A SOCIOECONOMIC EVALUATION OF THE RECREATIONAL USE OF FISH AND WILDLIFE RESOURCES IN ALBERTA, WITH PARTICULAR REFERENCE TO THE AOSERP STUDY AREA

VOLUME I

SUMMARY AND CONCLUSIONS

by

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Prepared for the

ALBERTA OIL SANDS ENVIRONMENTAL RESEARCH PROGRAM

Project TF 6.1

December 1978

The Hon. D.J. Russell
Minister of the Environment
222 Legislative Building
Edmonton, Alberta

and

The Hon. L. Marchand
Minister of State for the Environment
Fisheries and Environment Canada
Ottawa, Ontario

Sirs:

Enclosed is the report "A Socioeconomic Evaluation of the Recreational Use of Fish and Wildlife Resources in Alberta, with Particular Reference to the AOSERP Study Area. Volume I: Summary and Conclusions".

This report was prepared for the Alberta Oil Sands Environmental Research Program, through its Terrestrial Fauna Technical Research Committee (now part of the Land System), under the Canada-Alberta Agreement of February 1975 (amended September 1977).

Respectfully,

W. Solodzuk, P.Eng.
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Deputy Minister, Alberta Environment

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VOLUME I: SUMMARY AND CONCLUSIONS

DESCRIPTIVE SUMMARY

ABSTRACT

An estimated total of 1,390,980 Albertans over five years of age engaged in nonconsumptive recreational fish and wildlife activities in the Province during 1975-76, of whom 102,600 also engaged in hunting and of whom 308,500 also engaged in fishing activities during the same period. The annual total number of recreational days amounted to 20,500,000, of which nonconsumptive use accounted for 16,700,000, angling 3,100,000, and hunting 700,000 recreation days. Among the Provincial totals, 50,170 Albertans engaged in nonconsumptive fish and wildlife use in the AOSERP study area for a total of 83,393 recreation days. Angling involved 13,168 persons for 87,014 days and hunting involved 2,203 persons for 10,354 days. An estimated 13,648 AOSERP study area residents engaged in nonconsumptive activities in the study area for 54,592 days. AOSERP study area residents angling in the AOSERP study area accounted for 4,000 persons and 39,327 days and AOSERP study area residents hunting in the AOSERP study area accounted for 1,151 persons and 6,768 days.

Province-wide consumptive use (fishing and hunting) during 1975-76 involved harvests by Albertans of 5,789,448 fish, 22,382 big game, 248,210 upland game birds and 1,097,538 waterfowl. Among these totals 164,442 fish, 216 big game, 5,730 upland birds and 1,760 waterfowl were taken in the AOSERP study area by Albertans. AOSERP study area residents harvested 81,878 fish, 176 big game animals, 3,075 upland birds, and 1,057 waterfowl in the AOSERP study area during the same year.

The annual value of fish and wildlife resources from consumptive and nonconsumptive fish and wildlife recreational uses by Albertans is an estimated $99,500,000. Of this total, AOSERP study area fish and wildlife resources account for $608,720 annually. These values exclude values by non-Albertan users, non-participant options within the Province and elsewhere, and commercial and other nonrecreational fish and wildlife uses.

BACKGROUND AND PERSPECTIVE

This report summarizes the final results of a project which compared the recreational use of fish and wildlife in the AOSERP study area to the results of a similarly oriented evaluation covering the province as a whole. Along with three accompanying volumes (Recreational Fishing, Recreational Hunting, Nonconsumptive Recreational Use of Fish and Wildlife), this report represents one of the many studies sponsored by AOSERP to determine changes to the environment from oil sands development. It differs, however, from most of the ongoing research in that the focus is social rather than physical or biological.

The study was initiated by the former Aquatic and Terrestrial Research Committees to fulfil the following objectives:

1. To ascertain the socioeconomic characteristics of participants in recreational fishing, hunting, and nonconsumptive uses of fish and wildlife in the Athabasca Oil Sands area and throughout the province;
2. To establish a detailed profile of recreational fishing, hunting, and nonconsumptive fish and wildlife use activities in the Athabasca Oil Sands area and throughout the province, particularly with regard to activity locations, durations, expenses, and species to fish and wildlife involved;

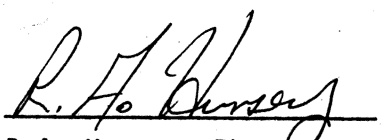
3. To determine the number of recreational days expended in these activities by Albertans in the Athabasca Oil Sands area and throughout the province;
4. To examine the desirability of different species of fish and wildlife in the Athabasca Oil Sands area; and
5. To estimate the value of fish and wildlife resources used for recreational purposes in the Athabasca Oil Sands area and throughout the province.

ASSESSMENT

The report entitled "A Socioeconomic Evaluation of the Recreational Use of Fish and Wildlife Resources in Alberta with Particular Reference to the AOSERP Study Area", which was prepared by W. Phillips, D. DePape, and L. Ewanyk (Department of Rural Economy, University of Alberta) has been reviewed by the Alberta Oil Sands Environmental Research Program. In view of the value of the report, the Alberta Oil Sands Environmental Research Program recommends that the report be published and made public.

The study provides comprehensive baseline information on the recreational use of fish and wildlife in the Athabasca Oil Sands region prior to major industrial development of the area. This background data base is necessary to measure changes in the use of these resources in view of further oil sands development and the attending increase in human populations.

The content of this report does not necessarily reflect the views of Alberta Environment, Fisheries and Environment Canada, or the Alberta Oil Sands Environmental Research Program. The mention of trade names for commercial products does not constitute an endorsement or recommendation for use.



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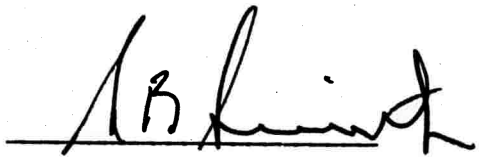

S.B. Smith, Ph.D.
Program Director
AOSERP

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ACKNOWLEDGEMENTS

This research project TF 6.1 was funded by the Alberta Oil Sands Environmental Research Program, a joint Alberta-Canada research program established to fund, direct, and co-ordinate research in the Athabasca Oil Sands area.

The results of this project represent the culmination of efforts on the part of many individuals. Appreciation is extended to those who permitted interviews and responded to mail questionnaires. Interviews were conducted by Laurie Brook, William Dunn, and Linda Westwood. The authors wish particularly to thank Linda Westwood for her work in compiling and coding interview results. Sorting and coding of mail questionnaire returns was undertaken by Dolaine DePape, Virginia Penny, Pegi Gunn-Graham, and Evelyn McElhaney. Special thanks goes to Evelyn McElhaney who also edited, typed, and proofread all four volumes of the project report. Her efforts provided welcome relief to the authors.

The role of the Department of Rural Economy, University of Alberta, and its Chairman, Alf Petersen, is gratefully acknowledged. In particular, the authors acknowledge Clare Shier for computer data processing, Gail Johnston for key punching, Ronn Bence for graphics, and Wendy Williamson for bookkeeping.

The authors wish to thank Dave Neave, Gerry Kemp, and other members of the Terrestrial Fauna Technical Research Committee and Ron Wallace, Mel Falk, and other members of the Aquatic Fauna Technical Research Committee. Their interest, support, and advice were most helpful throughout the duration of the project. The assistance given by Ron Weatherill, Program Co-ordinator, is also gratefully acknowledged.

Finally, the authors wish to extend their gratitude to Carol Ward, Alberta Fish and Wildlife Division, whose role as project co-ordinator and whose assistance at every stage of the project activity was invaluable. Her efforts were vital to the success of the project.

FORWARD

This report is Volume I of a four volume set entitled "A Socioeconomic Evaluation of the Recreational Use of Fish and Wildlife Resources in Alberta, with Particular Reference to the AOSERP Study Area." The four volumes carry the following subtitles: Volume I, Summary and Conclusions; Volume II, Recreational Fishing; Volume III, Recreational Hunting; and Volume IV, Nonconsumptive Recreational Use of Fish and Wildlife.

The project, which began in January 1976, was financed by the Alberta Oil Sands Environmental Research Program under the auspices of the Aquatic and Terrestrial Fauna Technical Research Committees. Phase I of the project, the design phase, was carried out by the authors under a contract between the Alberta Oil Sands Environmental Research Program and I.M.P.A.C.T. Environomics Ltd. Phase II of the project, the implementation and analysis phase, was carried out by the authors under a contract between the Alberta Oil Sands Environmental Research Program and the University of Alberta. The work in Phase II was undertaken at the Department of Rural Economy, University of Alberta.

1. BACKGROUND, SCOPE, AND OBJECTIVES

1.1 PUBLIC RESOURCE ALLOCATION OBJECTIVES

A socioeconomic evaluation of the recreational use of fish and wildlife resources in Alberta, with particular emphasis given to the Alberta Oil Sands Environmental Research Program (AOSERP) study area (Figure 1), is the focus of this study. Three distinct components of fish and wildlife recreational use are detailed in three subsequent volumes. They are: (1) Fishing activities, Volume II; (2) Hunting activities, Volume III; and (3) Nonconsumptive activities (such as viewing and photographic), Volume IV. The results of the subsequent three volumes are summarized and analyzed in their report, Volume I. Before presenting the results and accompanying analysis, however, a conceptual perspective, including a definition of socioeconomic evaluation and its place in public resource allocation decisions, is essential.

A central question addressed by a socioeconomic evaluation is: What is the most appropriate natural resource use pattern which will best serve the interests of Canadians and, in particular, Albertans? The objective of serving the best interests of society may be expressed in terms of maximizing the present value of social net benefits. Present values are determined by discounting the future stream of values--in this case discounting the flow of future social net benefits. Present values are determined by discounting the future social net benefits; that is, social benefits less social costs. Social benefits and costs include all benefits and costs regardless of incidence, i.e., regardless of the distribution of the benefits and costs among different members of a specified society. Meeting the social net benefit maximization objective is a difficult if not impossible task due to complexities too numerous to treat in depth here. In essence, attaining this objective requires the allocation of natural resources among major use categories such as oil extraction and fish and wildlife uses. Allocation issues also arise within each use category. For example,

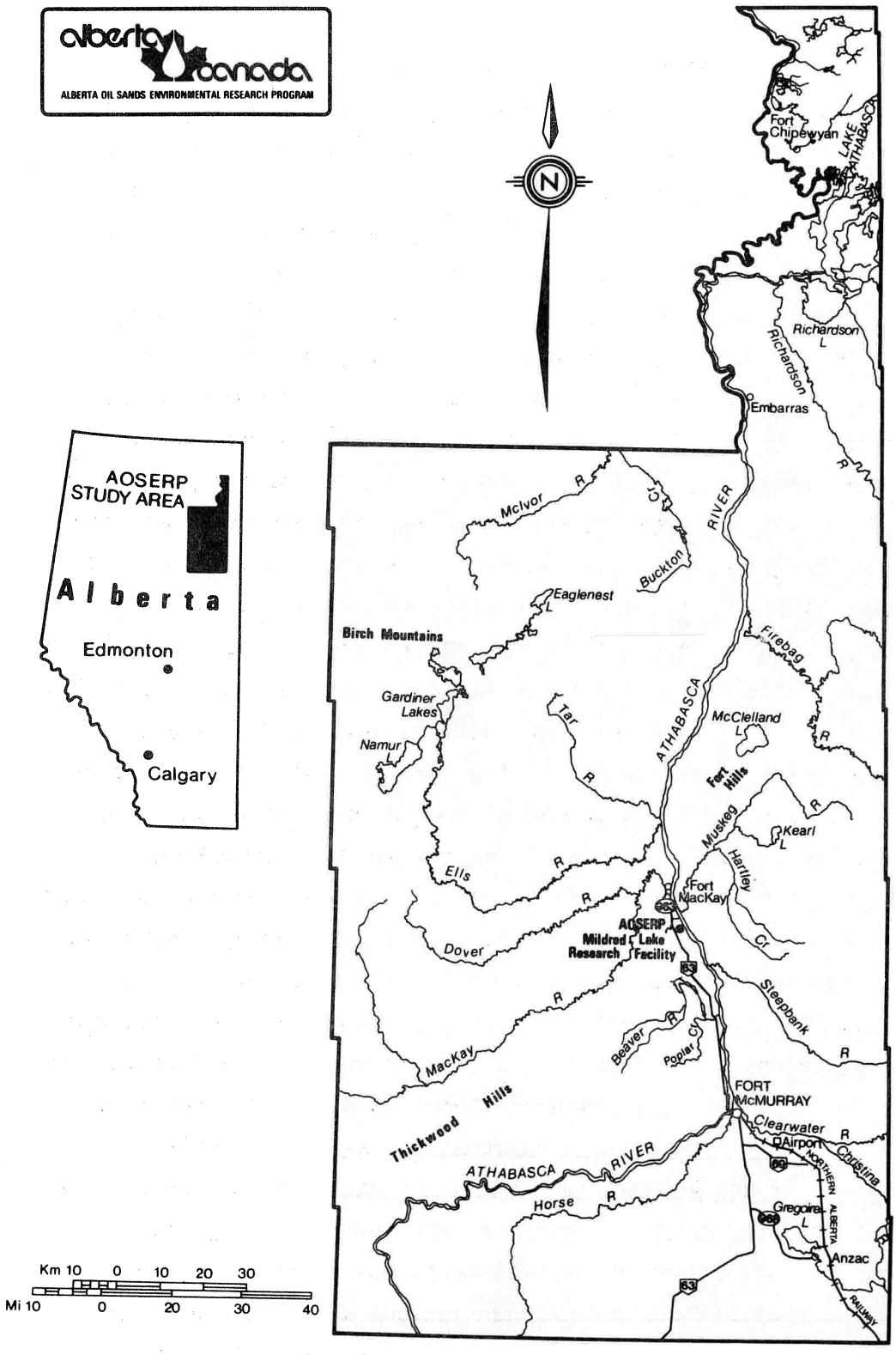

Figure 1. Map of the AOSERP study area.

within the fish and wildlife use category, there occur recreational hunting, fishing and trapping, scientific uses, subsistence uses and so on.[1]

The issues are not so much those of deciding among uses so that some are permitted at the exclusion of others, but rather those of determining optimum levels of utilization within and between categories so that net benefits are maximized. For example: How much habitat should be protected? What population of species should be maintained? To what extent should different fish and wildlife uses be permitted? Answers to these questions require, among other things, that all possible resource combinations be known and that all current and future benefits and costs be known. This information is essential in selecting that combination or resource use pattern which renders the greatest net benefit.

One important drawback of resource evaluation is the fact that measures of benefits and costs for some uses are not readily available. For example, oil extraction provides goods and services which can be assigned market prices which in turn provide ready measures of benefits and costs. Fish and wildlife oriented recreational activities, on the other hand, have values (particularly benefits) which are minimally reflected in market prices (e.g., license fees) if at all. Value portions not reflected in the market place are termed extramarket values or extramarket benefits or costs (Ciriacy-Wantrup 1968). The current extramarket values associated with fish and wildlife uses can be measured in part. This report deals with such measurement. The information provided is important in determining the direction resource allocations should take in order to increase social net benefits to society.

Another important drawback of resource evaluation is uncertainty about future benefits and costs. Because of this uncertainty, resource allocation decisions at best can only be made

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[1]This study focuses only on recreational hunting, fishing, and nonconsumptive uses. A complete assessment of fish and wildlife would also include the other uses mentioned here as well.

in the direction of increasing social net benefits in an incremental fashion, as opposed to arriving at a once and for all optimum resource allocation. Future benefits and costs become better known only with the passage of time and further incremental resource allocation decisions can then be made on the basis of the new information. Along with these future values are current values, particularly benefits, which cannot be measured. Consequently, the net benefit maximization policy objective may have to be reformulated, not in terms of maximizing a definite quantitative net gain, but in terms of choosing policy alternatives whereby maximum possible losses are minimized. This policy objective, called "safe minimum standard of conservation", is one of incurring costs (like an insurance premium) for safeguards in order to minimize the probability of high cost irreversible outcomes (Ciriacy-Wantrup 1968). Establishment of safe minimum standards is often appropriate for resource uses characterized by benefits and costs that defy quantitative measurement. For example, fish and wildlife uses may be permanently displaced by oil extraction in the AOSERP study area. However, by incurring costs to bring about certain environmental safeguards, such displacement can be reduced, thus retaining current and potential values and options associated with fish and wildlife uses. By acknowledging the fact that there are current values which cannot be measured, as well as future values which are at present uncertain, the importance of adopting a resource use policy strategy that recognizes these considerations becomes clear. Hence, the importance of the safe minimum standard of conservation approach emerges. In addition to measuring some nonmarket values, the analysis below also addresses those nonmeasurable benefits and costs associated with the recreational use of fish and wildlife.

1.2 METHODOLOGICAL FRAMEWORK OF EVALUATION: AN OVERVIEW

The process of resource evaluation must begin with information regarding physical and biological inputs and outputs pertaining to an area such as the AOSERP study area. An inventory of natural resources, their locations, and alternative uses must be taken.[1] The quantity and quality of nonrenewable resources, as well as mineral deposits, will define the physical potential of nonrenewable resource extraction operations in the area. Water resource development potential for municipal and industrial uses, navigation, and waterbased outdoor recreation represents another major use category. Other renewable resource uses such as forestry, outdoor recreation, and wildlife habitat form the third major use category. However, these major use categories cannot be examined in isolation. The impact of oil extraction on renewable resource use alternatives, for example, may be considerable and exemplifies the need for information regarding interrelationships among the major use categories. Furthermore, interrelationships within major use categories require examination. The interaction between industrial water use and sport fishing, and the interaction between hunting and wildlife management are just two examples. In other words, multiple land use evaluation must begin with use potentials and the physical and biological complementarity, substitutability and competitiveness among these resource uses. Once this information is gathered it is then possible to develop physically and biologically feasible alternative resource use patterns. Only then can comprehensive socioeconomic evaluation begin.

Socioeconomic evaluation can draw on a number of evaluative techniques such as activity analysis (e.g., linear and nonlinear programming and input-output analysis) and extramarket

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[1]This type of inventory is already underway by the Alberta Oil Sands Environmental Research Program.

value estimation techniques (e.g., willingness to pay and travel cost techniques). However, regardless of the techniques employed, an overall evaluation framework of benefit-cost analysis is essential. This procedure usually involves the measurement of social benefits and costs associated with existing resource uses in a region such as the AOSERP study area.

As indicated previously, the use of market prices in evaluating existing nonrenewable resource uses offers readily available measures of benefits and costs. Certain private entities developing and managing publicly owned resources have economic incentives to do so only as long as the benefits exceed the costs incident upon these entities. However, benefits and costs exist which are incident upon those in society other than the private entrepreneurs involved. These external benefits and costs must be taken into account in order to fully assess the value of existing nonrenewable resource uses to society as a whole. These benefits and costs are often largely, if not solely, extramarket. Examples of external costs include soil, water, and air pollution, and reduction in fish and wildlife habitat and outdoor recreational opportunities. External benefits may include improved accessibility and other associated developments. Some of these extramarket values can be measured, as shown below, while others cannot. Those benefits and costs which defy measurement must enter the evaluation qualitatively (usually descriptively) rather than quantitatively. Evaluation of existing renewable resource uses in a region such as the AOSERP study area is more difficult since these resources are publicly administered and their values are largely extramarket. These include fish and wildlife and outdoor recreation.

Evaluation of social benefits and costs (including external benefits and costs) for alternative resource use patterns in an area indicates, in part, the direction public policy for future development and management should take. For example, resource use priorities should be given to those uses which offer the greatest social net benefits over time. However, there are two related effects that must also be included in evaluation. First, projected demand for

goods and services rendered by these priority uses may not increase sufficiently to permit development approximating physical or biological potentials. Second, social costs may increase at rates higher than social benefits. In other words, as long as added social benefits exceed social costs, expanded resource use will be in society's best interest. Another factor to consider in avoiding substantial error in resource allocation is the fact that in some instances, increased development can be of such magnitude that it affects the price of the goods or services it produces. This result limits the usefulness of benefit-cost analysis unless such price changes can be taken explicitly into account.

Some of the external costs of increased resource development may render that development alternative uneconomic even though the external cost incurred is extramarket and cannot be measured. For example, the irreversible loss of a substantial amount of fish and wildlife is difficult to quantify. However, steps can be taken to insure against such loss (safe minimum standard). These steps may call for certain restrictions on the development alternative. This method of dealing with high cost irreversibilities appear to have wide application in dealing with current and future scenic values, wilderness values, fish and wildlife values, outdoor recreation values, and others of a similar nature. That same development alternative may look even less attractive to society as a whole if alternative sites outside the area offer similar prospects with far less external effects. For example, energy resource development sites outside the AOSERP study area but within the province may be preferable in terms of reduced external costs. Furthermore, future oil sands development options still remain intact.

The methodological evaluation scheme outlined so far deals only with direct social benefits and costs; that is, those benefits and costs that arise directly from resource use. However, indirect benefits and costs exist which have importance for measuring regional economic impact generated by resource development and management.

Any development scheme will attract other activities such as retail services, banking, and other professional and trade services required by those directly connected with the resource development project (e.g., Fort McMurray and the Athabasca Oil Sands development projects). Thus, part of the income paid to the project personnel is passed on to others not directly involved with the project, thereby generating secondary economic activity. Associated with this secondary activity are indirect benefits and costs which can be measured with the aid of input-output analysis. Input-output analysis allows measurement of the flow of goods and services within an area as well as into and out of that area. Thus, impact multipliers can be generated which indicate the indirect value to the area's economy as a result of every dollar spent directly on the resource project.

While indirect social net benefits from resource use alternatives may be included in benefit-cost analysis from a regional viewpoint, they may have no value to the province or nation as a whole. The added economic activity and resulting indirect social benefits to the AOSERP study area may be offset by a corresponding decrease in economic activity in other parts of the province or country; that is, indirect benefits and costs may be considered transfers and have little or no net effect on society as a whole. However, the redistribution of economic acitivity (i.e., income redistribution) may be desirable from an equity point of view. Thus, while indirect benefits and costs should not be part of analyzing the resource allocation question, in terms of net benefit maximization they are meaningful components of the incidence of income distribution questions.

