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PROJECT REPORT

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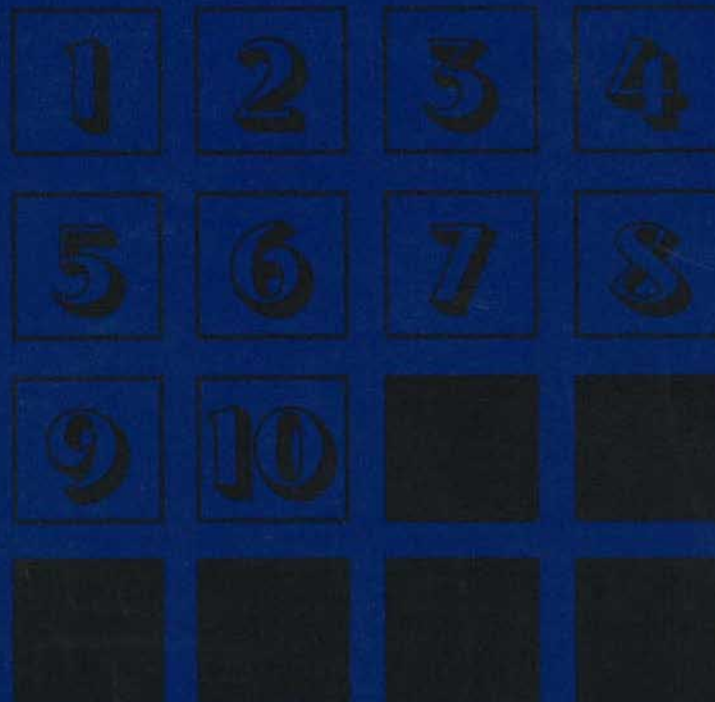
nt Environnement
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des Pêches

1972 MANITOBA
ROUGHFISH HARVESTING
PROJECT-1354-72

l Development Branch
ory Fishing Division

GENERAL REPORT



1972 MANITOBA
ROUGHFISH HARVESTING
PROJECT-1354-72

INTRODUCTION AND ABSTRACT SUMMATION

72-10126

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Department of the Environment
Industrial Development Branch
Exploratory Fishing Division
Chief, J. Rycroft

1972 MANITOBA
ROUGHFISH HARVESTING
PROJECT—1354—72

Co-Authors
Andrew and Ian B. Duthie

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GENERAL REPORT ABSTRACT

SECTION 1

GENERAL REPORT ABSTRACT

A. Introduction General

This general report was devised to provide coverage on the key aspects of Rough Fish Harvesting in Manitoba. Much research has gone into this report and many of the units provide good information and gackground for any future studies done in this area.

The initial approach was to treat the report as a single unit, However, it was found that so many varied factors were involved, that it was necessary to look at the overall fisheries picture before drawing conclusions and recommendations. Background information there-fore, was obtained regarding transportation, production and marketing trends in order to come up with a composite of the real situation.

It was decided to fragment the Report in units so that each could be considered in isolation without confusing the issue. Also, if more research needs to be done in one area, the relevant unit can be used as a base.

SECTION 1

B. Terms of Reference

In 1971, the Exploratory Fishing Division of the Industrial Development Branch carried out an emergency program in Manitoba to fulfil two objectives:

1. Alleviate the plight of fishermen deprived of their livelihood due to mercury pollution.
2. Implement a Rough Fish and Gear Development Program in Southern Manitoba Lakes.

A continuation of this program in 1972 was authorized by the Ottawa Fisheries Advisory Committee as a result of a meeting held on December 13, 1971. The responsibility remained with the Exploratory Fishing Division of The Industrial Development Branch, and Project Supervisor, A. Duthie was assigned to implement the program.

SECTION 1

C. Objectives

1. Short Term

Selectively harvest Rough Fish in volume using the most effective gear and techniques available.

2. Long Term

Assist in the establishment of a viable secondary industry.

