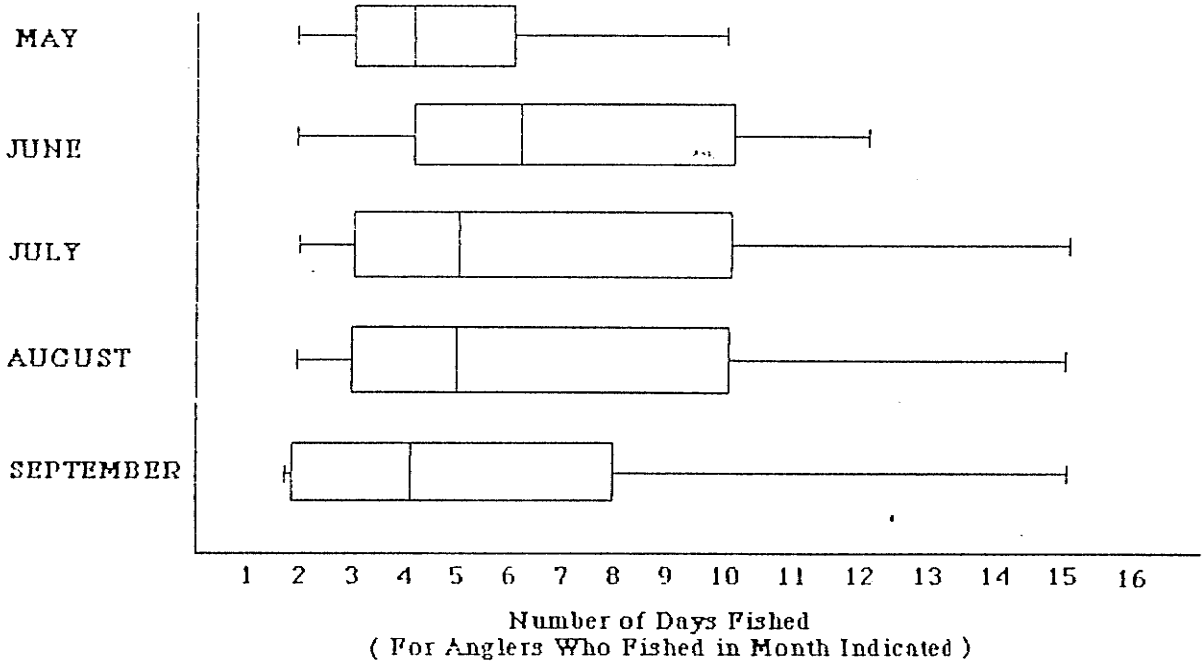

Figure 3: Distribution of Angler Days in N.W.O. (Ontario Residents)

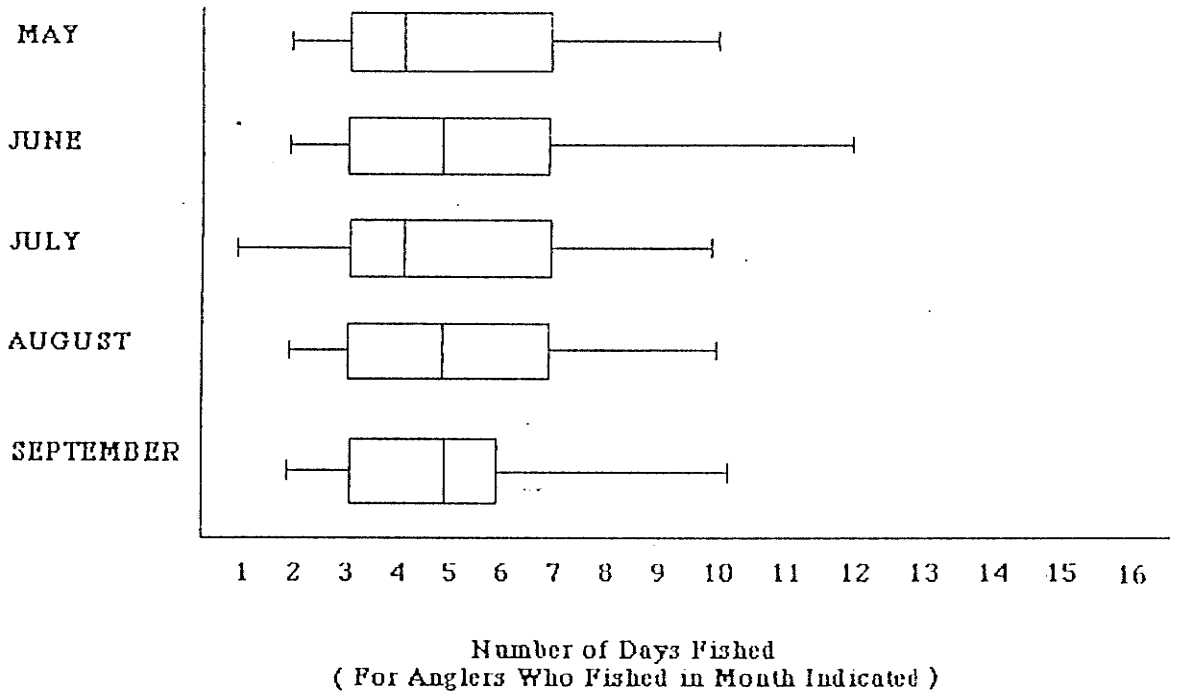

Figure 4: Distribution of Angler Days in N.W.O. (Canadian Residents)

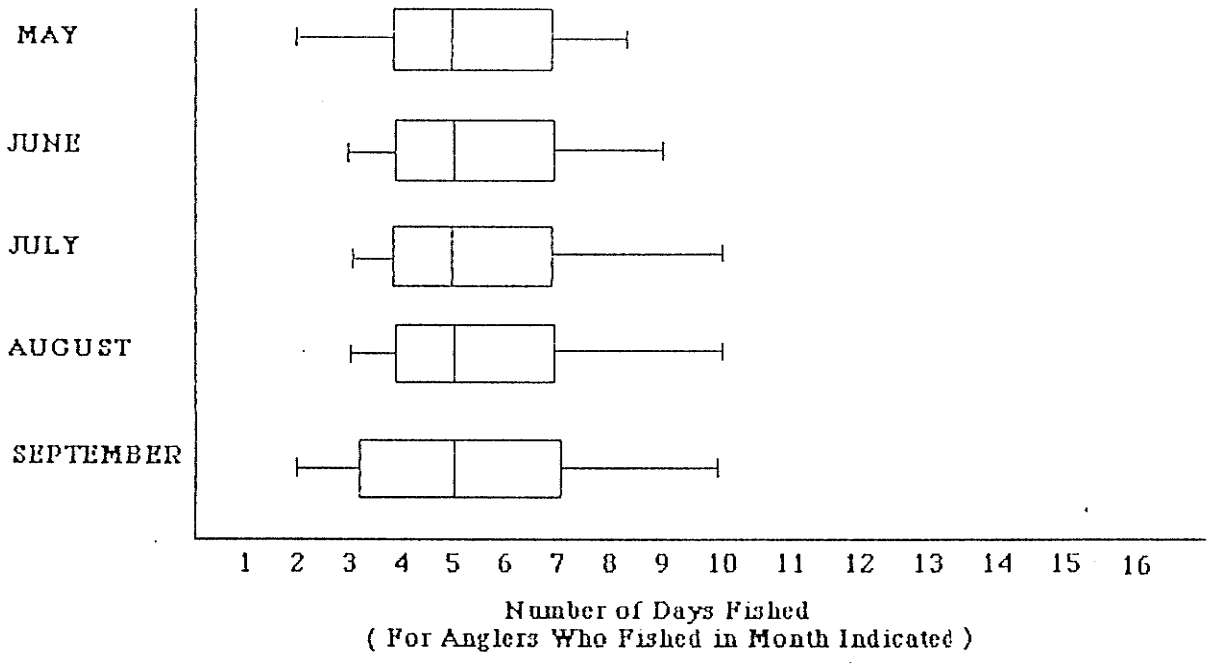

Figure 5: Distribution of Angler Days in N.W.O. (American Residents)

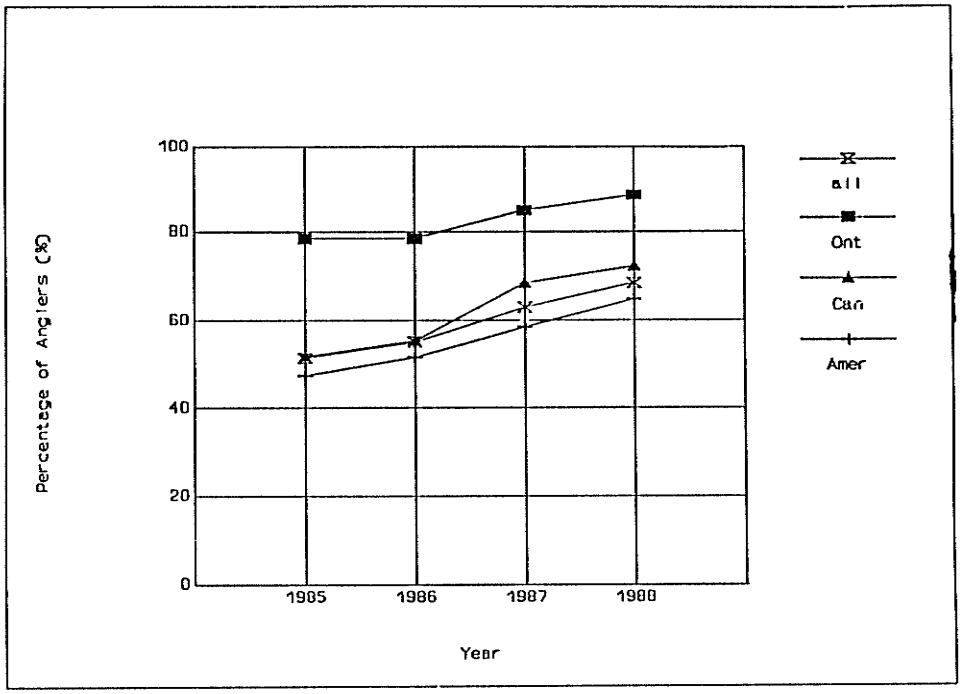

Figure 6: Years Previously Fished in N.W.O. by 1989 Anglers

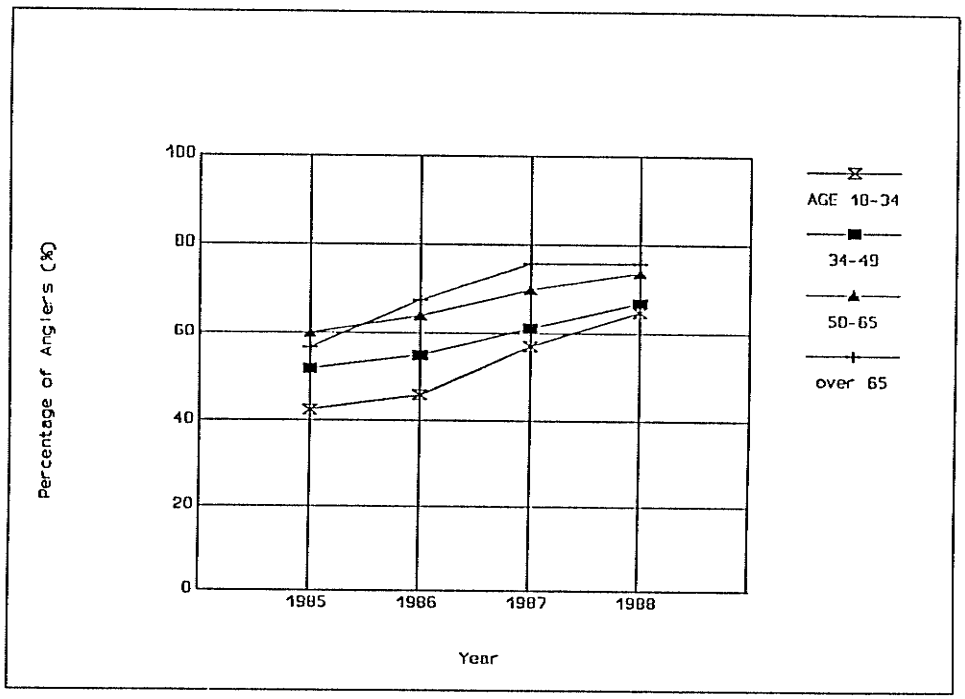

Figure 7: Years Previously Fished in N.W.O. by 1989 Anglers (Age)

4.4 ATTITUDES

The attitudes that anglers have toward existing management practices and regulations are important when developing new management practices and regulations. For this reason, questions dealing with species preference, catch limits and regulations were included.

