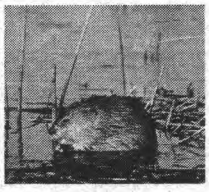
Canada Alberta Northwest Territories

Northern River Basins Study





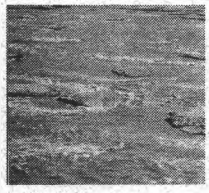



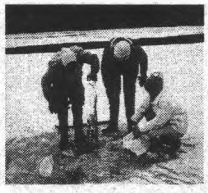


NORTHERN RIVER BASINS STUDY PROJECT REPORT NO. 58

WATER RESOURCES USE AND MANAGEMENT ISSUES

FOR THE PEACE, ATHABASCA AND SLAVE RIVER BASINS: DESIGN OF QUESTIONNAIRE AND SURVEY METHODS






DATE DUE	

Prepared for the
Northern River Basins Study
under Project 4121-D2

by

Golder Associates Ltd.

NORTHERN RIVER BASINS STUDY PROJECT REPORT NO. 58

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FOR THE PEACE, ATHABASCA AND SLAVE RIVER BASINS: DESIGN OF QUESTIONNAIRE AND SURVEY METHODS

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PREFACE:

The Northern River Basins Study was initiated through the "Canada-Alberta-Northwest Territories Agreement Respecting the Peace-Athabasca-Slave River Basin Study, Phase II - Technical Studies" which was signed September 27, 1991. The purpose of the Study is to understand and characterize the cumulative effects of development on the water and aquatic environment of the Study Area by coordinating with existing programs and undertaking appropriate new technical studies.

This publication reports the method and findings of particular work conducted as part of the Northern River Basins Study. As such, the work was governed by a specific terms of reference and is expected to contribute information about the Study Area within the context of the overall study as described by the Study Final Report. This report has been reviewed by the Study Science Advisory Committee in regards to scientific content and has been approved by the Study Board of Directors for public release.

It is explicit in the objectives of the Study to report the results of technical work regularly to the public. This objective is served by distributing project reports to an extensive network of libraries, agencies, organizations and interested individuals and by granting universal permission to reproduce the material.

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Whereas the above publication is the result of a project conducted under the Northern River Basins Study and the terms of reference for that project are deemed to be fulfilled,
IT IS THEREFORE REQUESTED BY THE STUDY OFFICE THAT;
this publication be subjected to proper and responsible review and be considered for release to the public.

(Dr. F. J. Wrona, Ph.D., Science Director) (Date) 7 June 95

Whereas it is an explicit term of reference of the Science Advisory Committee "to review, for scientific content, material for publication by the Board",
IT IS HERE ADVISED BY THE SCIENCE ADVISORY COMMITTEE THAT;
this publication has been reviewed for scientific content and that the scientific practices represented in the report are acceptable given the specific purposes of the project and subject to the field conditions encountered.
SUPPLEMENTAL COMMENTARY HAS BEEN ADDED TO THIS PUBLICATION: [ ] Yes [ ] No

(Dr. P. A. Larkin, Ph.D., Chair) (Date) 7 June 95

Whereas the Study Board is satisfied that this publication has been reviewed for scientific content and for immediate health implications,
IT IS HERE APPROVED BY THE BOARD OF DIRECTORS THAT;
this publication be released to the public, and that this publication be designated for: **[ ] STANDARD AVAILABILITY [ ] EXPANDED AVAILABILITY**

(Lucille Partington, Co-chair) (Date) 8 June 95

(Robert McLeod, Co-chair) (Date) June 12, 1995

WATER RESOURCES USE AND MANAGEMENT ISSUES FOR THE PEACE, ATHABASCA AND SLAVE RIVER BASINS: DESIGN OF QUESTIONNAIRE AND SURVEY METHODS

STUDY PERSPECTIVE

> ***Related Study Questions***
>
> *3) Who are the stakeholders and what are the consumptive and non-consumptive uses of the water resources in the river basins?*

The Northern River Basins Study Board will be formulating recommendations covering many areas likely of consequence or interest to basin residents. In an effort to assist the Board in this task, a series of projects were initiated to query the residents on their use of northern river basins waters. Existing information was either not available or as extensive as required in its coverage for the area under study. This project report details the background work to devise a survey instrument and strategy to capture for households a representative cross section of information on water use and resident attitudes toward the water resource. The project also assessed the most effective means for approaching and obtaining information from stakeholder groups.

The review and assessment for stakeholder groups concluded workshops were an effective way of collecting data. However, given that nearly every stakeholder wanted to be considered for a workshop, it was decided that a telephone survey was the most effective and cost efficient means to collect information.

The Study Board reviewed the draft questionnaire at the December 1994 Board meeting. The household survey instrument presented in this report formed the basis for a series of survey instruments to collect water use information from households and other stakeholders, including industry and municipalities. These surveys were implemented in early 1995.

A finalized list of stakeholders and the questionnaires used, as amended by the Study Board, will be included in the report for the surveys project. Analysis of all the surveys, including a treatment of non-respondents, will be included in a forthcoming report that will synthesize a response to NRBS Guiding Question 3.

REPORT SUMMARY

As part of the ongoing research investigations for the Other Uses Component of the Northern River Basins Study (NRBS), Golder Associates was retained to develop data gathering strategies to collect socio-economic information on residents of northern communities within the NRBS region.

The first project task was the development of a sampling strategy and the design of a questionnaire for a household survey. This household survey was intended to obtain a general assessment of river uses and issues from people residing in the Peace, Athabasca and Slave river basins. The second task was to use the information generated by Project 4121-D1 and develop a workshop strategy with the intent of gathering specific data on water uses by stakeholders in the study area.

In this study, Golder concluded there are three possible approaches for conducting a household survey: personal interviews, mail-out surveys and telephone interviews. Considering the time and budget constraints for completion of a survey during the fall of 1994, we recommend the survey of the NRBS area's general population be conducted using a telephone survey. It is the most efficient and effective method to cover the affected area in a relatively short time period. While a telephone survey will selectively exclude certain parts of the northern population (households without phones), telephone number listings provide the most recent and comprehensive listings of northern residents from which to draw a sample. Telephone surveys also tend to produce higher overall response rates than other types of surveys thus minimizing non-response errors.

In order to maximize response rates, it is recommended the study be advertised prior to implementation. In administering the survey, people should first be called by telephone to let them know about the survey and to solicit their cooperation. Potential respondents should then be given the choice of answering the survey questions at that time, or being sent a copy of the questionnaire by mail and called later. This approach would give respondents an opportunity to think about the questions before they are called again and collect any information they require.

There are a number of ways of drawing samples of households to be interviewed including treating the entire basin as one sampling unit and drawing telephone numbers at random, or creating a stratified sample based on categorizing the general population into distinct population segments (or strata) from which a sample of a specific size is drawn and interviewed. A stratified random sample of the general population of the NRBS area is the recommended method for this survey based on the need to highlight regional differences in use of aquatic resources and population values and attitudes.

Various methods can be applied to define the strata to be used in sampling including community characteristics or geographic location of residence. This study examined basing the stratification on community characteristics including ethnic origin (i.e. native vs. non-native), size of communities, economic base of a community (i.e. forestry, agriculture, oil and gas) and whether a population was rural or urban. Geographic stratification according to residence along the river mainstreams and major tributaries, and also dividing the major rivers into various reaches that are consistent with reach definitions being used in other NRBS studies was also examined in this study.

Although the first approach attempts to stratify the northern population according to distinct socio-economic indicators that can be useful for the data analysis, the second approach is simpler to undertake and could provide similar results if properly administered. For these reasons, Golder recommends the geographic stratification approach be used for the household survey.

Golder examined collection of information from stakeholders on specific uses of the rivers using either stakeholder workshops or surveys. Given the study budget and timing, and logistical issues associated with holding workshops, Golder believes that a questionnaire survey similar to the one proposed for northern basin households represents an alternative and less costly approach.

A stakeholder survey will enable the NRBS to collect in-depth and value-based information concerning river uses by specific groups of people; information that the general household survey may not provide. In other words, the stakeholder and household surveys could complement each other by creating a different set of data but using a similar design framework.

On balance, a questionnaire survey that builds upon the survey instrument developed for the household survey would provide a consistent and parallel database at lower cost. For this reason, Golder recommends that a stakeholder survey be undertaken.

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1.0 INTRODUCTION

The Northern River Basins Study (NRBS) is a joint project between the Governments of Canada, Alberta and the Northwest Territories that commenced in September of 1991. The purpose of the NRBS is to "characterize the cumulative effects of development on the water and aquatic environment of the Study area by coordinating with existing programs and undertaking appropriate new technical studies." To undertake this study, a Study Board, Study Office and Science Advisory Committee were created. The NRBS study area includes the mainstems and main tributaries of the Peace, Athabasca and Slave rivers.

The Study Board has developed a vision statement to provide overall guidance for the various technical activities being conducted in support of the Study and has also identified 16 questions that serve to focus study activities. One of these questions is:

> *3) Who are the stakeholders and what are the consumptive and non-consumptive uses of the water resources in the river basins?*

Eight study components were established to address 16 questions. One of the eight components, the Other Uses Component, is primarily responsible for developing and undertaking research and investigations related to the use of water resources by people with in the study area. The Other Uses Component Group is working closely with the Traditional Knowledge Component Group, which is responsible for collecting information on resource use and values of indigenous people and long-time residents.

In 1993/94, the Other Uses Component commissioned an initial analysis of existing stakeholder groups in the study area. This study identified some 290 stakeholder groups and suggested that one way of collecting data on the use of the rivers and associated aquatic resources would be through a series of regional workshops with appropriate stakeholder groups. This study also noted that the general public is also a stakeholder, and some alternative methods are required to determine their use of aquatic resources. As a result, the Other Uses Component decided to undertake projects to gather information from specific stakeholder groups and from the general public residing within the NRBS Study area by means of a stakeholder survey and a household survey. The stakeholder project will gather information on issues and concerns that stakeholders may have regarding northern rivers. Stakeholders include industry, local government, and environmental group representatives. A household survey is intended to obtain a more general assessment of river uses and issues from the general public residing in the Peace, Athabasca and Slave river basins.

The purpose of this project is to develop a final design for both the household and stakeholder surveys, and builds upon a number of existing data sources including:

- Project 4101-B1 - Status and Future Requirements for Socio-Economic Research and Public Communications and Construction, Praxis, Inc. February 1994.

- Project 4101-C1 - Inventory and Compilation of Existing Socio-Economic Information for the Peace, Athabasca and Slave River Basins, Praxis, Inc. and Kerrie Hale, draft report dated May 1994.
- Project 4121-D1 - Stakeholder Screening Survey, South Slave Research Centre, draft report dated July 1994.
- Science Advisory Committee meeting held on July 25/26, in Edmonton.

Terms of reference for this project are provided in Appendix A, Terms of Reference.

2.0 HOUSEHOLD SURVEY DESIGN

There are no existing data bases that describe how northern residents use the aquatic resources of the basin for such things as recreation, subsistence, transportation or other purposes or the cultural or lifestyle importance of northern rivers. The only way of obtaining this information is by directly questioning a sample of northern residents. Based on Alberta Municipal Affairs latest population census information, the NRBS area including the N.W.T. portion[1] of the study area including Status Indians and Metis living in Metis Settlements, comprises approximately 296,119 individuals[2].

The total population of Status Indians and Metis living in Metis Settlements is 27,343 or approximately 10% of the population of the study area.

2.1 TYPE OF SURVEY

Three possible approaches for conducting a household survey, include in-person interviews, mail-out surveys, and telephone interviews. Personal interviews are face-to-face interviews at locations in the northern basins. This approach involves high implementation costs to complete a sufficient number of surveys to create a statistically-valid data base. Those costs include interviewer training and logistics across large distances.

The second approach would involve a mail-out survey. Mail-out surveys are fairly inexpensive to conduct, however response rates tend to be low (10 to 20 percent) and the potential non-response bias can be very high because only people with specific issues or concerns may choose to reply. In addition, mail surveys usually take considerable time to implement, especially if several mail-outs are done to boost response rates. It is also difficult to select a random sample of northern residents because there is no comprehensive list of addresses from which to draw a sample.

The third approach involves telephone surveys. This approach is relatively easy to implement because there is a comprehensive list of telephone numbers for the region and a random sample can easily be drawn from this list. The telephone is an efficient method to collect information in a relatively short period of time. A phone survey enables the interviewer to clarify questions, typically it has a higher response rate than mail surveys and its administration of the survey is

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1 Includes Fort Smith, Fort Smith Unorganized and Fort Resolution Census Districts based on Statistics Canada's Census District designation.

2 This figure is based on Alberta Municipal Affairs latest census data. Depending on the municipalities, the census is either federal or municipal and was taken during the period of June 1991 to June 1993.

faster than a mail survey. However, this approach means that a portion of the survey population (those without telephones) will be precluded from the survey. It is important that the extent and possible implications of this omission be assessed as part of the analysis.

Recommended Approach

Considering the time and budget constraints for this particular project, it is recommended that the survey of the NRBS area's general population be conducted using a telephone survey. A telephone survey is the most efficient and effective method to cover the affected area in a relatively short period of time. While a telephone survey will selectively exclude certain parts of the northern population (households without phones), telephone number lists provide the most recent and comprehensive listing of northern residents from which to draw a sample. In addition, telephone surveys tends to produce higher overall response rates than other types of surveys so non-response errors are minimized.