1.3 POLICY FORMULATION AND IMPLEMENTATION: AN OVERVIEW

The methodological framework outlined here can be employed to determine orderly development and use of natural resources in regions such as the AOSERP study area. However, once the direction and extent of resource use patterns serving society's best interests are determined, public policies facilitating this result are necessary.

Existing economic incentives and subsequent actions of private entities will not result in resource use consistent with maximizing social net benefits. The reason for this inconsistency has to do in part with public resource ownership, externalities, and the existence of extramarket values. In the absence of public policy, far more emphasis will be put on resources with market prices (e.g., oil extraction) thus resulting in a lag in the protection or use of other resources (e.g., recreational use of fish and wildlife). Government regulation is therefore essential to correct the imbalance.

There are two basic ways of regulating private resource users: (1) imposing penalties or prohibitions to discourage certain kinds of actions; and (2) offering subsidies or remuneration to encourage certain other kinds of actions. Existing laws (acts, guidelines, and regulations) governing property may be changed or new laws may be needed to reduce conflict among various private and public resource use interests and to bring private benefits and costs into closer alignment with social benefits and costs. For example, environmental damage due to oil sands development results in a cost to society as a whole and is not borne solely by oil interests. Through government regulation this external cost can be reduced or shifted onto the oil producing entities in such a way that the interests of society as a whole are better served. Such actions need not preclude oil sands development but rather may serve to alter certain activities associated with this development through such means as environmental protection or reclamation. Hence, governments at different levels must not only take responsibility for evaluation, but also for policy formulation and implementation as well, if society's best interests are to be served.

Current and potential resource use conflicts must be brought into focus. The wishes of individuals and groups constituting society at large which are not reflected in the market place must be ascertained and priorities for evaluation established.

Gathering comprehensive physical, biological, and socioeconomic information for the AOSERP study area is a monumental task and is subject to continual updating. Therefore, resource utilization changes and additions should take place incrementally over time--not on an ad hoc basis, but in a systematic manner. Because of uncertainty, resource use plans should include sufficient flexibility and safeguards to allow for changes in those plans as new developments take place or as new information becomes available. For example, the increasing demand for the recreational use of fish and wildlife may increase substantially in the future, but the nature and extent of future increases are uncertain. Without flexibility in resource use, future outdoor recreational needs may not be fulfilled in accordance with society's best interests because of irreversible actions taken in the past.

1.4 RECREATIONAL USE OF FISH AND WILDLIFE: OBJECTIVES AND PERSPECTIVES

This socioeconomic evaluation of the recreational use of fish and wildlife resources in the Athabasca Oil Sands area and throughout the province represents but a small part of the physical, biological, and socioeconomic research sponsored by the Alberta Oil Sands Environmental Research Program. It also represents but a small portion of the input requirements essential for comprehensive public resource use decision making processes as presented above.

A quantum jump in international oil prices as well as the deterioration of Canada's balance of trade in oil has generated a great deal of interest in the oil sands resources of northeastern Alberta in the past few years. There have been a series of proposals to establish oil sands extraction operations. A new oil recovery plant is currently under construction. New programs to design and examine alternative methods for extracting oil from the oil sands are underway. However, along with this activity, there has also been substantial concern about the social and environmental side effects (externalities) of oil sands development.

Utilizing current technology, oil sands recovery involves gigantic surface mining operations and huge recovery plants. The inevitable results are significant land disturbances and substantial air and water pollution. These effects could alter current and potential resource uses of natural environments, such as the recreational use of fish and wildlife, which are of value to all Canadians and particularly to Albertans. If proper decisions are to be made about the development of oil sands, it is necessary to ascertain the manner in which oil recovery activities will affect the use of other natural resources. As indicated previously in more general terms, such information is essential input into public policy formulation and implementation if the best interests of Albertans and Canadians generally are to be served by the selection of resource use patterns in northeastern Alberta.

This socioeconomic evaluation of recreational use of fish and wildlife in the AOSERP study area (Figure 1) is compared to the results of a similarly oriented evaluation covering the province as a whole. Along with the three accompanying volumes, this report represents one of many studies being carried out under the auspices of AOSERP to determine the effects of oil sands development on the environment. It differs, however, from most of the other research currently underway in that the focus is social (that is, on people and their recreational use of a natural resource) rather than physical or biological (that is, on the characteristics of a resource per se).

The study reported herein was carried out with the following objectives in mind:

1. To ascertain the socioeconomic characteristics of participants in recreational fishing, hunting, and nonconsumptive uses of fish and wildlife in the AOSERP study area and throughout the province;
2. To establish a detailed profile of recreational fishing, hunting, and nonconsumptive fish and wildlife use activities in the AOSERP study area and throughout the province, particularly with regard

to activity locations, durations, expenses, and species of fish and wildlife involved;

3. To determine the number of recreational days expended in these activities by Albertans in the AOSERP study area and throughout the Province;
4. To examine the desirability of different species of fish and wildlife in the AOSERP study area; and
5. To estimate the value of fish and wildlife resources used for recreational purposes in the AOSERP study area and throughout the Province.

Recreational consumptive fish and wildlife uses (fishing and hunting) and recreational nonconsumptive fish and wildlife uses (observation, photography, and study) exclude commercial, scientific, and other nonrecreational uses of fish and wildlife. The terms of reference of this study exclude Indians and Metis as recreational participants. Fish and wildlife used as a source of food or other means of livelihood bynative people is essentially nonrecreational in character. Consequently, native residents of the AOSERP study area and throughout the province have been virtually excluded from consideration in this study.

Attainment of the objectives outlined above is essential to the assessment of consumptive and nonconsumptive recreational use of fish and wildlife. Furthermore, when the socioeconomic information is combined with physical and biological information, it is possible to ascertain the importance of recreational fish and wildlife uses in relation to other fish and wildlife resource uses and in relation to other resource use patterns which may alter fish and wildlife habitat.

The results presented in this report provide important data for fish and wildlife resource management. Fishing and hunting alter wildlife populations in varying degrees in different locations. In order to regulate the amounts, locations, and times of recreational fishing and hunting activities, it is essential to know where participants go and what they do. Similarly hunting alters wildlife

populations in varying degrees in different locations. Wildlife harvest is an important management tool. In order to regulate the amounts, locations, and times of hunting activities, it is essential to know where hunters go and what they do.

Nonconsumptive recreational use of fish and wildlife also has management implications. Although nonconsumptive participants do not affect different species in the same way hunters and fishermen do through consumptive uses, nevertheless human presence at certain locations and times can be disruptive to species populations. These disturbances, for example, can occur during breeding times in breeding locations and cause abandonment of the young or disruption of other behavioural patterns of species populations. Again, in order to regulate the amounts, locations, and times of human presence and activity, it is essential to know where people go and what they do. This information is provided.

Beyond recreational activities, this report also provides an indication of fish and wildlife values arising from such activities. Hunting and fishing, like many outdoor recreational activities, are divisible in consumption, and thus the privileges of fishing or hunting can be sold.[1] However, in North America, the fugitive nature of fish and wildlife resources has historically led to public ownership of these resources, and fishing and hunting license fees cannot be considered adequate measures of social benefits.[2] Nonconsumptive recreational uses of fish and wildlife are typically non-priced although many of these uses could be so priced. Often such uses are in association with other recreational activities, such as camping, for which user fees may be charged. Nevertheless, the values associated with nonconsumptive recreational fish and wildlife uses are almost exclusively extramarket.

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[1]Other recreational acitivies, such as viewing scenic areas, are often not divisible in consumption; that is, the enjoyment of an area by one person is not dependent on the enjoyment of the area by others.

[2]Social benefits include all benefits, market, and extramarket, that accrue from fishing and hunting activities and may be largely, but not solely, incident upon fishermen and hunters themselves.

Recreational uses of fish and wildlife, like other resource uses for which extramarket benefits typically exist, tend to receive less attention and, as indicated previously, become displaced by commercial resource uses for which market prices provide comparatively complete and ready measures of use value. Oil extraction in the Athabasca Oil Sands, for example, may displace, through land and water regime disturbances, fish and wildlife habitat and hence fish and wildlife. The oil produced has value reflected in the market place. The displaced fish and wildlife have value but that value, which is also displaced (lost), is not reflected in the market place. As indicated above, public policy directed at resolving resource use conflicts must reflect both market and extramarket values in determining resource use patterns which best serve society. For example, commercial resource uses, such as oil extraction, which displace values (largely extramarket) from uses tied to natural environments, such as recreational fish and wildlife uses, incur social costs in the form of displaced or foregone benefits which must be charged against the commercial uses. Historically this approach has been largely neglected, resulting in resource use imbalances favouring commercial resource uses. This report, therefore, is not only important in providing fish and wildlife management input, but also in providing quantitative estimates of extramarket benefits associated with recreational activities involving fish and wildlife uses. These estimated benefits should be taken explicitly into account, along with other important information, in formulating public decisions regarding natural resource utilization.

2. RECREATIONAL FISHING SURVEY RESULTS

2.1 OBJECTIVES

The focus of this section is a socio-economic evaluation of recreational fishing activity in Alberta by Alberta residents with particular emphasis given to the Alberta Oil Sands Environmental Research Program (AOSERP) study area (Figure 1). Socio-economic information is essential in the assessment of recreational fishing activity and when combined with physical and biological information, it is possible to ascertain the importance of recreational fish resource uses in relation to other fish resource uses and in relation to other resource use patterns which may alter fish habitat.

The results presented herein were obtained with the intent of achieving the following objectives:

1. To ascertain the socioeconomic characteristics of participants in the AOSERP study area and throughout the Province;
2. To establish a detailed profile of recreational fishing activities in the AOSERP study area and throughout the Province, particularly with regard to activity locations, durations, expenses, creel counts, and species of fish;
3. To determine the number of recreational fishing days expended by Albertans in the AOSERP study area and throughout the Province;
4. To examine the desirability of different species of fish in the AOSERP study area and throughout the Province;
5. To estimate the value of fish resources used for recreational purposes in the AOSERP study area and throughout the Province.

The results obtained in meeting these objectives are summarized here. The results pertaining to the first objective are presented under "Socioeconomic Characteristics" and "Fishing Experience". The results pertaining to the fifth objective are

presented under "Fishing Activity Costs and Benefits". Finally the results pertaining to the second, third, and fourth objectives are presented under "Fishing Activity".

2.2 METHODS

Two mail questionnaries were designed and utilized to obtain the information required to meet the objectives of this study (Appendices 7.1 and 7.2). One questionnaire was for a randomly cited systematic sample of 1,967 recipients from the 197,000 Alberta resident fishing license holders during the 1975-76 season. The other questionnaire was for a randomly cited systematic sample of 2,112 recipients from the 3,038 AOSERP study area resident fishing license holders during the same season. The initial mailing to both sample recipients was followed by a second mailing to nonrespondents of the initial mailing. The combined response of first and second mailings to the provincial survey was 582 (31.7 percent), of which 551 returns were usable. The combined response to the AOSERP study area survey was 455 (24.4 percent), of which 438 were usable (Table 1). A comparison between first and second mailings for selected variables from both survey results was made to see if there was evidence of nonresponse bias. There was no such evidence in either survey. Detailed results of the provincial fishing survey are contained in Volume II, Appendix 8.3 and detailed results of the AOSERP study area fishing survey are contained in Volume II, Appendix 8.4.

2.3 RESULTS

2.3.1 Socioeconomic Characteristics

Among the 197,000 Alberta fishing license holders during the 1975-76 fishing season, nearly one half (48 percent) resided in Edmonton and Calgary; the remainder were dispersed throughout the Province. Residents of the AOSERP study area (3,038 persons) accounted for 1.54 percent of all Alberta resident license holders. Approximately 88 percent of AOSERP study area license holders resided in Fort McMurray. The average age province-wide was 36.27

Table 1. Socioeconomic characteristics and fishing experience of provincial and AOSERP study area fishing license holders, 1975-76 season.

Item	Alberta Residents	AOSERP Study Area Residents
No. of Fishing License Holders (person)	197,000	3,038
No. of Survey Respondents (persons)	551	438
Average Age (years)	36.27	32.76
Proportion of Male Respondents (percent)	84.00	78.00
Average Family Size (persons)	3.36	3.68
Average Family Income (dollars)	$17,471.00	$21,973.00
Average Formal Education (years)	12.00	12.00
Fished Prior to the 1975-76 Season (percent)	92.50	90.00
Fished in Alberta Prior to the 1975-76 Season (percent)	90.10	81.30
Fished in Study Area Prior to the 1975-76 Season (percent)		69.60
Fished in Study Area During or Prior to the 1975-76 Season (percent)	9.40	
Fished in Alberta During the 1975-76 Season (percent)	83.30	90.20
Fished in Study Area During the 1975-76 Season (percent)	4.20	82.40
Estimated No. of Resident Anglers During the 1975-76 Season (percent)	164,100	2,503

years, whereas the generally younger AOSERP study area license holders averaged 32.76 years of age (Table 1). The proportion of males among provincial license holders was 84 percent and among AOSERP study area license holders 78 percent. AOSERP study area resident license holders tended to have larger families than those in the province as a whole--3.68 persons per family compared to 3.36 persons per family, respectively (Table 1).

Among 17 occupation categories for provincial license holders holders, tradesmen accounted for 17.5 percent followed by professional and technical occupations, 16 percent and managerial occupations 10.2 percent; other categories represented less than 10 percent each. Among AOSERP study area license holders, tradesmen accounted for 18.4 percent, managerial occupations, 14.9 percent and homemaker, 12.3 percent; other categories represented less than 10 percent each.

Annual family income was generally higher for AOSERP study area resident license holders than for the provincial group as a whole. One half of the provincial resident license holders had annual family incomes between $10,000 and $20,000 with an average of $17,471 per family. One half of the AOSERP study area resident license holders had annual family incomes between $15,000 and $25,000 with an average $21,973 per family (Table 1).

The distribution of years of formal education for provincial resident license holders and AOSERP study area license holders was similar. Both groups had an average of 12 years of formal education (Table 1). The provincial distribution indicates that 23.3 percent had high school matriculation, 18.7 percent had at least one year of university, and 20.9 percent had at least one year of formal technical training, bringing the total to 63.3 percent. Approximately 98 percent had at least seven years of formal education. The AOSERP study area distribution indicates that 21.2 percent had high school matriculation, 21.8 percent had at least one year of university, and 22.9 percent completed at least one year of formal technical training, bringing the total to 65.9 percent. Approximately 97 percent had at least seven years of formal education.

2.3.2 Fishing Experience

Among the 197,000 provincial resident fishing license holders, 92.5 percent had fishing experience prior to the 1975-76 season. Among the 3,038 AOSERP study area resident fishing license holders the proportion was 90 percent (Table 1). Those provincial license holders who fished in Alberta prior to the 1975-76 season amounted to 90.1 percent of all provincial license holders whereas those AOSERP study area license holders who fished in Alberta prior to the 1975-76 season accounted for only 81.3 percent of all AOSERP study area license holders. Only 9.4 percent of the provincial license holders had ever fished in the AOSERP study area. Among the AOSERP study area license holders only 69.6 percent had fished in the AOSERP study area prior to the 1975-76 season (Tables 1 and 2).

During the 1975-76 fishing season 83.3 percent of provincial license holders engaged in fishing in Alberta; that is, there were approximately 164,100 resident anglers who were active during the season. Among these anglers an estimated 8,240 persons, or 4.2 percent of the provincial license holders, fished in the AOSERP study area (Tables 1 and 2).

Among AOSERP study area resident license holders, 90.2 percent fished in Alberta during the 1975-76 season. Nearly all of these (82.4 percent) were active in the AOSERP study area. The estimated number of AOSERP study area resident anglers active in the AOSERP study area is 2,503 persons (Tables 1 and 2).

The balance of this summary focuses only on active resident anglers during the 1975-76 season. These include 164,100 provincial resident anglers who were active throughout the province, 8,240 provincial resident anglers who were active in the AOSERP study area (5.02 percent of the provincial total) and 2,503 AOSERP study area resident anglers who were active in the AOSERP study area (1.53 percent of the provincial total) (Table 2).

AOSERP study area resident anglers tended to rate their fishing experience in the AOSERP study area during the 1975-76 season better than provincial resident anglers rated their fishing experiences throughout the province. AOSERP study area ratings were

Table 2. Ratings, costs, and benefits for fishing activities of provincial and AOSERP study area resident anglers, 1975-76 season.

Item		Alberta Residents	AOSERP Study Area Residents[a]
No. of Resident Anglers (persons)		164,100	2,503
No. of Angler Survey Respondents (persons)		459	361
No. of Anglers Active in AOSERP Study Area (persons)		8,240	2,503
Rating of Fishing Experiences (percent)[b]	- very good	6.2	10.0
	- good	25.0	27.5
	- fair	35.8	36.1
	- poor	22.8	15.8
	- very poor	10.2	10.6
Rating of AOSERP study area Fishing Compared to Provincial Fishing (percent)			
	- better than	19.0	
	- as good as	52.4	
	- worse than	28.6	
Annual Total Fishing Costs per Person (dollars)		796.75	625.33
Annual Extramarket Benefits per Person (dollars)		140.60	106.36
Annual Value per Person Attributable to Fish Resource (dollars)		144.60	110.36
Annual Total Angler Fishing Costs (dollars)		$130,746,675.00	$1,565,201.00
Annual Total Angler Extramarket Benefits (dollars)		$ 23,072,460.00	$ 266,230.00
Annual Total Angler Value of Fish Resource (dollars)		$ 23,728,860.00	$ 276,231.00

[a] Includes only those AOSERP study area residents who fished in the AOSERP study area during the 1975-76 season.

[b] An estimated 8,240 Alberta resident anglers out of the total of 164,100 anglers, fished in the AOSERP study area during the 1975-76 season. The corresponding sample size was 23 out of 459 respondents.

as follows: very good, 10.0 percent; good 27.5 percent; fair, 36.1 percent; poor, 15.8 percent; and very poor, 10.6 percent. Provincial resident anglers rated their province-wide fishing experiences as follows: very good, 6.2 percent; good, 25.0 percent; fair, 35.8 percent; poor, 22.8 percent; and very poor, 10.2 percent (Table 2).

Provincial resident anglers who fished in the AOSERP study area during the 1975-76 season rated their fishing experiences in comparison with their provincial fishing experiences as follows: AOSERP study area fishing better than provincial fishing, 19.0 percent; fishing as good as provincial fishing, 52.4 percent; and fishing worse than provincial fishing, 28.6 percent (Table 2).

2.3.3 Fishing Activity Cost and Benefits

Annual total fishing costs included fishing trip costs (which are made up of travel, lodging, food, beverages, rental, fishing service, and miscellaneous costs), fishing license costs, and capital purchase costs allocated to fishing activities. The costs to provincial resident anglers averaged $796.75 per person. Based on the 164,100 anglers in the province, the provincial total of annual fishing costs for the 1975-76 season was $130,746,675. Annual total fishing costs for AOSERP study area resident anglers averaged $625.33 per person for a total of $1,565,201. (1.2 percent of the provincial total) (Table 2). The lower costs per person for AOSERP study area resident anglers is primarily due to the fact that they spend less time fishing and travel much shorter distances (Table 3).

Extramarket benefits over and above fishing costs are a partial measure of the value of fishing to anglers. The annual extramarket benefits to resident anglers averaged $140.60 per person for a provincial total of $23,072,460. Annual extramarket benefits to AOSERP study area resident anglers averaged $106.36 per person for a total of $266,230 (1.15 percent of the provincial total) (Table 2). The lower annual average for AOSERP study area resident

Table 3. Fishing activities of provincial and AOSERP study area resident anglers, 1975-76 season.

Item	Fishing Activities of Alberta Resident Anglers in Alberta	Fishing Activities of Alberta Resident Anglers in AOSERP Study Area	Fishing Activities of AOSERP Study Area Resident Anglers in AOSERP Study Area
No. of Resident Anglers (persons)	164,000	8,240	2,503
Ave. No. of Angler Days per Person (days)	10.05	6.60[a]	9.06
Ave. No. of Trips per Person (trips)	8.89	4.70	10.47
Ave. No. of Angler Days per Trip per Person (days)	1.13	1.40	0.98
Ave. Party Size per Trip (persons)	2.95	3.20	2.91
Ave. Distance Travelled per Person km (miles)	2,095.88(1,301.54)	1,423.00(884.00)	803.19(498.78)
Ave. Distance Travelled per Trip per Person km (miles)	235.75(146.40)	301.00(187.00)	76.71(47.64)
Ave. Distance from Residence to Site per Person km (miles)	117.87(73.20)	150.60(93.50)	38.36(23.82)
Ave. No. of Fish Caught per Person (fish)	35.28	20.00	32.72
Ave. No. of Fish Caught per Day per Person (fish)	3.51	3.03	3.61
Total No. of Angler Days (days)	1,649,205	54,384[a]	22,677
Total No. of Trips (trips)	1,458,849	38,728	26,212
Total Distance Travelled km (miles)	343,933,518(213,582,714)	11,729,726(7,284,160)	2,010,380(1,248,446)
Total No. of Fish Caught (fish)	5,789,448	164,442	81,878

[a]This figure represents 62 percent of total fishing time spent in the Province by those Alberta resident anglers who fished in the AOSERP study area among other Alberta locations.

anglers is in part accounted for by the fact that they spend less time fishing (Table 3). However, even with this adjustment, AOSERP study area resident anglers are below the provincial average (11.74 extramarket benefits per day as compared to the provincial average of 13.99 per day), despite the fact that they tended to rate AOSERP study area fishing higher than provincial anglers rated provincial fishing.

The value of fishing resources to anglers consists of a market component (the license fees) and an extramarket component (the extramarket benefits derived from fishing). On this basis, the annual amount of Alberta's fishing resources to resident anglers is $144.60 per person for a provincial total of $23,728,860. The annual value of AOSERP study area fishing resources to AOSERP study area resident anglers is $110.36 per person for a total of $276,231 (1.16 percent of the provincial total). The provincial annual value of Alberta's fishing resources does not include the recreational value of the fish resource to those residents who do not fish nor the recreational value to other Canadians and non-Canadians. Furthermore, it does not include the value of the fish resource from commercial and other nonrecreational uses.