4.4.1 Species Preference

Although it was generally acknowledged that walleye was the preferred species to fish in Northwestern Ontario, it was also necessary to determine what other species were also popular (Table 9). Walleye had the greatest demand (73%), northern pike the second greatest, followed by smallmouth bass and lake trout.

The choice of species does vary according to residents. Ontario residents had a higher preference for walleye (85%) than Canadians (73%) and Americans (71%). Lake trout was the preferred second choice of Ontario residents (48%) whereas, northern pike was the preferred second choice of Canadians (37%) and Americans (46%). (Figures 8 to 11). The "other" category was used by a few respondents and the most commonly cited species were perch (Perca flavescens), sauger (Stizostedion canadense) and whitefish (Coregonus clupeaformis).

TABLE 9

Ranking of Species Preferred to Catch

	Frequency of Ranking (%)			
	*1	2	3	4
Walleye	73	19	6	3
Northern	10	42	27	17
Lake Trout	6	16	20	20
Brook Trout	1	1	5	7
Muskellunge	5	5	14	23
Smallmouth	6	15	26	25
Crappie	0	1	2	4
Other	0	1	1	3

*Codes: 1=Favorite species (n=1266)
2=Second Favorite Species (n=1245)
3=Third Favorite Species (n=1167)
4=Fourth Favorite Species (n=1035)

Question 7 asked the respondents if they would change their preference of fish they enjoyed catching if lower catch and possesion limits were imposed. Of those surveyed 25% (321) indicated they would change their fishing preference. From that percentage 72% (232) of the respondents indicated that they would change to a species of which more could be kept.

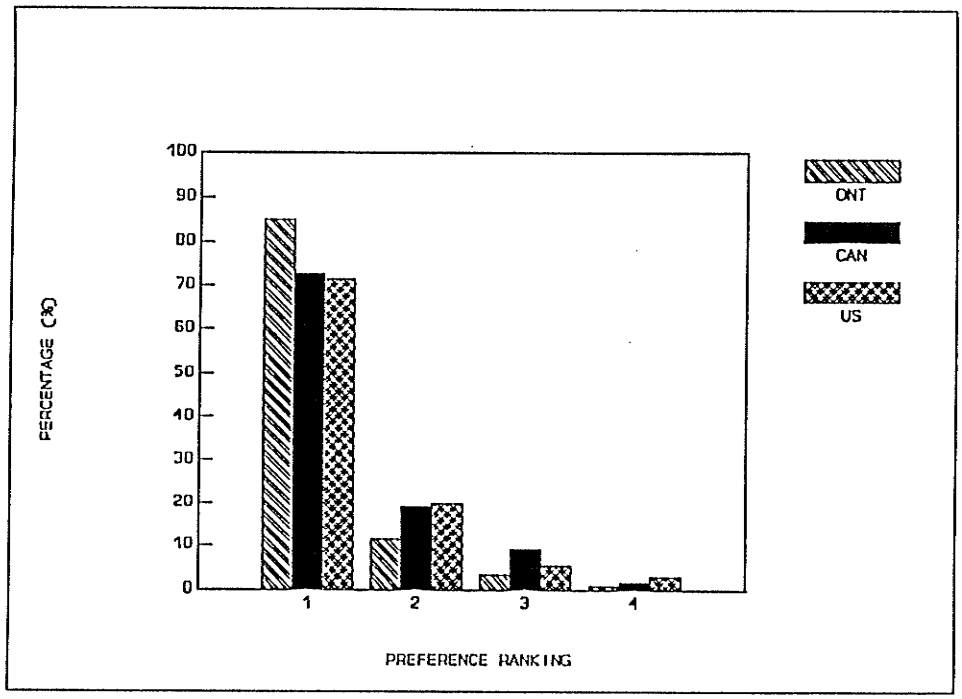

Figure 8: Angler Preference for Walleye in N.W.O.

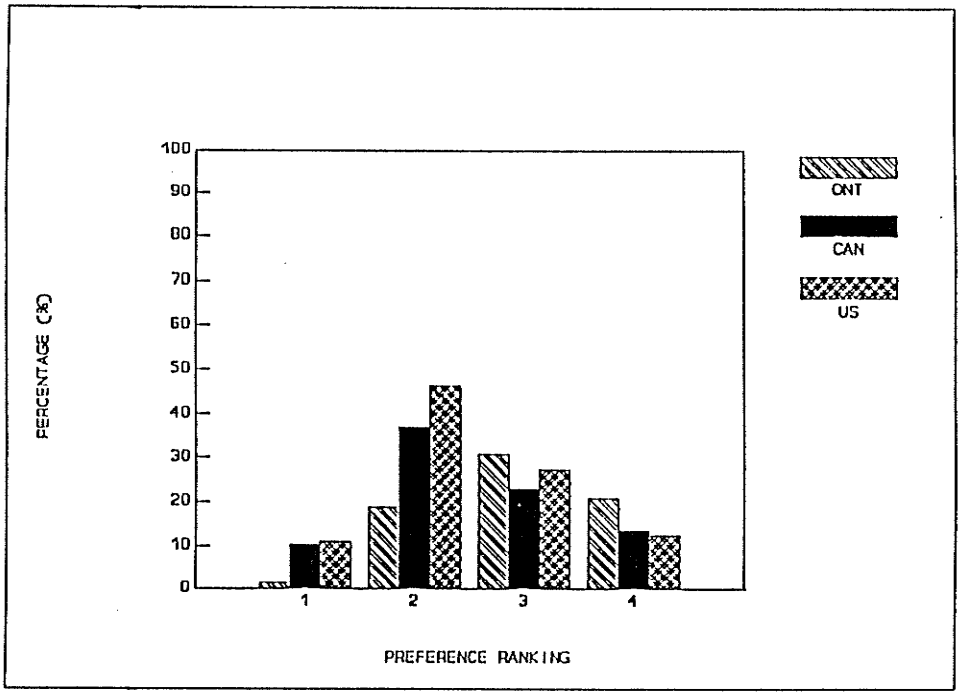

Figure 9: Angler Preference for Northern Pike in N.W.O.

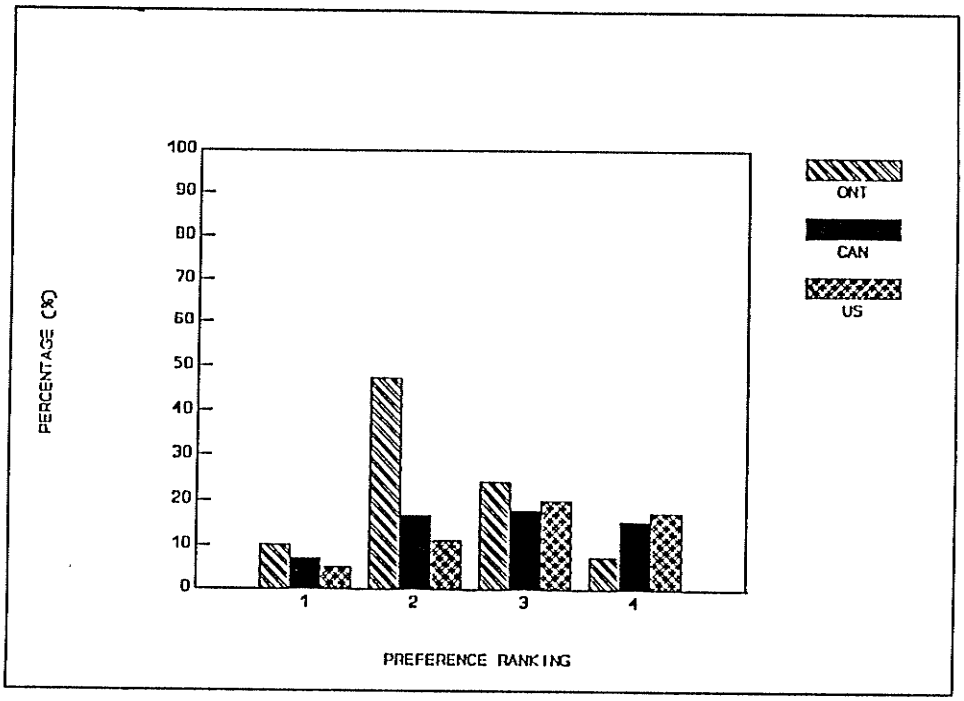

Figure 10: Angler Preference for Lake Trout in N.W.O.

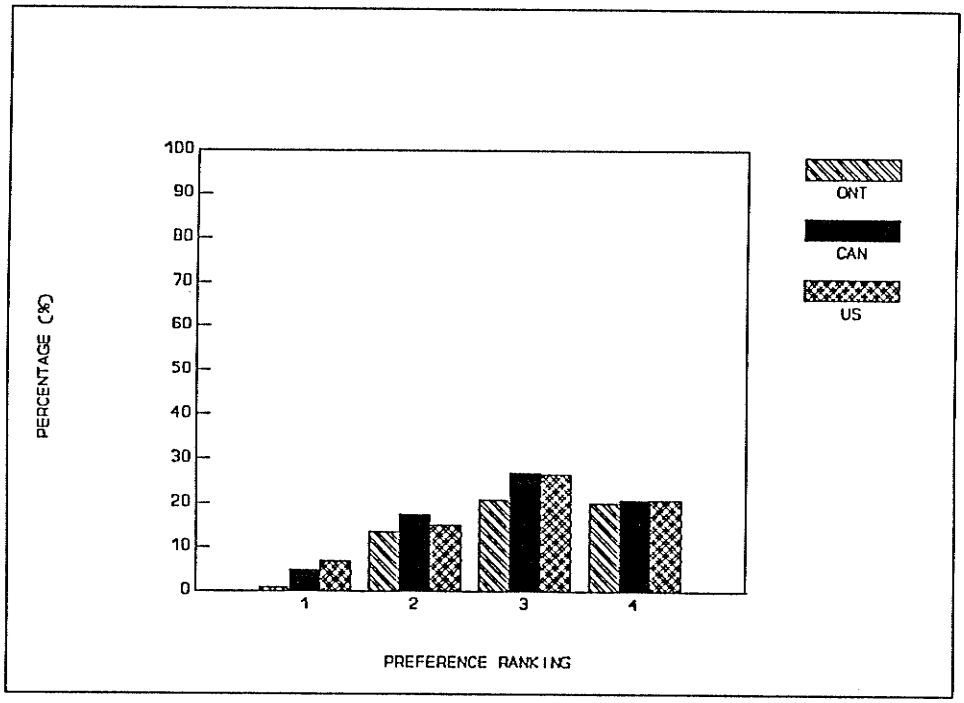

Figure 11: Angler Preference for Smallmouth Bass in N.W.O.