In order to maximize response rates, it is recommended that the study be advertised prior to implementation. In administering the survey people should first be called by telephone to let them know about the survey and to solicit their cooperation. Potential respondents should then be given the choice of answering the survey questions at that time, or being sent a copy of the questionnaire by mail and being called later. This approach would give respondents an opportunity to think about the questions before they are called again and collect any information they require.

Using this approach, the survey results should be adequate to meet the needs of the NRBS, so long as any difference between the characteristics of households in the survey and the population of the area is clearly identified in the analysis.

2.2 SAMPLE SELECTION

There are a number of ways of drawing samples of households to be interviewed. The simplest method is to treat the entire basin as one sampling unit and draw telephone numbers at random. This is easy to do but can mean there are too few responses from sparsely populated regions within the study area to generate statistically-valid results. This is a major concern if, as is the case with the NRBS survey, there are likely to be important regional differences in population characteristics.

The second approach is to use a stratified sample. A stratified sample is based on the categorization of the general population into distinct population segments, or strata, from which a sample of a specific size is drawn and interviewed (Scheaffer et al. 1986). This guarantees that a representative sample from each stratum will be interviewed and allows the overall characteristics of the total population to be estimated by combining and weighing the results from the individual strata. Stratified sampling tends to produce statistically better results for a

given sample size than does a simple random sample, especially when important differences in the overall composition of the general population are expected.

Recommended Approach

A stratified random sample of the general population of the NRBS area is the recommended method for this survey based on the need to highlight regional differences in use of aquatic resources and population values and attitudes.

2.3 POPULATION STRATIFICATION

Various methods can be used to define the strata to be used in sampling. As part of this study, Golder explored two different stratification approaches.

The first approach takes into account the work done as part of Project 4101-C1. In that material, the stratification of the population was based on their ethnic origin (i.e. native vs. non-native), the size of communities, the economic base of a community (i.e. forestry, agriculture, oil and gas) and whether a population was rural or urban. These stratum were selected based on the assumption that different water uses and values related to northern values will occur between rural and urban and between native and non-native populations. It is also assumed that a community's economic base will influence the way water is used and valued.

The second approach uses strata that differentiate between people living along the river mainstreams and people living along major tributaries, and also divides the major rivers into various reaches that are consistent with reach definitions being used in other NRBS studies. The assumptions underlying this approach are that people living in different locations will have different values and uses for water use.

These two options are described below in greater detail:

2.3.1 Stratification by Community Characteristics / Economic Base

Upon reviewing census data and other information regarding the study area, Praxis (Project 4101-C1) suggested stratifying the general population based on four key elements:

- population size of communities
- urban vs. rural
- economic base
- ethnicity (native and non-native).

These elements were selected for various reasons:

- First, it was anticipated that household attitudes toward water would be affected by differences in municipal infrastructure associated with settlement size. For example, it is assumed that we would find more people using private wells in unincorporated areas or hamlets than people residing in a town or city. In other words, access to municipal water is likely to have a greater impact on water consumption pattern of residents because of convenience and its perceived unlimited availability as compared to private wells which are less convenient and more likely to be perceived as finite resources by its users.
- Second, it was assumed that a primarily agricultural community would probably show a different water use pattern than a community primarily involved in industrial resource use such as oil and gas or forestry.
- Third, the uses and values attached to northern rivers are also expected to differ between native and non-native populations. A native population involved in traditionally-based activities such as fishing, trapping and hunting is probably using and perceiving water resources differently than a population that does not rely on water resources for subsistence purposes.

These three basic assumptions (settlement size, economic base and ethnicity) provide the framework in developing the population stratification.

Definition of the actual stratification process required making a number of additional assumptions:

- rural populations would be differentiated from urban populations using census information.
- urban centres would be divided into two categories those with populations between 100 and 4,000, and those with populations above 4,000 - to account for different levels of municipal water infrastructure.
- Native and Metis Settlements were differentiated from non-native communities based on census data.
- communities and rural areas were then classified in terms of their economic base (agriculture, resource-based, service/government/tourism, and traditional) based on discussions with Alberta Municipal Affairs and representatives of Municipal Districts (M.D.) and Improvement Districts (I.D.).

These assumptions were used to define 11 strata from which samples could be drawn. Those stratum and the approximate population in each stratum are identified below.

Economic Base	Rural	Between 100 and 4,000	Over 4,000
Agriculture	17,700	8,900	10,100
Resource-based	17,500	14,900	63,800
Service/Gov't/Tourism	55,200 less urban	14,800	40,400
Traditional	3,500 less urban	3,500	

Details of which communities and settlements are located within each of these 11 strata are provided in Appendix B, Population Stratification.

One of the practical difficulties in defining these strata was that households had to be grouped by telephone prefixes that do not match M.D. or I.D. boundaries or contain several communities. In addition, there is no way of differentiating between urban and rural residents, except by using screening questions when the survey is administered. Another major problem in using this approach is that for some communities it was impossible to define a specific economic base and there was also concern that households selected in any area may not actually represent the "major" economic activity of the region.

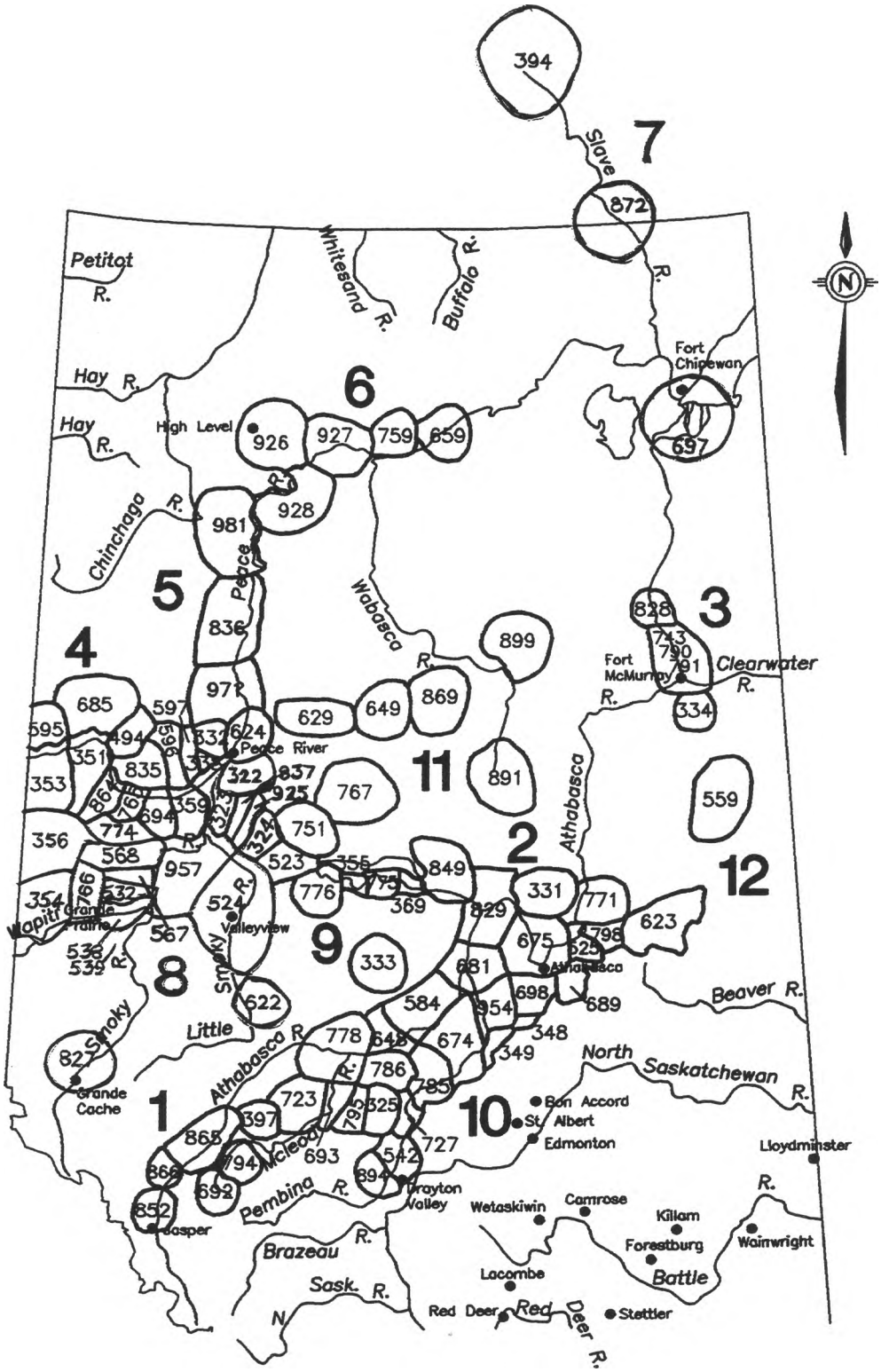
Because of the practical difficulties in applying this stratification framework and the potential for overlaps among strata, an alternate method was developed.

2.3.2 Stratification by Proximity to Rivers

An alternative approach to sample selection uses strata that differentiate between people living along the river mainstems and people living along major tributaries, and also divides the major rivers into various reaches that are consistent with reach definitions being used in other NRBS studies. To facilitate the design process, each stratum was defined in terms of groups of telephone prefixes. The location of these strata is shown in Figure 1 which also contains information on the telephone prefixes in each stratum and the number of active residential telephone numbers in 1990. This approach resulted in the following 12 strata:

1. Upper Athabasca River
2. Middle Athabasca River
3. Lower Athabasca River
4. Upper Peace River

Figure 1 (part 1)



PROPOSED POPULATION STRATIFICATION BASED ON RIVERS, MAINSTEMS AND MAJOR TRIBUTARIES

Figure 1

Proposed Strata for Proposed Household Survey

1	Upper Athabasca River	Whitecourt, Jasper, Hinton, Brule, Jasper East	778,852,865,866	5,660
2	Middle Athabasca River	Calling Lake, Grassland, Ft. Assiniboine, Blue Ridge, Athabasca, Flatbush, Wandering River, Smith	331,584,525,648,675, 681,771,829	3,002
3	Lower Athabasca River	Anzac, Fort McMurray, Fort McKay	334,743,790,791,828	7,133
4	Upper Peace River	Girouxville, Grimshaw, Berwyn, Silver Valley, Bonanza, Eaglesham, Hines Creek, Bear Canyon, Whitelaw, Brownvale, Worsley, Wanham, Rycroft, Fairview, Spirit River	323,332,338,351,353, 359,494,595,596,597, 685,694,765,835,864	5,023
5	Middle Peace River	Peace River, Manning, Dixonville, Keg River	624,836,971,981	3,478
6	Lower Peace River	Fox Lake, Jean D'Or Prairie, High Level, Fort Vermilion, La Creta	659,759,926,927,928	2,219
7	Slave River and Delta	Fort Resolution, Fort Chipewyan, Fort Smith	394,697,872	1,055
8	Smoky/Wapiti Drainage	Nampa, McLennan, Beaverlodge, Hythe, Valleyview, Grande Prairie, Clairmont, Sexwmith, Fox Creek, Wembley, Woking, Grande Cache, Fahler, Donnely, Debolt	322,324,354,356,524, 532,538,539,567,568, 622,766,774,827,837, 925,957	14,851
9	Lesser Slave Drainage	Swan Hills, Faust, Driftpile, Canyon Creek, High Prairie, Grouard, Kinuso, Joussard, Slave Lake	333,355,369,523,751, 775,776,849	4,774
10	Pembina/Macleod Drainage	Wildwood, Clyde, Westlock, Marlboro, Drayton Valley, Barrhead, Cadomin, Peers, Eson, Evansburg, Sangudo, Mayerthorpe, Robb, Niton Junction, Lodgepole, Jarvie	325,348,349,397,542, 674,692,693,723,727, 785,786,794,795,894, 954	16,173
11	Wabasca Drainage	Little Buffalo Lake, Red Earth, Gift Lake, Peerless Lake, Wabasca, Chipewyan Lake	629,649,767,869,891, 899	756
12	La Biche,Other Drainage	Conklin, Lac La Biche, Boyle, Rochester, Plamondon	559,623,689,698,798	2,887
				67,011

5. Middle Peace River
6. Lower Peace River
7. Slave River and Delta
8. Smoky/Wapiti Drainage
9. Lesser Slave Drainage
10. Pembina/Macleod Drainage
11. Wabasca Drainage
12. La Biche/Other Drainage.

This approach results in two stratum with large populations (in excess of 14,000), two with small populations (1,055 or less) and eight stratum with populations between 2,200 and 7,200.

2.3.3 Recommended Approach

Although, stratification by community characteristics attempts to stratify the northern population according to distinct socio-economic indicators that can be useful for the data analysis, it is apparent that stratification by geographic location is more simple to undertake and could provide similar results if properly administered. For this reason, Golder recommends the second approach be used for the household survey.

2.4 SAMPLE SIZE

The budget available for the household survey suggests that about 1,000 households could be included in the survey. This would suggest about 85 surveys per stratum. However, it was noted that two of the proposed strata contain extremely large population (in excess of 14,000) compared to the others. In order to provide a consist sampling ratio among strata, it is suggested that twice as many surveys be completed for the Smoky/Wapiti Drainage and the Pembina/Macleod Drainage. Thus, the total sample size would be 1,190 households. For this size sample, survey estimates of proportions would be at worst $\pm$ 5.3 percent, 19 times out of 20.