2.3.4 Fishing Activity

The 164,100 Alberta resident anglers spent a total of 10.05 days per person or 1,649,205 days fishing in Alberta during the 1975-76 season (Table 3). The number of trips averaged 8.89 trips per person for a total of 1,458,849 trips, bringing the number of days per trip to 1.13. The average fishing party size was 2.95 persons. Among the 164,100 Alberta resident anglers, 8,240 anglers fished in the AOSERP study area during the 1975-76 season, which accounted for 62 percent of their time spent in fishing. The number of fishing days spent in the AOSERP study area was 6.6 days per person or a total of 54,384 days (3.3 percent of the provincial total). The associated number of trips was 4.7 trips per person for a total of 38,728 trips (2.65 percent of the provincial total) bringing the average number of days per trip to 1.40. The average

fishing party size was 3.2 persons (Table 3). The 2,503 AOSERP study area resident anglers fished in the AOSERP study area during the 1975-76 season for a total of 9.06 days per person for a total of 22,677 days (1.38 percent of the provincial total). The associated number of trips was 10.47 trips per person for a total of 26,212 trips (1.8 percent of the provincial total) bringing the number of days per trip to 0.98. The average fishing party size was 2.91 persons (Table 3).

The 164,100 Alberta resident anglers travelled during the 1975-76 season a total of 2,095.88 km (1,301.54 miles) per person or 343,933,518 km (213,582,714 miles) on their fishing trips. The average number of km per trip was 235.75 km (146.40 miles) and the average distance from residence to fishing site was 117.87 (73.2 miles) (Table 3). The 8,240 Alberta resident anglers who fished in the AOSERP study area an average 62 percent of the time during the 1975-76 season, travelled a total of 1,423 km (884 miles) per person or 11,729,726 km (7,284,160 miles) which is 3.41 percent of the provincial total in connection with AOSERP study area fishing trips. The average number of km per trip was 301 km (187 miles) and the average distance from residence to the AOSERP study area fishing site was 150.6 km (93.5 miles) (Table 3). The 2,503 AOSERP study area resident anglers travelled during the 1975-76 season a total of 803.19 km (498.78 miles) per person or 2,010,380 km (1,248,446 miles) which is 0.58 percent of the provincial total in connection with AOSERP study area fishing trips. The average number of km per trip was 76.71 km (47.64 miles) and the average distance from residence to the AOSERP study area fishing site was 38.36 km (23.82 miles) in (Table 3).

The 164,100 Alberta resident anglers caught a total of 35.28 fish per person during the 1975-76 season for a total catch of 5,789,448 fish. The average number of fish caught per day was 3.51 (Table 3). The 8,240 Alberta resident anglers who fished in the AOSERP study area an average 62 percent of the time during the

1975-76 season caught a total of 20 fish per person in the AOSERP study area for a total catch of 164,442 fish (2.84 percent of the provincial total). The average catch per day was 3.2 fish (Table 3). The 2,503 AOSERP study area resident anglers caught a total of 32.72 fish per person in the AOSERP study area for a total catch of 81,878 fish (1.41 percent of the provincial total). The average catch per day was 3.61 fish (Table 3).

The results presented here indicate that AOSERP study area resident anglers tend to spend less time, take more trips, travel much shorter distances, and have a slightly higher success rate, in connection with AOSERP study area fishing, than Alberta anglers generally. There are also differences in the proportions of different species caught, partly due to the fact that the availability of different species in the AOSERP study area differ from the species available province-wide. The total catch of 5,789,448 fish during the 1975-76 season by Alberta resident anglers is allocated among the following species: Great Northern Pike, 31.45 percent; Trout, 30.88 percent; Yellow Perch, 15.62 percent; Yellow Walleye, 9.70 percent; Whitefish, 7.81 percent; Arctic Grayling, 3.26 percent; and Dolly Varden, Goldeye, and Sauger combined, 1.28 percent. The total AOSERP study area catch of 81,878 fish during the 1975-76 season by AOSERP study area resident anglers is allocated among the different species as follows: Great Northern Pike, 52.31 percent; Yellow Walleye, 24.78 percent; Artic Grayling, 13.62 percent; Trout, 4.33 percent; Yellow Perch, 3.73 percent; Goldeye, 1.08 percent; and Splake, Sucker, and Whitefish combined 0.15 percent.

Angler preferences for different species, measured in terms of the number of times each species was sought, is in part also dependent on species availability, but nevertheless differs from the profile of total catch by species and differs between the AOSERP study area resident anglers and Alberta resident anglers. Alberta resident angler preferences for different species are as follows: Great Northern Pike, 33.12 percent; Trout, 32.85 percent; Yellow Walleye, 13.43 percent; Yellow Perch, 11.14 percent;

Whitefish 5.38 percent; Arctic Grayling, 2.68 percent; Goldeye 1.22 percent; and Sauger, Dolly Varden, and Chub combined, 0.18 percent. AOSERP study area angler preferences for different species are as follows: Great Northern Pike, 49.19 percent; Yellow Walleye, 38.27 percent; Arctic Grayling, 7.64 percent; Trout 2.07 percent; Goldeye 1.76 percent; and Perch, Splake, Sucker, and Whitefish combined 1.07 percent.

The geographical distribution of fishing activities in Alberta resident anglers is varied among the subbasins throughout the Province (Figure 2). Each angler during the 1975-76 season caught an average 35.28 fish in an average of 2.3 subbasins. The average catch per person per subbasin is 15.34 fish. The angler success rates among the subbasins ranged from 0.0 to 46.6 fish per person. On average, 15,687 trips were made per subbasin in which the total catch averaged 62,252 fish for the season. The number of trips ranged from 358 to 70,872 trips and the total catch ranged from 0 to 398,430 fish. Those subbasins that were above average in angler success rates, total catch and number of times a species was sought are as follows: 511, 525, 541, 564, 611, 612, 613, 716, 718, 720, 722, 725, 731, and 748.

Each AOSERP study area resident angler during the 1975-76 season fished in an average of 1.7 AOSERP study area grid locations (Figure 3). The average catch per person per grid location was 19.25 fish. The angler success rates among the 10 grid locations ranged from 2.0 to 73.5 fish per person. Grid number 1 provided the highest success rate of 73.5 fish per person followed by number 2 with 28.0 fish per person and number 10 with 20.3 fish per person. These three grid locations are all above average in angler success rates. On average, 2,621 trips were made to an AOSERP study area grid location by AOSERP study area resident anglers in which all species were sought 3,516 times and the total catch was 8,188 fish. Grid numbers 9 and 10 were well above average in total number of trips and in total number of times species were sought. Grid numbers 1, 2, 9, and 10 were above average in total number of fish caught (Table 4).

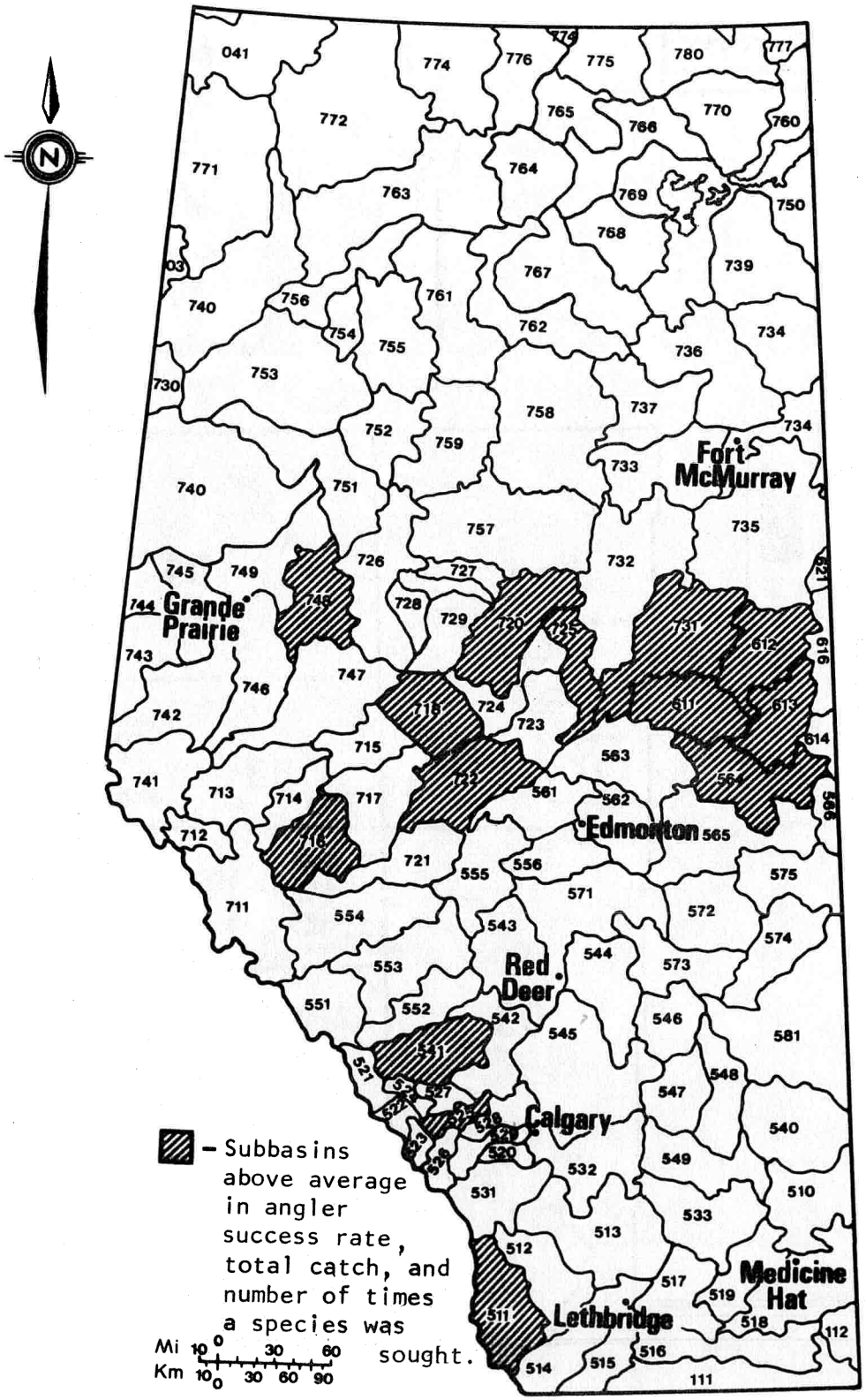

Figure 2. Map of Alberta subbasins.

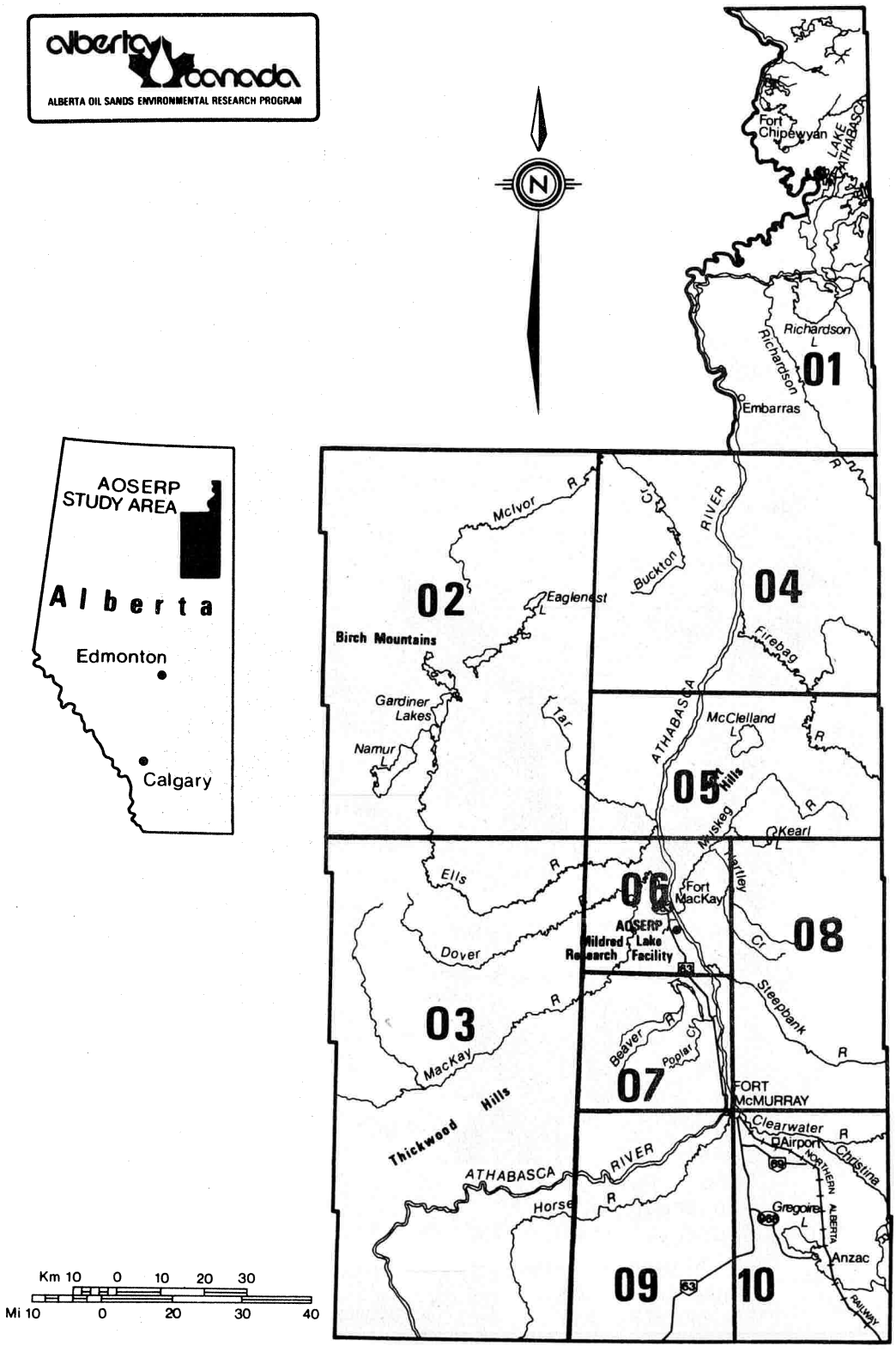

Figure 3. Map of AOSERP study area grids.

Table 4. Estimated number of trips, number of times species sought, and total catch by AOSERP study area grid locations for resident AOSERP study area anglers, 1975-76 season.[a]

AOSERP Study Area Grid No.[b]	Estimated Total No. Of Trips	Estimated No. of Times Species Were Sought	Estimated Total No. of Fish Caught
1	1,517	2,066	17,096
2	592	931	8,495
3	28	28	14
4	289	331	1,410
5	56	63	14
6	585	698	1,001
7	1,439	2,080	3,285
8	226	416	212
9	5,184	6,190	11,372
10	16,296	22,355	38,979
TOTAL	26,212	35,158[c]	81,878

[a]Source: Volume II, Table 5.

[b]Grid locations are given in Figure 3.

[c]Among the 26,212 trips, two species were sought on 8,946 trips and one species was sought on 17,266 trips bring the total number of times sought to (8,946 x 2) + 17,266 or 35,158 times sought.

3. RECREATIONAL HUNTING SURVEY RESULTS

3.1 OBJECTIVES

The focus of this section is a socioeconomic evaluation of recreational hunting activities in Alberta by Alberta residents with particular emphasis given to the AOSERP study area (Figure 1). Socioeconomic information is essential in the assessment of recreational wildlife resource uses in relation to other wildlife resource uses and in relation to other resource use patterns which may alter wildlife habitat.

The results presented herein were obtained with the intent of achieving the following objectives:

1. To ascertain the socioeconomic characteristics of participants in the AOSERP study area and throughout the Province;
2. To establish a detailed profile of recreational hunting activities in the AOSERP study area and throughout the Province, particularly with regard to activity locations, durations, expenses, numbers of wildlife taken, and species of wildlife;
3. To determine the number of recreational hunting days expended by Albertans in the AOSERP study area and throughout the Province;
4. To examine the desirability of different species of wildlife in the AOSERP study area and throughout the Province; and
5. To estimate the value of wildlife resources used for recreational purposes in the AOSERP study area and throughout the Province.

The results obtained in meeting these objectives are summarized here. The results pertaining to the first objective are presented under "Socioeconomic Characteristics" and "Hunting Experience". The results pertaining to the fifth objective are presented under "Hunting Activity Costs and Benefits". Finally, the results

pertaining to the second, third, and fourth objectives are presented under the heading "Hunting Activity".

3.2 METHODS

Two mail questionnaires were designed and utilized to obtain the information required to meet the objectives of this study (Appendices 7.3 and 7.4). One questionnaire was for a randomly cited systematic sample of 1,994 recipients from the 124,814 Alberta resident hunting license holders during the 1975-76 season. The other questionnaire was for all 1,630 AOSERP study area resident hunting license holders during the same season. The initial mailing to both groups of recipients was followed by a second mailing to nonrespondents of the initial mailing. The combined response of first and second mailings to the provincial survey was 710 (37.0 percent) of which 680 returns were usable. The combined response to the AOSERP study area survey was 421 (28.2 percent) of which 398 were usable (Table 5). A comparison between first and second mailings for selected variables from both survey results was made to see if there was evidence of nonresponse bias. The comparison for the provincial survey was indeterminate, neither confirming nor rejecting evidence of nonresponse bias. There was no evidence of nonresponse bias in the AOSERP study area survey. Detailed results of the provincial hunting survey are contained in Volume II, Appendix 8.3, and detailed results of the AOSERP study area hunting survey are contained in Volume II, Appendix 8.4.

3.3 RESULTS

3.3.1 Socioeconomic Characteristics

Of the 124,814 Alberta hunting license holders during the 1975-76 hunting season, 38 percent resided in Edmonton and Calgary; the remainder were widely dispersed throughout the Province. The 1,630 AOSERP study area residents accounted for 1.31 percent of all Alberta resident license holders. Approximately 92 percent of AOSERP study area license holders resided in Fort McMurray. The average age province-wide was 34.19 years whereas the generally

Table 5. Socioeconomic characteristics and hunting experience of provincial and AOSERP study area license holders, 1975-76 season.

Item	Alberta Residents	AOSERP Study Area Residents
No. of Hunting License Holders (persons)	124,814	1,630
No. of Survey Respondents (persons)	680	398
Average age (years)	34.19	32.74
Proportion of Male Respondents (percent)	97.70	95.10
Average Family Size (persons)	3.52	3.78
Average Family Income (dollars)	$18,349.00	$19,411.00
Average Formal Education (years)	12.00	12.00
Average No. of Different Alberta Hunting Licenses Held	2.42	3.00
Hunted Prior to the 1975-76 Season (percent)	94.10	89.10
Hunted in Alberta Prior to the 1975-76 Season (percent)	87.40	82.90
Hunted in AOSERP Study Area Prior to the 1975-76 Season (percent)	5.00	63.80
Hunted in Alberta During the 1975-76 Season (percent)	82.20	91.50
Hunted in AOSERP Study Area During the 1975-76 Season (percent)	2.20	70.60
Estimated No. of Resident Hunters During the 1975-76 Season (persons)	102,600	1,151

slightly younger AOSERP study area license holders averaged 32.74 years of age (Table 5). The proportion of males among provincial license holders was 97.7 percent and among AOSERP study area license holders, 95.1 percent. AOSERP study area resident license holders tended to be from slightly larger families than those in the Province as a whole--3.78 persons per family compared to 3.52 persons per family, respectively (Table 5).

Among 17 occupation categories for provincial license holders, tradesmen accounted for 16.8 percent followed by professional and technical occupations, 12.9 percent, and labourers, 10.8 percent with other categories representing less than 10 percent each. Among AOSERP study area resident license holders, tradesmen accounted for 23.1 percent, followed by managerial occupations, 13.9 percent, operative occupations, 13.6 percent, and professional and technical occupations, 12.3 percent with miscellaneous occupations, 13.1 percent and other categories representing less than 7 percent each.

Annual family income was generally higher for AOSERP study area license holders than for the provincial group as a whole. Nearly one half (46 percent) of the provincial resident license holders had annual family incomes between $10,000 and $20,000 with an average of $18,349 per family. Approximately one half of the AOSERP study area license holders had annual family incomes between $15,000 and $25,000 with an average of $19,411 per family (Table 5).

The distribution of years of formal education for provincial resident license holders and AOSERP study area license holders are slighly dissimilar even though both groups had an average of 12 years of formal education (Table 5). The provincial distribution indicates that 24.2 percent had high school matriculation, 18.2 percent had at least one year of university, and 18.4 percent completed at least one year of formal technical training, bringing the total to 60.8 percent. Approximately 98 percent had at least seven years of formal education. The AOSERP study area distribution, however, indicates that 21.8 percent had high school matriculation,

12.0 percent had at least one year of university, and 19.7 percent completed at least one year of formal technical training, bringing the total to 53.5 percent. Approximately 94 percent had at least seven years of formal education.

3.3.2 Hunting Experience

Among the 124,814 provincial resident hunting license holders, 94.1 percent had hunting experience prior to the 1975-76 season. Of the 1,630 AOSERP study area resident license holders, 89.1 percent had prior hunting experience (Table 5). Those provincial license holders who hunted in Alberta prior to the 1975-76 season accounted for 87.4 percent of all provincial license holders whereas those AOSERP study area license holders who hunted in Alberta prior to the 1975-76 season accounted for only 82.9 percent of all AOSERP study area license holders. Only 5.0 percent of provincial license holders had ever hunted in the AOSERP study area prior to 1975-76. Among the AOSERP study area license holders, only 63.8 percent had hunted in the AOSERP study area prior to the 1975-76 hunting season (Table 5).

Provincial resident hunting license holders held on average 2.42 different kinds of Alberta hunting licenses and hunted primarily for enjoyment and secondarily for meat. AOSERP study area resident hunting license holders held an average of 3.0 different kinds of Alberta hunting licenses and hunted primarily for meat and secondarily for enjoyment.

During the 1975-76 hunting season 82.2 percent of provincial license holders engaged in hunting in Alberta; that is, there were approximately 102,600 resident hunters (by inference) who were active during the season. Of these hunters, an estimated 2,203 persons, or 2.2 percent of provincial license holders, hunted in the AOSERP study area (Tables 5 and 6).