SECTION 1

D. Conclusions

1. Trap nets are successful in catching mullet in large quantities on Lake Winnipegosis.
2. Trap nets are successful in catching rough fish including mullet on Lake Winnipeg but adverse river conditions such as late break up and heavy overruns hampered fishing operations.
3. Beach seine operations are successful on Lake Manitoba and Lake Winnipeg.

D. Recommendations

1. Industrial Development Branch should not conduct any more experimental trap gear projects in Central Canada.
2. A subsidy or grant should be allocated to encourage large scale rough fish operations in specified areas in Manitoba.
 - a) Lake Winnipegosis.
 - b) Lake Manitoba.
 - c) Lake Winnipeg.
3. The purpose of financial assistance would be to overcome problems such as:
 - a) Lack of Ice.
 - b) Lack of Boxes.
 - c) Lack of Holding Facilities.
 - d) Lack of Adequate Processing Facilities to handle the Volume.
 - e) Lack of Trained Personnel.

SECTION 1

4. A TASK FORCE - Provincial/Freshwater Fish Marketing Corporation/Federal should co-ordinate the whole operation with The Industrial Development Branch acting in an advisory capacity.
5. ALL species caught by trap nets and seines including high price species should be harvested and brought to Freshwater Fish Marketing Corporation for disposal. This would require changes in Fisheries Regulations.
6. ALL data and information from these operations should be made available to Environmental Analysis System Central to combine with the current Industrial Development Branch data on Harvesting.
7. THE Industrial development Branch would be willing to assist in setting up a training program, perhaps during the winter in preparation for the 1973 Program in co-operation with Freshwater Marketing Corporation. Funds would be required for such assistance.

SECTION 1

E. Unit Titles

Units

- 1 Introduction and Abstract Summation.
- 2 Project Administration, Organization, Control and Status.
- 3 Transportation and Economic Analysis Study.
- 4 Project and Computer Analysis.
- 5 Design and Construction of Trap Nets.
- 6 Manitoba - Trap Net Background and Information.
- 7 Critical Examination and Review Technique.
- 8 Primary Producers Critique Evaluation.
- 9 Marketing Information.
- 10 Economic Trends in Manitoba Fisheries.

SECTION 1

UNIT CONTENTS

F. Unit 1

Introduction and Abstract Summation

This Unit contains a General Report Abstract which is common to all units. The format is as follows:

- a) Introduction General which outlines the motivation and general background which led to the decision being made to carry on the Program. Also, the Introduction includes an explanation of the breakdown of the Report and the reasons behind the strategy.
- b) Terms of Reference which outlines the decision making process involved in setting up the program and the designated areas of responsibility. The Objectives of the General Program are outlined in Section C and the units titles shown in Section E. Section F is titled Unit Contents. A synopsis is made of each unit to make it simple for the reader to have a quick overview.

F. Unit 2

Project Administration, Organization, Control and Status

This provides information on the procedural aspects of the Program. It was felt necessary to bring concentration to bear on the Organizational and Procedural factors due to the complexity of the projects and the implications of conducting such projects.

Therefore, a strong structure was created which could deal completely with Federal and Provincial Government departments and agencies.

Objective

To give information on the procedural aspect of the Program.

SECTION 1

UNIT CONTENTS

F. Unit 3

Transportation and Economic Analysis Study

Transportation and Economics were studied to produce this particular report.

Detailed transport information was gathered on road and rail freight charges, etc.

A list of franchised operators was prepared and a regression analysis devised to show the correlation between distance and transport rates.

Finally a breakdown of operators' revenues and costs was run through the computer, to show break even points under varying conditions.

F. Unit 4

Project and Computer Analysis

This Unit is a breakdown of the statistical data fed into the computer from source documents collected in the field. It is fairly comprehensive and gives an indication of useful computer applications. Highlighted in the Unit are the Production Statistics in graphical form - by time, area and key species. The interesting aspect of this exercise is the fact that all information is now stored in the Central Information Bank.

SECTION 1
UNIT CONTENTS

F. Unit 5

Design and Construction of Trap Nets

This Unit was prepared as a result of research carried out on the Manitoba involvement with Trap Nets and Pound Gear from the technical viewpoint.