4.4.2 Catch Limit

The respondent was asked to indicate if they thought it was important to keep their limit of fish while fishing in Northwestern Ontario. Of those who responded, 60% thought it necessary to keep their limit. The highest percentage was the American angler (63%) and the lowest was the Ontario angler (47%) (Table 10). Similarly, Table 11 shows the age of those anglers who preferred to keep their limit of fish. The highest was in the 50-65 age class (69%) and the lowest in the 18-34 age group (53%).

TABLE 10

Importance of Keeping Limit: By Residence

	Frequency (%)		
	Ontario	Canadian	American
n=	137	187	938
Important	47	55	63

Differences are significant between groups if proportions differ by about 10 percentage points (Appendix C)

Walleye was the preferred fish to keep while northern pike, lake trout and smallmouth bass were less important to the Northwestern Ontario angler.

When asked what their number one choice of species to catch their limit on was, 86% of the respondents preferred walleye.

TABLE 11

Importance of Keeping Limit: By Age

	Frequency (%)		
	AGE GROUP		
	18-34	35-49	50-65
n=	347	469	374
Important	53	57	69

* Differences are significant between groups if proportions differ by about 7 percentage points (Appendix C)

Northern pike was chosen as the second favorite species to limit (49% or 156), followed by smallmouth bass and lake trout. This breakdown along with the entire selection of species is given in Table 12 and shown in Figure 12 to Figure 14.

TABLE 12

Species Preferred for Catch Limit

	Frequency of Ranking (%)		
	*1	2	3
Walleye	86	13	1
Northern Pike	5	49	33
Lake Trout	4	16	23
Brook Trout	0	1	3
Muskellunge	1	1	9
Smallmouth Bass	3	17	27
Crappie	1	2	3
Other	0	1	3

*Codes: 1=Favorite Species (n=761)
2=Second Favorite Species (n=634)
3=Third Favorite Species (n=479)

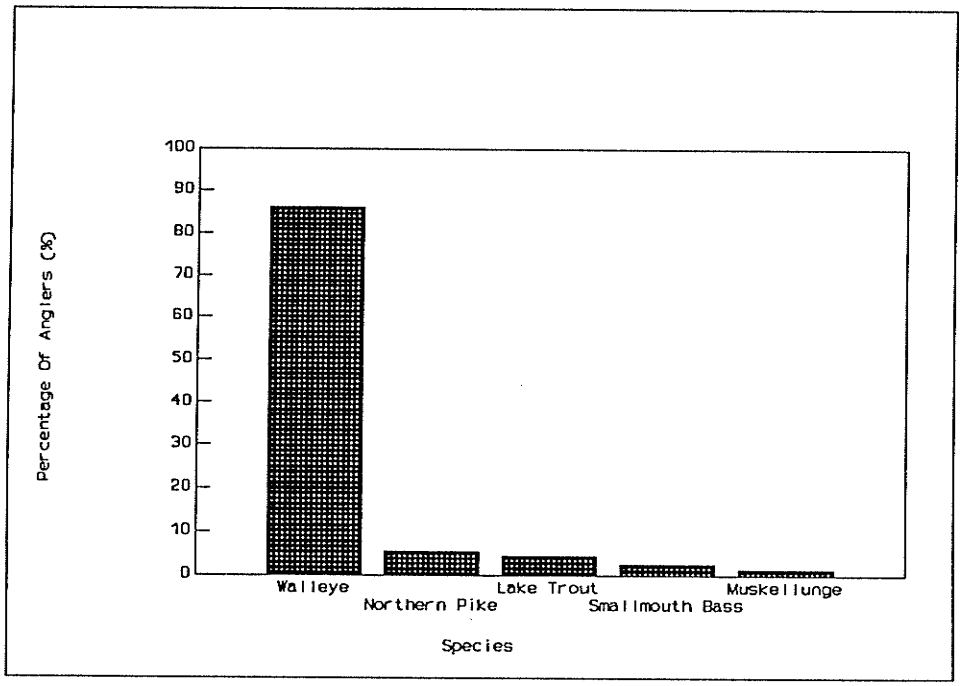

Figure 12: First Most Preferred Species to Limit Out On (n=761)

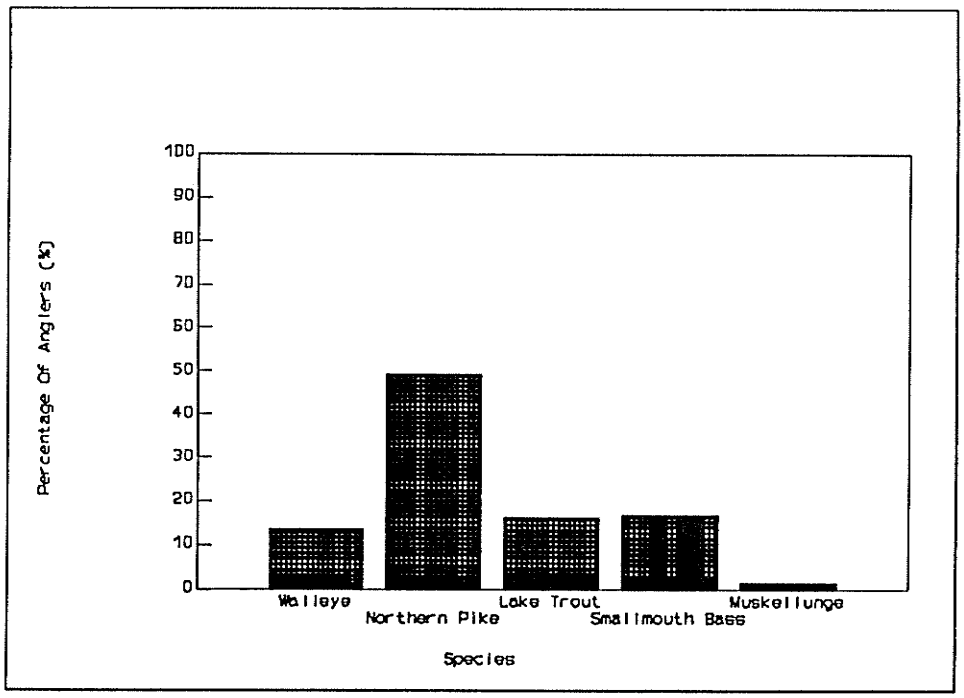

Figure 13: Second Most Preferred Species to Limit Out On (n=634)

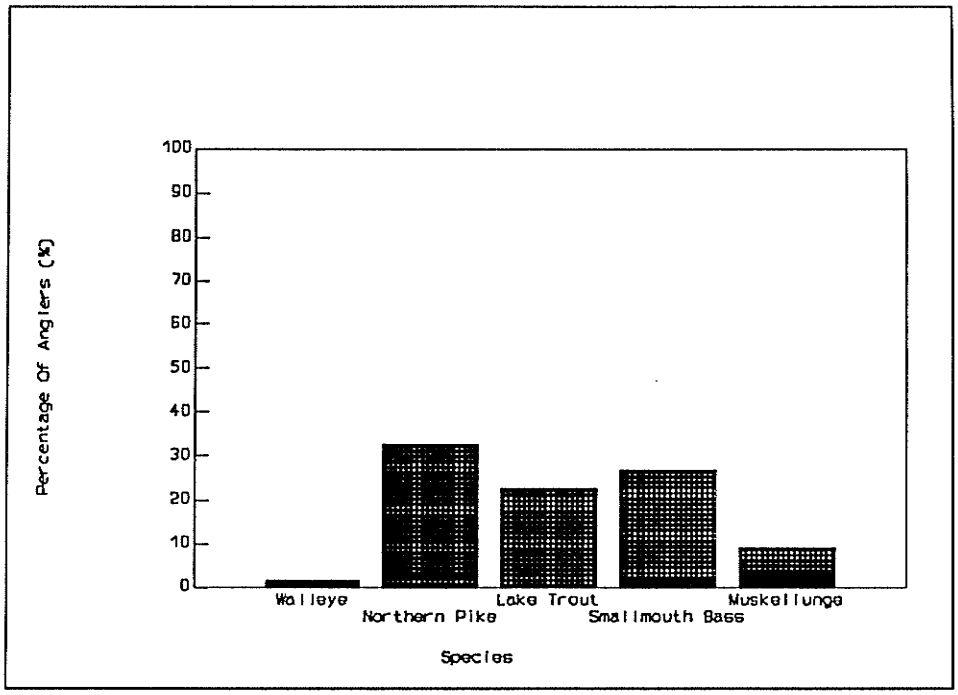

Figure 14: Third Most Preferred Species to Limit Out On (n=479)

4.4.3 Regulations

It was important to determine the impact on angling pressure, if regulations were changed on certain areas or lakes. When the base group was asked if they would change to a lake with less strict regulations, 24% of the respondents said they would. Forty percent indicated they would not change location, and 36% were unsure.

When managing for sport fishing, regulations may be set such that they theoretically favour the production of fewer but larger fish or more numerous but smaller fish. To establish the attitudes of those anglers utilizing Northwestern Ontario such a question was included in this study but the results were indecisive. While 48% chose to have more but smaller fish, 52% of the respondents preferred to have larger but

fewer fish. No difference in attitudes due to age class were apparent. However, there were slight differences by place of residence. The majority of Ontario respondents preferred to have lots of fish (59% or 84). The Canadian and American anglers who answered this question favoured fewer but bigger fish (55% or 82 and 53% or 428 respectively) (Table 13).

TABLE 13

Angler Preference: Lots of Fish or Bigger Fish

	frequency (%)		
n=	Ontario 127	Canadian 183	American 914
Lots of Fish	59	45	47
Fewer Larger Fish	41	55	53

Differences are significant between groups if proportions differ by about 10 percentage points (Appendix C)

In an effort to manipulate the harvest but not deny angling opportunities, the Ontario government is implementing size limit regulations (see Chapter 1). A greater number of respondents favoured the new regulations for walleye (55%) than not (31%). Those having no opinion or not stating any opinion numbered 14%. In comparison, 52% favoured the new regulations for northern pike, 29% opposed the regulations, and 19% stated no opinion.

The anglers who fished in Kenora and Red Lake had favoured the new regulations for walleye the highest (62%) and Ignace had the lowest level of acceptance (44%) (Table 15). Similar responses were apparent for northern pike.

Finally, the complexity of the regulations in the province of Ontario has continued to grow. Forty-four percent of the respondents indicated the regulations were too complex while 54% did not find the regulations too complex. Only 2% of the respondents did not respond to this question.