Among AOSERP study area resident license holders, 91.5 percent hunted in Alberta during the 1975-76 season. Most of these (70.6 percent) were active in the AOSERP study area. The estimated

Table 6. Ratings for hunting activites of provincial and AOSERP study area resident hunters, 1975-76 season.

Item		Alberta Residents	AOSERP Study Area Residents[a]
No. of Resident Hunters (persons)		102,600	1,151
No. of Hunter Survey Respondents (persons)		559	281
No. of Hunters Active in the AOSERP Study Area (persons)		2,203	1,151
Proportion of Hunters Hunting Big Game (percent)		58.3	85.8
Proportion of Hunters Hunting Upland Bird Game (percent)		32.0	34.5
Proportion of Hunters Hunting Waterfowl (percent)		60.3	11.0
Rating of Big Game Hunting Experiences (percent)	- very good	14.1	5.7
	- good	23.8	22.3
	- fair	28.5	25.3
	- poor	24.8	31.4
	- very poor	8.8	15.3
Rating of Upland Bird Game Hunting Experiences (percent)	- very good	8.1	15.9
	- good	23.3	35.2
	- fair	34.9	34.1
	- poor	23.3	8.0
	- very poor	10.4	6.8
Rating of Waterfowl Hunting Experiences (percent)	- very good	19.5	13.3
	- good	38.4	23.3
	- fair	27.7	26.8
	- poor	9.8	23.3
	- very poor	4.6	13.3

continued . .

Table 6. Concluded.

Item		Alberta Residents	AOSERP Study Area Residents[a]
Rating of AOSERP Study Area Big Game Hunting Compared to Provincial Hunting (percent)[b]	- better than	40.0	
	- as good as	40.0	
	- worse than	20.0	
Rating of AOSERP Study Area Upland Bird Game Hunting Compared to Provincial Hunting[b]	- better than	20.0	
	- as good as	60.0	
	- worse than	20.0	
Rating of AOSERP Study Area Waterfowl Hunting Compared to Provincial Hunting (percent)[b]	- better than	0.0	
	- as good as	50.0	
	- worse than	50.0	

[a] Includes only those study area residents who hunted in the area during the 1975-76 season.

[b] An estimated 2,203 Alberta resident hunters of the toal 102,600 hunters, hunted in the AOSERP study area during the 1975-76 season. The corresponding sample size was 12 out of 559 respondents.

number of AOSERP study area resident hunters active in the AOSERP study area is 1,151 persons (Tables 5 and 6).

The balance of this summary focuses on active resident hunters during the 1975-76 season. These include 124,814 provincial resident hunters who were active throughout the Province, 2,203 provincial resident hunters who were active in the AOSERP study area (2.2 percent of the provincial total), and 1,151 AOSERP study area resident hunters who were active in the AOSERP study area (1.12 percent of the provincial total) (Table 6).

Among provincial resident hunters, 58.3 percent hunted big game throughout the Province and tended to rate their experiences better than the 85.8 percent of AOSERP study area resident hunters who hunted big game in the AOSERP study area.

The provincial big game hunting ratings were as follows: very good, 14.1 percent; good, 23.8 percent; fair, 28.5 percent; poor, 24.8 percent; and very poor, 8.8 percent. The big game hunting ratings were as follows: very good, 5.7 percent; good, 22.3 percent; fair, 25.3 percent; poor 31.4 percent; and very poor, 15.3 percent (Table 6).

Thirty-two percent of provincial resident hunters hunted upland bird game throughout the Province and tended to rate their experiences worse than the 34.5 percent of AOSERP study area resident hunters who hunted upland bird game in the study area. The provincial upland bird game hunting ratings were as follows: very good, 8.1 percent; good, 23.3 percent; fair, 34.9 percent; poor, 23.3 percent; and very poor, 10.4 percent. The AOSERP study area upland bird game hunting ratings were as follows: very good, 15.9 percent; good, 35.2 percent; fair, 34.1 percent; poor, 8.0 percent; and very poor, 6.8 percent (Table 6).

Among the provincial resident hunters, 60.3 percent hunted waterfowl throughout the Province and tended to rate their experiences better than the 11 percent of the study area resident hunters who hunted waterfowl in the area. The provincial waterfowl hunting ratings were as follows: very good, 19.5 percent; good, 38.4 percent;

Table 7. Costs and benefits for hunting activities of provincial and AOSERP study area resident hunters, 1975-76 season.

Item	Alberta Residents	AOSERP Study Area Residents[a]
No. of Resident Hunters (persons)	102,600	1,151
No. of Hunter Survey Respondents (persons)	559	281
Annual Total Hunting Costs per Person (dollars)	$397.29	$304.92
Annual Extramarket Benefits per Person (dollars)	$237.02	$105.19
Annual Value per Person Attributable to Wildlife Resource (dollars)	$250.23	$118.40
Annual Total Hunter Costs (dollars)	$40,761,955.00	$350,963.00
Annual Total Hunter Extramarket Benefits (dollars)	$24,318,250.00	$121,074.00
Annual Total Hunter Value of Wildlife Resource (dollars)	$25,673,600.00	$136,278.00

[a]Includes only those study area residents who hunted in the study area during the 1975-76 season.

Table 8. Hunting activities of provincial and AOSERP study area resident hunters, 1975-76 season.

Item	Hunting Activities of Alberta Resident Hunters in Alberta	Hunting Activities of Alberta Resident Hunters in the AOSERP Study Area	Hunting Activities of AOSERP Study Area Resident Hunters in the AOSERP Study Area
No. of Resident Hunters (persons)	102,600	2,203	1,151
Ave. No. of Hunter Days per Person (days)	7.13	4.70[a]	5.88
Ave. No. of Trips per Person (trips)	4.50	2.10	2.40
Ave. No. of Hunter Days per Trip per Person (days)	1.58	2.24	2.45
Ave. Party Size per Trip (persons)	2.67	2.80	2.43
Ave. Distance Travelled per Person km (miles)	931.53(578.48)	593.24(368.40)	298.40(185.31)
Ave. Distance Travelled per Trip per Person km (miles)	207.00(128.55)	282.44(175.40)	124.33(77.21)
Ave. Distance from Residence to Site per Person km (miles)	103.51(64.28)	141.22(87.70)	62.17(38.61)
Total No. of Hunter Days (days)	731,538	10,354[a]	6,768
Total No. of Trips (trips)	461,700	4,626	2,762
Total Distance Travelled km (miles)	95,574,956(59,352,048)	1,306,900(811,585)	343,465(213,292)

[a]This figure represents 48 percent of total hunting time spent in the Province by those Alberta resident hunters who hunted in the study area among other Alberta locations.

fair, 27.7 percent; poor, 9.8 percent; and very poor, 4.6 percent. The AOSERP study area waterfowl hunting ratings were as follows: very good, 13.3 percent; good, 23.3 percent; fair, 26.8 percent; poor, 23.3 percent; and very poor, 13.3 percent (Table 6).

Provincial resident hunters who hunted in the study area during the 1975-76 season rated their hunting experiences in comparison with their provincial hunting experiences. The big game hunting ratings were as follows: AOSERP study area hunting better than provincial hunting, 40 percent; AOSERP study area hunting as good as provincial hunting, 40 percent; and AOSERP study area hunting worse than provincial hunting, 20 percent. The upland bird game hunting ratings were as follows: AOSERP study area hunting better than provincial hunting, 20 percent; AOSERP study area hunting as good as provincial hunting, 60 percent; and AOSERP study area hunting worse than provincial hunting, 20 percent. The waterfowl hunting ratings were as follows: AOSERP study area hunting as good as provincial hunting, 50 percent; and AOSERP study area hunting worse than provincial hunting, 50 percent (Table 6).

3.3.3 Hunting Activity Costs and Benefits

Annual total hunting costs included hunting trip costs (which are made up of travel, lodging, food, beverage, rental, guiding, ammunition, hunting services, and miscellaneous costs), hunting license costs, and capital purchase costs allocated to hunting activities. The costs to provincial resident hunters averaged $397.29 per person. Based on the 102,600 hunters in the Province, the provincial total of annual hunting costs for the 1975-76 season was $40,761,955. Annual total hunting costs for AOSERP study area resident hunters averaged $304.92 per person for a total of $350,963 (0.86 percent of the provincial total) (Table 7). The lower cost per person for AOSERP study area resident hunters is primarily due to the fact that they spend less time hunting and travel much shorter distances (Table 8).

Extramarket benefits over and above hunting costs is a partial measure of the value of hunting to hunters. The annual extramarket benefits to resident hunters averaged $237.02 per person (consisting of $200.85 for big game, $157.63 for upland bird game, and $115.13 for waterfowl)[1] for a provincial total of $24,318,250. Annual extramarket benefits to study area resident hunters averaged $105.19 per person (consisting of $77.74 for big game, $55.40 for upland bird game, and $27.58 for waterfowl) for a total of $121,074 (0.50 percent of the provincial total) (Table 7). The lower annual average for these resident hunters is in part accounted for by the fact that they spent less time hunting (Table 8). However, even with this adjustment, AOSERP study area resident hunters are below the provincial average--$17.89 in extramarket benefits per day (consisting of $15.58 for big game, $10.00 for upland bird game, and $9.71 for waterfowl) compared to the provincial average of $33.24 per day (consisting of $31.58 for big game, $20.85 for upland bird game, and $21.60 for waterfowl). The fact that study area resident hunter extramarket benefits per day from hunting in the AOSERP study area are about one half of those for provincial hunters from hunting province-wide is consistent with big game and waterfowl hunting experience ratings. However, study area resident hunters rated upland bird game hunting better than provincial hunters even though extramarket benefits per day were about one half of those for provincial hunters.

The value of wildlife resources to hunters consists of a market component (the license fees) and an extramarket component (the extramarket benefits derived from hunting). On this basis, the annual value of Alberta's wildlife resources to resident hunters is $250.23 per person for a provincial total of $25,673,600.

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[1] The totals of extramarket benefits per person for big game, upland bird game, and waterfowl hunting are greater than for all hunting combined. However, hunters spent only part of their total hunting time in each of the three groups and in many instances sought combinations of big game, upland bird game, and/or waterfowl on parcicular hunting trips.

The annual value of study area wildlife resources to study area resident hunters is $118.40 per person for a total of $136,278 (0.53 percent of the provincial total). The provincial annual value of Alberta's wildlife resources does not include the recreational value of the wildlife resources to those residents who do not hunt nor the recreational value to other Canadians and non-Canadians. Furthermore, it does not include the value of the wildlife resources from commercial and other nonrecreational uses.

3.3.4 Hunting Activities

The 102,600 Alberta resident hunters spent a total of 7.13 days per person or 731,538 days hunting in Alberta during the 1975-76 season (Table 8). The number of trips averaged 4.50 persons for a total of 461,700 trips, bringing the number of days per trip to 1.58. The average hunting party size was 2.67. Among the 102,600 Alberta resident hunters, 2,203 hunted in the AOSERP study area during the 1975-76 season which accounted for 48 percent of their time spent hunting. The number of hunting days spent in the study area was 4.7 days per person or a total of 10,354 days (1.42 percent of the provincial total). The associated number of trips was 2.1 per person for a total of 4,626 trips (1.0 percent of the provincial total) bringing the average number of days per trip to 2.24. The average hunting party size was 2.8 persons (Table 8). The 1,151 study area resident hunters hunted a total of 5.88 days per person in the study area during the 1975-76 season for a total of 6,768 days (0.93 percent of the provincial total). The associated number of trips was 2.4 trips per person for a total of 2,762 trips (0.60 percent of the provincial total) bringing the number of days per trip to 2.45. The average hunting party size was 2.43 persons (Table 8).

The 102,600 Alberta resident hunters travelled a total of 931.53 km (578.48 miles) per person during the 1975-76 season or 95,574,957 km (59,352,048 miles) on their hunting trips. The average number of km per trip was 207 km (128.55 miles) and the average distance from residence to hunting site was 103.51 km (64.28 miles) in Table 8. The 2,203 Alberta resident hunters

who hunted in the AOSERP study area an average of 48 percent of the time during the 1975-76 season, travelled a total of 593.2 km (368.4 miles) per person or 1,306,900 km (811,585 miles) which is 1.37 percent of the provincial total in connection with study area hunting trips. The average number of km per trip was 282.44 km (175.4 miles) and the average distance from residence to an AOSERP study area hunting site was 141.22 km (87.7 miles) in Table 8. The 1,151 study area resident hunters travelled a total of 296.50 km (185.31 miles) per person during the 1975-76 season or 343,465 km (213,292 miles) which is 0.36 percent of the provincial total in connection with study area hunting trips. The average number of km per trip was 124.33 km (77.21 miles) and the average distance from residence to an AOSERP study area hunting site was 62.17 km (38.61 miles) in Table 8.

The results presented here indicate that study area resident hunters tend to spend less time, take fewer trips, and travel much shorter distances than Alberta hunters generally.

3.3.4.1 Big game hunting activity. Among the 102,600 provincial hunters during the 1975-76 season, 59,816 hunters hunted big game during an average of 6.36 days per person. The big game harvest success rate was 0.37 animals per person for a total provincial take of 22,382 big game animals (Table 9). Of the total big game harvest, deer accounted for 55.17 percent; moose, 23.28 percent; elk, 11.21 percent; antelope, 7.76 percent; and bear, 2.59 percent. Of the 2,203 provincial resident hunters who hunted in the study area during the 1975-76 season, 1,542 hunted big game in the AOSERP study area during an average of 4.57 days per person. The big game harvest success rate was 0.14 animals per person for a total take of 216 big game animals (0.97 percent of the provincial total) which were primarily moose (Table 9). Among the 1,151 study area resident hunters during the 1975-76 season, 988 hunted big game in the study area during an average of 4.99 days per person. The big game harvest success rate was 0.18 animals per person for a total take of 176 big game animals (0.79 percent of the provincial

total) (Table 9). Of the total big game harvest, moose accounted for 79.1 percent; bear, 18.6 percent; and caribou, 2.3 percent.

The results presented here indicate that AOSERP study area big game hunters have a lower success rate than provincial big game hunters. There are also differences in the proportion of different species taken, primarily due to the fact that availability of different species in the study area differs from the species available province-wide.

Big game hunters preferences for different species, measured in terms of the number of times each species was sought, is in part also dependent of species availability, but nevertheless differs from the profile of total harvest by species and differs between study area resident hunters and Alberta resident hunters. Alberta resident hunter preference for different species was as follows: deer, 48.91 percent; moose, 24.79 percent; elk, 20.35 percent; bear 3.99 percent; antelope, 0.98 percent; bighorn sheep, 0.83 percent; and caribou, 0.15 percent. Study area resident hunter preference for different species was as follows: moose, 83.85 percent; bear 11.62 percent; deer, 3.81 percent; and caribou, 0.36 percent.

The geographical distribution of big game hunting activities of Alberta resident hunters is quite varied among 97 Wildlife Management Units (WMU) throughout the Province (Figure 4). Each hunter during the 1975-76 season bagged, on average, 0.37 animals in an average of 1.5 WMU locations. The average take per person per WMU was 0.25 animals. The big game hunter success rates among the WMU locations ranged from 0.00 to 1.50 animals per person. On average 913 big game hunters were active in a WMU in which 228 big game animals were taken during the 1975-76 season. The number of hunters ranged from 193 to 4,824 persons. Those WMU locations which were above average in hunter success rates, total number of hunters, and total number of animals taken are as follows: 108, 110, 132, 158, 304, 522, and 524 (Figure 4).

Table 9. Game harvest by provincial and AOSERP study area resident hunters, 1975-76 season.

Item	Hunting Activities of Alberta Resident Hunters in Alberta	Hunting Activities of Alberta Resident Hunters in the AOSERP Study Area	Hunting Activities of AOSERP Study Area Resident Hunters in the AOSERP Study Area
Big Game			
Number of Resident Hunters (persons)	59,816	1,542	988
Ave. No. of Hunter Days per person (days)	6.36	4.57	4.99
Ave. No. of Big Game Animals Taken per Person (animals)	0.37	0.14	0.18
Total No. of Big Game Animals Taken (animals)	22,382	216	176
Upland Bird Game			
Number of Resident Hunters (persons)	32,832	1,102	397
Ave. No. of Hunter Days per Person (days)	4.13	3.40	5.54
Ave. No. of Upland Game Birds Taken per Person (birds)	7.56	5.20	7.74
Total No. of Upland Birds Taken (birds)	248,210	5,730	3,075
Migratory Bird Game			
Number of Resident Hunters (persons)	61,868	220	127
Ave. No. of Hunter Days per Person (days)	5.33	1.00	2.84
Ave. No. of Waterfowl Taken per Person (waterfowl)	17.74	8.00	8.32
Total No. of Waterfowl Taken (waterfowl)	1,097,538	1,760	1,057

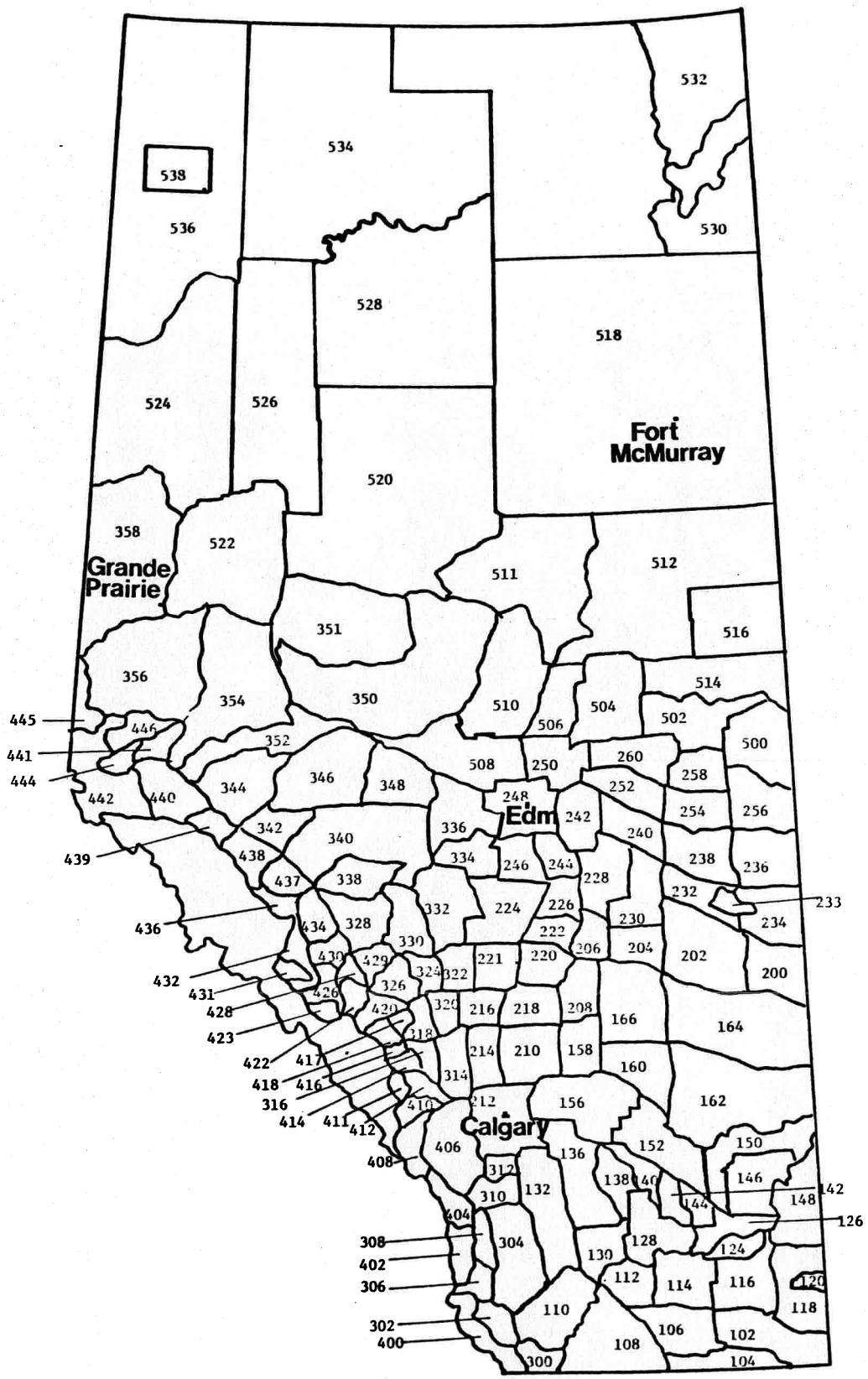

Figure 4. Map of Alberta Wildlife Management Units.

Each study area resident hunter during the 1975-76 season hunted big game in an average of 1.7 AOSERP study area grid locations (Figure 3). The average take per person per grid location was 0.11 animals. The big game hunter success rates among the 10 grid locations ranged from 0.00 to 0.60 animals per person. Grid locations 1, 2, 3, 4, and 5 were above average in hunter success rates. On average, 168 study area resident big game hunters were active in a grid location in which 17.6 big game animals were taken during the 1975-76 season. The number of hunters ranged from 21 to 541 persons. Grid locations 9 and 10 were well above average in the number of study area resident big game hunters and grid locations 3, 4, 9, and 10 were above average in the total number of big game animals taken (Figure 3).

3.3.4.2 Upland bird game hunting activity. Among the 102,600 provincial resident hunters during the 1975-76 season, 32,832 hunted upland bird game during an average of 4.13 days per person. The upland bird game harvest success rate was 7.56 birds per person for a total provincial take of 248,210 upland birds (Table 9). Of the total upland bird game harvest, grouse accounted for 67.71 percent; pheasant, 24.07 percent; partridge, 8.05 percent; and ptarmigan, 0.17 percent. Of the 2,203 provincial resident hunters who hunted in the study area during the 1975-76 season, 1,102 hunted upland bird game in the area during an average of 3.40 days per person. The upland bird game harvest success rate was 5.20 birds per person for a total take of 5,730 upland birds (2.31 percent of the provincial total) (Table 9). Of the total upland bird game harvest, grouse accounted for 80.8 percent; partridge, 11.5 percent; and ptarmigan, 7.7 percent. Among the 1,151 study area resident hunters during the 1975-76 season, 397 hunters hunted upland bird game in the area during an average of 5.54 days per person. The upland bird game harvest success rate was 7.74 birds per person for a total take of 3,075 upland game birds (1.24 percent of the provincial total) (Table 9). Of the total upland bird game harvest, grouse accounted for 96.7 percent and ptarmigan for 3.3 percent.