2.5 SAMPLE FRAME

The frame from which the sample will be drawn consists of all residential telephone numbers for calling areas within the study area. The relative location of these calling areas is shown in Figure 1. Lists of such numbers are available from Dominion Directories (for Alberta) and NorthwesTel.

Population estimates will be developed by scaling survey data in proportion to the number of active telephone numbers in each stratum[3]. Survey responses should be used to estimate the total population with telephone access. This must be compared with the most recent census information to determine the number of northern households without telephones that would not be represented in the survey.

2.6 INFORMATION REQUIREMENTS

The basic design of the study questionnaire focuses on factual data related to answering Study Board Question #3. Thus, questions will solicit information regarding:

- the nature of river uses (consumptive and non-consumptive);
- the amount of use;
- their awareness of upstream water uses that may affect them;
- the location of use;
- factors that limit or constrain use (under what conditions do people decide not to eat fish or drink water); and
- how important these uses are to them in both social and economic terms.

A second component of the questionnaire survey will include questions on values and expectations on future use. These questions will focus on:

- river qualities and management issues of greatest importance to users;
- an assessment of how these qualities and issues have changed during the past 20 years;
- possible means for measuring ecosystem health and how to monitor;
- the relative importance of development versus protection in the river basins;
- expectations about future river health assuming no change in management practices;
- suggestions for improving water management practices; and,
- the types of recommendations that the Study should be proposing.

To facilitate response time, these questions should be as structured as possible using multiple choice or simple answer questions where appropriate. A draft of a questionnaire that would satisfy these requirements is provided in Appendix C, Draft Questionnaire.

2.7 PRETEST

After the final draft of the questionnaire is complete, it should be pretested on at least 20 residents of the NRBS study area. The pretest will serve to identify questions that respondents find redundant, identify incomplete answer categories, and identify objectionable or ambiguous

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[3] This number must be determined at the time that the samples are drawn by Dominion Directories & NorthwesTel

questions. Additionally, respondents might offer additional questions that they feel should have been asked.

With respect to the pretest, Dillman (1978) and Babbie (1990) recommend the following:

1. Before pretesting the questionnaire, the entire questionnaire should be scrutinized by the research staff and the client to assure that the questionnaire is as complete as possible.
2. Pretest the whole questionnaire rather than a portion of it.
3. Pretest the questionnaire via telephone, as if the real survey was taking place.

During the pretest process, it may be necessary to make several revisions to the questionnaire. However, this should be a relatively easy process because the feedback from an hour or two of pretest calls can be used to make immediate revisions. More pretest calls using the revised format can then be made the same day, and so on, until the questionnaire is perfected.

3.0 STAKEHOLDER WORKSHOP STRATEGY

A part of the NRBS Project 4121-D2 included the development of a stakeholder workshop strategy using the results of the Stakeholder Screening Survey (Project 4121-D1) as a framework. The strategy was to consist of:

- identifying the stakeholder groups to be included,
- location of the workshops,
- general issues to be discussed,
- format for these discussions,
- schedule for these workshops.

The following workshop strategy incorporates the recommendations stemming from the Stakeholder Survey in combination with the consultant's experience in organizing and delivering workshops. The proposed strategy has incorporated the stakeholders' preferred option regarding workshop location, schedule and agenda.

However, while well designed and executed workshops are effective mechanisms for gathering stakeholder information, they can also be expensive and therefore may not be the most cost-effective way to collect information from stakeholders. For example, holding a workshop across northern Alberta would involve significant logistics costs. It may also be difficult to retain the commitment of the facilitators required for the number of workshops likely to be needed.

Given these logistical problems, a questionnaire survey similar to the one proposed for northern basin households represents an alternative approach that may prove more cost-effective.

The purpose of this section of the report is to prepare a detailed strategy for workshops. An alternative approach for collecting stakeholder information is suggested in section 4.0.

3.1 GUIDING PRINCIPLES FOR THE STAKEHOLDER WORKSHOP STRATEGY

To ensure a successful workshop and facilitation process is developed and implemented, the following general components should be included in an overall workshop approach.

- The goals and objectives of the workshops must be clearly stated and understood by stakeholders, coordinating workshop facilitators, small group facilitators and members of the Northern River Basins Study
- the role of the stakeholders in the overall process must be clearly stated,
- the questions that need to be addressed during the workshops by the participants must be clearly outlined,
- a set agenda and timeline for the workshop must be set,
- facilitators must keep the process on task and be neutral,
- facilitators should be appropriately briefed/trained,
- adequate time should be given for small group discussion on each topic area,
- there should be time to share the views of the small group discussions with other participants.

An overall workshop coordinating group should be hired to coordinate and implement the workshop strategy. Their role would be to develop specific pre-workshop materials, prepare invitations to be sent out to the stakeholder groups, book actual venues and deal with logistical issues, hire and train facilitators, act as the key facilitator at the workshops and work with the NRBS in developing appropriate materials for the open house portion and small group sessions of the workshops. In addition, this coordinating group would be responsible for summarizing and analysing workshop data.

3.2 OBJECTIVES OF THE WORKSHOPS

A clear set of objectives must be developed prior to the start of the workshop. The following objectives can be refined with the NRBS study team and the overall coordinating facilitating group prior to the preparation of pre- workshop materials and commencement of the workshops. It is important that these objectives be communicated to all invited stakeholders as part of the invitation package and again reiterated at the start of each workshop. Workshop objectives for this project could include the following:

- To provide the public with an opportunity to participate in the planning and study of the Northern River Basins,
- To review and discuss the results from the stakeholder and household surveys (if undertaken prior to the workshop) with the participants,
- To discuss and validate the issues identified to date,

- To gather specific information on consumptive and non-consumptive use of the Northern River Basins by specific stakeholders and stakeholder groups,
- To create a data base similar to the household survey, and
- To provide stakeholders and stakeholder groups with an opportunity to meet informally with NRBS staff members.

3.3 TIMING OF THE WORKSHOPS

It would be beneficial if the household survey and analysis was completed prior to the commencement of the workshops. This information, along with the results from the stakeholder survey (Project 4121-D1) could be used as part of the background information at the workshops and summarized as pre-workshop material. To avoid "re-inventing the wheel" and to help participants focus primarily on data gathering at the workshops, this information could be used as part of the facilitation process at the workshop as a way of validating the issues and identifying deficiencies in the issue scoping exercises. Recommendation 4.5 of the Stakeholder Survey clearly states the need to provide as much information as possible prior to the workshop for participants to prepare effectively.

If the NRBS decides to hold the workshops prior to or during the data collection exercise for the household survey, late fall (November) would be an appropriate time-frame to implement the workshops. This would allow for the necessary lead-time to develop pre-workshop materials, adequate time to invite participants and prepare public display materials.

3.4 LOCATION AND NUMBER OF WORKSHOPS

Based on the information gathered by Project 4121-D (Recommendation 4.3), a total of eight workshops should be held in the following locations: Peace River, Grande Prairie, Athabasca, Fort McMurray, Edmonton, Fort Chipewyan, Fort Smith and Fort Vermilion.

3.5 LENGTH OF THE WORKSHOPS

To accomplish the objectives and questions outlined above, the consultants suggest that the workshop be a total of one day in length similar to the recommendation 4.6 of the Stakeholder Survey which indicated that the majority of those surveyed favoured a one-day workshop. To accommodate those surveyed who indicated a preference for having the workshops held in the middle of the week on two consecutive evenings, the workshops should commence at 6 p.m. and finish at 10:00 p.m. both days. The first day would be used to introduce the purpose of the workshop, review existing material and collect general data using key questions as a guide. Adequate time must be allowed at these stakeholder workshops to discuss the purpose of the workshop, how public input will be utilized by the NRBS and to review the public consultation process to date. The second day would primarily focus on a mapping exercise that will allow participants to identify, plot and discuss specific issues related to the northern river basins. Time will also be allocated to allow participants to review other groups' work.

3.6 NUMBER OF PARTICIPANTS

The Stakeholder Survey recommends that all surveyed stakeholders who indicated that they would come to the workshops or who were undecided should be invited to attend the workshops. This would bring the number of potential participants to approximately 200 for 8 workshops.[4] It assumes that organizations will send only one representative per workshop.

The specific stakeholders who will attending a particular workshop will be discussed as part of the workshop implementation process.

3.7 PROPOSED AGENDA

3.7.1 First Evening Session

6:00 -7:00	Registration and Open House
7:00 - 7:30	Welcome and Introduction - Purpose of workshop - Importance of public input - Public consultation process to date - NRBS update
7:30 - 7:45	Division into small groups and topic areas COFFEE BREAK
7:45 - 9:45	Small Group Discussions -General data collection: -refer to "questions to be addressed"
9:45 - 10:00	Wrap-up

3.7.2 Second Evening Session

6:00 - 6:15	Introduction to Mapping Session
6: 15- 6:30	Continuation of Small Group Discussion from previous evening session (optional)
6:30 - 8:30	Small Group -Specific data collection - mapping session -refer to "questions to be addressed"
8:30 - 8:45	COFFEE BREAK
8: 45 - 9:00	Small Group Wrap-up (information summarized on the maps and hung on the walls for review by other groups)
9:00 - 9:15	Closing Remarks - "Thanks for Coming"

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[4] Two-hundred and forty-five organizations were invited to attend. Assuming that 80% of them will attend, it will bring the total workshop participants to 196.(Stakeholder Screening Project: 23)

9:15 - 10:00 Participants "Walk- About"
Participants have the opportunity to review material presented by the other groups (identified on the maps) and provide any comments to the facilitators of that particular group.

3.8 SMALL GROUP SESSIONS

To ensure active participation of all stakeholder groups at the workshops, we suggest workshop participants be divided into small working groups of eight to ten. These are large enough groups to allow for a synergy to develop, but small enough to allow ample opportunity for participation by all stakeholders. Each working group would be led by a neutral facilitator. To ensure appropriate data is collected in the small groups, it is critical that professionally-trained facilitators be chosen to lead these sessions. A training and debriefing session to ensure facilitators know the role they will play during the workshop is an important step in the workshop process. If possible, the overall coordinating facilitator should try to find local facilitators to work with the small groups. If this is not feasible they should look to other individuals who have the capability and expertise to facilitate small group processes.

To minimize duplication of data, the working groups should be divided into different themes or topics such as types of river use (consumptive and non-consumptive), water management or water use issues. Themes would be defined once a confirmed list of participants attending each workshop is completed. It would be the role of NRBS and the coordinating facilitator to determine the specific themes or topics to be discussed at each workshop. This should be based upon the interest, knowledge and expertise of those stakeholder groups attending the workshop.

3.9 QUESTIONS TO BE ADDRESSED AT THE WORKSHOPS

To ensure that the data collected during the workshops are consistent between workshops and useful for the NRBS, a series of questions should be developed similar to the ones used in the Household Survey. This would ensure a parallel database and provide a framework to guide the workshops' discussion. Some questions could be asked during the small group discussion with others during the mapping session, and these questions should reflect the themes that a particular workshop adopts. A combination of general and specific questions should be used to collect the necessary information. At this time, the questions that we developed are generic enough to be used in any workshop. The following is a sample of possible questions:

- Are you aware of any problems related to water in your region? (If yes, ask participants to indicate (if possible) on the map where the problem lies).
- What are the current uses of the rivers and lakes of your region? (This question could be used to guide the mapping session).
- Have you noticed changes to the rivers and lakes of your region in the last few years? (If yes, ask participants to characterize these changes and plot them on the map).

- Do you have specific recommendations to improve water resource planning and management in your area?
- Are there specific studies you would like the NRBS to undertake?
- What do you consider barriers to implementing an effective planning program for the northern river basins?
- What is needed to ensure that balanced development occurs in the Northern River Basins?

3.10 MATERIALS AND INFORMATION

Regional maps and air photo mosaics could be used as a framework for plotting specific data discussed and presented by the participants at the workshop. A synthesis of the environmental information done from other studies through the NRBS GIS data base should be utilized as a tool at the workshops. The facilitators would be responsible for using flip charts to summarize group discussions. Regional maps and air photo mosaics would be used as working documents. Each small working group would receive one copy on which they could directly write comments, add specific data or respond to the questions.

Displays, materials and study results should be available at the workshop for review by interested participants. The workshop should be used as an opportunity for the NRBS to publicize their work to date and to informally chat with the stakeholder groups.

3.11 PRE-WORKSHOP MATERIAL

A pre-workshop package should be developed and sent to all stakeholder groups who have confirmed their attendance at the workshop. All participants should receive the pre-workshop package at least two weeks prior to each workshop. This allows participants adequate opportunity to review, understand and prepare for the workshop. The workshop package should include a copy of the agenda, objectives of the workshop, a synthesis of the household (if it has been completed before the workshops) and stakeholder surveys and how the participants will be asked to participate in the process. The importance of providing adequate information and preparation time prior to the workshop is crucial if the workshop is to become a useful data gathering mechanism (Recommendation 4.5 of Stakeholder Survey).

3.12 ANALYSIS OF WORKSHOP MATERIAL

The consultant recommends that the results of the workshops be analyzed by the group in charge of coordinating the overall workshop strategy. A specific approach to the data analysis will be developed in concert with the NRBS team prior to the implementation of the workshops.

They will be at least two types of information to be analyzed:
data collected as part of the mapping exercise, and;
information collected from the flipchart notes.

Flip chart notes will be summarized and "theme" papers developed to show the range of issues discussed under a particular theme and the stakeholders' recommended actions.