TABLE 14

Proposed Regulations for Northwestern Ontario

	frequency (%)			
	Walleye		Northern Pike	
	In Favour	Not in Favour	In Favour	Not in Favour
Ontario (n=139)	66	22	51	22
Canadian (n=187)	58	26	55	25
American (n=942)	53	33	51	31

Note: A "No Opinion" category was included in the questionnaire but not in the table

Differences are significant between groups if proportions differ by about 10 percentage points (Appedix C)

TABLE 15

Proposed Regulations for Northwestern Ontario (District)

	frequency (%)			
	Walleye		Northern Pike	
	In Favour	Not in Favour	In Favour	Not in Favour
Kenora (n=298)	62	22	58	20
Fort Frances (n=192)	59	28	54	30
Sioux lookout (n=182)	49	41	48	37
Red Lake (n=201)	62	28	59	28
Dryden (n=182)	52	37	49	30
Ignace (n=79)	44	42	41	41

Note: A "No Opinion" category was included in the questionnaire but not in the table.

Differences are significant between groups if proportions differ by about 13 percentage points (Appendix C).

4.5 MANAGEMENT PROGRAMS

The management programs were listed in question 15 and each respondent was to indicate his or her perception of the statements listed in the table. The Likert scale was used to allow the respondent to indicate how much he/she agrees or disagrees with the statement. There were twelve statements to which the angler was to indicate whether he/she; strongly agreed, agreed, neutral, disagreed, strongly disagreed or had no opinion. The results are listed in Tables 16 to 19.

Of the twelve statements, four received a positive response from the respondents. The majority of respondents agreed with the statement "Fish size limits are important for maintaining fish stocks" Fifty-seven percent strongly agreed with the statement and 23% of all respondents agreed. The highest agreement rate was the Ontario based anglers who had 68% strongly agreeing.

The statement "catch and release programs are a sensible method to maintain fish populations" received the next highest support rate. Almost one half of all the respondent (47%) strongly agreed with this statement while only 4% of the respondents strongly disagreed. This percentage is consistent by, age, sex and, place of residence.

The enforcement of regulations received favourable responses although only 28% of the anglers strongly agreed. The same percentage of respondents also agreed with the enforcement of regulations. Although the support favouring this statement is lower for the Ontario residents, almost one half of the Ontario respondents agreed or strongly agreed that the enforcement is adequate in Northwestern Ontario.

Three statements did not receive favourable responses. First, one out of every four respondents (25%) did not agree that the fishing had improved over the last five years. Second, 40% of the survey participants strongly disagreed with the statement that suggests that they were allowed to keep too many fish. In addition, 27% of the respondents disagreed with the statement. This percentage is even higher for the American angler (Table 14). Third, the suggestion to shorten seasons did not receive favourable support. Twenty-six percent of the

respondents strongly disagreed with this management practice. It is consistent within the base group. However, over 30% of the Ontario respondents did not agree with the idea of shortening seasons.

TABLE 16

Management Programs (All Respondents)

	frequency (%) (n=1272)					
	STRONGLY AGREE <----------> STRONGLY DISAGREE					NO OPINION
Fish size limits are important for maintaining fish stocks	57	23	10	3	3	4
Promotion of regulations changes by the government is adequate	15	24	26	9	6	20
Crowding of anglers where you fish has decreased your fishing enjoyment	20	17	22	15	17	9
Enforcement of regulations in the region is adequate	28	28	19	6	6	14
Education programs conducted by the government are effective	10	13	25	7	5	40
Access to remote lakes has been made to easy because of new roads	16	15	20	14	14	22
In the past 5 years fishing has been getting better	5	10	25	20	25	16
Catch and release programs are a sensible method to maintain fish populations	47	27	12	5	4	4
Using barbless hooks helps maintain fish populations	23	20	20	12	10	15
Stricter regulations are necessary to ensure fishing enjoyment	16	19	25	18	15	7
The regulations allow you to keep too many fish	4	7	17	27	40	6
Shortening seasons is good method of protecting the fishery	11	13	22	18	26	11

TABLE 17

Management Programs (Ontario)

	frequency (%) (n=139)					
	STRONGLY AGREE <----------> STRONGLY DISAGREE					NO OPINION
Fish size limits are important for maintaining fish stocks	68	13	7	1	4	6
Promotion of regulations changes by the government is adequate	21	19	22	15	12	12
Crowding of anglers where you fish has decreased your fishing enjoyment	27	22	16	13	12	9
Enforcement of regulations in the region is adequate	21	27	16	6	20	11
Education programs conducted by the government are effective	9	14	25	14	17	21
Access to remote lakes has been made to easy because of new roads	23	18	16	10	26	7
In the past 5 years fishing has been getting better	7	9	26	23	28	8
Catch and release programs are a sensible method to maintain fish populations	47	22	11	5	8	7
Using barbless hooks helps maintain fish populations	35	17	21	6	8	13
Stricter regulations are necessary to ensure fishing enjoyment	22	21	17	14	20	6
The regulations allow you to keep too many fish	4	12	17	22	37	8
Shortening seasons is good method of protecting the fishery	18	17	14	15	31	6

TABLE 18

Management Programs (Canadian)

	frequency (%) (n=187)					
	STRONGLY AGREE <----------> STRONGLY DISAGREE					NO OPINION
Fish size limits are important for maintaining fish stocks	62	19	10	1	2	6
Promotion of regulations changes by the government is adequate	18	23	26	10	5	19
Crowding of anglers where you fish has decreased your fishing enjoyment	20	25	23	15	9	8
Enforcement of regulations in the region is adequate	27	23	20	10	6	14
Education programs conducted by the government are effective	11	15	28	10	8	29
Access to remote lakes has been made to easy because of new roads	16	16	21	15	11	21
In the past 5 years fishing has been getting better	4	12	22	20	27	15
Catch and release programs are a sensible method to maintain fish populations	50	30	9	2	5	5
Using barbless hooks helps maintain fish populations	32	23	16	7	14	8
Stricter regulations are necessary to ensure fishing enjoyment	28	18	24	14	9	7
The regulations allow you to keep too many fish	6	12	20	21	34	6
Shortening seasons is good method of protecting the fishery	16	10	24	13	27	11

TABLE 19

Management Programs (American)

	frequency (%) (n=942)					
	STRONGLY AGREE <----------> STRONGLY DISAGREE					NO OPINION
Fish size limits are important for maintaining fish stocks	54	25	11	4	3	4
Promotion of regulations changes by the government is adequate	13	25	27	9	6	21
Crowding of anglers where you fish has decreased your fishing enjoyment	19	15	23	15	19	9
Enforcement of regulations in the region is adequate	30	29	19	5	4	14
Education programs conducted by the government are effective	10	13	24	6	3	45
Access to remote lakes has been made to easy because of new roads	15	14	21	15	12	24
In the past 5 years fishing has been getting better	5	10	25	20	24	18
Catch and release programs are a sensible method to maintain fish populations	47	28	13	6	3	4
Using barbless hooks helps maintain fish populations	19	20	21	13	10	16
Stricter regulations are necessary to ensure fishing enjoyment	12	18	27	20	15	7
The regulations allow you to keep too many fish	3	5	16	29	42	6
Shortening seasons is good method of protecting the fishery	9	14	22	19	24	12

4.6 ELEMENTS INFLUENCING ANGLING ENJOYMENT

Additional information was collected to determine how important various elements were to the overall enjoyment of the fishing experience. Every factor that was listed in the questionnaire received a favourable response. The importance of nature to the fishing experience was very high to three out of every four anglers. This was followed by catching fish as the second most important aspect associated with their fishing experience in Northwestern Ontario. The least important aspects associated with angling were the social outing and camping experience. The frequency depended on the place of residence (Table 20 to Table 23). American residents rated camping the lowest among the user groups but rated catching fish the highest.

TABLE 20

Elements Influencing Angling Enjoyment (All Respondents)

	Frequency (%) (n=1272)					
	Very Important	<---------->			Not Important	No Opinion
Nature	77	16	4	1	1	2
Camping	31	25	20	6	10	8
Catch Fish	60	28	8	2	1	1
Social Outing	28	29	19	8	11	5
Eating Fish	37	32	18	7	4	1

TABLE 21

Elements Influencing Angling Enjoyment (Ontario)

	frequency (%) (n=139)					
	Very Important <----------> Not Important					No Opinion
Nature	76	16	5	0	0	4
Camping	40	29	17	5	4	5
Catch Fish	43	27	17	5	5	2
Social Outing	43	24	14	3	9	7
Eating Fish	40	30	19	9	1	1

TABLE 22

Elements Influencing Angling Enjoyment(Canadian)

	frequency (%) (n=187)					
	Very Important <----------> Not Important					No Opinion
Nature	78	17	2	1	1	2
Camping	39	25	18	5	6	7
Catch Fish	55	31	11	4	1	0
Social Outing	26	29	25	8	7	5
Eating Fish	35	33	15	11	6	1

TABLE 23

Elements Influencing Angling Enjoyment (American)

	frequency (%) (n=942)					
	Very Important	<---------->			Not Important	No Opinion
Nature	77	15	4	1	1	2
Camping	28	25	21	6	12	8
Catch Fish	64	28	6	1	0	1
Social Outing	27	29	19	8	12	5
Eating Fish	38	32	18	6	5	2

4.7 SIZE LIMITS

Question 16 of the survey was included in order to determine the attitudes towards size restrictions for specific species of fish which are susceptible to high angling pressure. A similar question was already presented earlier to determine attitudes towards specific size regulations on walleye and northern pike. The information generated from question 16 will determine general attitudes for size regulations for four of the more common sport fish in Northwestern Ontario. Tables 24 through 27 present the information from this study.

When asked to rate four fish species on the importance of size limits for maintaining size stocks, the anglers rated muskellunge as the most important species (53%). Northern pike received the lowest percentage of responses (35%). The Ontario angler indicated that walleye was the most important species for size limit regulations (56%) while only 41%

of the American anglers thought it very important for walleye. Generally all four species received a favourable rating for the use of size limits for the protection of fish stocks.

TABLE 24

Importance of Size Limits

	frequency (%) (n=1272)					
	Very Important <----------> Not Important					No Opinion
Muskellunge	53	16	8	2	4	18
Northern Pike	35	27	17	6	7	9
Lake Trout	36	24	15	4	3	18
Walleye	44	29	14	3	4	6

TABLE 25

Importance of Size Limits (Ontario)

	frequency (%) (n=139)					
	Very Important <----------> Not Important					No Opinion
Muskellunge	53	10	8	2	6	21
Northern Pike	28	17	18	9	17	11
Lake Trout	50	20	11	3	6	11
Walleye	56	22	9	1	6	5

TABLE 26

Importance of Size Limits (Canadian)

	frequency (%) (n=187)					
	Very Important <----------> Not Important					No Opinion
Muskellunge	54	14	7	2	5	18
Northern Pike	36	27	16	4	8	10
Lake Trout	40	24	11	4	3	18
Walleye	50	29	8	3	1	9

TABLE 27

Importance of Size Limits (American)

	frequency (%) (n=942)					
	Very Important <----------> Not Important					No Opinion
Muskellunge	53	17	8	2	3	18
Northern Pike	35	28	17	6	6	8
Lake Trout	34	25	16	4	3	19
Walleye	41	29	15	4	4	6

4.8 LODGE OWNERS

It should be noted that lodge owners who responded to this survey were asked to answer the questions according to how they felt the majority of their guests would respond. Therefore, lodge owners' opinions are not intended to be their own personal opinions but rather should represent the opinions of their guests. A number of problems presented themselves once the questionnaires were returned. Firstly, the questionnaire design was such that a number of questions could not be answered in this manner. Secondly, it became evident during data entry that a number of lodge owners answered the questions using their own opinions and therefore the truthfulness of the lodge owners responses could be questioned. Nevertheless, all responses were included because it was difficult to discriminate between their personal viewpoints and their perception of their guests' viewpoints.