The results presented here indicate that study area resident upland bird game hunters have a slightly higher success rate than provincial upland bird game hunters although the success rate per day is slightly lower. There are also differences in the proportion of different species taken, primarily due to the fact that the availability of different species in the study area differs from the species available province-wide.

Upland bird game hunter preferences for different species, measured in terms of the number of times each species was sought, is in part also dependent on species availability, but nevertheless differs from the profile of total harvest by species and differs between study area resident hunters and Alberta resident hunters. Alberta resident hunter preference for different species was as follows: grouse 58.37 percent; pheasant, 36.05 percent; partridge, 5.35 percent; and ptarmigan, 0.23 percent. AOSERP study area resident hunter preference for different species was as follows: grouse, 88.1 percent; ptarmigan, 10.9 percent; and pheasant, 1.0 percent.

The geographical distribution of upland bird game hunting activities of Alberta resident hunters is quite varied among 75 Wildlife Management Units throughout the Province (Figure 4). Each hunter during the 1975-76 season bagged an average of 7.56 birds in an average of 1.3 WMU locations. The average take per person per WMU was 5.82 birds. The upland bird game hunter success rates among the WMU locations ranged from 0.0 to 90.0 birds per person. On average, 569 upland bird game hunters were active in a WMU in which 3,311 upland game birds were taken during the 1975-76 season. The number of hunters ranged from 201 to 3,827 persons. Those WMU locations which were above average in hunting success rates, total number of hunters, and total number of birds taken were as follows: 130, 132, 142, 156, 238, 252, 322, and 352.

Each study area resident hunter hunted upland bird game during the 1975-76 season in an average of 1.4 grid locations (Figure 3). The average take per person per grid location was 5.53

birds. The upland bird game hunter success rates among nine grid locations[1] ranged from 2.00 to 9.50 birds per person. Grid locations 1, 5, 8, and 9 were above average in hunter success rates. On average, 56 study area resident upland bird game hunters were active in a study area grid location in which 308 upland birds were taken during the 1975-76 season. The number of hunters ranged from 0 to 181 persons in the 10 grid locations. Grid locations 7, 9, and 10 were above average in both the number of resident upland bird game hunters and total number of upland birds taken (Figure 3).

3.3.4.3 Migratory bird game hunting activity. Among the 102,600 provincial resident hunters during the 1975-76 season, 61,868 hunters hunted waterfowl during an average of 5.22 days per person. The waterfowl harvest success rate was 17.74 waterfowl per person for a total provincial take of 1,097,538 (Table 9). Of the total waterfowl harvest, ducks accounted for 90.73 percent and geese for 9.27 percent. Of the 2,203 provincial resident hunters who hunted in the study area during the 1975-76 season, 220 hunted waterfowl in the area during an average of one day per person. The waterfowl harvest success rate was 8.00 waterfowl per person for a total take of 1,760 waterfowl (0.16 percent of the provincial total) (Table 9). Of the total waterfowl harvest, ducks accounted for 87 percent and geese for 13 percent. Among the 1,151 study area resident hunters during the 1975-76 season, 127 hunted waterfowl in the area during an average of 2.84 days per person. The waterfowl harvest success rate was 8.32 per person for a total take of 1,057 waterfowl (0.10 percent of the provincial total) (Table 9). Of the total waterfowl harvest, ducks accounted for 78 percent and geese for 22 percent.

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[1] Excludes grid number 2 where upland bird game hunting was negligible.

The results presented here indicate that study area resident waterfowl hunters have a substantially lower success rate than provincial waterfowl hunters although the success rate per day is only slightly lower. There are also differences in the proportion of different species taken, primarily due to the fact that the availability of different species in the study area differs from the availability of species province-wide.

Waterfowl hunter preferences for different species, measured in terms of the number of times each species was sought, is in part also dependent on species availability, but nevertheless differs from the profile of total harvest by species and differs between study area resident hunters and Alberta resident hunters. Alberta resident hunter preferences for different species was as follows: ducks, 67.36 percent and geese 32.64 percent. Study area resident hunter preference for different species was as follows: ducks 79.2 percent and geese 20.8 percent.

The geographical distribution of waterfowl hunting activities of Alberta resident hunters is quite varied among 86 Wildlife Management Units throughout the Province (Figure 4). Each hunter during the 1975-76 season bagged, on average, 17.74 waterfowl in an average of 1.6 WMU locations. The average take per person per WMU was 11.09 waterfowl. The waterfowl hunter success rates among the WMU locations ranged from 0.00 to 62.00 waterfowl per person. On average, 1,151 waterfowl hunters were active in a WMU in which 12,762 waterfowl were taken during the 1975-76 season. The number of hunters ranged from 193 to 4,048 persons. Those WMU locations which were above average in hunter success rates, total number of hunters, and total number of waterfowl taken were as follows: 108, 158, 164, 200, 204, 206, 220, 222, 226, 228, 230, 238, 240, 242, 248, 252, 258, 336, and 508.

Each study area resident hunter during the 1975-76 season hunted waterfowl in an average of 1.04 grid locations (Figure 3). The average take per person per grid location was 8.0 waterfowl.

The waterfowl success rates among five grid locations[1] ranged from 3.33 to 31.25 waterfowl per person. Grid number 1 was well above average in hunter success rates. An average of 13 study area resident waterfowl hunters were active in a grid location in which 106 waterfowl were taken during the 1975-76 season. The number of hunters ranged from 0 to 56 persons in the 10 grid locations. Grid numbers 1, 4, 9, and 10 were above average in the number of study area resident waterfowl hunters and grid numbers 1 and 10 were above average in the total number of waterfowl taken (Figure 3).

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[1] Excludes grid numbers 2, 3, 5, 6, and 8 where waterfowl hunting was negligible.

4. NONCONSUMPTIVE FISH AND WILDLIFE ACTIVITY SURVEY RESULTS

4.1 OBJECTIVES

The focus of this section is a socioeconomic evaluation of nonconsumptive recreational fish and wildlife activity in Alberta by Alberta residents with particular emphasis given to the AOSERP study area (Figure 1). Socioeconomic information is essential in the assessment of nonconsumptive recreational fish and wildlife activity and when combined with physical and biological information, it is possible to ascertain the importance of nonconsumptive recreational fish and wildlife resource uses in relation to other fish and wildlife resource uses and in relation to other resource use patterns which may alter fish and wildlife habitat.

The results presented herein were obtained with the intent of achieving the following objectives:

1. To ascertain the socioeconomic characteristics of participants in the AOSERP study area and throughout the Province;
2. To establish a detailed profile of participant nonconsumptive fish and wildlife activities in the AOSERP study area and throughout the Province, particularly with regard to activity locations, durations, and species of fish and wildlife;
3. To determine the number of recreation days expended in these activities by Albertans in the AOSERP study area and throughout the Province;
4. To examine the desirability of different species of fish and wildlife in the AOSERP study area and throughout the Province; and
5. To estimate the value of fish and wildlife resources used for nonconsumptive recreational purposes in the AOSERP study area and throughout the Province.

The results obtained in meeting these objectives are summarized here. The results pertaining to the first objective are presented under the heading "Socioeconomic Characteristics". The results pertaining to the second, third, and fifth objectives are presented under "Nonconsumptive Recreational Fish and Wildlife Activity Days and Benefits", "Locations of Fish and Wildlife Enjoyment Activities", and "Other Activities Associated with Fish and Wildlife Enjoyment". The results pertaining to the fourth objective are presented under the heading "Species Preferences".

4.2 METHODS

Two questionnaires were designed and utilized to obtain the information required to meet the objectives of this study (Appendices 7.5 and 7.6). One was a mail questionnaire for a randomly cited systematic sample of 3,641 recipients from the estimated 580,756 Alberta households during 1975. The initial mailing to sample recipients was followed by a second mailing to nonrespondents of the initial mailing. The combined response of first and second mailings was 807 (24.4 percent) of which 689 returns were useable (Table 10). A comparison between first and second mailings for selected variables for survey results was made to see if there was evidence of nonresponse bias. For lack of any strong evidence to the contrary, nonresponse bias is assumed not to exist. Detailed results of the provincial survey are contained in Volume IV, Appendix 7.2.

The second questionnaire was an interview questionnaire for a randomly selected sample of 410 AOSERP study area resident interviewees, of which 103 were Great Canadian Oil Sands (GCOS) and Syncrude Canada Ltd. camp residents from the estimated 6,040 such residents, and of which 307 were AOSERP study area household residents from the estimated 4,747 households (Table 10). The results of the survey are contained in Volume IV, Appendix 7.3.

Table 10. Socioeconomic characteristics of provincial and AOSERP study area residents.

Item	Alberta Household Residents	AOSERP Study Area Camp Residents	AOSERP Study Area Household Residents
Number of Households or Camp Residents	580,756	6,040	4,747
Number of Survey Respondents (persons)	689	103	307
Average Family Size (person)[a]	3.20	1.00	3.06
Average Household Size (persons)	3.20	1.00	3.18
Average Adult Age (years)	40.92	31.22	32.79
Average Child Age (years)	11.20	0.00	8.20
Adult Average Formal Education (years)	12.00	12.00	12.00
Average Family Income (dollars)	$17,677.00	$14,896.00	$18,653.00
Average Length of Time at Current Residence (years)	n.a.	0.90	3.40
Total Number of Individuals Engaged in Nonconsumptive Activities (persons)[b]	1,390,980	3,111	10,537

[a] Includes only family members living at home.

[b] Nonconsumptive activities means nonconsumptive recreational fish and wildlife activities such as observation and study. Number of individuals includes only those persons over five years of age. AOSERP study area figures include only those active in the area.

4.3 RESULTS

4.3.1 Socioeconomic Characteristics

Of members of the 580,756 Alberta households during 1975, one half resided in Edmonton and Calgary; the remainder were widely dispersed throughout the Province. Residents of the study area (21,147 persons) accounted for 0.96 percent of all Alberta residents. Approximately 97.3 percent of the residents resided in Fort McMurray. There were an estimated 4,747 households and 6,040 GCOS and Syncrude camp residents in the study area (Table 10). The average length of residence in the study area was 0.9 years for camp residents and 3.4 years for household residents.

Aside from camp residents, for whom family size was considered to be one person for purposes of the survey, average family size of 3.06 persons in the AOSERP study area was smaller than the provincial average of 3.20 persons (both figures including only immediate family members living at home). Study area resident households included non-family members as well, bringing the average household size to 3.18 persons.[1] The average adult age province-wide was 40.92 years whereas the generally younger study area adult camp and household residents average 31.22 and 32.79 years of age, respectively. The average age per child province-wide was 11.20 years compared to the average age per study area child of 8.20 years. Both province-wide resident adults and study area resident adults had achieved an average of 12 years of formal education (Table 10).

Among 17 occupation categories for provincial residents, homemaker accounted for 24.7 percent, followed by professional and technical occupations, 18.4 percent, managerial occupations, 7.8 percent, clerical occupations, 7.6 percent, retired, 7.6 percent, and tradesmen, 7.4 percent. Among study area household residents, homemaker accounted for 26.0 percent, tradesmen, 14.0 percent, operative occupations, 7.8 percent, and professional and technical,

[1] Since no indication of province-wide household size was ascertained, family size and household size were assumed equivalent.

7.6 percent. Among study area camp residents, tradesmen accounted for 50.0 percent, labourer, 16.7 percent, operative occupations, 12.7 percent, and managerial, 7.8 percent. All other categories for the three groups of residents were less than 7.0 percent each.

Annual average family income province-wide was $17,677 during 1975 (Table 10). Family income in the study area during the same year was higher at $18,653. Study area camp residents' average income was $14,896 during 1975; however, many camp residents resided in the study area only part of 1975 and still others did not move there until 1976. The average income for camp residents during 1976 may be considerably higher. On a per capita basis, province-wide income was $5,524 per person whereas AOSERP study area income was considerably higher at $8,442.

4.3.2 Nonconsumptive Recreational Fish and Wildlife Activity Days and Benefits

There were a total of 1,390,980 provincial residents over five years of age who were actively engaged in nonconsumptive recreational fish and wildlife activities in Alberta during 1975 (Tables 10 and 11). The annual total amount of time in these activities amounted to 16,678,600 recreation days (Table 11). Of this total, bird life enjoyment accounted for 34.2 percent, animal life enjoyment accounted for 39.6 percent, and aquatic life enjoyment accounted for 26.2 percent. Of the 1,390,980 active Alberta residents, 50,170 individuals (3.6 percent of the provincial total) were active in the AOSERP study area. The annual total number of recreation days in nonconsumptive recreational fish and wildlife activity in the study area by these individuals was 83,390 days (0.50 percent of the provincial total).

The 50,170 provincial residents active in the study area included a total of 13,648 study area residents (3,111 camp residents and 10,537 household residents) (Tables 10 and 11) who spent an annual total of 54,592 recreation days (0.33 percent of the provincial total) in nonconsumptive recreational fish and wildlife activities in the study area (Table 11).

Table 11. Nonconsumptive recreational fish and wildlife activity days and benefits of provincial and AOSERP study area residents.

Item		Alberta Residents	AOSERP Study Area Residents
Total Number of Individuals Engaged in Nonconsumptive Activities[a]	Alberta	1,390,980	n.a.
	AOSERP Study Area	50,170	13,648
Annual Total Numbers of Days Engaged in Nonconsumptive Activities	Alberta	16,678,600	n.a.
	AOSERP Study Area	83,393	54,592
Annual Total Benefits from Non-consumptive Activities	Alberta	$50,035,800	n.a.
	AOSERP Study Area	$250,180	$209,087

[a]Nonconsumptive activities mean nonconsumptive fish and wildlife activities such as observation and study. Number of individuals includes only those persons over five years of age.

Extramarket benefit is the value of a day's involvement in nonconsumptive recreational fish and wildlife activities. For provincial residents this benefit was estimated at $3.00 per person per day.[1] Based on the estimated total annual number of days in such activities the annual total extramarket benefits for all active Alberta residents was $50,035,800 (Table 11). The portion allocated to the study area from provincial resident activity there is $250,180 annually (0.5 percent of the provincial total).

The extramarket benefits per person per day for nonconsumptive recreational fish and wildlife activities by study area residents averaged $3.61 for bird life, $4.48 for animal life, and $3.12 for aquatic life. The extramarket benefits for all species combined was $3.83 per person per day. Based on the estimated total annual number of days in nonconsumptive recreational fish and wildlife activities by residents in the study area, the annual total benefits amounted to $209,087 (0.42 percent of the provincial total.

4.3.3 Locations of Fish and Wildlife Enjoyment Activities

Nonconsumptive recreational fish and wildlife enjoyment activities by provincial residents are widely dispersed throughout the Province and, for many individuals, in numerous locations. The Province was divided into five areas (Figure 5) among which total recreation days of nonconsumptive fish and wildlife activities are allocated. Area 1 is the AOSERP study area, within which 50,170 individuals (3.6 percent of the provincial total) spent 83,393 days (0.5 percent of the provincial total) in such activities. Area 2 is northern Alberta, excluding Area 1, within which 680,751 provincial residents (48.9 percent of the provincial total) spent 4,369,790 days (26.2 percent of the provincial total) in such activities. Area 3 is the eastern slopes of Alberta within which 965,081 provincial residents (69.4 percent of the provincial total) spent 5,137,005 (30.8 percent of the provincial total in such activities.

[1] Market benefits expressed in the form of recreation fees are considered neglible; consequently, these benefits also represent the value of fish and wildlife resources associated with nonconsumptive activity.

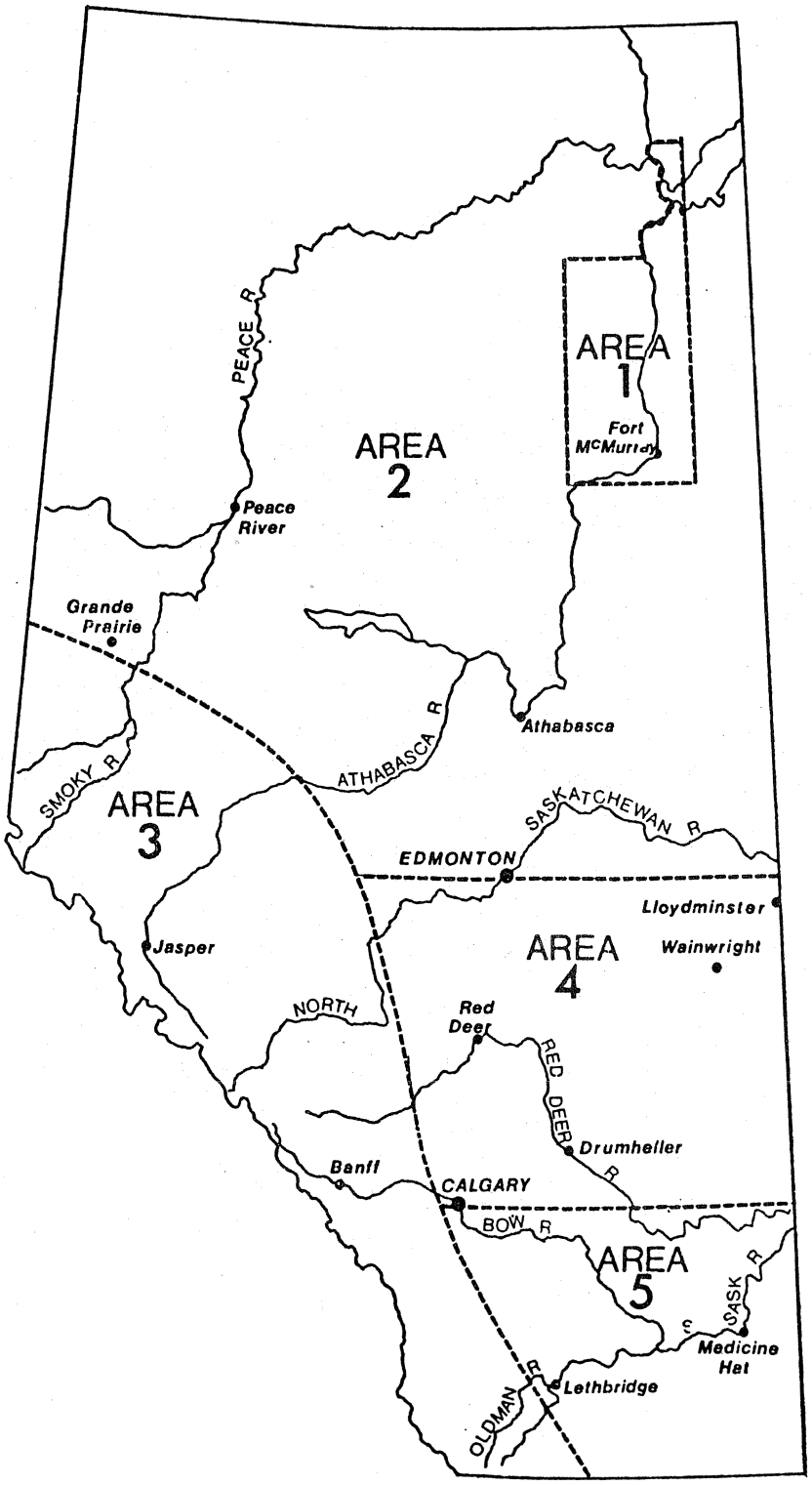

Figure 5. Map of Alberta activity areas.

Area 4 is east central Alberta, within which 826,250 provincial residents (59.4 percent of the provincial total) spent 4,419,825 days (26.5 percent of the provincial total) in such activities. Finally, Area 5 is southeastern Alberta, within which 416,474 provincial residents (29.9 percent of the provincial total) spent 2,668,574 days (16.0 percent of the provincial total) in such activities.

Location preferences by provincial residents by type of area for nonconsumptive recreational fish and wildlife activities were strongest for mountain areas followed by forested areas, national parks, provincial parks, and wilderness areas. These features typify the Eastern Slopes (Area 3) and, with the exception of mountain areas, typify northern Alberta (Areas 1 and 2) where, combined, nearly 60 percent of the total activity time by provincial residents was spent.

Unlike province-wide activities, nonconsumptive recreational fish and wildlife activities by study area residents in the area were not widely dispersed but limited to a comparatively few accessible locations within the area. In addition to such activities at Fort McMurray (grid locations 9 and 7, Figure 3), where virtually all AOSERP study area survey residents live, much of the total activity time was spent during outdoor recreation trips within the area at Gregoire Lake and Anzac which are both in grid location 10 (Figure 3), at Fort MacKay (grid location 6) and along the Athabasca River which passes through grid locations 1, 3, 4, 5, 6, 7, and 9 (Figure 3). The dominant mode of travel was car or truck. Each individual, on average, made approximately 15 such trips per year involving an average of two days per trip, an average round-trip distance of approximately 88 km (55 miles) per trip, and an average cost of approximately $17.00 per person per trip.

4.3.4 Species Preferences

Provincial residents who engaged in nonconsumptive recreational fish and wildlife enjoyment activities in the Province liked to see, in order or preference, the following species: deer, moose,

trout, elk, bear, bighorn sheep, goose, owl, duck, pheasant, mountain goat, pronghorn antelope, yellow walleye, hawk, squirrel, beaver, eagle, coyote, grouse, bison, yellow perch, great northern pike, robin, fox, and other species. Provincial residents would like to see, in order of preference, increased populations in the following species: trout, deer, pronghorn antelope, moose, elk, arctic grayling, bear, yellow walleye, owl, bison, white pelican, duck, beaver, hawk, yellow perch, mountain goat, wolf, partridge, crane, fox, swan, and other species.