3.13 WORKSHOP FOLLOW-UP

Participants at the workshops should receive a copy of the workshop summary discussing the major topics and themes presented at the workshop they attended. Copies of other workshops' summaries should also be made available upon request.

In case not all issues are covered at the workshops, the process should allow for participants to present more information in the form of written briefs. These briefs should focus on providing more data for the NRBS and minimize political statements by organizations.

4.0 ALTERNATIVE TO PROPOSED WORKSHOP STRATEGY

Although, the use of workshops can be perceived by stakeholders as an appropriate vehicle to encourage the public to become involved in the NRBS process, it is also important to note that the information to be gathered at the workshop could be assembled through a questionnaire survey. The advantage of a "stakeholder survey" is its ability to collect adequate and reliable facts and value-based information concerning specific types of river uses that the general household survey may not provide. In other words, the stakeholder and household surveys could complement each other by creating a different set of data but using a similar design framework.

The collection of data using a questionnaire format would ease the comparison of information between the two surveys and enable the data be cross checked if necessary. A stakeholder survey would allow for the manipulation of the data (cross-tabulations) during the data analysis as opposed to relying strictly on verbal information gathered during the workshops. Finally, a stakeholder survey offers a cheaper alternative to the delivery of eight workshops at eight separate locations.

The only way of contacting a sufficient number of these interest groups to get an accurate assessment of their river use or values is by identifying them as a specific stakeholder and conducting a separate survey with representatives of that group. Work to date has already identified many of these stakeholder groups, most of which have already been contacted by telephone to prepare them for future data collection activities.

Future activities on the stakeholder survey would involve two tasks. The first task would involve contacting stakeholder groups by mail and providing them with a description of the NRBS and the reasons for the survey, along with the list of questions to be answered. The second task would involve data collection. Stakeholders will be given the option of completing the questionnaire and returning it by mail within a specified time period, or of responding to the questions during a follow-up telephone call. This approach gives stakeholders some time to

review the questions before providing answers and to seek input from other members of their organization. This would lead to higher response rates than a standard mail survey and would produce better information.

As with the general household survey, the survey of stakeholders would be used to identify their uses of the rivers as well as to determine issues, concerns, and future expectations for the basin and for the Northern River Basins Study. Questions would be similar to those proposed for the household survey.

5.0 RECOMMENDATIONS

Although stakeholder workshops would be an effective way of allowing stakeholder groups to define their use of the river basin and to identify their concerns about water management issues, it is not clear that there is sufficient budget to undertake such workshops. As noted in Project 4121-D1, workshops in eight communities would bring in most stakeholder groups, and workshops in other locations would be required if all stakeholders are to be included in the process.

On balance, a questionnaire survey that builds upon the survey instrument developed for the household survey would provide a consistent and parallel database at lower cost. For this reason, we recommend that a stakeholder survey be undertaken.

6.0 LITERATURE CITED

Babbie, E., 1990. Survey research methods. Second ed. Wadsworth Publishing Co., Belmont, California. 395pp.

Dillman, D. A., 1978. Mail and telephone surveys: the total design method. John Wiley & Sons, New York, New York. 325pp.

APPENDIX A: TERMS OF REFERENCE

NORTHERN RIVER BASINS STUDY

SCHEDULE A - TERMS OF REFERENCE

Project 4121-D: Design of Questionnaires and Survey Methods

I. BACKGROUND & OBJECTIVES

The Northern River Basins Study (NRBS) is a joint project between the governments of Canada, Alberta and the Northwest Territories that commenced in September of 1991. The purpose of the NRBS is "to characterize the cumulative effects of development on the water and aquatic environment of the Study areas by coordinating with existing programs and undertaking appropriate new technical studies". To undertake this study, a Study Board, Study Office and Science Advisory Committee were created. The study area includes the mainstems and main tributaries of the Peace, Athabasca and Slave rivers.

The Study Board developed a vision statement to provide overall guidance for the various technical activities being conducted in support of the study and also identified 16 questions that serve to focus study activities. One of these questions is:

> #3 Who are the stakeholders and what are the consumptive and non-consumptive uses of the water resources in the river basins?

Eight study Components have since been established to address these 16 questions and the Other Uses Component is primarily responsible for developing and undertaking research and investigations related to the use of water resources. This group is working in close association with the Traditional Knowledge Working Group, which is responsible for collecting information on resource use and values of indigenous people and long-time residents.

In order to collect information about stakeholders and their uses of aquatic resources, the Other Uses Component is planning to undertake surveys of selected samples of northern residents. Two types of surveys will be used. Workshops will be conducted with selected northern stakeholder groups to determine the extent of specific river uses and concerns. To obtain a more general assessment of river uses and issues, a stratified random sample of northern residents will be interviewed using a telephone survey.

A consultant is required to prepare a detailed design for the two surveys. For the household survey, this will entail developing a statistically-based sampling strategy and a questionnaire. This work will build on work conducted as part of Project 4101-C to develop on initial stratification system for classifying northern communities for survey purposes. For the stakeholder survey, the consultant will review the results of Project 4121-D, which involves screening 290 stakeholder groups to determine which of these groups should be included in the workshops, and will then determine the locations, scheduling and an agenda for the workshops.

Objectives

1. Prepare detailed survey strategies for obtaining information about uses and values associated with aquatic resources, socio-economic characteristics of the northern communities and environmental perspectives from
    I) randomly-selected households and,
    ii) representatives of selected stakeholder

2. Develop a questionnaire for obtaining water use information and other socio-economic information from households.

II. REQUIREMENTS

A. Review and Synthesis of Existing Stakeholder Information

1. Review information on stakeholder groups (projects 4101-C1 and 4121-D1)

    I) identify the stakeholder groups to be included in workshops
    ii) identify appropriate regional boundaries for workshops
    iii) identify appropriate socio-economic characteristics to be used as strata for the household survey

2. Review the questionnaire developed for the Traditional Knowledge component to gain information on the types of aquatic use information they are collecting.

B. Development of Household Survey Instrument

1. Design a sampling strategy for a telephone survey of households in the study area based on the socio-economic regions (strata) suggested from Project 4101-C1. This strategy will identify the population within each region, the target number of surveys to be completed, and the method to be used for randomly selecting households or individuals to be surveyed. The strategy should also include recommendations for dealing with non-responses. The outcome of this process is to be summarized in the form of a survey planning report. The planning report will have to be in sufficient detail such that it could be used as the basis for setting out the terms and conditions for a consultant to actually implement the survey.

2. Based on a review of the Traditional Knowledge survey instrument and in consultation with the advisory group for the Other Uses Component, design a questionnaire suitable for administration by telephone. The results from the various surveys are intended to be compatible as much as possible.

C. Development of Stakeholder Workshop Strategy

1. The Contractor will review the results of the stakeholder screening study (Project 4121-D1) and develop a strategy for conducting workshops with key stakeholder groups. This strategy should consist of:

    I) identifying the stakeholder groups to be included,
    ii) the location of the workshop,
    iii) the general issues to be discussed,
    iv) the format for these discussions, and
    v) the schedule for these workshops.

    At this point, provisions have been made for six workshops but this number may be changed depending on the outcomes of the analysis. A draft of the proposed stakeholder workshop program should be in sufficient detail to serve as the basis for a terms of reference to be developed for implementation of this program.

2. Develop a survey instrument to be used in the workshop. The Contractor will develop a detailed agenda for each of the various workshops, including a detailed list of questions that need to be answered by each of the stakeholder groups. Where possible, this information should be consistent with the data to be collected from the general household survey as well as the Traditional Knowledge study.

    The majority of this study must be completed by July 31, 1994 and will commence in early June once the consultant has been selected. It is expected that the design of the household survey would require approximately three weeks while development of the workshop program would require the remaining two weeks and would commence after Project 4121-D1 has been completed.

    There will need to be two meetings in Edmonton in June. One of these meetings will be to discuss a first draft of the proposed household survey in late June and the second will be to review a second draft of the household survey plus the first draft of the strategy for conducting stakeholder workshops.

III. DELIVERABLES

1.	Sampling Strategy for the Household Survey	due July 31, 1994
2.	Household Survey Questionnaire	due July 31, 1994
3.	Stakeholder workshop agenda	due July 31, 1994
4.	Stakeholder workshop survey instrument	due July 31, 1994

5. Six to ten 35 mm slides that can be used at public meetings to summarize the proposed survey methods and schedule.

due July 31, 1994

IV. REPORTING REQUIREMENTS

1) The Contractor is to provide draft and final reports in the style and format outlined in the NRBS Style Manual. A copy of the Style Manual entitled " A Guide for the Preparation of Reports" will be supplied to the contractor by the NRBS.

2) Ten copies of the Draft Reports along with an electronic disk copy are to be submitted to the Project Liaison Officer by July 31, 1994.

Three weeks after the receipt of review comments on the draft report, the Contractor is to provide the Project Liaison Officer with two unbound, camera-ready copies and ten cerlox-bound copies of the final report along with an electronic version.

3) The final report is to include the following: an acknowledgment section that indicates any local involvement in the project, Project Summary, Table of Contents, List of Tables, List of Figures and an Appendix with the Terms of Reference for this Project.

Text for the report should be set up in the following format:

a) Times Roman 12 point (Pro) or New Times Roman (WPWIN60) font.
b) Margins are 1" at top and bottom, 7/8" on left and right.
c) Headings in the report body are labelled with hierarchical decimal Arabic numbers
d) Text is presented with full justification; that is, aligns on both left and right margins.
e) Page numbers are Arabic numbers for the body of the report, centred at the bottom of each page and bold.

- If photographs are to be included in the report text they should be high contrast black and white.
- All tables and figures in the report should be clearly reproducible by a black and white photocopier.
- Along with copies of the final report, the Contractor is to supply an electronic version of the report in Word Perfect 5.1 or Word Perfect for Windows Version 6.0 format.
- Electronic copies of tables, figures and data appendices in the report are also to be submitted to the Project Liaison Officer in a spreadsheet (Quattro Pro preferred, but also Excel or Lotus) or database (dBASE IV)

format. Where appropriate, data in tables, figures and appendices should be geo-referenced.

4. All figures and maps are to be delivered in both hard copy (paper) and digital formats. Acceptable formats include: DXF, uncompressed Eoo, VEC/VEH, Atlas and ISIF. All digital maps must be properly geo-referenced.

5 All sampling locations presented in report and electronic format should be geo-referenced. This is to include decimal latitudes and longitudes (to six decimal places) and UTM coordinates. The first field for decimal latitudes/longitudes should be latitudes (10 spaces wide). The second field should be longitude (11 spaces wide).

The Project Liaison Officer (Component Coordinator) for the project is:

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APPENDIX B: POPULATION STRATIFICATION
Based on Community Characteristics and Economic Base

B.1 INTRODUCTION

Various methods can be used to define the strata to be used in sampling. For the NRBS household survey Golder explored two different approaches. The first approach builds upon work done as part of Project 4121-D2, which suggested stratification of the population on the basis of ethnic origin (i.e. native vs. non-native), the size of communities, the economic base of a community (i.e. forestry, agriculture, oil and gas), and whether a population was rural or urban. This appendix describes how this method could be applied for the household survey.

B.2 SELECTION OF STRATA

Upon reviewing the census information and based on the consultant's knowledge of the study area, the general population was stratified based on four key elements:

- population size of communities
- urban vs. rural
- economic base
- ethnicity (native and non-native).

The assumption is that different water uses and values related to northern values will occur between rural and urban populations and between native and non-natives. It is also assumed that a community's economic base will influence the way water is used and valued.

With the latter, these distinctions would occur primarily because of the differences in municipal infrastructure associated with settlement size. For example, it is more likely to find people using private wells in unincorporated areas or hamlets than people residing in a town or city. In other words, access to municipal water is likely to have a greater impact on water consumption pattern of residents because of convenience and its perceived unlimited availability as compared to private wells which are less convenient and more likely to be perceived as finite resources by its users.

It is also assumed that a primarily agricultural community will probably show a different water use pattern than a community primarily involved in industrial resource use such oil and gas or forestry. The uses and values attached to northern rivers is also expected to differ between native and non-native populations. A native population involved in traditionally-based activities such as fishing, trapping and hunting is probably using and perceiving water resources differently than a population that does not rely on water resources for subsistence purposes.

These three basic assumptions (settlement size, economic base and ethnicity) provide the framework in developing the population stratification.

B.3 METHODOLOGICAL CONSTRAINTS

In refining the definitions of survey data, one important constraint was the sample frame and sampling method. For this phone survey, a random sample of phone numbers based on telephone prefixes was to be used. While it was easy to identify prefixes falling within the NRBS area and to identify prefixes for individual communities, these prefixes do not coincide with the Municipal District (M.D.) and Improvement District (I.D.) boundaries that were used to define distinct rural areas.

This limitation became apparent when trying to aggregate telephone prefixes into distinct areas with a common economic base, and it had to be assumed that areas with identified economic bases could be grouped into relatively homogeneous zones. For communities and areas that did not have an economic base identified, I.D.s and M.D.s were contacted to determine the main source of employment in their respective districts. However, it is uncertain as to how well regions defined in terms of telephone prefixes actually reflect real differences in settlement size, economic base or ethnicity. Considerable effort was spent trying to match strata boundaries with prefixes.