Differences greater than 8% between the base group and the lodge owners' responses were considered to be significant (Appendix C).

4.8.1 Demographics

A significant difference in demographics was noted between lodge owners' perceptions of their guests and the base group itself. This inconsistency was expected because those anglers who fish in the region were not limited to those anglers who fish at registered lodges. The pertinent information is the consistency of answers between the base group and lodge owners. Therefore only the questions relating to behaviours, attitudes and perceptions will be discussed.

4.8.2 Behaviours

4.8.2.1 Species Preference

The perception of lodge owners is similar to that of the angler with respect to the importance of catching their limit of fish. Over one half (53%) of the lodge owners thought it was important for anglers to keep their limit. The species considered to be the most sought after was the walleye, followed by northern pike. Table 28 shows the preference as understood by the lodge owner and Table 29 shows the species lodge owners believe anglers want to catch their limit on.

TABLE 28

Ranking of Species preferred to Catch (Lodge Owner)

	Frequency of Ranking (%)			
	*1	2	3	4
Walleye	82	9	5	1
Northern	5	49	25	15
Lake Trout	3	17	27	22
Brook Trout	1	1	2	2
Muskellunge	3	4	11	29
Smallmouth	5	18	28	24
Crappie	0	2	1	4

*Codes: 1=Favorite species (n=179)
2=Second Favorite Species (n=178)
3=Third Favorite Species (n=173)
4=Fourth Favorite Species (n=156)

TABLE 29

Species Preferred for Catch Limit (Lodge Owner)

	Frequency of Ranking (%)		
	*1	2	3
Walleye	94	4	3
Northern	1	62	18
Lake Trout	2	19	24
Brook Trout	1	0	0
Muskellunge	0	2	1
Smallmouth	2	12	44
Crappie	0	2	3
Other	0	1	3

*Codes: 1=Favorite species (n=96)
2=Second Favorite Species (n=86)
3=Third Favorite Species (n=72)

4.8.3 Attitudes

The percentage of lodge owners, who felt that the anglers would change the lake where they fished if regulations were more strict on the lake they currently fished, was very similar to the anglers' responses. One quarter of the lodge owners (25%) thought the anglers would change locations while 41% thought they would not change lakes and 34% were undecided.

The majority (68%) of lodge owners felt that their guests would favour lots of fish over fewer but bigger fish.

A higher percentage of the lodge owners favoured the new regulations on walleye and northern pike. Walleye was more highly favoured than northern pike at 79% and 70% respectively. On the other hand 17% did not favour the regulations on walleye while 25% did not favour the regulations for northern pike.

4.8.4 Management Problems

Many of the responses by the lodge owners about the management problems were similar to those mentioned by the base group (Table 30). However, a number of differences did occur. The lodge owners did not agree as strongly as the anglers that the enforcement of regulations was adequate. Only 18% of the lodge owners strongly agreed with this statement.

Over 50% of the lodge owners strongly agreed that access to lakes has been made too easy because of new roads. This is much higher than the 16% of the base group who formulated the same response.

Lodge owners also had strong opposition to the shortening of seasons. Sixty-four percent of all the lodge owners strongly opposed this as a method of protecting the sport fishing industry while only 24% of the base group strongly disagreed with this management program.

TABLE 30

Management Problems (Lodge Owners)

	frequency (%) (n=179)					
	STRONGLY AGREE <----------> STRONGLY DISAGREE					NO OPINION
Fish size limits are important for maintaining fish stocks	63	20	9	3	5	0
Promotion of regulations changes by the government is adequate	13	22	26	17	18	3
Crowding of anglers where you fish has decreased fishing enjoyment	19	21	20	15	21	5
Enforcement of regulations in the region is adequate	18	29	19	16	17	1
Education programs conducted by the government are effective	8	17	30	15	24	7
Access to remote lakes has been made to easy because of new roads	53	12	12	7	11	5
In the past 5 years fishing has been getting better	7	21	22	18	31	1
Catch and release programs are a sensible method to maintain fish populations	51	21	17	7	5	0
Using barbless hooks helps maintain fish populations	34	23	15	13	10	6
Stricter regulations are necessary to ensure fishing enjoyment	22	14	23	14	24	3
The regulations allow you to keep too many fish	11	9	20	21	37	2
Shortening seasons is good method of protecting the fishery	7	7	11	10	64	1

4.8.5 Elements Associated with Angling

The importance of the certain elements associated with sport fishing in Northwestern Ontario was comparable to the base group. The lodge owners indicated that nature was the most important element associated with angling followed by catching fish, eating fish, the enjoyment of the social outing and finally, camping (Table 31).

TABLE 31

Elements Influencing Angling Enjoyment (Lodge Owners)

	frequency (%) (n=179)					
	Very Important	<----------			Not Important	No Opinion
Nature	73	16	7	2	1	2
Camping	19	20	20	13	20	8
Catch Fish	62	22	10	2	2	2
Social Outing	38	27	18	7	7	3
Eating Fish	46	31	14	4	3	2

4.8.6 Size Limits

The lodge owners' response to size regulations was similar to that of the base group. Again muskellunge had the highest number of responses. Muskellunge was followed by walleye and then northern pike. Although the percentages of responses was higher for each species, the ranking of species in terms of importance of size limits for each species was the same as the base group (Table 32).

TABLE 32

Importance of Size Limits (Lodge Owners)

	frequency (%) (n=179)					
	Very Important <----------> Not Important					No Opinion
Muskellunge	77	7	3	2	3	8
Northern Pike	54	17	15	4	7	4
Lake Trout	50	18	9	6	7	9
Walleye	63	17	10	3	5	3

Finally the attitude towards the complexity of regulations was similar to the responses given by the base group. Forty-seven percent of the lodge owners found the regulations too complicated while 49% believed they were not too complicated.

Chapter V

DISCUSSION

5.1 INTRODUCTION

The purpose of this chapter is to examine the results of the survey as they relate to the study objectives.

5.2 DEMOGRAPHICS

5.2.1 Place of Residence

The breakdown of those anglers who responded to this study are typical of other studies conducted in Northwestern Ontario (Bedi et al. 1985; Ministry of Supply and Services, 1988). The percentage of American anglers (74%) is considerably higher than that of the Ontario anglers (11%) or other Canadian anglers (15%) (Table 2). These numbers were consistent with the surveys mailed out and are representative of the licences sold throughout Northwestern Ontario during the 1989 season.

The greatest number of respondents fished in the Kenora district followed by Red Lake and then Fort Frances. They spent an average of 7.6 hours fishing each day with the greatest number of angling days occuring during the month of June.

It is important to note that the age structure is not consistent with the place of residence. Ontario has a much higher number of anglers who

are between the ages of 18-34 than either the Canadian or American anglers. Of those Ontario residents who responded, 42% were between the ages of 18 and 34. Whereas the Canadian and American residents in the same age group, represented 32% and 25% respectively (approximately 10% was considered significant, Appendix C). This is probably a function of the amount of disposable income necessary to fish in the area. Obviously, Ontario residents require less money to fish in the region while Americans require considerably more income due to travel and accommodation costs that may be incurred.

5.2.2 Composition of Sexes

The overall composition of the sexes in this survey was similar to the sex composition of anglers in the 1985 survey of sport fishing (Minister of Supply and Services, 1988). The overall make-up of anglers was such that 85% were male and 15% were female. The breakdown of anglers according to residence was:

	MALE	FEMALE
Ontario	73%	27%
Canadian	84%	16%
American	87%	13%

This large division between the two sexes is not considered abnormal as sport fishing is a sport traditionally dominated by the male sex (Ciccheti, 1973). It should be understood that this separation may decrease in future years as more females enter male dominated sporting activities.

There appears to be few discernable differences between females and males in the analysis of this study. Females did appear to have a more favourable attitude towards the new regulations for walleye, however the differences were not significant (8%). Of the females who responded 60% favoured the new regulations while only 54% of the males favoured the regulation. No difference was evident for northern pike.

5.3 TRENDS IN FISHING

Fishing trends for the four years previous to 1989 are given in Figure 6 and Figure 7.

Over the last four years, the trend to spend more time angling has continued to increase. Although the trend indicates a steady increase in the number of anglers many of the respondents indicated that they were first time anglers. In Ontario, almost 90% of the anglers who responded had fished the year previous and 65% of the Americans had fished in 1988. The highest percentage of return anglers were from Ontario and in the age group 50-65.

The amount of time spent fishing in Northwestern Ontario does appear to be increasing. Only 11% had decreased their amount of time, while 28% of the respondents had increased it. This appears to be consistent with the trends in Figure 6 and 7 and does suggests continuation of increasing angling pressure in the region.

Twenty-two American anglers did indicate that fishing in Ontario was becoming too expensive and six respondents said they would not return. This number was small compared to the overall sample size.

5.4 ANGLING ASSOCIATIONS

The low number of anglers who belong to an angling association (8%) may lead to a lower understanding of fishing practices and fisheries management. Since angling associations often promote a better understanding of fisheries management, an anglers fishing behaviour or ethic may be molded by the various organizations that assist in fisheries conservation. Thirteen percent of Ontario residents belonged to an association while only about 8% of Canadian and American anglers belonged. The 1985 sport fishing survey (Ministry of Supply and Service, 1988) estimated that 20% of adult anglers belonged to some form of a wildlife organization. This survey was more specific than the latter because it asked the respondent to indicate if they belonged only to an angling association. This may account for the lower frequency of responses in this study.

There was little difference in the attitudes of those anglers who belonged to an angling association than those who did not. Even if differences did occur it may be difficult to determine if significant differences were apparent due to the small sample number. However there was a small divergence of 5% for those who favoured the new regulations over those who did not favour the regulations for walleye. For northern pike, the members of an angling association favoured the new regulations 8% more than those who did not belong to an angling association.

Members of angling associations also strongly favour catch and release programs 11% more than non-members. It is for such a reason that the Ministry of Natural Resources could help organizations increase

memberships as a means of promoting the merits of fishing programs such as catch and release fishing and their current management practices.

5.5 PREFERENCE RANKING OF ANGLERS

The percentage of anglers who preferred to fish for walleye is consistent with Bedi et. al. (1985). Over 73% of those who responded preferred walleye over any other fish (Table 9). This large distinction presents a problem when managing for sport fish in the region as it causes a great demand on the walleye stocks. The number of Ontario residents who favoured walleye was even higher at 85%. The different preferences of species preferred when fishing is given in Figures 8 to 11.

The preference for walleye is significantly different than any other species. Therefore it is important to look at other species in order to encourage a change in attitudes towards species that may be able to relieve some of the angling pressure. As a secondary choice northern pike are preferred by the non-residents of Ontario while the residents preferred lake trout. In terms of actual numbers, the number of anglers who preferred to fish for lake trout was considerably lower than those who preferred northern pike. This is because the lower number of Ontario residents compared to the other user groups. The reproductive rate of northern pike is considerably higher than the reproductive rate for lake trout (Scott and Crossman, 1973) In addition, with lake trout being limited to certain waters because of their biological nature, it may be easier to justify the promotion of lake trout as a species limited to catch and release fishing.