Study area household residents who engaged in nonconsumptive recreational fish and wildlife enjoyment activities in the study area liked to see, in order of preference, the following species: bear, deer, moose, squirrel, wolf, beaver, lynx, rabbit, chipmunk, caribou, fox, coyote, elk, duck, trout, goose, and other species. They would like to see, in order of preference, increased populations in the following species: deer, moose, bear, caribou, fox, wolf, beaver, rabbit, lynx, elk, squirrel, bison, goose, duck, ptarmigan, and other species.

Study area camp residents who engaged in nonconsumptive recreational fish and wildlife enjoyment activities in the area liked to see, in order of preference, the following species: deer, moose, bear, wolf, lynx, loon, fox, squirrel, beaver, goose, hawk, grouse, and other species. They would like to see, in order of preference, increased populations in the following species: deer, wolf, bear, lynx, caribou, moose, beaver, grouse, eagle, otter, rabbit, squirrel, fox, pelican, and other species.

Among all the preferences just presented there is a notable presence of game species which in part may reflect a significant interest in consumptive use of fish and wildlife (hunting and fishing) as well as nonconsumptive use. Certainly, as indicated in the section below, considerable nonconsumptive recreational fish and wildlife activity is done in association with consumptive recreational fish and wildlife activity.

In association with species preferences, AOSERP study area residents also expressed other preferences related to their nonconsumptive fish and wildlife activities in the study area. They tend to: prefer the summer over other seasons of the year for fish and wildlife enjoyment; actively seek fish and wildlife at least part of the time during their outdoor activities; place moderate to extreme importance on seeing fish and wildlife during their outdoor activities; and would tend to go more often to places where fish and wildlife might be found if there was greater access, and they would like to see, among different types of access, more roads and trails.

4.3.5 Other Activities Associated with Fish and Wildlife Enjoyment

Nonconsumptive recreational use of fish and wildlife through observation and study by individuals, generally takes place in association with other outdoor recreation activities. Provincial residents included in order of frequency, the following activities: driving for pleasure, picnicking, camping, fishing, hiking, boating, hunting, skiing, snowmobiling, and other activities. Individuals typically engaged in more than one associated activity during any given outing, e.g., driving for pleasure, picnicking, camping, fishing, and hiking may all be part of a single family outing involving non-consumptive fish and wildlife enjoyment. At least one person among 23 percent of all provincial households engages in hunting and at least one person among 54 percent of all provincial households engages in fishing, both of which constitute consumptive recreational fish and wildlife use.

Among study area residents, active household residents include fishing, driving for pleasure, camping, hunting, picnicking, hiking, snowmobiling, exploring, cross-country skiing, and boating as activities associated with nonconsumptive fish and wildlife

enjoyment in the study area. Active camp residents include fishing, hunting, camping, driving for pleasure, hiking, and exploring as activities associated with their nonconsumptive fish and wildlife enjoyment in the study area. Approximately 27 percent of study area residents engage in hunting and approximately 61 percent engage in fishing, constituting consumptive recreational fish and wildlife use.

5. SUMMARY AND CONCLUSIONS

A socioeconomic evaluation of the recreational use of fish and wildlife resources in Alberta, with particular emphasis given to the AOSERP study area (Figure 1) is the focus of this study. Socioeconomic information is essential in the assessment of recreational fish and wildlife activity and when combined with physical and biological information, it is possible to ascertain the importance of recreational fish and wildlife resource uses in relation to other fish and wildlife resource uses and in relation to other resource use patterns which may alter fish and wildlife habitata.

The study reported herein was carried out with the following objectives in mind:

1. To ascertain the socioeconomic characteristics of participants in recreational fishing, hunting, and nonconsumptive uses of fish and wildlife in the AOSERP study area and throughout the Province;
2. To establish a detailed profile of recreational fishing, hunting, and nonconsumptive fish and wildlife use activities in the AOSERP study area and throughout the Province, particularly with regard to activity locations, durations, expenses, and species of fish and wildlife involved;
3. To determine the number of recreational days expended in these activities by Albertans in the AOSERP study area and throughout the Province;
4. To examine the desirability of difference species of fish and wildlife in the AOSERP study area and throughout the Province;
5. To estimate the value of fish and wildlife resources used for recreational purposes in the AOSERP study area and throughout the Province.

The results obtained in meeting these objectives are presented in detail in Volumes 2, 3, and 4 of this report and are summarized in Chapters 2, 3, and 4 of this volume. The balance of this chapter presents only highlights of these results.

5.1 RECREATIONAL USE OF FISH AND WILDLIFE RESOURCES

There were a total of 1,390,980 Albertans over five years of age who engaged in nonconsumptive recreational fish and wildlife activities during 1975-76. Of this total, 102,600 engaged in hunting activites in the Province and 308,500 engaged in fishing activities in the Province (164,100 of whom held angling licenses). There were a total of 50,170 Alberta residents who engaged in nonconsumptive actities in the study area, and a total of 8,240 licensed anglers and 2,203 licensed hunters who engaged in fishing and hunting in the AOSERP study area. Of the AOSERP study area residents, 1,151 engaged in hunting activities and approximately 4,000 engaged in fishing activities in the study area (2,503 of whom held angling licenses).

The annual total number of recreation days spent by Alberta residents over five years of age in nonconsumptive recreational fish and wildlife activities in the Province amounted to 16,678,600 days. The annual total number of angler days by licensed anglers was 1,649,205 and the annual total number of hunter days was 731,538. The annual total number of angler days by Alberta resident children over five years of age and senior citizens (neither of whom require angling licenses), while not ascertained, was probably in the order of 1,440,000 angler days. The combined annual total number of recreation days spent by Alberta residents in consumptive and nonconsumptive fish and wildlife uses in Alberta was approximately 20,500,000 recreation days. Of this total, approximately 188,131 recreation days (0.92 percent of the provincial total) were spent in the study area including 83,393 nonconsumptive activity days, 10,354 hunter days, 54,384 licensed angler days, and 40,000 nonlicensed angler days.

The annual total number of recreation days spent by study area residents over five years of age in nonconsumptive recreational fish and wildlife activities in the area amounted to 54,592. The annual total number of hunter days was 6,768, the annual total number of licensed angler days was 22,677, and the annual total number of non-licensed angler days was 16,650. The combined annual total number of recreation days spent by these residents in consumptive and nonconsumptive fish and wildlife resource uses in the study area was 100,687 days (0.49 percent of the provincial total).

The province-wide annual total number of fish caught by Alberta resident licensed anglers was 5,789,448, of which 164,442 were caught in the study area. Study area resident licensed anglers caught 81,878 fish in the area. The provincial annual total number of big game harvested by Alberta hunters was 22,382, of which 216 were harvested in the study area. Study area hunters harvested 176 big game animals in the study area. The provincial annual total number of upland game birds harvested by Alberta hunters was 248,210, of which 5,730 were harvested in the study area. Study area hunters harvested 3,075 upland birds in the area. The provincial annual total number of waterfowl taken by Alberta hunters was 1,097,538, of which 1,760 were taken in the study area. AOSERP study area hunters harvested 1,057 waterfowl in the area.

5.2 RECREATIONAL BENEFITS FROM FISH AND WILDLIFE RESOURCE USE

Extramarket benefits are the value of recreational fish and wildlife activities over and above travel and other activity expenses. The value of fish and wildlife resources from such activities consists of extramarket benefits plus market benefits in the form of license fees and other recreational fees related to fish and wildlife use. The market portion of fish and wildlife consumptive use values in the form of hunting and fishing license fees is significant, whereas the market portion of fish and wildlife nonconsumptive use values is not.

The annual total extramarket benefits received by Alberta residents over five years of age from nonconsumptive recreational fish and wildlife activities in the Province amounted to $50,035,800. The annual total licensed angler extramarket benefits were $23,072,460 and the annual total licensed hunter extramarket benefits were $24,318,250. The combined annual total extramarket benefits received by Albertans from both consumptive and nonconsumptive recreational fish and wildlife activities (excluding extramarket benefits received by non-licensed anglers) amounted to $97,426,500 per year. Of this total, $1,355,210 in annual extramarket benefits (1.39 percent of the provincial total) were received by provincial residents from recreational fish and wildlife activities in the study area which included $250,180 from nonconsumptive fish and wildlife activities, $344,194 from hunting, and $760,835 from licensed anglers.

The annual total extramarket benefits received by study area residents over five years of age from nonconsumptive recreational fish and wildlife activities in the area amounted to $209,087. The annual total licensed angler extramarket benefits were $266,230 and the annual total licensed hunter extramarket benefits were $121,074. The combined annual total extramarket benefits received by study area residents from both consumptive and nonconsumptive recreational fish and wildlife activities (excluding extramarket benefits received by non-licensed anglers) amounted to $596,400 per year (0.61 percent of the provincial total).

These extramarket benefits, with the addition of hunting and fishing license fees, provide an estimate of the annual value of fish and wildlife resources for recreational consumptive and nonconsumptive use activities. For the Province as a whole, this annual value was $99,438,260. For the AOSERP study area, the annual value was $608,720 (0.61 percent of the provincial total).

The estimated extramarket benefits and resource values presented here are attributable only to consumptive and nonconsumptive recreational fish and wildlife resource use by Albertans and study area residents. These estimates do not include recreational

values of Alberta's fish and wildlife to non-Albertans nor do they include option values to non-participants both within the Province and elsewhere. Furthermore, these estimated values do not include the value of fish and wildlife resources in Alberta from commercial or other nonrecreational uses.

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403/427-3943

Penthouse Jarvis Building,
9925 - 107 Street
Edmonton, Alberta, Canada.
T5K 2H9

ALBERTA OIL SANDS
ENVIRONMENTAL RESEARCH PROGRAM

Dear Sportsman:

The Alberta Oil Sands Environmental Research Program (AOSERP) was begun in 1975 by the Governments of Alberta and Canada, with the goal of directing, coordinating, funding, and supervising research into the environmental effects of Athabasca oil sands development.

As part of this research effort, AOSERP is conducting a series of surveys and interviews in Alberta to determine the extent of recreational activities related to fish and wildlife resources. The information collected will contribute to a greater understanding and more effective management of fish and wildlife resources throughout Alberta, and especially in the Athabasca Oil Sands Area.

We request your cooperation in completing, as best you can, the enclosed questionnaire. Your answers will be combined with those of other respondents so as to ensure that your individual response will be held in strict confidence.

We hope you share our objectives in making fish and wildlife management programs more responsive to the needs of present and future Albertans. Your anticipated cooperation and assistance is greatly appreciated.

Yours truly,

Dave Neave
Chairman, Terrestrial
Fauna Committee

Ron Wallace
Chairman, Aquatic
Fauna Committee

Sponsored jointly by

Alberta ENVIRONMENT

Environment Canada

Environnement Canada

alberta canada

ALBERTA OIL SANDS
ENVIRONMENTAL RESEARCH PROGRAM

403 / 427-3943

Penthouse Jarvis Building,
9925 - 107 Street
Edmonton, Alberta, Canada.
T5K 2H9

Dear Sportsman:

Several weeks ago you were mailed a copy of the enclosed questionnaire and covering letter. If you have completed and returned the original questionnaire, please disregard the enclosed. We appreciate your assistance. If for some reason you have not completed and returned the questionnaire, we would be grateful if you would take a few minutes and complete the enclosed. We are anxious to receive as many returns as possible in order to ensure the success of this project.

Thanking you in advance.

Yours truly,

Dave Neave

Dave Neave
Chairman, Terrestrial
Fauna Committee.

Ron Wallace
Chairman, Aquatic
Fauna Committee.

Sponsored jointly by

Alberta ENVIRONMENT

Environment Canada Environnement Canada

CONFIDENTIAL

№ 11974

ALBERTA FISHING SURVEY 1975-76 FISHING SEASON

1. Residence (city or town) _____ 2. Age _____

3. Sex Male ☐ 4. Occupation _____
Female ☐

5. Including yourself, how many of your immediate family are living at your residence? (Please circle the appropriate number).

1 2 3 4 5 6 7 8 9

6. Approximately what was the total amount of money earned by you and your family in 1975? Estimate and check one.

Less than $5,000	☐	$20,001 - $25,000	☐
$ 5,001 - 10,000	☐	$25,001 - 30,000	☐
$10,001 - 15,000	☐	$30,001 - 35,000	☐
$15,001 - 20,000	☐	$35,001 or over	☐

7. Education: (please circle highest year completed).

Grade School	0	1	2	3	4	5	6	7	8	9
High School	10	11	12							
University	1	2	3	4	5	6	7	8	9	
Technical School	1	2	3	4						

8. Please respond to each question below by checking the appropriate answer.

	Yes	No
(a) Have you ever fished for sport before the 1975-76 season? (April 1975 - March 1976).	☐	☐
(b) Have you ever fished for sport in Alberta before the 1975-76 season?	☐	☐
(c) Have you ever fished for sport in the Athabasca Oil Sands Area before the 1975-76 season? (see the map attached for a description of this area).	☐	☐

9. Did you fish for sport AT LEAST ONCE during the 1975-76 fishing season in Alberta? (includes ice fishing).

YES ☐ IF "YES" PLEASE COMPLETE ALL THE QUESTIONS THAT FOLLOW.

NO ☐ IF "NO" PLEASE RETURN THIS QUESTIONNAIRE IN THE SELF-ADDRESSED ENVELOPE THAT HAS BEEN PROVIDED.

10. If you made any major purchases in Alberta in 1975 that are used in whole or in part for fishing in Alberta please list the item(s) purchased, the purchase price and the extent to which this item is used for fishing in Alberta.

ITEM	PURCHASE PRICE $	AMOUNT OF USE FOR ALBERTA FISHING 100%	75%	50%	25%	0%
e.g. boat motor	1,150		✓			

11. If you DID fish in Alberta during the 1975-76 season, please complete the following information for each fishing trip taken (includes ice fishing). (NOTE: 1 FULL day of fishing is 4 or more hours spent in the activity).

Areas Fished: (please list nearest town or landmark)	Total No. Days Fished in Area (Estimate to nearest 1/2 day)	No. Trips Taken to Area	Usual No. in Fishing Party	Miles to Area	What were You Fishing For?	Approx. number You caught of each species
e.g. Cold Lake	2 1/2	2	2	100	trout	20
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						

12. Based on your experience, how would you rate your fishing trips in Alberta during the 1975-76 season? (check one).

Very Good ☐ Good ☐ Fair ☐ Poor ☐ Very Poor ☐

13. Please estimate as best you can the amount of money you personally spent for sport fishing purposes in Alberta during the 1975-76 fishing season. Please estimate for each category below as it applies to you.

TRAVEL COSTS (includes gasoline, oil, air fare, etc.) $ _____

LODGING (includes hotels, motels, camping fees, etc.) $ _____

FOOD (includes restaurant meals & food purchased for fishing trips, etc.) $ _____

BEVERAGES $ _____

RENTALS (includes rental of boats, motors and other equipment, etc.) $ _____

FISHING SERVICES (includes guiding fees, packers fees, etc.) $ _____

FISHING GEAR (includes tackle, bait, flies, etc.) $ _____

OTHER (please specify) _____ $ _____

_____ $ _____

14. Approximately how much do you think a day's fishing in Alberta is worth to you, in dollars per day, above what you spend on travel and other expenses? (circle the appropriate dollar value).

$ 0 1 2 3 4 5 6 7 8 9 10

$ 12 14 16 18 20 22 24 26 28 30

If higher or other dollar value please specify. $ _____

15. Approximately how much money would you have to be paid NOT to fish in Alberta FOR ONE YEAR (Estimate and circle the least amount acceptable to you).

$	0	1	2	3	4	5	6	7	8	9
$		10	20	30	40	50	60	70	80	90
$		100	200	300	400	500	600	700	800	900

If higher or other dollar value please specify $ _____

16. Give any additional comments that might help to evaluate the sport fishing in Alberta.

_____

_____

17. Of the fishing trips you took during the 1975-76 season, were any of them to the Athabasca Oil Sands Area? (see the map attached for a description of this area).

YES ☐ IF "YES" PLEASE COMPLETE ALL THE QUESTIONS THAT FOLLOW.

NO ☐ IF "NO" PLEASE RETURN THIS QUESTIONNAIRE IN THE SELF-ADDRESSED ENVELOPE THAT HAS BEEN PROVIDED.

18. Please indicate with X's on the map attached the areas you fished during the 1975-76 season in the Athabasca Oil Sands Area. Please be as accurate as possible.

19. How would you rate the fishing trips to the Athabasca Oil Sands Area compared to your other fishing trips in Alberta as a whole? (check one).

Better than ☐ as good as ☐ worse than ☐

20. Approximately how much do you think a day's fishing in the Athabasca Oil Sands Area is worth to you in dollars per day, above what you spend on travel and other expenses? (circle the appropriate dollar value.)

$	0	1	2	3	4	5	6	7	8	9	10
$		12	14	16	18	20	22	24	26	28	30

If higher or other dollar value please specify $ _____

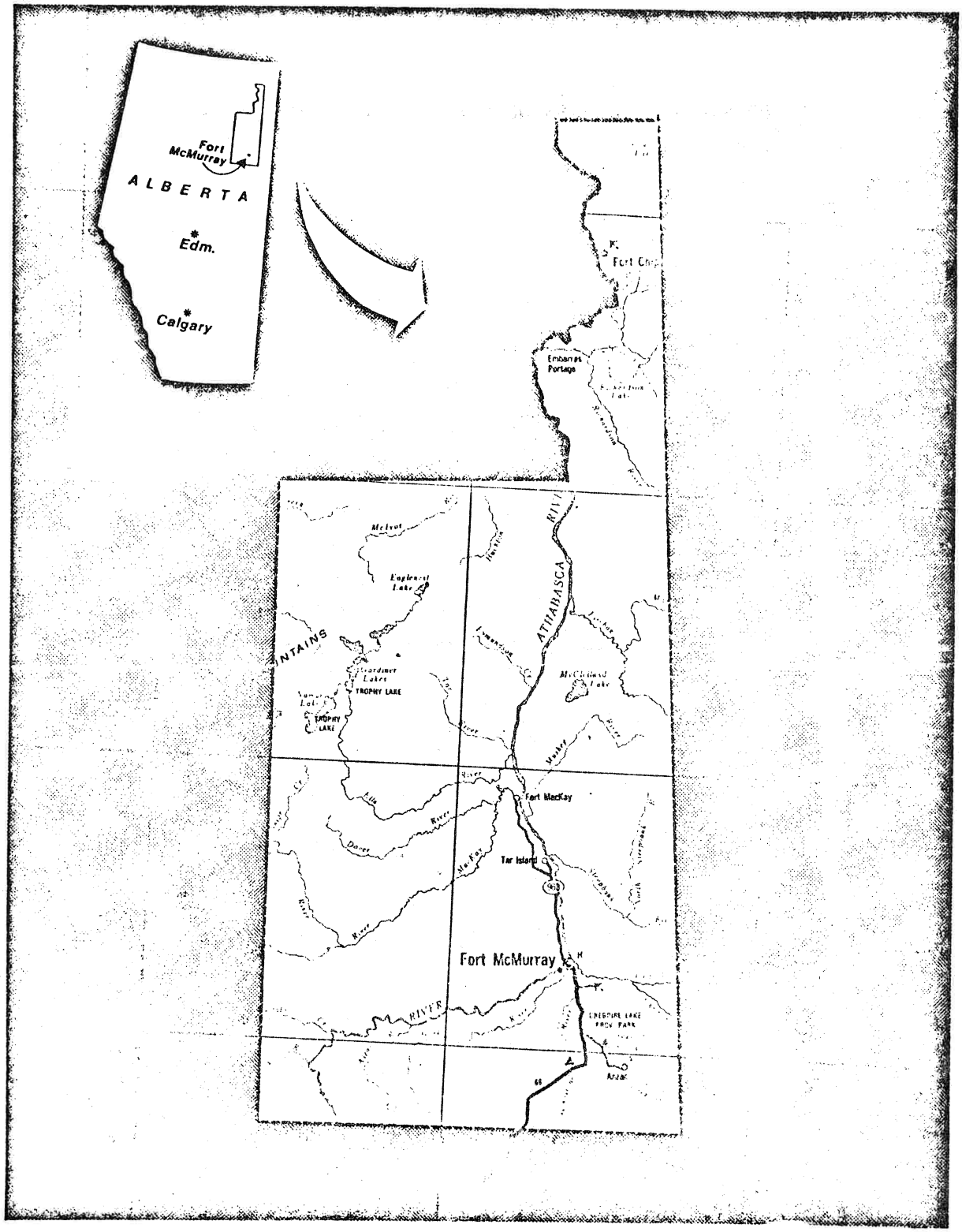
21. Provide any additional comments that might help evaluate the sport fishing in the Athabasca Oil Sands Area.

_____

_____

_____

THANK YOU VERY MUCH FOR YOUR CO-OPERATION IN ANSWERING AND RETURNING THIS QUESTIONNAIRE.



ATHABASCA OIL SANDS AREA

alberta canada

ALBERTA OIL SANDS ENVIRONMENTAL RESEARCH PROGRAM

7.2 AOSERP STUDY AREA FISHING QUESTIONNAIRE AND COVERING LETTERS

alberta canada

ALBERTA OIL SANDS
ENVIRONMENTAL RESEARCH PROGRAM

403 / 427-3943

Penthouse Jarvis Building,
9925 - 107 Street
Edmonton, Alberta, Canada.
T5K 2H9

Dear Sportsman:

The Alberta Oil Sands Environmental Research Program (AOSERP) was begun in 1975 by the Governments of Alberta and Canada, with the goal of directing, coordinating, funding, and supervising research into the environmental effects of Athabasca oil sands development.

As part of this research effort, AOSERP is conducting a series of surveys and interviews in Alberta to determine the extent of recreational activities related to fish and wildlife resources. The information collected will contribute to a greater understanding and more effective management of fish and wildlife resources throughout Alberta, and especially in the Athabasca Oil Sands Area.

We request your cooperation in completing, as best you can, the enclosed questionnaire. Your answers will be combined with those of other respondents so as to ensure that your individual response will be held in strict confidence.

We hope you share our objectives in making fish and wildlife management programs more responsive to the needs of present and future Albertans. Your anticipated cooperation and assistance is greatly appreciated.