B.4 DEFINITION OF STRATA

B.4.1 Settlement Size

Population centres were divided into three distinct categories:

- centres between 100 and 4000 (e.g., Beaverlodge, Cadomin, Clairmont)
- centres above 4000 (e.g., Barrhead, Slave lake, Hinton, Grande Prairie)
- rural

These three categories were chosen because:

- it was assumed that uses and values will differ between city dwellers (centres over 4,000) and town, hamlets or villages dwellers as discussed earlier,
- rural areas probably have their own water systems.

Definitions of the rural strata is extremely difficult, however,

- Telephone prefixes do not differentiate the urban and rural households. Each prefix includes residences located within an urban settlement as well as those located in the surrounding rural area. Thus, there is no way of knowing in advance how much territorial coverage this prefix has outside that community. The only method to secure a representative sample of urban and rural households is to use the urban-rural split as a "screening" question in the questionnaire. In this case, the interviewer could differentiate between an individual living in a town, hamlet, or village or an individual living on acreage or a farm.

- Using Alberta Municipal Affairs population figures, each designated city and town have their population figures listed separately. For settlements that are not considered cities or towns, populations are included in the overall population figure of the surrounding M.D. or I.D.

- Most settlements designated as town or cities have their own prefixes. Hamlets can also have their own prefixes depending on the phone exchange requirements of the local area.

Using Alberta Government Telephone's list of phone number prefixes, all prefixes within the study area were identified. To assist with the stratification process, prefixes were grouped according to M.D. or

I.D. boundaries whenever possible while recognizing that prefixes linked to centres near M.D. or I.D. boundaries reach into areas outside the municipality or district.

Table 1 divides the NRBS area into the various M.D.s and I.D.s it encompasses. Column One lists all the I.D. and M.D. covering the study area and the main settlements that have been identified in each of the I.D.s. or M.D.s. Column Two indicates the prefixes that cover the I.D. or M.D. Column 3 gives the population of I.D.s and M.D.s excluding cities and towns. Populations of I.D. and M.D.s include hamlets, villages and unincorporated settlements. Column 4 lists all the cities and towns and their population located in a particular I.D. or M.D. Population for cities and towns are listed separately and are not included in the population figure for the M.D. or I.D. (Column 3). Natives living off-reserves are included in the population counts in this table. Native people living on-reserves will be incorporated into the general population associated with a particular phone exchange, i.e. the Duncan Band with a Brownvale exchange (597).

TABLE 1: BREAKDOWN OF NRBS AREA ACCORDING TO PHONE PREFIXES AND M.D. AND I.D. BOUNDARIES

	Phone Prefixes	Population of I.D. or M.D. excluding cities and towns	Population of Cities and Towns
I.D. 12 Jasper	852, 866	5,414	
I.D. 14 (M.D. of Yellowhead #94) Edson, Evansburg, Wildwood, Carrot Creek, Niton Junction, Peers, Robb, Brule, Pinedale, Hinton, Entwhistle, Cadomin	727, 325, 795, 693, 723, 397, 794, 865, 692	8,692	Edson - 7,323 Evansburg - 723 Hinton - 9,108 Entwhistle - 460
I.D. 15 (M.D. of Woodland #15) Whitecourt, Fort Assiniboine, Blue Ridge, Silver Creek, Hardy, Windfall Junction, Bembo, Knight, Goose Lake	778, 648, 584, 786	2,980	Whitecourt - 7,056
I.D. 16 (M.D. of Greenview) Valleyview, Debolt, Fox Creek, Little Smoky, Grande Cache, Crooked Creek, Grovedale, Ridgevalley *Sturgeon Lake Band*	524, 957, 622, 827 532	5,269	Valleyview - 2,039 Fox Creek - 2,260 Grande Cache - 3,842
I.D. #124 Slave Lake, Chisholm, Smith *Sawridge Band*	829, 849, 369, 681,	2,274	Slave Lake - 5,607
I.D. #125 High Prairie, Enilda, Faust, Joussard Swan Hills, Kinuso, Grouard *Kapawe'no First Nation* *Sucker Creek Band* *Swan River First Nation* *East Prairie* *Peavine*	751,523, 776, 333, 355,775	3,833	High Prairie - 2,932 Swan Hills - 2,348 Kinuso - 254
I.D. #131 Nampa, Reno, Marie Reine, Harmon Valley, Three Creeks, Springburn *St. Isidore* *Little Buffalo*	322,624, 629	2,465	Nampa - 496

TABLE 1: PAGE 2 OF 4

	Phone Prefixes	Population of I.D. or M.D. excluding cities and towns	Population of Cities and Towns
I.D. 17 Red Earth Creek, Sandy Lake, Wabasca-Desmarais, Peerless Lake, Trout Lake, Little Buffalo Lake *Bigstone Cree Nation* *Loon River Cree Band* *Lubican Lake Band* *Whitefish Lake Band* *Woodland Cree Band* *Gift Lake*	649, 869 891, 629, 767	2,680	
I.D. 18 (North) Fort McMurray, Conklin, Fort Chypewyan, Fort McKay, Janvier (Chard) *Janvier Band* *Fort McKay First Nation* *Fort McMurray #468 First Nation* *Mikisew Cree First Nation*	743, 559, 790, 791, 799, 899, 334	2,550	Fort McMurray - 34,706
I.D. 18 (South) Lac La Biche, Venice, Wandering River, Plamondon	623, 771, 798, 689, 635, 826, 594, 639	6,612	Lac la Biche - 2,737 Plamondon - 253
I.D. 19 Wanham, Eaglesham, Tangent, Watino	694,359,	1,378	Wanham - 216 Eaglesham - 184
I.D. 20 Spirit River, Woking Bonanza	864, 353, 351, 774	2,722	Spirit River - 1,044
I.D. 21 Worsley, Cleardale, Hines Creek	685, 494, 595, 596,	2,903	Hines Creek - 423

TABLE 1: PAGE 3 OF 4

	Phone Prefixes	Population of I.D. or M.D. excluding cities and towns	Population of Cities and Towns
I.D. 22 Dixonville, Manning, Paddle Prairie, Kem River, Keg River, Deadwood, Laddy, North Star, Hotchkiss, Notikewin *Paddle Prairie*	624, 836, 971, 981,	3,789	Manning - 1,139
I.D. 23 High Level, Fort Vermilion, Embarras, Little Red River, North, Vermilion, Rainbow Lake, Crete, Zama City *Beaver First Nation* *Dene Tha' Band* *Little Red River Cree Nation* *Tallcree Band*	926, 928, 927, 321, 759	7,400	High Level -2,922
I.D. 24 Wood Buffalo National Park		286	
M.D. of Smoky River #130 Fahler, Donnelly, Girouxville, McLennan	837, 323, 324	2,613	Fahler - 1,183 McLennan - 1,026 Donnelly - 421 Girouxville - 349
M.D. Of Peace #135 Grimshaw, Berwyn, Brownvale, Peace River *Duncan Band*	332, 338, 597	1,559	Grimshaw - 2,812 Peace River - 6,696 Berwyn - 606
M.D. of Fairview #136 Fairview, Bluesky, Whitelaw	835, 596	1,812	Fairview - 3,262
M.D. of Westlock #92 Westlock, Clyde, Pibroch, Jarvie, Pickardville	835; 935, 954	6,994	Westlock - 4,719

TABLE 1: PAGE 4 OF 4

	Phone Prefixes	Population of I.D. or M.D. excluding cities and towns	Population of Cities and Towns
M.D. of Brazeau 77[5] Lodgepole	894	6,301	
County of Athabasca #12 Grassland, Colinton, Rochester, Athabasca, Boyle	525,675	6,229	Athabasca - 2,278 Boyle - 784
County of Grande Prairie #17 Grande Prairie, Sexsmith, Clairmont, La Glace, Rycroft, Beaverlodge, Wembley, Hythe *Horse Lake Band*	532,538, 539, 567, 568, 765, 567, 831, 354, 356	12,314	Beaverlodge - 1,779 Grande Prairie - 28,271 Sexsmith - 1,354 Wembley - 1,414 Hythe - 623 Rycroft - 634
County of Barrhead #11 Fort Assiniboine, Barrhead	584, 674	5,591	Barrhead - 4,160
County of Lac St. Anne #28 Greencourt, Sangudo, Mayerthorpe	785,786	8,059	Mayerthorpe - 1,692 Sangudo - 405
N.W.T.	872,394	425[6]	Fort Smith - 2,480 Fort Resolution - 515

5 Only the western portion of the M.D., it does not include Town of Drayton Valley.

6 Population of Fort Smith Unorganized Census District.

B.4.2 Economic Base

Using information from Alberta Municipal Affairs in combination with telephone interviews with M.D. and I.D. representatives, and consultant's knowledge of the study area, each community was assigned an economic base whenever possible. Four types of economic bases were identified for the study area: agriculture, resource-based (forestry, oil and gas), service/government/tourism, and traditional (native communities).

Table 2 divides communities according to their economic base and size whenever possible. To designate an economic base to rural areas, we used the overall economic base of an I.D. or M.D. as a criterion to categorize settlements of less than 100. It assumed that the majority of hamlets and other smaller settlements found in a particular area will have a similar economic base as the I.D. and M.D. it is found in. Information collected through the interviews with I.D. or M.D. administrators indicated that a number of areas have traditionally relied on agriculture as the main source of employment for their residents. However, due to changing economic conditions in the last few years, a number of individuals have turned to resource-based activities such as oil and gas and forestry to supplement their income. In many cases, the work is seasonal whereby an individual tends to his/her farm in the summer and turns to oil and gas and forestry jobs during the winter months. Consequently, defining an area's economic base can be difficult if one assumes that an increasing number of individuals are involved in cross-sectoral economic activities.

TABLE 2: BREAKDOWN OF STUDY AREA INTO ECONOMIC BASES AND POPULATION SIZES

	Size of Population Centres		
Economic Base	**less than 100**	**between 100 and 4,000[7]**	**Over 4,000[8]**
Agriculture	Lone Point Canyon Creek/Widewater/Wagner Cherry Point Clear Prairie Royce Worsley Reno, Marie-Reine, Three Creeks, Carcajou, Deadwood, North Star, Motikewin, Warrensville, Weberville Ridgevalley I.D #125 I.D. #131 I.D. 18 (South) I.D 19 I.D. 17 I.D. 20 I.D. 22 I.D. 23 I.D. 124 M.D. of Smoky River #130 M.D. of Peace #135 M.D. of Fairview #136 M.D. of Westlock #92 County of Athabasca #12 County of Barrhead County of Grande Prairie County of Lac St. Anne	Beaverlodge 354), Berwyn (338), Bluesky, Boyle (689), Boyle, Brownvale (597), Colinton, Debolt (957), Dixonville (971), Donnelly (925), Eaglesham (359), Enilda, Entwhistle, Evansburg, Fahler (837), Fairview (835), Girouxville (323), Hythe (356), Keg River (981), La Glace, Kinuso (775), Mayerthorpe (786), Nampa (322), Pibroch, Plamondon (798), Rochester (698), Rycroft (765), Sangudo, Sexsmith (568), Spirit River (864), Wandering River (771), Wanham (694), Wembley (766), Whitelaw (596)	Barrhead (674) Westlock (349)

7 Rural households in the "between 100 and 4000" category are assumed to have the same socio-economic characteristics as households found in the "less than 100" category. Consequently, rural households in this column could be sampled to meet the "less than 100" sampling requirements.

8 Rural households in the "over 4000" category are assumed to have the same socio-economic characteristics as households found in the "less than 100" category. Consequently, rural households could be sampled to met the "less than 100"sampling requirements.

TABLE 2: PAGE 2 OF 2

	Size of Population Centres		
Economic Base	**less than 100**	**between 100 and 4,000[9]**	**Over 4,000[10]**
Resource-based	Windfall Little Smoky M.D of Yellowhead #94 M.D. of Woodland #15 M.D. of Greenview M.D. of Brazeau I.D. 18 (North) I.D. 21	Athabasca (675) Blue Ridge (648) Cadomin (692) Fort Assiniboine (584) Fox Creek (622) Grande Cache (827) Grouard (751) High Prairie (523) Hines Creek (494) La Crete (928) Manning (836) Red Earth Creek (649) Robb (794) Trout Lake (869) Valleyview (524)	Edson (723) Fort McMurray (743, 790,791,799) Hinton (865) Slave Lake (849) Whitecourt (778)
Service/ Government/ Tourism	I.D. 12 I.D. 24	Fort Smith (872) Fort Resolution (394) Grimshaw (332) High Level (926) Lac La Biche (623) McLennan (324) Swan Hills (333)	Grande Prairie (532, 538,539,831) Peace River (624) Jasper (852,866)
Traditional	see Table 4	see Table 4	

9 Rural households in the "between 100 and 4000" category are assumed to have the same socio-economic characteristics as households found in the "less than 100" category. Consequently, rural households in this column could be sampled to meet the "less than 100" sampling requirements.

10 Rural households in the "over 4000" category are assumed to have the same socio- economic characteristics as households found in the "less than 100" category. Consequently, rural households could be sampled to met the "less than 100" sampling requirements.

B.4.3 Native and Métis Populations

Table 3 lists the Native and Métis communities found in the study area, their respective populations and the prefixes they are found under. The total population of Status Indians and Metis living in Metis Settlements is 27,343 or approximately 10% of the population of the study area. Given that Native and Metis communities are found in the same phone exchange as non-native communities, we anticipate that approximately 10% of the random calls will be with Native or Metis respondents.