More important is the preference for smallmouth bass as a sport fish. Over 25% of the anglers rated smallmouth bass as their third or fourth preference. If this species can be promoted as a more favourable fish to catch pressures may be lifted temporarily from other species (i.e. walleye, northern pike). Species such as crappies or perch can also be encouraged as a substitute to walleye, lake trout or northern pike for shore lunches.

5.6 SPECIES PREFERENCE FOR CATCH LIMIT

Over one half of all anglers surveyed indicated it was important to catch their limit. The species they listed as being most important to "fill their stringer" was walleye (86%) (Figure 12 to 14). The anglers preference for walleye and northern pike indicates that the OMNR selective harvest of these species may be a necessary regulation.

When asked if the ranking of fish would change if a lower number of fish could be kept, 25% of those surveyed indicated they would change to a different species. Only 17% of Ontario residents felt they would change species, whereas 27% of American anglers would change the species they sought. For Canadians 21% indicated a change in preference.

Of those people who said their preference ranking would change, 72% of those anglers would change to a species where a greater number of fish could be kept. This suggests that a large number of anglers still want to catch a large number of fish rather than angling for just a few.

5.6.1 Quantity of Fish Species

Many of the respondents did not believe that the regulations allowed the keeping of too many fish. Only 11% of those surveyed agreed or strongly agreed with this statement. Conversly, 67% of the respondents disagreed or strongly disagreed with the statement. One of the most common complaints presented by the American angler in the comments section of the questionnaire was the quantity of fish they were allowed to take home. Fifty three respondents said the number was too small and several suggested that they should be allowed a two day limit because they were only in the area for a short period of time each year. They felt the current regulations do not allow enough fish for the amount of time and money required to travel to Northwestern Ontario.

One respondent that favoured the current regulations indicated that if she had to worry about the cost of fish per pound she would get her fish at the supermarket. This type of attitude emphasizes the need to promote the entire fishing experience and downplay the importance of keeping fish. Northwestern Ontario does not have sufficient resources to allow all anglers to keep their limit of fish, especially for the more desired species (walleye, northern pike and lake trout) (Ontario Ministry of Natural Resources, 1988b)

5.7 REGULATIONS

A common complaint among lodge owners was that the angling regulations were too universal for the entire province (region) and did not consider each lake separately. This information was gathered during a number of non-selective discussions in the summer of 1989. Changes may be too difficult to implement because of the vast number of lakes in the region and the limited staff in the Ministry of Natural Resources.

Only 24% of the respondents felt they would change locations if regulations were more strict on the lake they currently fish. Of these, 304 anglers answered that it was important to them to keep their limit of fish. This was particularly true for many of the American anglers who are only in Northwestern Ontario for a limited number of days each year. If people had more access to fishing for the entire season the compulsion to catch their limit may be reduced. Ontario residents felt keeping their limit (47%) was less important than American residents (63%) (Table 10). With a large percentage of anglers originating from the United States the need to promote catch and release fishing as a conservation practice is strengthened.

5.8 SIZE PREFERENCE OF FISH

When setting regulations for sport fishing, management can try to satisfy two different attitudes of angler preference; either lots of smaller fish or fewer but larger fish. This survey asked the participants to indicate their preference for either "lots of fish" or "fewer but larger fish". The answers to this question have given little

insight into this problem. The only difference that was present was the lower preference of Ontario residents towards lots of fish and the preference of non-residents (Canadian and American) towards larger trophy size fish. Even this difference was minimal.

Of the anglers who preferred to have fewer larger fish many did not feel the regulations allowed them too many fish. Of the 486 Americans who preferred fewer but larger fish 65% strongly disagreed or disagreed that the regulations allowed them to keep too many fish. Similarly, of the 101 Canadian anglers, 50% strongly disagreed or disagreed with the statement. This may suggest that although many of the anglers say that they wanted bigger fish at the expense of a more plentiful stock, in reality their responses may not truly represent their opinions.

It was suggested by many American anglers that they can fish any where but it is for trophy fish that they frequent Northwestern Ontario.

5.9 SIZE LIMIT REGULATIONS

As with many new regulations, there are groups which oppose the new regulations and those that favour them. The new regulations in place for the 1990 season are no exception. Regarding the new regulations for walleye, 55% of the respondents were in favour. Of those in favour the highest percentage was with the Ontario angler (66%) and the lowest was the American angler at 53%. Of those anglers who favour fewer but bigger fish the majority were in favour of the new size regulations. Of American anglers who preferred fewer but bigger fish, the majority (55%) were in favour of the new regulations for walleye. Ontario residents had

a slightly higher, but not significantly different, acceptance toward the new regulations (63%). Overall acceptance of regulations for northern pike was similar to that of walleye. There was no significant difference in the percentage of anglers by place of residence. A significant difference was noted between the the acceptance of the new regulations between a few of the districts (Table 15). Kenora and Red Lake had the highest percentage of respondents in favour (62%) while Ignace had the lowest percentage of anglers in favour of the new regulations. This difference may be a result of poorer promotional efforts in the districts that least that favour the new regulations. However, it may be that fish stocks in those districts are not suffering to the same degree that they are in other districts so anglers may not agree with the changes.

The trend for the new regulations on walleye and northern pike, indicates a slight decrease in acceptance by the older age groups. The older age groups may have more time to fish in the future and may also be responsible for formulating opinions of younger anglers. For this reason it may be necessary to market the merits of the current management practices toward the older age groups.

It became apparent during analysis that although a number of people favoured size regulations they may not favour the proposed regulations. Of the anglers who indicated that they were not in favour of the new regulations for walleye, 54% said they did favour size limits. This suggests that over half the people who did not favour the regulations will favour regulations of a different variety. Similarly, 44% of those who were not in favour of the new regulations for northern pike did favour size limits for the species.

A comment that was echoed 15 times by a variety of anglers was the problem of size limits. Those anglers suggested that the size of the proposed limits were too small and should be increased. However, this may result in a number of anglers complaining that the size limits will be too large. In addition many respondents (31) indicated a need for a minimum size limit because too many small fish were being kept by anglers.

Another problem that people foresaw with the new regulations was that their catch would have to be transported whole to determine the size of the fish. People may be more inclined to accept the proposed regulations if a solution to this problem could be found.

5.10 MANAGEMENT PROGRAMS

The management programs presented in this survey have received a variety of responses. In general, the majority of respondents did not agree that fishing has been improving over the last five years. This attitude does affect the development of new management practices for the Northwestern Ontario Region.

As the number of anglers who fish in Northwestern Ontario continues to increase, the need for anglers to accept selective harvest restrictions which includes catch and release programs increases accordingly. The acceptance of such a program needs to be voluntary and regulated, to assure success from all user groups. The perception of most anglers appears to favour catch and release fishing, with 75% of all respondents believing that catch and release programs are a sensible

technique to maintain fish populations. Overall 70% of the Ontario residents, 80% of the Canadian respondents, and 75% of American respondents either agree or strongly agree with this management method.

This acceptance is extremely positive. However, the success of catch and release enhanced by the use of barbless hooks and proper handling of fish that are being released. The statement that barbless hooks help to maintain fish populations did not receive the same favourable response as catch and release programs. Only 43% of the respondents agreed or strongly agreed with this statement. Of all three user groups the importance of barbless hooks was rated the lowest by the American angler at 40%, The overall acceptance of the other two user groups was highest with Ontario at 53% and then Canadians at 55%. In order to limit the mortality rate of fish after being released the acceptance of barbless hooks should be increased.

Anglers need to be educated about the sheer number of anglers who use the area and the demand on the lakes they generate. This may assist in increasing acceptance of selective harvest programs and the use of barbless hooks.

The effectiveness of educational programs conducted by the government was analyzed. Approximately 25% of respondents agreed or strongly agreed that the programs were effective. More importantly, the number of respondents who disagreed or strongly disagreed was higher for Ontario residents than Canadian residents or American residents. The percentages are as follows: 31% Ontario, 17% Canadian, and 9% American. Almost 40% of the base group had no opinion on the effectiveness of the

educational programs conducted by the Ministry. This in itself may suggest the need to increase the intensity of educational programs aimed at the Northwestern Ontario angler. If proper programs are implemented the attitudes of anglers can be altered to understand the problems facing sport fishing in the region and steps can be taken to minimize the negative effects.

This problem of education was often commented upon by the respondents. Thirty two respondents indicated the need to educate anglers on the reasons for and benefits from catch and release angling. More intensive educational programs are currently being conducted which may increase the anglers' compliance with the management programs.

5.11 ELEMENTS INFLUENCING ANGLING ENJOYMENT

The elements associated with angling enjoyment all received a positive response (Table 20). Nature had the highest percentage of respondents with over 75% of anglers indicating it was a very important part of the fishing experience. This did not vary according to various breakdowns by other aspects. It suggests that this aspect of angling enjoyment should be promoted as an important part of the Northwestern Ontario fishing experience.

"Catching fish" also had highly favourable responses but not quite as high as nature. Sixty percent of the base group listed catching fish as a very important part of the total experience. The Ontario angler had the lowest percentage with 40%. The American angler answered with 'very important' more often than other groups. In line with this, only

37% of anglers who responded indicated that eating fish was a very important part of fishing enjoyment. Only 6% of the anglers who indicated that catching their limit of fish was important indicated that eating fish was not important. This suggest that the anglers who do catch their limit may be fishing in part for the food supply.

Camping and the enjoyment of the social aspect of fishing had the least positive responses. Only 31% of respondents thought that camping was very important to the fishing experience while 28% of the respondents indicated that the social aspects of the outing were very important. These responses are consistent with the Ontario and American angler but the Canadian respondent valued camping higher than the social aspects. American anglers may have indicated a lower level of importance because they are limited to where they can camp because of the Crown Lands Camping Program. This low level of importance may not be of concern to the OMNR if the intention of such a program was to persuade those american anglers who camped on crown land to stay at registered lodges.

5.12 COMMENTS

The comments section that was left at the end of the questionnaire provided the respondent with an opportunity to add comments about topics that may or may not have been addressed in this survey. The most common complaint that was cited by respondents was the problem with commercial fishing. Although the Ministry was aware of the conflict between sport fishing and commercial harvest, respondents suggest little has been done to alleviate this problem. This is particularly true when it comes to

the native (subsistence) harvest of fish. Over 44 respondents indicated a problem with commercial harvest. Of those, over half specified the need to control native netting of sport fish. These anglers indicated that no management practice would help as long as commercial and/or subsistence harvesting of fish continued. In addition, if the OMNR is promoting the selective harvest of fish, anglers may be less inclined to accept these new management practices if they perceive the commercial (subsistence) harvest of fish to negate what little good they are doing. This suggests a need on the part of the government to educate anglers about the importance (and treaty right) of subsistence harvest to the native communities.

Problems also exist with the user fee for border water fishing and for camping on crown lands. The additional expense and inconvenience of these user fees was a major concern of American anglers. With this additional cost some American anglers felt discriminated against and also felt the resource is becoming accessible only to higher income groups. This may meet an objective of the OMNR, which wants to encourage a greater proportion of anglers' expenditures to be spent within the Region.

Restocking has been a topic of debate as a management tool in different provinces. Ontario has decided not to restock species and has come under some criticism because of it. Twenty-two anglers thought that this was the only way of improving the fisheries in the region.