Although this cannot be regarded as a complete trap net breakdown, much information can be derived from it to provide a useful handbook for the Canadian Freshwater fishermen.

F. Unit 6

Manitoba - Trap Net Background and Information

Contents:

1. Up to this point in time, only fragmented information existed on the background of impounding gear in Manitoba.
2. Before any development can be carried out scientifically, the work of previous years should be considered.

It is interesting to note that trap nets were brought to the Great Lakes around 1850 and were introduced to Lake Winnipeg around 1875.

SECTION 1

UNIT CONTENTS

F. Unit 7

Critical Examination and Review Technique

This technique is used to:

1. Completely understand problems.
2. Formulate alternative decisions based on economic considerations.

The approach is as follows:

1. Question the Achievements.
2. Get the Facts.
3. Question the Facts.
4. Analyse the Facts.
5. Create Optimum Alternatives.
6. Submit Proposal.
7. Implement and Follow Up.

F. Unit 8

Primary Producers Critique Evaluation

The purpose of this critique was to provide some insight into the thinking of the commercial fishermen regarding the future of their industry.

While the project was in operation, we had many talks with the fishermen regarding their outlooks and opinions on the future potential of rough fish harvesting in Manitoba.

SECTION 1

UNIT CONTENTS

F. Unit 9

Marketing Information

This is not a Market Analysis but purely a report of findings which we encountered in the process of researching the background information on the Manitoba Fishery.

F. Unit 10

Economic Trends in Manitoba Fisheries

This Unit deals with the past production figures and trends in the fisheries for the past 30 years.

Some interesting conclusions can be drawn from the graphical presentations and, when sociological factors are considered, the trends confirm that the Manitoba fisheries are in a state of decline.

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| 11. | Extract : | Trammel Nets - a new net for rough fish; Lawler, Herb; "Fishing" - Volume 6 no. 1 Manitoba Department of Mines and Natural Resources; May 1966. | 39 |

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HISTORICAL BACKGROUND

SECTION 2

HISTORICAL BACKGROUND

Manitoba has an area of 251,000 square miles of which 39,225 miles consist of water surface. The water drainage system is all-contributory to Hudson Bay. The two lakes involved in this particular study are as follows:

- a) Lake Winnipeg with an area of 9,230 square miles.
- b) Lake Winnipegosis with an area of 2,068 square miles.

Lake Winnipeg Development

Early 1900's - 1872:

Lake fish were harvested for consumption by settlers and Indians up until 1872 when small quantities of fish were being sold in Winnipeg.

1882:

Start of commercial fisheries with annual landings of 100,000 pounds.

1884:

Fish were being exported to the United States in greater quantities than were sold locally. During this period small fish processing plants were springing up and the number of commercial fishing vessels was increasing.

1887:

Annual production was estimated in the region of 2½ million pounds, of which over 60% was exported to the United States.

1893:

The commercial fishing fleet had increased to 30 sailboats and 13 steam tugs which produced an annual catch of 4 million pounds.

SECTION 2

HISTORICAL BACKGROUND

The traditional fishing technique used on Lake Winnipeg is gill nets with limited experimentation having been conducted with other types of gear.

Some baited lines, beach seines and pound nets were utilized in the late 19th century but were discontinued after 1890. Trap nets were used experimentally to a minor degree until 1961 when the Provincial Government of Manitoba legalized their use in certain areas. When it became apparent however that trap nets were so effective as to threaten the gill net fishery, they were banned.

In the early 1900's three distinct fisheries developed:

- i) The Summer Fishery
- ii) The Fall Fishery
- iii) The Winter Fishery

Around 1900, an additional number of steam tugs were introduced to the lake and they served as the power source for groups of sailboats in that each tug towed about a dozen sailboats out to lift their nets and towed them back to port if the wind was against them.

Gradually sailboats were replaced by gas driven boats until by 1930, very few sailboats were involved in fishing.