B.4.4 Summary

Using these criteria, settlement size, economic base and ethnicity - a total of 11 strata can be defined for the study area. These strata are as follows:

Economic Base	Over 4,000	Between 100 and 4,000	Rural
Agriculture	8,879	11,872	83,205
Resource-based	63,000	14,913	23,426
Service/Government/Tourism	40,381	14,839	5,700
Traditional		3,490	23,857

TABLE 3: LIST OF NATIVE AND METIS COMMUNITIES IN THE NRBS AREA

Indian Reserves	Prefixes		Population
Beaver First Nation	927	(Fort Vermilion exchange)	602
Bigstone Cree Nation	891	(Wabasca exchange)	4243
Dene Tha' Band	321	(Assumption exchange)	2000
Duncan Band	597	(Brownvale exchange)	143
Horse Lake Band	356	(Hythe exchange)	483
Kapaw'eno First Nation	751	(Grouard exchange)	205
Little Red River Cree Nation	759	(Jean D'Or Prairie exchange)	2416
Loon River Cree Band	649	(Red Earth exchange)	309
Lubicon Lake Band	629	(Little Buffalo Lake exchange)	251
Sawridge Band	849	(Slave Lake exchange)	289
Sturgeon Lake Band	524	(Valleyview exchange)	1644
Sucker Creek Band	523	(High Prairie exchange)	1603
Swan River First Nation	775	(Kinuso exchange)	781
Tallcree Band	927	(Fort Vermilion exchange)	739
Whitefish Lake Band	767	(Gift Lake exchange)	1372
Woodland Cree Band	629	(Little Buffalo Lake exchange)	682
Athabasca Chipewyan First Nation	697	(Fort Chipewyan exchange)	555
Fort McKay First Nation	828	(Fort McKay exchange)	430
Fort McMurray #468 First Nation	334	(Anzac exchange)	407
Heart Lake First Nation	623	(Lac La Biche exchange)	201
Janvier Band	559	(Conklin exchange)	464
Mikesew Cree First Nation	697	(Fort Chipewyan exchange)	1746
Driftpile Band	355	(Faust exchange)	1559
Fort Smith	1430		
Fort Resolution	465		
Métis Settlements	**Prefixes**		**Population**
East Prairie	523	(High Prairie exchange)	260
Gift Lake	767	(Gift Lake exchange)	697
Paddle Prairie	981	(Keg River exchange)	470
Peavine	523	(High Prairie exchange)	363
Buffalo Lake	689	(Boyle exchange)	534

B.5 DETAILED SAMPLE DESIGN

After the 11 socio-economic strata were identified, the next step was to identify how the samples were to be drawn within each stratum. Below, we outline how each sample frame was determined for each stratum.

Stratum #1

Agriculture: Towns With Over 4,000 Residents

Only two towns with populations larger than 4,000 people were identified in the agriculture economic base. Consequently, the telephone prefixes "674" and "349" represent the sample frame for towns in the agriculture economic base with populations over 4,000 residents.

Town	Prefix	Population	% of Total
Barrhead	674	4160	47
Westlock	349	4719	53
TOTAL		8879	100

Stratum #2

Agriculture: Towns With 100 - 4,000 Residents

Overall, 25 telephone prefixes were identified in the agriculture economic base (Table 3).

Town	Prefix	Population	% of Total
Beaverlodge	334	1779	18
Berwyn	338	606	6
Fahler	837	1183	12
Girouxville	323	349	3
Hythe	356	623	6
Kinuso	775	254	3
Mayerthorpe	786	1692	17
Plamondon	798	253	3
Rycroft	765	634	6

Town	Prefix	Population	% of Total
Spirit River	864	1044	10
Wanhan	694	216	2
Wembley	766	1424	4
TOTAL		10057	100

Stratum #3

Agriculture: Rural Populations

Within each economic base, the strata for the towns with 100 - 4,000 and over 4,000 residents will be sampled first, but these strata will include urban and rural households. To separate rural households a screening question should be used when sampling people from these strata. This screening question will enable the telephone surveyor to identify whether the person being sampled is from an urban or rural (farm or community with less than 100 residents) area. If the person answering the phone is from a rural area, they will be sampled until the recommended sample size *(n)* for the town has been reached. Therefore, depending on the rural population associated with the prefix, all 90 of the rural residents needed for the rural strata could be sampled while attempting to sample the urban residents. However, it is likely that less than (*n*) rural residents will be screened during the sampling of towns with 100 - 4,000 and over 4,000 residents and it will be necessary to sample additional rural residents. Therefore, we identified I.D.s and M.D.s that are primarily agriculture-based (see Table 3) to facilitate the sampling process. These I.D.s/M.D.s are listed below. The choice of these I.D. or M.D. are based on two conditions. First, it was felt that they were relatively homogeneous economically which means that the likelihood of reaching a non-agricultural community was smaller than in other regions. Secondly, we did not select all I.D. or M.D. that were identified as agricultural because it would have led to very small sample size according to prefixes and would have rendered the administration of the survey more difficult.

I.D. or M.D.	Prefix	Rural Pop. of I.D. or M.D.	% of Total
I.D. 124	369	2274	13
I.D. 125	355	3833	21
I.D. 20	353	2772	16
I.D. 23	927	7260	41
M.D. 135	597	1559	9
TOTAL		17698	100

Stratum # 4

Resource-Based: Towns With Over 4.000 Residents

Five towns with populations larger than 4,000 people were identified in the resource-based economic base. The prefixes and current population for each town is provided below.

Town	Prefix	Population	% of Total
Edson	723	7323	12
Fort McMurray	743, 790, 791, 799	34706	54
Hinton	865	9108	14
Slave Lake	849	5602	9
Whitecourt	778	7056	11
Total		63795	100

Stratum #5

Resource Based: Towns With 100 - 4.000 Residents

Overall, 15 telephone prefixes were identified in the resource-based economic base (Table 2). The towns and telephone prefixes for this stratum are provided below.

Town	Prefix	Population	% of Total
Athabasca	675	2278	15
Blue Ridge	648		
Cadomin	692		
Fort Assiniboine	584		
Fox Creek	622	2260	15
??????????	751		
Grande Cache	827	3842	26
High Prairie	523	2932	20
Hines Creek	494	423	3
La Crete	328		
Manning	836	1139	7
Red Earth	524		
Robb	794		
Terrel Lake	869		
Valleyview	524	2038	14
TOTAL		14912	100

Stratum #6

Resource-Based: Rural Populations

As discussed above, the strata for the towns with 100 - 4,000 and over 4,000 residents will be sampled first and a screening question will be used to distinguish rural from urban residents. If the person answering the phone is from a rural area, they will be sampled until the recommended sample size (*n*) for the town has been reached. Therefore, depending on the rural population associated with the prefix, all of the rural residents needed for the rural strata could be sampled while attempting to sample the urban residents. However, it is likely that less than (*n*) rural residents will be screened during the sampling of towns with 100 - 4,000 and over 4,000 residents and it will be necessary to sample additional rural residents. Therefore, we identified I.D.s and M.D.s that are primarily resource-based (see Table 2) to facilitate the sampling process. These I.D.s/M.D.s are listed below.

I.D. or M.D.	Prefix	Rural Pop. of I.D. or M.D.	% of Total
I.D. 14 (M.D. of Yellowhead #94)	727	8692	49
I.D. 18 (North)	899	2550	15
M.D. of Brazeau 77	894	6301	36
TOTAL		17543	100

Stratum #7

Service/Government/Tourism: Towns With Over 4,000 Residents

Three towns with populations larger than 4,000 people were identified in the Service/Government/Tourism economic base. The population and telephone prefixes for each of these towns is provided below.

Town	Prefix	Population	% of Total
Grande Prairie	532, 538, 539, 831	28271	70
Jasper	852, 866	5414	13
Peace River	624	6696	17
TOTAL		40381	100

Stratum #8

Service/Government/Tourism: Towns With 100 - 4,000 Residents

Overall, 7 towns with populations between 100 and 4,000 were identified in the Service/Government/Tourism economic base (Table 2).

Town	Prefix	Population	% of Total	n
Fort Resolution	425	515	3	3
Fort Smith	425	2481	17	15
Grimshaw	332	2812	19	17
High Level	926	2921	20	18
Lac La Biche	623	2737	18	16
McLennan	324	1026	7	6
Swan Hills	333	2348	16	15
TOTAL		14839	100	90

Stratum #9

Service/Government/Tourism: Rural Populations

Because no district rural-based prefixes were identified for the Service/Government/Tourism economic base, all people selected for this population strata will be sampled during the survey of residents in the Between 100 and 4,000 and Over 4,000 strata, and will be selected using the screening questions in the survey.

Stratum #10 and #11

Traditional

The Agriculture, Resource-based, and Service/Government/Tourism economic bases will be sampled first. As discussed earlier, a screening question will be used to discern whether households should be placed into the Traditional economic base. Moreover, a second screening question will enable the telephone surveyor to identify whether the person being sampled is from an urban or rural (farm or community with less than 100 residents) area. If the person answering the phone is of Traditional origin, they will be sampled until the recommended sample sizes for Traditional residents of rural areas and towns with populations between 100 and 4,000 are reached. Therefore, depending on the density of the Traditional population associated with the prefix, all of the Traditional-based households needed for the rural and 100 - 4,000 population strata could be sampled in the process of sampling the Agriculture, Resource-based, and Service/Government/Tourism economic bases. However, if fewer households are identified during the screening process, it will be necessary to sample additional Traditional people. Therefore, we randomly selected 7 prefixes that are associated with each of the Indian Reserves and Metis Settlements in the Northern Rivers study area. The population and telephone prefixes of major reserves and settlements are summarized below:

Reserve/Settlement	Prefix	Population	% of Total
Kapawēno First Nation	751	205	6
Loon River Cree Band	649	309	9
Sawridge Band	849	289	8
Swan River First Nation	775	781	22
Tallcree Band	927	739	21
Gift Lake	767	697	20
Paddle Prairie	981	470	20
TOTAL		3490	100

APPENDIX C: DRAFT QUESTIONNAIRE

NRBS HOUSEHOLD QUESTIONNAIRE

PART I: INTRODUCTION

Telephone Number Name of Interviewer

	Date	Time	Result
First Attempt			
Second Attempt			
Third Attempt			

1. HELLO. HAVE I REACHED:
   a. A PRIVATE RESIDENCE? *(Go to Question 2)*
   b. A BUSINESS? *(Do not continue. Thank the potential respondent and hang up. Go to next number.)*

2. CAN I PLEASE SPEAK TO AN ADULT MEMBER OF THE HOUSEHOLD?
   If there is no adult member available, ask when it would be appropriate to call back, and note below:

3. HELLO. MY NAME IS _____ AND I WORK FOR_____. WE ARE CONDUCTING A HOUSEHOLD SURVEY ON BEHALF OF THE NORTHERN RIVER BASINS STUDY. HAVE YOU HEARD OF THIS STUDY? *(Circle appropriate response)*

   a. NO *(Read following)*

   THE NORTHERN RIVER BASINS STUDY IS A FOUR YEAR STUDY OF THE EFFECTS OF DEVELOPMENT ON THE AQUATIC RESOURCES OF THE PEACE, ATHABASCA AND SLAVE RIVER BASINS, AND IS BEING CONDUCTED ON BEHALF OF THE GOVERNMENTS OF ALBERTA, NORTHWEST TERRITORIES AND CANADA.

   b. YES

4. ONE OF THE OBJECTIVES OF THE STUDY IS TO FIND OUT HOW NORTHERNERS USE AND VALUE THE PEACE, ATHABASCA AND SLAVE RIVERS.

   YOUR HOUSEHOLD HAS BEEN SELECTED AT RANDOM TO HELP US PROVIDE THIS INFORMATION.

   WE NEED YOUR COOPERATION TO ANSWER A SERIES OF QUESTIONS ABOUT HOW YOU AND MEMBERS OF YOUR HOUSEHOLD MAKE USE OF THE AQUATIC RESOURCES OF THE REGION.

WE NEED TO COLLECT INFORMATION FROM ABOUT 1,000 HOUSEHOLDS AND INDIVIDUAL RESPONSES WILL KEPT CONFIDENTIAL.

5. THIS SURVEY CAN BE DONE IN ANY OF THREE WAYS.

   a. WECAN DO THE SURVEY OVER THE TELEPHONE NOW IN ABOUT 30 MINUTES,
   b. WE CAN MAIL YOU THE QUESTIONNAIRE AND THEN CALL YOU BACK IN A COUPLE OF WEEKS TO COLLECT THE INFORMATION.
   c. WE CAN MAIL YOU A QUESTIONNAIRE FOR YOU TO MAIL BACK; OR,

WHICH OF THESE METHODS WOULD YOU PREFER. *(Circle the appropriate response)*

5A. *IF A: PROCEED WITH THE REMAINDER OF THE SURVEY*

5B. *if b. or c.:*

WHAT IS YOUR MAILING ADDRESS SO THAT WE CAN SEND YOU THE QUESTIONNAIRE?

THANK YOU FOR YOUR ASSISTANCE. WE LOOK FORWARD TO RECEIVING YOUR INFORMATION IN THE NEXT FEW WEEKS.

6. *IF RESPONDENT DOES NOT WANT TO PARTICIPATE IN THE SURVEY:*

ARE THERE ANY PARTICULAR REASONS WHY YOU DON'T WANT TO PARTICIPATE? *(Record reasons below)*

THANK THEM FOR THEIR TIME AND COOPERATION.