There were a wide variety of comments about methods of managing the fisheries. The most common suggestions have already been listed

throughout this study. The most commonly aired opinion was that sport fishing in Northwestern Ontario was a positive experience. Over 156 anglers made some comment favouring the sport fisheries or simply commented upon the beauty that the area had to offer. These positive responses provide support for the management practises imposed in the region.

5.13 A COMPARISON WITH LODGE OWNERS

Although many of the responses by the lodge owners may have been their own opinions and not the opinions of their guests, the analysis does show consistency between the lodge owners and the base group. Only a few of the variables in this study received a significant difference in frequencies. A significant difference between the lodge owners and the base group was approximately 8% (Appendix C).

5.13.1 Species Preference

The percentage of responses and the order of preference towards species by the lodge owner was similar to those of the base group. The lodge owners suggested that there was a lower number of anglers who would prefer to keep their limit than those who actually responded to the questionnaire. The difference was not significant with the lodge owners indicating 53% and the base group anglers indicating 60%.

A major difference between the lodge owners and the base group was the preference of lots of fish or fewer trophy size fish. Understandably, lodge owners favoured lots of fish with 68% making this

choice. The base group of anglers only indicated this choice 48% of the time.

One of the greatest discrepancies was in the favouring of new size regulations for walleye and northern pike. Walleye had the greatest difference with 79% of the lodge owners favouring the new regulations while only 55% of the anglers favoured the regulations. For northern pike 70% of the lodge owners favoured the regulations but only 52% of the anglers favoured the regulations. This may help the Ministry of Natural Resources when gaining support of the new regulations. It does suggest that if the lodge owners perceive their guests as favouring the new regulations then the lodge owners themselves are more apt to accept them. On the other hand it may also imply that the education and/or promotion of new regulations may have been more effective with the lodge owners.

5.14 MANAGEMENT PROGRAMS

The majority of lodge owners answered similarly to those of the anglers on the topic of management programs. Some differences did occur but most of the variations were minimal.

Both the enforcement of regulations and the education of the anglers by the government received a higher percentage of negative feedback from the lodge owners than the main based angler. This higher percentage of negative responses by the lodge owners may suggest personal bias. It should be noted that although there was a difference in percentages, overall more anglers agreed that the enforcement of regulations is

adequate than those who did not agree. For educational programs more lodge owners did feel that they were not effective.

Two statements had a large divergence when compared to the anglers. Over one half of the lodge owners strongly agreed that access to remote lakes is made too easy because of new roads. Only 16% of the anglers felt the same way. Similarly 64% of the lodge owners strongly disagreed with shortening seasons while only one quarter of the anglers indicated this response. This difference of responses is particularly strong where the management program influences the income of the lodge owner. Both logging roads and shortening seasons effects the lodge owner directly. This in turn demonstrates the bias of the responses by the lodge owners who responded to this survey.

Generally, few differences exist between responses of lodge owners and those of anglers. It may suggest that lodge owners are aware of the attitudes of anglers using their lodges. This does not imply that no difference in attitudes existed between the lodge owners and the anglers, but simply in relation to this survey only a minimal level of difference in responses is evident.

Chapter VI

CONCLUSION AND RECOMMENDATIONS

In general, anglers in Northwestern Ontario favoured the management practices currently being used by the Ontario Ministry of Natural Resources (OMNR). Although attitudes varied among the different user groups (Ontario residents, Canadians, and Americans), all user groups supported the majority of techniques currently practiced by the OMNR. Specifically, they favoured programs such as catch and release fishing and the new size limits proposed for walleye and northern pike.

The assessment of Northwestern Ontario angler attitudes was achieved by analyzing the data collected from a mail-out questionnaire. The rate of return for this study was 67%.

The basic characteristics of the anglers who fished in Northwestern Ontario in 1989 were as follows.

- The average angler was male (85%), between the ages of 35-49 (38%) and from the United States (74%). For Ontario residents, the average angler was male between the ages of 18-34 (42%).
- Only 8% of all anglers belonged to an angling association.
- The highest district of use was Kenora with the main form of accommodation being the main base lodge.
- June had the highest average number of fishing days (3.0) while each angler spent an average of 7.6 hours per day fishing.

Differences in attitudes were evident between the various user groups in the region. Walleye was the most preferred species (73%) by all the user groups. However, Ontario residents' second preference was for lake trout, whereas American, and Canadian anglers who were not residents of Ontario, preferred northern pike.

A large majority of anglers favoured catch and release fishing (70%) This support is important to help maintain fish stocks. It is important that angler acceptance of catch and release fishing continues to help maintain fish stocks. The acceptance was similar between user groups, however, the general attitutes towards barbless hooks was not as prevalent. American anglers had the lowest percentage of responses favouring the use of barbless hooks. Less than half (39%) thought barbless hooks help maintain fish populations. The majority of Ontario and American anglers agreed with the use of barbless hooks. Further education on the benefits of barbless hooks should be emphasized with special attention given to the American angler.

While fisheries management is now promoting catch and release fishing, the anglers, nevertheless, want to keep their limit of fish. Of those anglers surveyed, 60% still thought it was important to keep their limit of fish, especially walleye. American anglers thought it was more important to keep their limit than the other two user groups. Although the majority of anglers favoured catch and release fishing the large number of anglers who wanted to keep their limit of fish indicates a contradiction in angler responses. Similarly, 70% of the anglers surveyed did not believe that the regulations allow too many fish to be kept. If the anglers want to continue to catch their current limit of

fish, stocks such as walleye and lake trout may be depleted. This supports the claim that many anglers may support, in principle, certain management techniques such as catch and release angling, but may not want to adhere to the practices when they impact on their own angling experience.

The acceptance of the proposed size limit regulations for Northwestern Ontario was positive. Over half the anglers favoured the new regulations for walleye (55%) and for northern pike (52%). More importantly, only 31% and 29% of the respondents disagreed with the size limits proposed for walleye and northern pike respectively. The respondents felt size limits were important for muskellunge, walleye, lake trout and northern pike. The greatest support for size limits on walleye came from the Ontario anglers. This is consistent with the higher level of acceptance shown by Ontario residents for the proposed regulations.

Although differences in attitudes were noticeable among user groups, the majority of the questions did not receive a sufficient difference to be significant. This suggests that many of the attitudes held by American anglers are similar to the Ontario residents.

Generally, the lodge owners appeared to understand the anglers who made up their client group. Although some differences were apparent, many of the differences seemed to result when the management practice impacted on their business. For example, the lodge owners disagreed more than anglers with shortening the length of the fishing season. Lodge owners also indicated a greater concern that access to lakes has been

made too easy as a result of new roads. One aspect of fisheries management that received a greater positive response by the lodge owners than the anglers was the new regulations. For walleye, 79% of the lodge owners indicated that their guests were in favour of the new regulations, and 70% were in favour of the regulations for northern pike. It should be noted that the design of the questionnaire may have limited the responses of the lodge owners. In addition, during data analysis many of the lodge owners responses suggested personal bias.

The results of this survey indicate that the Ontario Ministry of Natural Resources, Fish and Wildlife Branch, management practices have been accepted by the anglers using the region. However, a new angler ethic is required if fisheries management is to be successful. Anglers can no longer continue to deplete the resource at the rate previously experienced. To be successful, lodge owners and anglers can assist the government to ensure the fishing enjoyment is maintained or increased in the future.

6.1 RECOMMENDATIONS

The following recommendations are presented for consideration by the Ontario Ministry of Natural Resources.

- Continue with the size limit regulations for walleye and northern pike proposed for Northwestern Ontario in 1990.
- Increase the promotion of management programs and education of anglers in Northwestern Ontario. Promotion of selective harvest angling as an enjoyable method of fishing is especially important. Consideration should also be given to placing more of the onus for

fisheries management on the angler by using public relation programs and "peer pressure". For example, signs posted strategically at popular launch sites could stress the importance of fisheries conservation.

- A further study of the socio-economic characteristics of the anglers is required. This may assist in determining if any other differences exist among the various user groups. This study included attitudes toward management practices, but a further study should investigate factors such as income of anglers, willingness of anglers to pay for their fishing experience, and other detailed characteristics of anglers
- Further study should be conducted to determine attitudes of lodge owners, as this survey was not designed to accommodate their opinions. Personal interviews with the lodge owners should be conducted to determine their opinions of the management practices currently in place for Northwestern Ontario.
- Investigate the use of smaller, area specific management groups with representation from all the user groups to assist in the development and implementation of new management practices.

BIBLIOGRAPHY

Bedi, N. and P. Clifford. 1980. 1980 Surveys of Ontario's Resident and Non-Resident Sport Fisherman. Ontario Ministry of Natural Resources. ISBN 0-7743-7849-2. 149 pp.

Clark, Richard D. 1983. "Potential Effects of Voluntary Catch and Release of Fish on Recreational Fisheries. North American Journal of Fisheries Management. 3:306-314.

Cicchetti, Charles J. 1973. Forecasting Recreation in the United States D.C. Heath and Company. Lexington, Massachusetts.

Cox, E.T. and W.J. Straight. 1975. Ontario Anglers Facts and Figures. Ontario Ministry of Natural Resources. Toronto

Department of Fisheries and Oceans. 1987. Canada's Recreational Fisheries: An overview and a description of Department of Fisheries and Ocean Programs. Ministry of Supply and Services, Ottawa.

Dillman, Don A. 1978. Mail and Telephone Surveys: The Total Design Method. John Wiley and Sons, New York.

Fowler, Floyd J. 1984. Survey Research Methods Sage Publications Inc., Newbury Park, California.

Harris, Charles C. and Eric P. Bergensen. 1985. "Survey on Demand for Sport Fisheries: Problems and Potentials for It's Use in Fishery Management Planning." North American Journal of Fisheries Management. 5:400-410.

Hoinville, Gerald and Roger Jowell. 1978. Survey Research Practice Heinemann Educational Books, London.

Jackson, Winston. 1988. Research Methods. Rules for Survey Design and Analysis.

Kanuck, Leslie and Conrad Berenson. 1978. "Mail Surveys and Response Rates: A Literature Review." in Readings in Survey Research. Robert Ferber ed. American Marketing Association. 299-330 pp.

Kinnear, D.R., and J.R. Taylor. 1979. Marketing Research. An applied approach. McGraw Hill Book Company, U.S.A. 656pp.

Mason, G, B. Macpherson, D. Hum, L. Roberts, and A. Anderson. 1983. Survey Research Methods (2nd ed.). Institute for Social and Economic Research, University of Manitoba. 278 pp.

Ontario Ministry of Natural Resources and Environment Canada. 1974. Preliminary Analysis of Goals and Issues. First Report of the Federal-Provincial Working Group on Strategic Planning for Ontario Fisheries. 97 pp.

Ontario Ministry of Natural Resources. 1980. Strategic Land Use Plan. Northwestern Ontario Planning Region. Ministry of Natural Resources Strategic Land Use Plan. 84p..

Ontario Ministry of Natural Resources. 1987a. The Ontario Resident Sport Fishing Licence. A Brochure. Queens Printer for Ontario.

Ontario Ministry of Natural Resources. 1987b. Crown Land Recreation Pilot Program. Crown Land Camping Evaluation. Unpublished Document. 49pp.

Ontario Ministry of Natural Resources. 1988a. Dryden District Fisheries Management Plan. 1987-2000. Ontario Ministry of Natural Resources.