Yours truly,

Dave Neave
Dave Neave
Chairman, Terrestrial
Fauna Committee

Ron Wallace
Ron Wallace
Chairman, Aquatic
Fauna Committee

Sponsored jointly by

Alberta ENVIRONMENT

Environment Canada | Environnement Canada

alberta canada

ALBERTA OIL SANDS
ENVIRONMENTAL RESEARCH PROGRAM

403 / 427-3943

Penthouse Jarvis Building,
9925 - 107 Street
Edmonton, Alberta, Canada.
T5K 2H9

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Fauna Committee.

Ron Wallace
Chairman, Aquatic
Fauna Committee.

Sponsored jointly by

Alberta ENVIRONMENT

Environment Canada

Environnement Canada

CONFIDENTIAL

Nº 22119

SPORTS FISHING SURVEY - 1975-76 FISHING SEASON

1. Residence (city or town) _____ 2. Age _____

3. Sex Male ☐ 4. Occupation _____
Female ☐

5. Including yourself, how many of your immediate family are living at your residence? (Please circle the appropriate number)

1 2 3 4 5 6 7 8 9

6. Approximately what was the total amount of money earned by you and your family in 1975? Estimate and check one.

Less than $5,000 ☐ $20,001 - 25,000 ☐

$ 5,001 - 10,000 ☐ $25,001 - 30,000 ☐

$10,001 - 15,000 ☐ $30,001 - 35,000 ☐

$15,001 - 20,000 ☐ $35,001 - or over ☐

7. Education: (please circle highest year completed).

Grade School 0 1 2 3 4 5 6 7 8 9

High School 10 11 12

University 1 2 3 4 5 6 7 8 9

Technical School 1 2 3 4

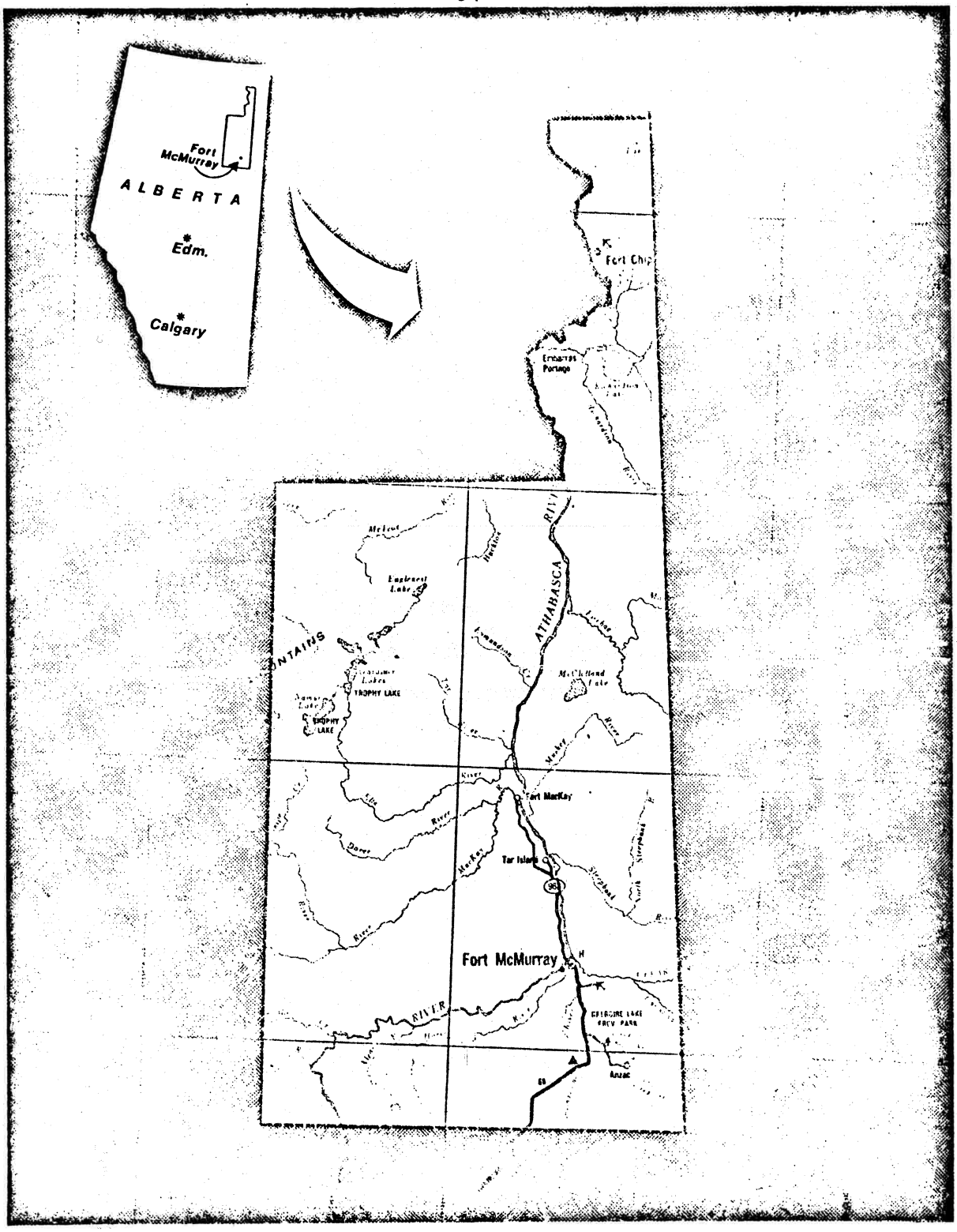
8. Please respond to each question below by checking the appropriate answers.

		Yes	No
(a)	Did you fish AT LEAST ONCE during the 1975-76 season in Alberta? (April 1975 - March 1976)	☐	☐
(b)	Have you ever fished for sport before the 1975-76 season?	☐	☐
(c)	Have you ever fished for sport in Alberta before the 1975-76 season?	☐	☐
(d)	Have you ever fished for sport in the Athabasca Oil Sands Area before the 1975-76 season (see the map attached for a description of this area)?	☐	☐

9. Did you fish in the Athabasca Oil Sands Area during the 1975-76 season. (see the map attached for a description of this area.)

Yes ☐ IF "YES" PLEASE COMPLETE ALL THE QUESTIONS THAT FOLLOW.

No ☐ IF "NO" PLEASE RETURN THIS QUESTIONNAIRE IN THE SELF-ADDRESSED ENVELOPE THAT HAS BEEN PROVIDED.



ATHABASCA OIL SANDS AREA

alberta canada

ALBERTA OIL SANDS ENVIRONMENTAL RESEARCH PROGRAM

7.3 PROVINCIAL HUNTING QUESTIONNAIRE AND COVERING LETTERS

alberta canada

ALBERTA OIL SANDS
ENVIRONMENTAL RESEARCH PROGRAM

403 / 427-3943

Penthouse Jarvis Building,
9925 - 107 Street
Edmonton, Alberta, Canada.
T5K 2H9

Dear Sportsman:

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Dave Neave
Chairman, Terrestrial
Fauna Committee

Ron Wallace
Chairman, Aquatic
Fauna Committee

Sponsored jointly by

Alberta ENVIRONMENT

Environment Canada

Environnement Canada

alberta canada

ALBERTA OIL SANDS
ENVIRONMENTAL RESEARCH PROGRAM

403 / 427-3943

Penthouse Jarvis Building,
9925 - 107 Street
Edmonton, Alberta, Canada.
T5K 2H9

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Fauna Committee.

Ron Wallace
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Fauna Committee.

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Alberta ENVIRONMENT

Environment Canada

Environnement Canada

CONFIDENTIAL

ALBERTA HUNTING SURVEY 1975 HUNTING SEASON

1. Residence (city or town) _____ 2. Age _____

3. Sex Male ☐ 4. Occupation _____
Female ☐

5. Including yourself, how many of your immediate family are living at your residence? (Please circle the appropriate number.)

1 2 3 4 5 6 7 8 9

6. Approximately what was the total amount of money earned by you and your family in 1975? Estimate and check one.

Less than $5,000 ☐	$20,001 - $25,000 ☐
$ 5,001 - 10,000 ☐	$25,001 - 30,000 ☐
$10,001 - 15,000 ☐	$30,001 - 35,000 ☐
$15,001 - 20,000 ☐	$35,001 or over ☐

7. Education: (Please circle highest year completed.)

Grade School	0	1	2	3	4	5	6	7	8	9
High School	10	11	12							
University	1	2	3	4	5	6	7	8	9	
Technical School	1	2	3	4						

8. Please respond to each question below by checking the appropriate answer.

	Yes	No
(a) Have you ever hunted before the 1975 season?	☐	☐
(b) Have you ever hunted in Alberta before the 1975 season?	☐	☐
(c) Have you ever hunted in the Athabasca Oil Sands Area before the 1975 season? (see the map attached for a description of this area).	☐	☐

9. What are the main reasons that you go hunting? Rank the following items in order of importance; 1st, 2nd, 3rd choices.

(a) for meat _____
(b) for a trophy _____
(c) for outdoor enjoyment _____
(d) other (please specify _____ _____

10. Which Alberta licenses did you hold in 1975? (Please check where applicable).

- ☐ Bird Game
- ☐ Migratory Bird Game
- ☐ Mule Deer
- ☐ Whitetailed Deer
- ☐ Angling License (1975-76 season)
- ☐ Moose
- ☐ Moose (Zone I)
- ☐ Elk
- ☐ Caribou
- ☐ Black Bear
- ☐ Grizzly Bear

Other (please specify) _____

_____

11. Did you hunt for sport AT LEAST ONCE during the 1975 hunting season in Alberta? (check.)

YES ☐ IF "YES" PLEASE COMPLETE ALL THE QUESTIONS THAT FOLLOW.

NO ☐ IF "NO" PLEASE RETURN THIS QUESTIONNAIRE IN THE SELF-ADDRESSED ENVELOPE THAT HAS BEEN PROVIDED

12. If you DID hunt in Alberta during the 1975 season, please complete the following information for each hunting trip taken. (NOTE: 1 FULL day of hunting is 4 or more hours spent in the activity.)

Trip No.	Area(s) Hunted: Nearest Town, Landmark or Wildlife Management Unit	Days Hunted in Area (Estimate to nearest 1/2 day)	Miles to Area	No. in Hunting Party	Game you Hunted in Area	Game Bagged by Yourself Only (type & number)
Example	Vermilion	3 1/2	100	2	Ducks & Geese	10 ducks, 2 geese
1.						
2.						
3.						
4.						
5.						
6.						
7.						

13. Based on your experience, how would you rate your hunting trips in Alberta during the 1975 season? (check where applicable).

	Very Good	Good	Fair	Poor	Very Poor
Big Game					
Upland Bird Game					
Waterfowl					

14. Please estimate as best you can the amount of money you personally spent for hunting purposes in Alberta during the 1975 season. Please estimate for each category below as it applies to you.

	HUNTING FOR:		
	Big Game	Upland Birds	Waterfowl
TRAVEL COSTS (includes gasoline, oil, air fare, etc.) $			
LODGING (includes hotels, motels, camping fees, etc.) $			
FOOD (includes restaurant meals and food purchased for hunting trips, etc.) $			
BEVERAGES $			
RENTALS (includes rental of hunting equipment, etc.) $			
GUIDES (includes guiding fees, etc.) $			
AMMUNITION $			
HUNTING SERVICES (includes packer fees, taxidermy, etc.) $			
OTHER (please specify) _____ $			
_____ $			

15. If you made any major purchase in Alberta in 1975 that are used in whole or in part for hunting in Alberta please list the item(s) purchased, the purchase price and the extent to which this item is used for hunting in Alberta.

ITEM	PURCHASE PRICE $	AMOUNT OF USE FOR ALBERTA HUNTING 100%	75%	50%	25%	0%
e.g. rifle	$160	✔				

16. If you participated in the following hunting activities in Alberta during the 1975 season, how much value in dollars per day was it worth to you above what you spent on travel and other expenses (circle the appropriate dollar value).

Hunting For	Average Dollar Value Per Day											Higher or Other Dollar Value (specify)
Big Game	0	1	2	3	4	5	6	7	8	9	10	
		12	14	16	18	20	22	24	26	28	30	$ _____
Upland Birds	0	1	2	3	4	5	6	7	8	9	10	
		12	14	16	18	20	22	24	26	28	30	$ _____
Waterfowl	0	1	2	3	4	5	6	7	8	9	10	
		12	14	16	18	20	22	24	26	28	30	$ _____

17. Approximately how much money would you have to be paid NOT to hunt in Alberta FOR ONE YEAR (Estimate and circle the least amount acceptable to you).

$	0	1	2	3	4	5	6	7	8	9
$		10	20	30	40	50	60	70	80	90
$		100	200	300	400	500	600	700	800	900

If higher or other dollar value please specify. $ _____

18. Give any additional comments that might help evaluate the sport hunting in Alberta.

_____

_____

_____

19. Of the hunting trips you took during the 1975 season, were any of them to the Athabasca Oil Sands Area? (see the map attached for a description of this area).

YES ☐ IF "YES" PLEASE COMPLETE ALL THE QUESTIONS THAT FOLLOW.

NO ☐ IF "NO" PLEASE RETURN THIS QUESTIONNAIRE IN THE SELF-ADDRESSED ENVELOPE THAT HAS BEEN PROVIDED.

20. Please indicate with X's on the map attached, the areas you hunted during the 1975 season in the Athabasca Oil Sands Area. Please be as accurate as possible.

21. How would you rate the hunting trips to the Athabasca Oil Sands Area compared to your other hunting trips in Alberta as a whole? (check where applicable).

	Better Than	As Good As	Worse Than
Big Game			
Upland Birds			
Waterfowl			

22. If you participated in the following hunting activities in the Athabasca Oil Sands Area during the 1975-76 season, how much value in dollars per day was it worth to you above what you spent on travel and other expenses? (circle the appropriate dollar value).

HUNTING FOR:	AVERAGE DOLLAR VALUE PER DAY											HIGHER OR OTHER DOLLAR VALUE (SPECIFY)
Big Game	0	1	2	3	4	5	6	7	8	9	10	$ _____
		12	14	16	18	20	22	24	26	28	30	
Upland Birds	0	1	2	3	4	5	6	7	8	9	10	$ _____
		12	14	16	18	20	22	24	26	28	30	
Waterfowl	0	1	2	3	4	5	6	7	8	9	10	$ _____ _____
		12	14	16	18	20	22	24	26	28	30	

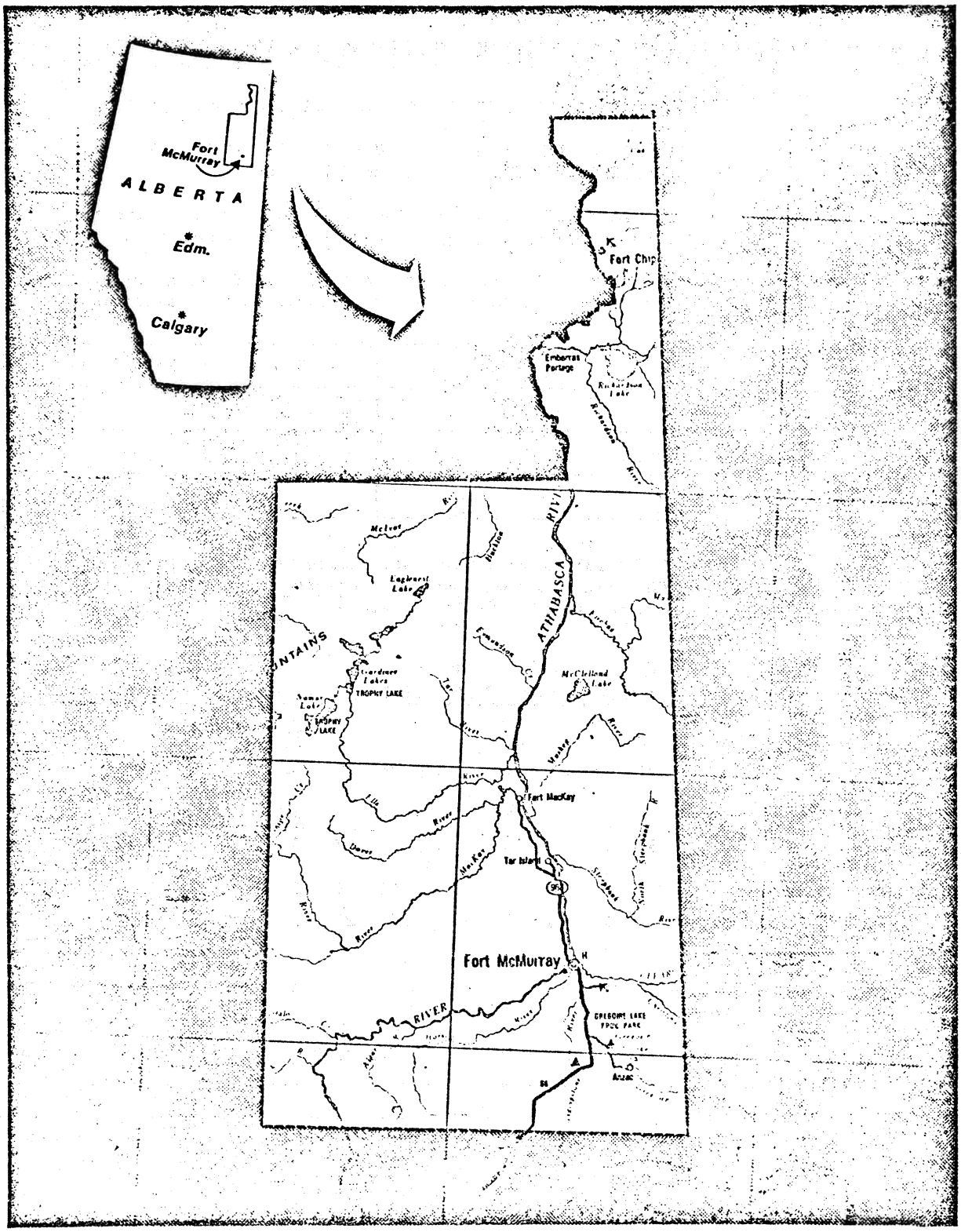
23. Provide any additional comments that might help evaluate the sport hunting in the Athabasca Oil Sands Area.

_____

_____

_____

THANK YOU VERY MUCH FOR YOUR CO-OPERATION IN ANSWERING AND RETURNING THIS QUESTIONNAIRE.



ATHABASCA OIL SANDS AREA

alberta canada

ALBERTA OIL SANDS ENVIRONMENTAL RESEARCH PROGRAM

7.4 AOSERP STUDY AREA HUNTING QUESTIONNAIRE AND COVERING LETTERS

ALBERTA OIL SANDS
ENVIRONMENTAL RESEARCH PROGRAM

403 / 427-3943

Penthouse Jarvis Building,
9925 - 107 Street
Edmonton, Alberta, Canada.
T5K 2H9

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Fauna Committee

Ron Wallace
Chairman, Aquatic
Fauna Committee

Sponsored jointly by
Alberta ENVIRONMENT
Environment Canada
Environnement Canada

alberta canada

ALBERTA OIL SANDS
ENVIRONMENTAL RESEARCH PROGRAM

403 / 427-3943

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Ron Wallace
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Fauna Committee.

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Alberta ENVIRONMENT

Environment Canada

Environnement Canada

CONFIDENTIAL

№ 41635

HUNTING SURVEY - 1975 HUNTING SEASON

1. Residence (city or town) _____ 2. Age _____

3. Sex Male ☐ 4. Occupation _____

Female ☐

5. Including yourself, how many of your immediate family are living at your residence? (Please circle the appropriate number.)

1 2 3 4 5 6 7 8 9

6. Approximately what was the total amount of money earned by you and your family in 1975? Estimate and check one.

Less than $5,000	☐	$20,001 - 25,000	☐
$ 5,001 - 10,000	☐	$25,001 - 30,000	☐
$10,001 - 15,000	☐	$30,001 - 35,000	☐
$15,001 - 20,000	☐	$35,001 or over	☐

7. Education: (please circle highest year completed)

Grade School	0	1	2	3	4	5	6	7	8	9
High School	10	11	12							
University	1	2	3	4	5	6	7	8	9	
Technical School	1	2	3	4						

8. Please respond to each question below by checking the appropriate answer.

		Yes	No
(a)	Did you hunt AT LEAST ONCE during the 1975 season in Alberta?	☐	☐
(b)	Have you ever hunted before the 1975 season?	☐	☐
(c)	Have you ever hunted in Alberta before the 1975 season?	☐	☐
(d)	Have you ever hunted in the Athabasca Oil Sands Area before the 1975 season? (see the map attached for a description of this area).	☐	☐

9. What are the main reasons that you go hunting? Rank the following items in order of importance; 1st, 2nd, 3rd choice.

(a) for meat _____
(b) for a trophy _____
(c) for outdoor enjoyment _____
(d) other (please specify)

_____ _____

10. Which Alberta licenses did you hold in 1975? (Please check where applicable.)

Bird Game	☐	Moose	☐
Migratory Bird Game	☐	Moose (Zone I)	☐
Mule Deer	☐	Elk	☐
Whitetailed Deer	☐	Caribou	☐
Angling License (1975-76 season)	☐	Black Bear	☐
		Grizzly Bear	☐

Others (please specify) _____

_____

11. Did you hunt in the Athabasca Oil Sands Area during the 1975 hunting season? (see the map attached for a description of this area).

Yes ☐ IF "YES" PLEASE COMPLETE ALL OF THE QUESTIONS THAT FOLLOW.

No ☐ IF "NO" PLEASE RETURN THIS QUESTIONNAIRE IN THE SELF-ADDRESSED ENVELOPE THAT HAS BEEN PROVIDED.

12. If you DID hunt in the Athabasca Oil Sands Area during the 1975 season, please complete the following information for each hunting trip taken. (NOTE: 1 FULL day of hunting is 4 or more hours spent in the activity.)

Trip No.	Area(s) Hunted: Nearest Town Landmark or Wildlife Management Unit	Days Hunted in Area (Estimate to nearest 1/2 day)	Miles to Area	Number in Hunting Party	Game you Hunted in Area	Game Bagged by Yourself Only (type and number)
Example	Ft. McMurray	3 1/2	100	2	Moose	Zero
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						

13. Please indicate, by placing the trip number on the map attached, the areas you hunted in the Athabasca Oil Sands Area during the 1975-76 season. Please carry out this procedure for every trip you listed in the table above.