PART II SCREENING QUESTIONS

THE FIRST PART OF OUR SURVEY ASKS SOME GENERAL QUESTIONS ABOUT YOU AND YOUR HOUSEHOLD.

7a. WHERE ARE YOU CURRENTLY LIVING? *(Read list. Circle appropriate response.)*

a. Town/city (specify) . _ *(Go to Question 8.)*
b. Farm
c. Cottage/rural subdivision
d. Native reserve.
e. Metis Settlement
f. Other (specify).

7b. *(If b to f selected)*. WHAT IS THE NAME OF THE CLOSEST CITY, TOWN, HAMLET OR VILLAGE?

8. HOW LONG HAVE YOU BEEN LIVING AT THIS LOCATION? *(Read list. Circle appropriate response.)*

a. Less than 1 year.
b. Between 1 and 3 years.
c. Between 3 and 7 years.
d. Between 7 and 10 years.
e. More than 10 years.

9. HOW LONG HAVE YOU BEEN LIVING AT LOCATIONS IN THE PEACE, SLAVE OR ATHABASCA RIVER BASINS? *(Read list. Circle appropriate response.)*

a. Less than 1 year.
b. Between 1 and 3 years.
c. Between 3 and 7 years.
d. Between 7 and 10 years.
e. More than 10 years.

10a. WHICH OF THE FOLLOWING MAJOR RIVERS IS NEAREST YOUR CURRENT RESIDENCE?
(Read list. Circle appropriate response.)

a. Athabasca River
b. McLeod River
c. Pembina River
d. Peace River
e. Wapiti River
f Smoky River
g. Little Smoky River.
h. Wabasca River
i. Slave River

10b. APPROXIMATELY HOW FAR AWAY IS THIS RIVER FROM YOUR CURRENT RESIDENCE?

_____ kilometres OR _____ Miles

11. DO YOU IDENTIFY YOURSELF AS BELONGING TO: (*Read list. Circle appropriate response.)*

a. An Aboriginal Group *(Go to Question 12)*
b. A Metis Group. *(Go to Question 13).*
c. Non-Native Group. *(Go to Question 14)*

12. ARE YOU A REGISTERED INDIAN?

_____ yes _____ No

13. DO YOU CURRENTLY LIVE: (*Read list. Circle appropriate response.)*

a. On a Reserve
b. Off Reserve.
c. In a Metis Settlement
d. Outside a Metis Settlement

14. WHICH OF THE FOLLOWING CATEGORIES BEST DESCRIBES YOUR HOUSEHOLD. (*Read list. Circle appropriate response.)*

a. Single Person
b. Couple with no children
c. Couple with children
d. Extended family
e. Single parent family
f. Two or more unrelated adults
g Two or more related adults
h Other *(describe below)*

15. HOW MANY PEOPLE IN YOUR HOUSEHOLD LIVE AT THIS LOCATION? people

16. HOW MANY PEOPLE IN YOUR HOUSEHOLD ARE IN THE FOLLOWING AGE CATEGORIES? (*Read list. Enter appropriate number and make sure total is same as in Question 15.)*

a. Under 5 years old _____
b. 5 to 9 years old _____
c. 10 to 14 years old _____
d. 15 to 19 years old _____
e. 20 to 34 years old _____
f. 35 to 44 years old _____
g. 45 to 54 years old _____
h. 55 to 64 years old _____
i. 65 years and older _____

17. WHAT AGE CATEGORY DO YOU BELONG TO? (*Read again and record response)*

18. SEX OF RESPONDENT? *(Guess but confirm if necessary)* Male Female

19. IN WHICH OF THE FOLLOWING INDUSTRIES ARE YOU AND MEMBERS OF YOUR HOUSEHOLD CURRENTLY EMPLOYED? *(Read list. Circle appropriate responses.)*

a. Agriculture
b. Trapping/Commercial Fishing
c. Oil and gas
d. Forestry (Logging)
e. Manufacturing (Lumber, paper,, etc.)
f. Construction
g. Transportation/Communications/Utilities
h. Retail or Wholesale Trade
i Finance, Insurance, Other Services
j. Government (Health, education)
k. Unemployed
l. Other (specify)

_____

PART III USE OF AQUATIC RESOURCES

THE NEXT PART OF OUR SURVEY ASKS SOME GENERAL QUESTIONS ABOUT HOW YOU AND YOUR HOUSEHOLD USE THE WATER, FISH, PLANTS AND WILDLIFE IN THE BASIN.

SECTION A: DRINKING WATER/DOMESTIC WATER

20. WHAT IS THE SOURCE OF YOUR HOUSEHOLD'S EVERYDAY DRINKING WATER? *(Read list. Circle appropriate response.)*

a.	Municipal water plant		*(Go to Question 22)*
b.	Bottled water		*(Go to Question 22)*
c.	Well		
d.	Surface water (lake, river)	Name source	_____
e.	Dug out		
f.	Spring water		
g.	Other	*(describe)*	_____

21. DO YOU TREAT THIS WATER IN ANY WAY BEFORE DRINKING IT? *(Check appropriate response.)*

No _____ Yes _____ *(Describe)* _____

_____

22. ARE THERE ANY PROBLEMS WITH THE QUANTITY OF WATER AVAILABLE FROM THIS SOURCE THROUGHOUT THE YEAR? *(Check appropriate response.)*

No _____ Yes _____ *(Describe)* _____

_____

23. ARE THERE ANY PROBLEMS WITH THE QUALITY OF WATER AVAILABLE FROM THIS SOURCE THROUGHOUT THE YEAR? *(Check appropriate response.)*

No _____ Yes _____ *(Describe)* _____

_____

24. OVER THE LAST 5 YEARS HAVE THERE BEEN ANY NOTICEABLE CHANGES IN THE QUALITY OR QUANTITY OF WATER YOU AND MEMBERS OF YOUR HOUSEHOLD HAVE BEEN DRINKING AND USING FOR HOUSEHOLD PURPOSES? *(Check appropriate response.)*

_____ No *(Go to Question 25)* _____ Yes

IF YES, DESCRIBE THE TYPES OF CHANGES (I.E., SMELL, COLOUR, TASTE, CLARITY) YOU HAVE NOTICED.

SECTION B: SUBSISTENCE USE OF AQUATIC RESOURCES

If you or members of your household use the aquatic resources of the basin for subsistence purposes, please answer the following questions. By subsistence, we mean harvesting fish or wildlife solely for consumption or as a source of income. If you are not a subsistence user, go to Section C.

25. HOW OFTEN DO YOU OR MEMBERS OF YOUR HOUSEHOLD PARTICIPATE IN THE FOLLOWING SUBSISTENCE ACTIVITIES: *(Read list. Check appropriate response for each activity)*

	Daily	Weekly	Monthly	Yearly
Fishing				
Trapping				
Hunting				
Other				

Specify _____

SUBSISTENCE FISHING

IF RESPONDENT OR HOUSEHOLD DOES NOT PARTICIPATE IN SUBSISTENCE FISHING, GO TO QUESTION 31.

26. LIST IN ORDER OF IMPORTANCE, THE THREE SPECIES OF FISH THAT YOU PREFER TO CATCH, AND INDICATE HOW MANY POUNDS OF THESE FISH OR THE NUMBER OF THESE FISH YOU AND MEMBERS OF YOUR HOUSEHOLD CATCH IN AN AVERAGE YEAR:

Importance	Name of Species	Average Annual Catch (pounds or kilograms)	Number Caught Per Year
#1			
#2			
#3			

27. LIST IN ORDER OF IMPORTANCE, THE THREE MAIN BODIES OF WATER IN WHICH YOU AND MEMBERS OF YOUR HOUSEHOLD USUALLY FISH AND INDICATE THE PROPORTION OF TOTAL CATCH THAT COMES FROM EACH WATER BODY.

Importance	Name of Water Body	Percent of Annual Catch
#1		
#2		
#3		

28. DO YOU OR MEMBERS OF YOUR HOUSEHOLD FISH IN THE MAINSTEMS OF THE ATHABASCA, PEACE OR SLAVE RIVERS, OR ANY OF THEIR MAJOR TRIBUTARIES?

_____ No _____ Yes

IF YES, PLEASE INDICATE THE THREE MOST IMPORTANT SITES ALONG THESE RIVERS AND INDICATE THE PROPORTION OF TOTAL CATCH THAT COMES FROM EACH LOCATION.

Importance	Name of Site	Percent of Annual Catch
#1		
#2		
#3		

29. OVER THE PAST 5 YEARS HAVE YOU OR ANY MEMBERS OF YOUR HOUSEHOLD NOTICED ANY CHANGES IN EITHER THE NUMBER, QUALITY OR HEALTH OF THE FISH YOU CAUGHT?

_____ No *(Go to Question 30)* _____ Yes

IF YES, DESCRIBE THE TYPES OF CHANGES YOU HAVE NOTICED.

Number: _____

Quality: _____

Health: _____

30. HOW DO YOU USE THE FISH YOU CATCH? WHAT PROPORTION OF TOTAL ANNUAL CATCH:

	Percent of Annual Catch
IS EATEN BY YOU AND MEMBERS OF YOUR HOUSEHOLD?	
IS GIVEN AWAY TO OTHERS FOR THEIR CONSUMPTION?	
IS FED TO DOGS?	

31. ON AVERAGE, ABOUT HOW MANY POUNDS (KILOGRAMS) OF CAUGHT FISH DO YOU AND MEMBERS OF YOUR HOUSEHOLD EACH CONSUME PER WEEK?

Pounds _____ Kilograms _____ Number eaten _____

TRAPPING

32. HOW FREQUENTLY DO YOU AND MEMBERS OF YOUR HOUSEHOLD TRAP IN AN AVERAGE YEAR? *(Read list. Circle appropriate response.)*

    a. Regularly
    b. Weekends Only
    c. Occasionally
    d. Never *(go to Question 38.)*

33. LIST IN ORDER OF IMPORTANCE, THE THREE SPECIES OF FURBEARERS THAT YOU PREFER TO TRAP, AND INDICATE HOW MANY OF THESE ANIMALS YOU AND MEMBERS OF YOUR HOUSEHOLD TRAP IN AN AVERAGE YEAR:

Importance	Name of Species	Number Trapped per Year
#1		
#2		
#3		

34. IN GENERAL TERMS, PLEASE DESCRIBE THE LOCATION OF YOUR TRAPPING AREA?

35. DO YOU OR MEMBERS OF YOUR HOUSEHOLD TRAP WITHIN 10 KILOMETRES (6 MILES) OF THE MAINSTEMS OF THE ATHABASCA, PEACE OR SLAVE RIVERS, OR ANY OF THEIR MAJOR TRIBUTARIES?

    _____ No _____ Yes

    IF YES, PLEASE INDICATE THE THREE MOST IMPORTANT LOCATIONS ALONG THESE RIVERS AND INDICATE THE PROPORTION OF TOTAL CATCH THAT COMES FROM EACH LOCATION.

Importance	Name of Water Body	Percent of Annual Catch
#1		
#2		
#3		

36. OVER THE PAST 5 YEARS HAVE YOU OR ANY MEMBERS OF YOUR HOUSEHOLD NOTICED ANY CHANGES IN EITHER THE NUMBER, QUALITY OR HEALTH OF THE FURBEARERS YOU TRAPPED?

    _____ No *(Go to Question 37)* _____ Yes

IF YES, DESCRIBE THE TYPES OF CHANGES YOU HAVE NOTICED.

Number: _____

Quality: _____

Health: _____

37. DO YOU OR MEMBERS OF YOUR HOUSEHOLD EAT ANY PARTS OF THE ANIMALS YOU TRAP?

No *(Go to Question 38)* Yes

_____ _____

IF YES, PLEASE INDICATE THE TYPE OF ANIMAL, THE PARTS OF THE ANIMAL YOU EAT, AND THE NUMBER THAT YOUR HOUSEHOLD CONSUMES IN AN AVERAGE YEAR.

Species	Parts Eaten	Number Eaten per Year

SUBSISTENCE HUNTING

38. IN AN AVERAGE YEAR, ABOUT HOW MANY ANIMALS DO YOU KILL FOR FOOD (SUBSISTENCE HUNTING) EACH YEAR?

_____ Animals Killed *(If none, go to Question 43.)*

39. LIST IN ORDER OF IMPORTANCE, THE THREE SPECIES OF ANIMALS THAT YOU PREFER TO HUNT AND KILL FOR FOOD, AND INDICATE HOW MANY OF THESE ANIMALS YOU AND MEMBERS OF YOUR HOUSEHOLD KILL IN AN AVERAGE YEAR:

Importance	Name of Species	Number Killed per Year
#1		
#2		
#3		

40. DO YOU OR MEMBERS OF YOUR HOUSEHOLD HUNT WITHIN 10 KILOMETRES (6 MILES) OF THE MAINSTEMS OF THE ATHABASCA, PEACE OR SLAVE RIVERS, OR ANY OF THEIR MAJOR TRIBUTARIES?

_____ No _____ Yes

IF YES, PLEASE INDICATE THE THREE MOST IMPORTANT SITES ALONG THESE RIVERS AND INDICATE THE PROPORTION OF TOTAL KILLS THAT COMES FROM EACH LOCATION.

Importance	Name of Site	Percent of Animals Killed
#1		
#2		
#3		

41. OVER THE PAST 5 YEARS HAVE YOU OR ANY MEMBERS OF YOUR HOUSEHOLD NOTICED ANY CHANGES IN EITHER THE NUMBER, QUALITY OR HEALTH OF THE ANIMALS YOU KILLED FOR FOOD?