Ontario Ministry of Natural Resources. 1988b. Kenora District Fisheries Management Plan. 1987-2000. Ontario Ministry of Natural Resources.

Ontario Ministry of Natural Resources. 1988c. Fort Frances District Fisheries Management Plan. 1987-2000. Ontario Ministry of Natural Resources.

Ontario Ministry of Natural Resources. 1988d. Ignace District Fisheries Management Plan. 1987-2000. Ontario Ministry of Natural Resources.

Ontario Ministry of Natural Resources. 1988e. Red Lake District Fisheries Management Plan. 1987-2000. Ontario Ministry of Natural Resources.

Ontario Ministry of Natural Resources. 1988f. Sioux Lookout District Fisheries Management Plan. 1987-2000. Ontario Ministry of Natural Resources.

Ranta, Bruce. An interview with Bruce Ranta, Ontario Regional Fisheries Biologist. June 21, 1989.

Sudman, Seyour. 1976. Applied Sampling Academic Press, New York.

Wallace, David. 1954. "A Case For-and Against-Mail Questionnaires" Public Opinion Quarterly (18): 40-52.

Yu, J., and H. Cooper. 1983. "A qualitative review of research design effects on response rates to questionnaires. Journal of Marketing Research. 20(1): 36-44.

Appendix A

THE QUESTIONNAIRE

15) How important are the following aspects associated with recreational fishing. Please respond to each statement below by checking a box that corresponds to a number from the scale below. You can think of the numbers being: 1 = very important; 2 = moderately important; 3 = neutral; 4 = not very important; 5 = not important.

	Very Important <----------> Not Important					No Opinion
	1	2	3	4	5	6
Nature	[]	[]	[]	[]	[]	[]
Camping experience	[]	[]	[]	[]	[]	[]
Catching fish	[]	[]	[]	[]	[]	[]
Social outing	[]	[]	[]	[]	[]	[]
Eating fish	[]	[]	[]	[]	[]	[]

16) Please indicate how important size limit regulations are for maintaining the fish species listed below.

	Very Important <----------> Not Important					No Opinion
	1	2	3	4	5	6
Muskellunge	[]	[]	[]	[]	[]	[]
Northern Pike	[]	[]	[]	[]	[]	[]
Lake Trout	[]	[]	[]	[]	[]	[]
Walleye	[]	[]	[]	[]	[]	[]

17) Do you feel the regulations on sport fishing are becoming too complex?

[] yes [] no

Please add any comments which you would like to make about sport fishing in Northwestern Ontario.

_____

_____

_____

_____

THANK YOU FOR YOUR PARTICIPATION

NORTHWESTERN ONTARIO RECREATIONAL ANGLER QUESTIONNAIRE

THANK YOU FOR YOUR PARTICIPATION

1) Which fishing licence did you purchase in 1989 for Northwestern Ontario.

[] Ontario Resident
[] Canadian (Nonresident of Ontario)
[] Nonresident of Canada

Age
[] 18-34
[] 35-49
[] 50-65

Sex
[] M
[] F

2) Did you sport fish in Northwestern Ontario in any of the years listed below. (PLEASE CHECK)

[]1985 []1986 []1987 []1988

3) Has the amount of time you spent sport fishing, in 1989, compared to previous years in Northwestern Ontario (Check)

[] Increased? [] Decreased? [] Remained the same?

4) Estimate the number of days between May to September, 1989 you spent sport fishing in Northwestern Ontario. (WRITE IN)

_____days in May
_____days in June
_____days in July
_____days in August
_____days in September

5) Are you a member of any angling association? (PLEASE CHECK)

[] yes [] no

6) Please rank the top 4 fish you prefer to catch in Northwestern Ontario. Place a number from 1 to 4 beside the appropriate answer, where 1= most prefered; 2=less preferred etc.

_____Muskellunge
_____Brook Trout
_____Smallmouth Bass
_____Other (please specify) _____

_____Northern Pike
_____Walleye
_____Lake Trout

Appendix B

THE COVER LETTERS

Ministry of Natural Resources
Ministère des Richesses naturelles
Ontario

December 8, 1989

Dear Angler,

According to my records I have not received your completed survey on sport fishing in Northwestern Ontario. If you have already returned the survey, thank you for your cooperation and please disregard this letter.

As stated previously the questionnaire is a study by myself in cooperation with the Ontario Ministry of Natural Resources. In order to complete my studies in the Natural Resources Institute at the University of Manitoba it is important to receive your completed questionnaire. The purpose of this study is to evaluate current practices and attitudes towards sport fishing in Northwestern Ontario.

I have enclosed a second survey and return envelope and would like to know your opinion on sport fishing in Northwestern Ontario. Unlike the first survey you received this copy has not been coded therefore your responses will be kept strictly confidential.

Only a limited number of questionnaires have been distributed so the completion of your survey would be greatly appreciated. The success of this study is dependent upon your participation.

Please complete this questionnaire and return it as soon as possible in the pre-paid envelope. Your co-operation will assist in the future management of sport fishing in the Northwestern Region of Ontario.

Thank You,

I. Blair McTavish
Graduate Student

Ministry of Natural Resources
Ministère des Richesses naturelles
Ontario

October 1989

Dear Angler,

You have been selected to participate in a study of recreational fishing for the Northwestern Region of Ontario. This study will be undertaken by myself, a graduate student at the Natural Resources Institute at the University of Manitoba, in co-operation with the Ontario Ministry of Natural Resources, Fish and Wildlife Branch. The purpose of this study is to evaluate current practices and attitudes towards sport fishing in the Region.

I have enclosed a questionnaire for you to complete. Only a limited number of questionnaires will be distributed so the completion of your survey would be greatly appreciated. The success of this study is dependent upon your participation.

Please complete this questionnaire and return it as soon as possible in the pre-paid envelope. This questionnaire is standardized and coded for statistical purposes and will be kept strictly confidential. If you have any further questions, please do not hesitate to call me or my advisor, Dr. Rick Baydack, at (204) 474-8373 or Bruce Ranta, Ontario Ministry of Natural Resources, at (807) 468-3111 between 8:30 and 4:30 Monday to Friday. Your co-operation will assist in the future management of sport fishing in the Northwestern Region of Ontario.

In appreciation for your assistance in this survey a fisheries conservation decal has been provided.

Thank You

I. Blair McTavish
Graduate Student

Ministry of Natural Resources
Ministère des Richesses naturelles
Ontario

December 8, 1989

Dear Lodge Owner,

According to my records I have not received your completed survey on sport fishing in Northwestern Ontario. If you have already returned the survey, thank you for your cooperation and please disregard this letter.

As stated previously the questionnaire is a study by myself in cooperation with the Ontario Ministry of Natural Resources. In order to complete my studies in the Natural Resources Institute at the University of Manitoba it is important I receive your completed questionnaire. The purpose of this study is to evaluate current practices and attitudes of anglers towards sport fishing in Northwestern Ontario.

I have enclosed a second survey and return envelope and would like you to answer the questions as you believe the majority of your customers (anglers) would answer the questionnaire. Unlike the first survey you received this copy has not been coded therefore your responses will be kept strictly confidential.

Only a limited number of questionnaires have been distributed so the completion of your survey would be greatly appreciated. The success of this study is dependent upon your participation.

Please complete this questionnaire and return it as soon as possible in the pre-paid envelope. Your co-operation will assist in the future management of sport fishing in the Northwestern Region of Ontario.

Thank You

I. Blair McTavish
Graduate Student

Ministry of Natural Resources
Ministère des Richesses naturelles
Ontario

October 1989

Dear Lodge Owner,

You have been selected to participate in a study of recreational fishing for the Northwestern Region of Ontario. This study will be undertaken by myself, a graduate student at the Natural Resources Institute at the University of Manitoba, in co-operation with the Ontario Ministry of Natural Resources, Fish and Wildlife Branch. The purpose of this study is to evaluate current practices and attitudes towards sport fishing in the Region.

I have enclosed a questionnaire for you to complete. Please complete this survey as you believe the majority of your customers (anglers) would complete this survey. The success of this study is dependent upon your participation so the completion of this survey would be greatly appreciated.

Please complete this questionnaire and return it as soon as possible in the pre-paid envelope. This questionnaire is standardized and coded but the information you provide will be strictly confidential. If you have any further questions, please do not hesitate to call me or my advisor, Dr. Rick Baydack, at (204) 474-8373 or Bruce Ranta, Ontario Ministry of Natural Resources, at (807) 468-3111 between 8:30 and 4:30 Monday to Friday. Your co-operation will assist in the future management of sport fishing in the Northwestern Region of Ontario.

In appreciation for your assistance in this survey a fisheries conservation decal has been provided.

Thank You

I. Blair McTavish
Graduate Student

Appendix C

SIGNIFICANT DIFFERENCES BETWEEN TWO POPULATIONS

To determine if differences were significant between the different user groups (Ontario, Canadian and American) a two-sample Z-test was used. This is used to test for the differences between two population proportions, and is computed as

$$Z = (P_1 - P_2) \Big/ \sqrt{\frac{\hat{P}_1(1-\hat{P}_1)}{n_1} + \frac{\hat{P}_2(1-\hat{P}_2)}{n_2}}$$

The hypothesis of equal population proportions is rejected if $|Z| > 1.96$

The denominator is largest when P and $P = .5$

Solving for the minimum significant difference we find;

$$Z = \frac{\hat{P}_1 - \hat{P}_2}{\sqrt{\frac{\hat{P}_1(1-\hat{P}_1)}{n_1} + \frac{\hat{P}_2(1-\hat{P}_2)}{n_2}}}$$

Or

$$(\hat{P}_1 - \hat{P}_2) > 1.96\sqrt{\frac{\hat{P}_1(1-\hat{P}_1)}{n_1} + \frac{\hat{P}_2(1-\hat{P}_2)}{n_2}}$$

This cannot be solved since it depends upon the unknown values P and P but an approximate solution is obtained by using $P = P = .5$ on the right hand side you get;

$$(\hat{P}_1 - \hat{P}_2) > 1.96\sqrt{\frac{.25}{n_1} + \frac{.25}{n_2}}$$

Example

Ontario resident population (n) = 139
Canadian resident population (n) = 187
American Resident population (n) = 942

Ontario Residents compared to American Residents

$$(\hat{P}_1 - \hat{P}_2) > 1.96\sqrt{\frac{.25}{139} + \frac{.25}{942}}$$

$$(\hat{P}_1 - \hat{P}_2) > .09$$

Therefore significant differences will occur between the Ontario Residents and the American Residents if the difference in sample proportions is greater than 9 percentage points.

Ontario Residents compared to Canadian Residents

$$(\hat{P}_1 - \hat{P}_2) > 1.96\sqrt{\frac{.25}{139} + \frac{.25}{187}}$$

$$(\hat{P}_1 - \hat{P}_2) > .11$$

Therefore differences will occur between the Ontario Residents and the Canadian Residents if the difference in sample proportions is greater than 11 percentage points.

Canadian Residents compared to American Residents

$$(\hat{P}_1 - \hat{P}_2) > 1.96\sqrt{\frac{.25}{187} + \frac{.25}{942}}$$

$$(\hat{P}_1 - \hat{P}_2) > .08$$

Therefore differences will occur between the Canadian Residents and the American Residents if the difference in sample proportions is greater than 8 percentage points.