14. Based on your experience, how would you rate your hunting trips in the Athabasca Oil Sands Area during the 1975 season? (check where applicable).

	Very Good	Good	Fair	Poor	Very Poor
Big Game					
Upland Bird Game					
Waterfowl					

15. If you participated in the following hunting activities in the Athabasca Oil Sands Area during the 1975 season, how much value in dollars per day was it worth to you above what you spent on travel and other expenses? (Circle the appropriate dollar value where applicable.)

HUNTING FOR:	AVERAGE DOLLAR VALUE PER DAY											HIGHER OR OTHER DOLLAR VALUE (SPECIFY)
Moose	0	1	2	3	4	5	6	7	8	9	10	
		12	14	16	18	20	22	24	26	28	30	$ _____
Whitetail Deer	0	1	2	3	4	5	6	7	8	9	10	
		12	14	16	18	20	22	24	26	28	30	$ _____
Mule Deer	0	1	2	3	4	5	6	7	8	9	10	
		12	14	16	18	20	22	24	26	28	30	$ _____
Upland Birds	0	1	2	3	4	5	6	7	8	9	10	
		12	14	16	18	20	22	24	26	28	30	$ _____
Waterfowl	0	1	2	3	4	5	6	7	8	9	10	
		12	14	16	18	20	22	24	26	28	30	$ _____
Other (please specify) #1 _____	0	1	2	3	4	5	6	7	8	9	10	
		12	14	16	18	20	22	24	26	28	30	$ _____
#2 _____	0	1	2	3	4	5	6	7	8	9	10	
		12	14	16	18	20	22	24	26	28	30	$ _____

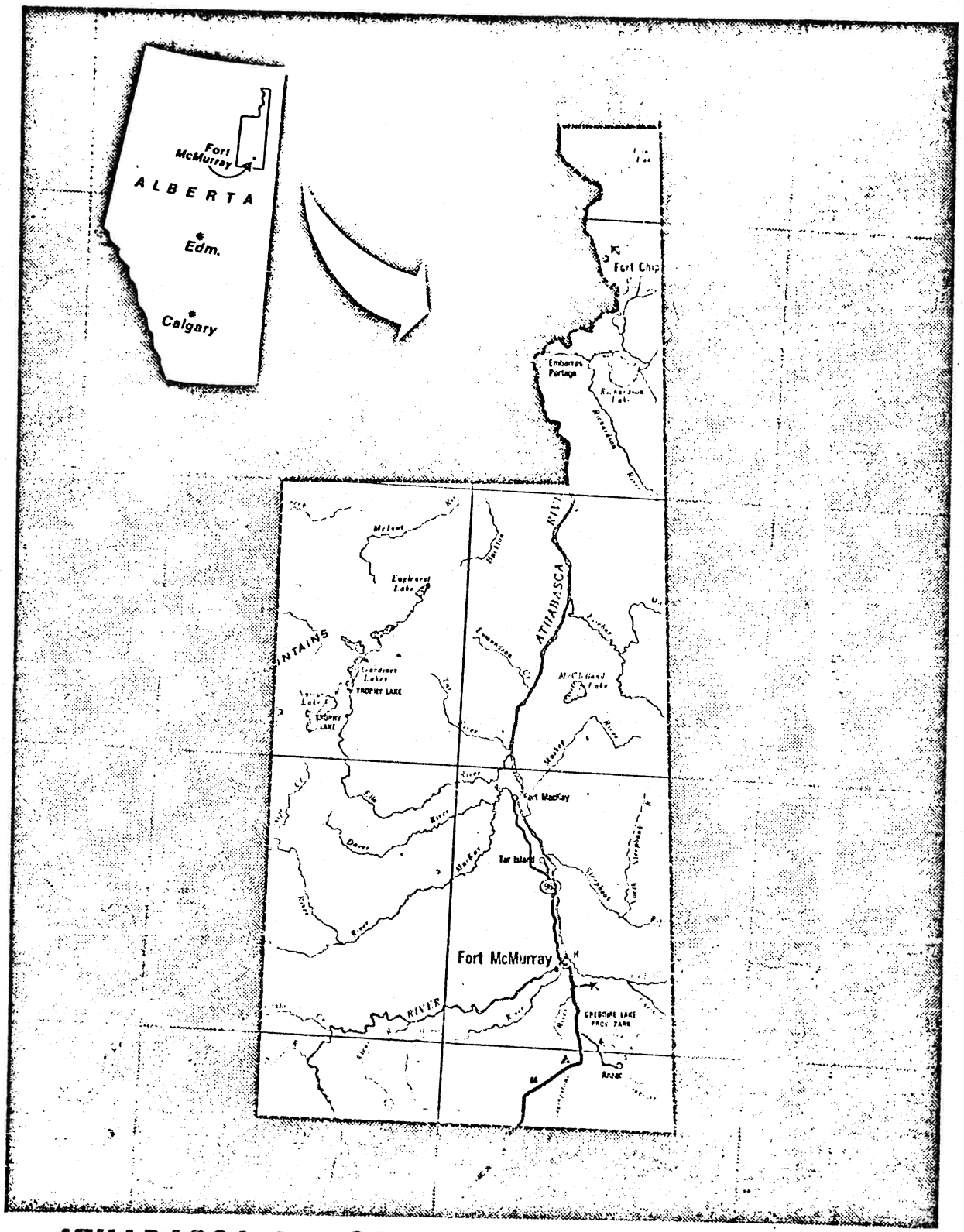
16. Give any additional comments that might help to evaluate the sport hunting in the Athabasca Oil Sands Area.

_____

_____

_____

THANK YOU VERY MUCH FOP YOUR CO-OPERATION IN ANSWERING AND RETURNING THIS QUESTIONNAIRE.



ATHABASCA OIL SANDS AREA

alberta canada

ALBERTA OIL SANDS ENVIRONMENTAL RESEARCH PROGRAM

7.5 PROVINCIAL NONCONSUMPTIVE QUESTIONNAIRE AND COVERING LETTERS

ALBERTA OIL SANDS
ENVIRONMENTAL RESEARCH PROGRAM

403 / 427-3943

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9925 - 107 Street
Edmonton, Alberta, Canada.
T5K 2H9

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We request your cooperation in completing, as best you can, the enclosed questionnaire. Your answers will be combined with those of other respondents so as to ensure that your individual response will be held in strict confidence.

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Fauna Committee

Ron Wallace
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Sponsored jointly by
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Environment Canada
Environnement Canada

ALBERTA OIL SANDS
ENVIRONMENTAL RESEARCH PROGRAM

403 / 427-3943

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Ron Wallace
Chairman, Aquatic
Fauna Committee.

Sponsored jointly by

Alberta ENVIRONMENT

Environment Canada

Environnement Canada

Confidential

№ 3643

EVALUATION OF FISH AND WILDLIFE RESOURCES IN ALBERTA

1. Residence (city or town) _____

2. Occupation: Yourself _____

   Spouse _____

3. (a) Including yourself, how many of your immediate family are living at your residence? _____

   (b) Please complete the following about your family at your residence.

   ADULTS: Yourself (check) _____ Age _____

   Spouse (check) _____ Age _____

   CHILDREN LIVING AT HOME:

   Oldest Child _____ age 4th oldest _____ age
   2nd oldest _____ age 4th oldest _____ age
   3rd oldest _____ age 6th oldest _____ age

4. Number of school years completed.

   Yourself _____ Spouse _____

5. Approximately what was the total amount of money earned by you and your family in 1975? Estimate and check one.

   less than $5,000 ☐ $20,000 - 25,000 ☐
   $5,001 - 10,000 ☐ $25,001 - 30,000 ☐
   $10,001 - 15,000 ☐ $30,001 - 35,000 ☐
   $15,000 - 20,000 ☐ $35,001 or more ☐

6. How many hours in 1975 did you and members of your family participate in the following activities in Alberta? Estimate to the best of your ability.

WILDLIFE ENJOYMENT, SUCH AS WATCHING/PHOTOGRAPHING	AVERAGE NUMBER OF HOURS		
	Yourself	Spouse	Average Per Child Over 5 Yrs. of Age
a. Birds	_____	_____	_____
b. Animals (mammals)	_____	_____	_____
c. Fish, Aquatic Life	_____	_____	_____

7. Approximately what percentage of the total hours spent by you and your family in WILDLIFE ENJOYMENT activities occurred in the following 5 areas of Alberta? (See the map attached for a description of these 5 areas). Please circle the appropriate percentage value for each area.

PERCENTAGE OF HOURS SPENT IN AREA

Area #1	0	10	20	30	40	50	60	70	80	90	100
Area #2	0	10	20	30	40	50	60	70	80	90	100
Area #3	0	10	20	30	40	50	60	70	80	90	100
Area #4	0	10	20	30	40	50	60	70	80	90	100
Area #5	0	10	20	30	40	50	60	70	80	90	100

Note: Please ensure that the sum of the percentage you circled equals 100.

8. If you participated in any WILDLIFE ENJOYMENT activities, how much enjoyment value, in dollars per hour, was it worth above what you spent on travel and other expenses?

WILDLIFE ENJOYMENT, SUCH AS WATCHING/PHOTOGRAPHING	AVERAGE DOLLAR VALUE PER HOUR		
	Yourself	Spouse	Average Per Child Over 5 Yrs. of Age
a. Birds	_____	_____	_____
b. Animals (mammals)	_____	_____	_____
c. Fish, Aquatic Life	_____	_____	_____

9. What other types of outdoor recreational activities did your family combine with WILDLIFE ENJOYMENT activities in 1975? (Check where applicable).

Hunting	☐	Boating	☐
Fishing	☐	Picnicing	☐
Camping	☐	Driving for pleasure	☐
Hiking	☐	Snowmobiling	☐
		Skiing	☐

If others please specify _____

_____

_____

_____

3

10. Did you or any member of your family participate in the following activities in 1975? (check)

	Yes	No
Hunting (1975 season)	☐	☐
Fishing (1975-76 season)	☐	☐

11. Please list in order of preference (1st, 2nd, 3rd choice) up to 10 different fish and wildlife species (e.g., moose, trout, owls) in Alberta that you like to see.

1. _____ 6. _____
2. _____ 7. _____
3. _____ 8. _____
4. _____ 9. _____
5. _____ 10. _____

12. Please list in order of preference (1st, 2nd, 3rd choice) up to 10 different fish and wildlife species (e.g., antelope, pelicans, arctic grayling) that you would like to see MORE POPULATIONS of in Alberta.

1. _____ 6. _____
2. _____ 7. _____
3. _____ 8. _____
4. _____ 9. _____
5. _____ 10. _____

13. Please number in order of preference (1st, 2nd, 3rd choice) the following types of areas in Alberta that you would prefer to watch/photograph fish and wildlife species.

Cultivated lands _____ Range lands _____

Forested areas _____ Roadside areas _____

Mountain areas _____ Urban areas _____

National parks _____ Wilderness areas _____

Provincial parks _____

14. Provide any additional comments that might help to evaluate the importance of fish and wildlife resources in Alberta.

_____

_____

_____

15. Did you or any member of your family participate in WILDLIFE ENJOYMENT activities in the Athabasca Oil Sands Area (Area #1) during 1975? (See the map attached for a description of this area).

Yes ☐ IF "YES" PLEASE COMPLETE ALL THE QUESTIONS THAT FOLLOW.

No ☐ IF "NO" PLEASE RETURN THIS QUESTIONNAIRE IN THE SELF-ADDRESSED ENVELOPE PROVIDED.

16. How would you rate the WILDLIFE ENJOYMENT activites in the Athabasca Oil Sands Area (Area #1) compared to your other WILDLIFE ENJOYMENT activities in Alberta as a whole? (check one)

better than ☐ as good as ☐ worse than ☐

17. Please list in order of preference (1st, 2nd, 3rd choice) up to 10 different fish and wildlife species (e.g., black bear, geese, perch) that you enjoyed watching/photographing in the Athabasca Oil Sands Area. (Area #1).

1. _____ 6. _____
2. _____ 7. _____
3. _____ 8. _____
4. _____ 9. _____
5. _____ 10. _____

18. In which areas of the Athabasca Oil Sands Area (Area #1) did you and your family most often frequent for WILDLIFE ENJOYMENT activities. (List the nearest town or landmark).

1. _____ 4. _____
2. _____ 5. _____
3. _____ 6. _____

19. Provide any additional comments that might help to evaluate the importance of fish and wildlife resources in the Athabasca Oil Sands Area. (Area #1).

_____

_____

_____

_____

THANK YOU VERY MUCH FOR YOUR CO-OPERATION IN ANSWERING AND RETURNING THIS QUESTIONNAIRE

ALBERTA OIL SANDS
ENVIRONMENTAL RESEARCH PROGRAM

403/743-2291
Local 74

8316 Fraser Avenue
Fort McMurray, Alberta, Canada.
T9H 1X1

Dear Resident:

The Alberta Oil Sands Environmental Research Program (AOSERP) was begun in 1975 by the Governments of Alberta and Canada, with the goal of directing, coordinating, funding, and supervising research into the environmental effects of Athabasca oil sands development.

As part of this research effort, AOSERP is conducting a series of surveys and interviews in Alberta to determine the extent of recreational activities related to fish and wildlife resources. The information collected will contribute to greater understanding and more effective management of fish and wildlife resources throughout Alberta, and especially in the Athabasca Oil Sands area.

This interview will help to determine the extent of your wildlife enjoyment activities that do not involve the removal of wildlife from its physical environment. We are not concerned, in this case, with activities such as hunting and fishing, where wildlife <u>is</u> removed from its environment.

The information that you provide will be held in strict confidence. It will be used only in combination with other responses.

We hope you share out objectives in making fish and wildlife management programs more responsive to the needs of present and future Albertans.

Thank you for your cooperation with the interviewer.

Sponsored jointly by

Environment Canada Environnement Canada

LOCAL NONCONSUMPTIVE QUESTIONNAIRE

(Interview)

CONFIDENTIAL

1. Did you (or another family member) go:

   hunting _____ (in 1975)

   fishing _____ (in 1975)

2. (See chart)

   On what occasions during the last year were you brought in contact with fish or wildlife (for viewing, photographing, observing, etc.)?

   i. What activity brought you in contact?

   ii. Where did you go?

   iii. How far did you travel? (round trip distance)

   iv. How did you get there? (car, boat, helicopter, etc.)

   v. How much did you spend to get there?

   vi. Why did you choose that particular area?

   vii. What species (e.g., moose, falcon) did you see?

   viii. For how long did you watch these species? (Estimate minutes or hours).

3. What season do you prefer for activities related to wildlife viewing?

   _____

4. Is wildlife something you actively seek during your outdoor activities, or do you see it accidently?

   accidently _____ sometimes actively _____ actively _____

5. How important is it to you that you see wildlife during your outdoor activities?

   extremely unimportant _____ extremely important
   1 2 3 4 5

6. What types of wildlife do you prefer to see in the Athabasca Oil Sands region? (List in order of preference).

   1. _____ 4. _____ 7. _____

   2. _____ 5. _____ 8. _____

   3. _____ 6. _____ 9. _____

   10. _____

2. (Chart)

Occasion	Activity	Where	Distance	How Travelled	Spent	Why	Species	Estimated Watching Time

7. Are there any species of wildlife that you would like to see more populations of in the region?

1. _____ 3. _____ 5. _____

2. _____ 4. _____ 6. _____

8. If there were greater accessibility to wildlife in the region, would you go where wildlife might be found:

more often _____ the same amount _____ less often _____

9. Do you think that wildlife is moving away from the town of Fort McMurray?

yes _____ no _____

If yes, how concerned are you?

extremely unconcerned _____ extremely concerned

1 2 3 4 5

10. If wildlife enjoyment were not free, how much would you be willing to pay (above and beyond expenses incurred) for a day of enjoyment in the Athabasca Oil Sands region:

animals: $ _____ per day per adult

$ _____ per day per child

birds: $ _____ per day per adult

$ _____ per day per child

fish: $ _____ per day per adult

$ _____ per day per child

11. How much is it worth to you to ensure that wildlife is preserved in the region?

$ _____ per year.

12. How would you rate the WILDLIFE ENJOYMENT activities in the Athabasca Oil Sands Region compared to your other WILDLIFE ENJOYMENT activities in Alberta as a whole?

better than _____ as good as _____ worse than _____

Personal information is confidential and will be aggregated for the purpose of determining any relationship that exists between occupation, family size, income, or education and the use of wildlife resources.

13. Residence _____ How long have you lived here? _____

14. Occupation: yourself: _____ Sex: M F

spouse: _____

15. How many of your immediate family are living at your residence? Ages?

yourself _____ age _____

spouse _____ age _____

children _____ ages _____

others _____ ages _____

16. Number of years education completed:

yourself:	0	1	2	3	4	5	6	7	8	9	Grade School
	10	11	12								High School
	1	2	3	4	5	6	7	8	9		University
	1	2	3	4							Technical School
spouse:	0	1	2	3	4	5	6	7	8	9	Grade School
	10	11	12								High School
	1	2	3	4	5	6	7	8	8		University
	1	2	3	4							Technical School

17. Total income of you and your family in 1975: (check one)

under $5,000 _____ $20,000 - $25,000 _____

$5,001 - 10,000 _____ 25,001 - 30,000 _____

10,001 - 15,000 _____ 30,001 - 35,000 _____

15,001 - 20,000 _____ 35,001 or over _____

18. Comments: _____

_____

_____

8. AOSERP RESEARCH REPORTS

1.		AOSERP First Annual Report, 1975
2.	AF 4.1.1	Walleye and Goldeye Fisheries Investigations in the Peace-Athabasca Delta--1975
3.	HE 1.1.1	Structure of a Traditional Baseline Data System
4.	VE 2.2	A Preliminary Vegetation Survey of the Alberta Oil Sands Environmental Research Program Study Area
5.	HY 3.1	The Evaluation of Wastewaters from an Oil Sand Extraction Plant
6.		Housing for the North--The Stackwall System
7.	AF 3.1.1	A Synopsis of the Physical and Biological Limnology and Fisheries Programs within the Alberta Oil Sands Area
8.	AF 1.2.1	The Impact of Saline Waters upon Freshwater Biota (A Literature Review and Bibliography)
9.	ME 3.3	Preliminary Investigations into the Magnitude of Fog Occurrence and Associated Problems in the Oil Sands Area
10.	HE 2.1	Development of a Research Design Related to Archaeological Studies in the Athabasca Oil Sands Area
11.	AF 2.2.1	Life Cycles of Some Common Aquatic Insects of the Athabasca River, Alberta
12.	ME 1.7	Very High Resolution Meteorological Satellite Study of Oil Sands Weather: "a Feasibility Study"
13.	ME 2.3.1	Plume Dispersion Measurements from an Oil Sands Extraction Plant, March 1976
14.	HE 2.4	Athabasca Oil Sands Historical Research Design (3 Volumes)
15.	ME 3.4	A Climatology of Low Level Air Trajectories in the Alberta Oil Sands Area
16.	ME 1.6	The Feasibility of a Weather Radar near Fort McMurray, Alberta
17.	AF 2.1.1	A Survey of Baseline Levels of Contaminants in Aquatic Biota of the AOSERP Study Area
18.	HY 1.1	Interim Compilation of Stream Gauging Data to December 1976 for the Alberta Oil Sands Environmental Research Program
19.	ME 4.1	Calculations of Annual Averaged Sulphur Dioxide Concentrations at Ground Level in the AOSERP Study Area
20.	HY 3.1.1	Characterization of Organic Constituents in Waters and Wastewaters of the Athabasca Oil Sands Mining Area

21.		AOSERP Second Annual Report, 1976-77
22.	HE 2.3	Maximization of Technical Training and Involvement of Area Manpower
23.	AF 1.1.2	Acute Lethality of Mine Depressurization Water on Trout Perch and Rainbow Trout
24.	ME 4.2.1	Review of Dispersion Models and Possible Applications in the Alberta Oil Sands Area
25.	ME 3.5.1	Review of Pollutant Transformation Processes Relevant to the Alberta Oil Sands Area
26.	AF 4.5.1	Interim Report on an Intensive Study of the Fish Fauna of the Muskeg River Watershed of Northeastern Alberta
27.	ME 1.5.1	Meteorology and Air Quality Winter Field Study in the AOSERP Study Area, March 1976
28.	VE 2.1	Interim Report on a Soils Inventory in the Athabasca Oil Sands Area
29.	ME 2.2	An Inventory System for Atmospheric Emissions in the AOSERP Study Area
30.	ME 2.1	Ambient Air Quality in the AOSERP Study Area, 1977
31.	VE 2.3	Ecological Habitat Mapping of the AOSERP Study Area: Phase I
32.		AOSERP Third Annual Report, 1977-78
33.	TF 1.2	Relationships Between Habitats, Forages, and Carrying Capacity of Moose Range in northern Alberta. Part I: Moose Preferences for Habitat Strata and Forages.
34.	HY 2.4	Heavy Metals in Bottom Sediments of the Mainstem Athabasca River System in the AOSERP Study Area
35.	AF 4.9.1	The Effects of Sedimentation on the Aquatic Biota
36.	AF 4.8.1	Fall Fisheries Investigations in the Athabasca and Clearwater Rivers Upstream of Fort McMurray: Volume I
37.	HE 2.2.2	Community Studies: Fort McMurray, Anzac, Fort MacKay
38.	VE 7.1.1	Techniques for the Control of Small Mammals: A Review
39.	ME 1.0	The Climatology of the Alberta Oil Sands Environmental Research Program Study Area
40.	VE 7.1	Interim Report on Reclamation for Afforestation by Suitable Native and Introduced Tree and Shrub Species
41.	AF 3.5.1	Acute and Chronic Toxicity of Vanadium to Fish
42.	TF 1.1.4	Analysis of Fur Production Records for Registered Traplines in the AOSERP Study Area, 1970-75.
43.	TF 6.1	A Socioeconomic Evaluation of the Recreational Use of Fish and Wildlife Resources in Alberta, with Particular Reference to the AOSERP Study Area. Volume I: Summary and Conclusions

These reports are not available upon request. For further information about availability and location of depositories, please contact:

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