_____ No *(Go to Question 42)* _____ Yes

IF YES, DESCRIBE THE TYPES OF CHANGES YOU HAVE NOTICED.

Number: _____

Quality: _____

Health: _____

42. WHAT DO YOU DO WITH THE MEAT FROM ANIMALS THAT YOU HAVE KILLED? WHAT PROPORTION:

	Percent of Annual Catch
IS EATEN BY YOU AND MEMBERS OF YOUR HOUSEHOLD?	
IS GIVEN AWAY TO OTHERS FOR THEIR CONSUMPTION?	
IS FED TO DOGS?	

43. ON AVERAGE ABOUT HOW MANY POUNDS OF MEAT FROM WILD GAME DO YOU AND MEMBERS OF YOUR HOUSEHOLD EACH CONSUME PER WEEK?

_____ Pounds _____ Kilograms

GENERAL QUESTIONS

44. WHEN INVOLVED IN SUBSISTENCE FISHING, TRAPPING OR HUNTING DO YOU EVER CONSUME OR USE RIVER OR LAKE WATER? *(Check appropriate response.)*

_____ No *(Go to Question 46)* _____ Yes

45. DO YOU TREAT THIS WATER IN ANY WAY BEFORE DRINKING IT? *(Check appropriate response.)*

_____ No _____ Yes *(Describe* _____

Treatment) _____

SECTION C: RECREATIONAL ACTIVITIES

46. HOW MANY TRIPS DO YOU OR MEMBERS OF YOUR HOUSEHOLD TAKE IN AN AVERAGE YEAR FOR THE FOLLOWING OUTDOOR RECREATION ACTIVITIES?

PLEASE INDICATE THE AVERAGE LENGTH OF TRIPS IN DAYS AND THE AVERAGE NUMBER OF HOUSEHOLD RESIDENTS PARTICIPATING ON THESE TRIPS. *(Read list. Enter appropriate response for each activity)*

Activity	Number of Trips in an Average Year	Average Length of trip (Days)	Average Number of Household Residents Participating
Fishing			
Boating			
Swimming (lakes/rivers)			
Canoeing			
Camping			
Hunting			
Other			

47. LIST IN ORDER OF IMPORTANCE, THE SITES ON RIVERS AND LAKES THAT YOU AND MEMBERS OF YOUR HOUSEHOLD MOST FREQUENTLY USE FOR RECREATIONAL PURPOSES.

ALSO, INDICATE THE USUAL RECREATIONAL ACTIVITY ON THESE TRIPS, THE NUMBER OF TRIPS TO EACH SITE IN AN AVERAGE YEAR, AND THE MAIN REASON FOR PREFERRING THIS SITE.

	Site #1	Site #2	Site #3	Site #4	Site #5
Site Name					
Usual Activity					
Number of Trips per year					
Main Reason for Choosing Site					

48. DO YOU OR MEMBERS OF YOUR HOUSEHOLD USE THE MAINSTEMS OF THE ATHABASCA, PEACE OR SLAVE RIVERS, OR ANY OF THEIR MAJOR TRIBUTARIES FOR RECREATIONAL PURPOSES?

_____ No *(Go to Question 54)* _____ Yes

IF YES, PLEASE INDICATE THE THREE LOCATIONS ALONG THESE RIVERS THAT YOU USE MOST FREQUENTLY AND INDICATE THE USUAL RECREATIONAL ACTIVITY AT EACH SITE AND THE NUMBER OF TRIPS TAKEN TO EACH SITE IN AN AVERAGE YEAR.

	Site #1	Site #2	Site #3
Site Description			
Usual Activity			
Number of Trips per year			

49. LIST IN ORDER OF IMPORTANCE, THE THREE SPECIES OF FISH THAT YOU PREFER TO CATCH FROM THE MAINSTEMS OF THE ATHABASCA, PEACE OR SLAVE RIVERS, OR ANY OF THEIR MAJOR TRIBUTARIES, AND INDICATE HOW MANY POUNDS OF THESE FISH YOU AND MEMBERS OF YOUR HOUSEHOLD CATCH IN AN AVERAGE YEAR FROM THESE LOCATIONS:

Importance	Name of Species	Average Annual Catch (pounds or kilograms)
#1		
#2		
#3		

50. ON AVERAGE, ABOUT HOW MANY POUNDS OR KILOGRAMS OF FISH CAUGHT FROM THESE LOCATIONS DO YOU AND MEMBERS OF YOUR HOUSEHOLD CONSUME PER YEAR? *(Enter appropriate response.)*

Pounds	Kilograms	Number eaten
_____	_____	_____

HOW MUCH OF THE FISH CAUGHT FROM THESE WATERS IS GIVEN AWAY TO OTHERS FOR THEIR CONSUMPTION?

_____	Pounds	_____	Kilograms	_____	Number given away

51. OVER THE PAST 5 YEARS HAVE YOU OR ANY MEMBERS OF YOUR HOUSEHOLD NOTICED ANY CHANGES IN THE WATER, FISH, ANIMALS OR PLANTS ALONG THE MAINSTEMS OF THE ATHABASCA, PEACE OR SLAVE RIVERS, OR ANY OF THEIR MAJOR TRIBUTARIES? *(Check appropriate response.)*

_____ No *(Go to Question 52)* _____ Yes

IF YES, DESCRIBE THE TYPES OF CHANGES YOU HAVE NOTICED.

Water: _____

Fish: _____

Animals: _____

Plants: _____

52. WHEN INVOLVED IN WATER-BASED RECREATIONAL ACTIVITIES IN THE REGION DO YOU EVER CONSUME OR USE RIVER OR LAKE WATER? *(Check appropriate response.)*

_____ No *(Go to Question 54)* _____ Yes

53. DO YOU TREAT THIS WATER IN ANY WAY BEFORE DRINKING IT? *(Check appropriate response.)*

_____ No _____ Yes *(Describe* _____

Treatment) _____

SECTION D: AGRICULTURAL WATER USE

If you or members of your household are involved in farming of any sort, please answer the following questions. If you are not involved in farming, please go to Part IV on Page 15.

54. WHICH OF THE FOLLOWING TERMS BEST DESCRIBES YOUR FARMING OPERATION? *(Read list. Circle appropriate response.)*

    a. Grains/Oilseeds
    b. Livestock only *(Go to Question 56)*
    c. Mixed Farm (Grain and livestock)
    d. Speciality crops *(describe)* _____

55. HOW MANY ACRES DO YOU PLANT OR HARVEST IN AN AVERAGE YEAR? _____ Acres

    WHAT TYPES OF CROPS DO YOU GROW:

    _____

    _____

    _____

56. DO YOU IRRIGATE ANY OF THESE CROPS?

    _____ No *(Go to Question 57)* _____ Yes

    WHAT IS THE SOURCE OF THIS WATER (NAME THE WATER BODY)?

    DO YOU HAVE A WATER LICENCE? No Yes

    HOW MANY ACRES OF LAND DO YOU IRRIGATE IN AN AVERAGE YEAR? acres

    HOW MUCH WATER (TOTAL VOLUME) DO YOU USE IN AN AVERAGE YEAR? acre-feet

(Grain and Oilseed farmers without livestock: Go to Question 59.)

57. HOW MANY OF EACH OF THE FOLLOWING TYPES OF LIVESTOCK DO YOU HAVE?

Type of Livestock	Number
1. Cattle	
2. Horses	
3. Pigs/Swine	
4. Sheep	
5. Poultry	

Other Livestock (List)	Number
6.	
7.	
8.	
9.	
10.	

58. PLEASE DESCRIBE HOW YOU NORMALLY DISPOSE OF MANURE.

59. DO YOU USE ANY HERBICIDES?

_____ No *(Go to Question 60)* _____ Yes

PLEASE LIST THE TYPES OF HERBICIDES YOU NORMALLY USE AND THE AMOUNT (BY WEIGHT OR BY VOLUME) APPLIED IN AN AVERAGE YEAR.

Type of Herbicide (List)	Amount Applied in an Average Year
1.	
2.	
3.	
4.	

60. DO YOU USE ANY PESTICIDES?

_____ No *(Go to Question 61)* _____ Yes

PLEASE LIST THE TYPES OF PESTICIDES YOU NORMALLY USE AND THE AMOUNT (BY WEIGHT OR BY VOLUME) APPLIED IN AN AVERAGE YEAR.

Type of Pesticides (List)	Amount Applied in an Average Year
1.	
2.	
3.	
4.	

61. DO YOU USE ANY FERTILIZERS?

_____ No *(Go to Question 62)* _____ Yes

PLEASE LIST THE TYPES OF FERTILIZERS YOU NORMALLY USE AND THE AMOUNT (BY WEIGHT OR BY VOLUME) APPLIED IN AN AVERAGE YEAR.

Type of Fertilizer (List)	Amount Applied in an Average Year
1.	
2.	
3.	
4.	

PART IV WATER MANAGEMENT VALUES AND ISSUES

62. IN YOUR OPINION, WHAT THREE FACTORS HAVE HAD THE GREATEST EFFECT ON WATER QUALITY OR QUANTITY IN THE MAJOR RIVER BASIN IN WHICH YOU LIVE (PEACE, ATHABASCA OR SLAVE) OVER THE LAST 20 YEARS?
    1.
    2.
    3.

63. THINKING ABOUT THESE FACTORS YOU MENTIONED:

	Factor #1	Factor #2	Factor #3
Describe the ways in which this factor has affected water quality, fish, wildlife, vegetation or the health of the river			
Describe the ways in which this factor has affected you or members of your household			
If no steps are taken to control this factor, describe how you think the health of the rivers will be affected over the next 10 years			
If no steps are taken to control this factor, describe how you think the health of members of your household will be affected over the next 10 years			
If the Northern River Basins Study were to suggest ways for managing this problem, what actions do you think they should recommend.			

64. PLEASE IDENTIFY WHICH OF THE FOLLOWING POTENTIAL THREATS TO WATER QUALITY AND QUANTITY IN THE BASINS CAUSES YOU THE MOST CONCERN AND WHICH CAUSES YOU THE LEAST CONCERN. *(Check only one issue in each of the LEAST and MOST columns.)*

GROUP 1:

Least Concern *(Check only one)*	Threat to Water Quality/Quantity	Most Concern *(Check only one)*
	Discharges of pulp mill effluent	
	Municipal sewage	
	Agricultural run-off	
	Forestry harvesting practices	

GROUP 2

Least Concern *(Check only one)*	Threat to Water Quality/Quantity	Most Concern *(Check only one)*
	Industrial waste disposal/tailings ponds	
	Municipal sewage	
	Draining wetlands	
	Radionuclides contamination	
	Upstream hydroelectric power operations	
	Agricultural run-off	

65. PLEASE IDENTIFY WHICH OF THE FOLLOWING MANAGEMENT OBJECTIVES IS OF MOST IMPORTANCE TO YOU AND WHICH IS OF LEAST IMPORTANCE. *(Check only one issue on each of the LEAST and MOST columns.)*

GROUP 1:

Least Important *(Check only one)*	Management Objectives	Most Important *(Check only one)*
	Diversification of the regional economy through manufacturing	
	Deregulation of industry/business	
	Setting discharge standards for effluents in northern rivers	
	Increased enforcement of emissions	
	Reducing local unemployment	
	Eliminate discharge of chlorine into rivers	

GROUP 2

Least Important	Management Objectives	Most Important
	Increased flood protection	
	Protection of traditional fishing, hunting & trapping	
	Balanced provincial budget	
	Diversification of the regional economy through tourism.	

66. ONE OF THE RESPONSIBILITIES OF THE NORTHERN RIVER BASINS STUDY IS TO ASSESS THE HEALTH OF NORTHERN RIVERS. JUST AS DOCTORS MEASURE BASIC HUMAN HEALTH IN TERMS OF BLOOD PRESSURE, HEART RATE AND TEMPERATURE, DESCRIBE THE THREE MOST IMPORTANT WAYS THAT YOU WOULD USE TO MEASURE THE HEALTH OF A RIVER.

1.
2.
3.

67. THINKING ABOUT THESE MEASURES OF RIVER HEALTH:

	Factor #1	Factor #2	Factor #3
How do you think this measure of river health has changed over the last 20 years?			
How often do you think this measure of river health should be monitored?	a. hourly b. daily c. weekly d. monthly e. yearly f. every 5 years g. every 10 years	a. hourly b. daily c. weekly d. monthly e. yearly f. every 5 years g. every 10 years	a. hourly b. daily c. weekly d. monthly e. yearly f. every 5 years g. every 10 years
Who do you think should be responsible for monitoring this measure of river health?	a. government b. industry c. universities d. independent agency e. public f. other	a. government b. industry c. universities d. independent agency e. public f. other	a. government b. industry c. universities d. independent agency e. public f. other
Who do you think should be responsible for paying for monitoring this measure of river health?	a. government b. all water users c. industrial water users d. other	a. government b. all water users c. industrial water users d. other	a. government b. all water users c. industrial water users d. other

68. WHAT ARE THE THREE MOST IMPORTANT RECOMMENDATIONS THAT YOU WOULD LIKE THE NORTHERN RIVER BASINS STUDY TO MAKE?

69. DO YOU HAVE ANY OTHER COMMENTS THAT YOU WOULD LIKE TO MAKE THAT WOULD BE OF INTEREST TO THE NORTHERN RIVER BASINS STUDY?

THANK YOU FOR YOUR ASSISTANCE.