The common type of fishing boat since that time has been the gas or diesel powered, 40 to 45 feet wooden or steel vessel with a beam of 10 to 12 feet and a small deckhouse midships and the 16 to 18 foot wooden, steel or fibreglass skiff.

Over the past 80 years, around 3 million pounds of whitefish have been harvested from the Lake annually but production has fallen off in the past 10 years due partly to enforced quotas. Pickerel, another important commercial species was producing well in the 1930's but production has fallen off in the past 30 years. There are many species of so called "rough" fish, which have never been seriously exploited due to the lack of demand, such as maria, bullheads, tulibee, carp, sunfish and mullet.

SECTION 2

HISTORICAL BACKGROUND

Since 1966 experiments have been conducted utilizing trap nets in connection with Rough fish harvesting with fair success.

Trawl experiments were conducted throughout the 1960's with limited success.

The lake was closed in 1970 due to mercury contamination but has since been re-opened in certain areas.

Lake Winnipegosis

A small fishery had developed by 1890 which grew in leaps and bounds after the railway came through in 1897. A sizeable winter fishery quickly developed.

In 1906, open water fishing was banned due to the fact that fishermen only received 2¢ per pound in the summer as against 5¢ per pound in the winter. In 1922, the ban on open water fishing was lifted and a healthy whitefish fishery developed in Lake Winnipegosis.

Since 1930, however, whitefish catches have been declining along with other high priced species. Low priced species had never been seriously exploited until a few years ago when a few trap net men started fishing for mullets and marias.

Currently, it appears that Lake Winnipegosis is dominated by "rough" species and that there seems little likelihood of this situation changing unless the rough fish are removed and restocking experiments are successful.

S.3.*

ACKNOWLEDGEMENTS

SECTION 3

ACKNOWLEDGEMENTS

On behalf of the Chief of the Exploratory Fishing Division of the Industrial Development Branch, Department of the Environment, we wish to extend our gratitude and appreciation to the many people and agencies without whose co-operation this study would not have been possible.

A tremendous contribution was made by the Provincial Government of the Manitoba Department of Mines, Resources and Environmental Management, in supplying statistical data and making many worthwhile proposals. In particular we would like to mention the contributions of:

Dr. Ken Doane

Dr. Ray England

Dr. Ed Davidoff

Dr. Ward Falkner

H. Pastuck

A strong link exists between the Industrial Development Branch and the Central Regional Office under the aegis of Mr. Len Cowley, Regional Director, who arranged office facilities for the project, operational headquarters and the use of Central Regional facilities. We found it most satisfying to note the good rapport existing between the Industrial Development Branch and the Central Region and the smooth co-operative effort which resulted. We wish to thank Mr. Rod Paterson, Chief Resource Development Branch and Frank Nokes, Information Officer for the valuable contributions they made.

Particular mention must be made of Mr. B. Snead, Chief Administrative Officer whose co-operation was such that it was a privilege to be associated with him. Mr. Bernhard Berger, Senior Lab Technician, Inspection Section, Central Region, was extremely helpful in the initial stages of the Project.

Mr. Dave Hagborg, Acting/Chief, Economics Branch, prepared the Computer Programming for the Project. In our opinion, Dave Hagborg, who recently published the "E.A.S. Status of Canadian Fisheries Central 1972" spent much time and effort to ensure the success of the project.

SECTION 3

ACKNOWLEDGEMENTS

Mr. Dan Topolinski, Economist and Transportation specialist, programmed and produced the Transportation Feasibility Cost Analysis and Cost Benefit Study. We were very much impressed and the model he set up is compatible for other similar analysis.

The contracted fishermen, without whom this project would not have been possible, carried out their contracts with keen interest and ensured the successful conclusion of the project.

Much credit must go to the Contracted Supervisors, Mr. Helgi Jones and Mr. Dempsey Valgardson, for the professional way in which they performed their functions and mention must be made of Helen Goshlak, project secretary, and the excellent way she performed a difficult job in Project Operational Headquarters, Winnipeg.

Mention must also be made of Carl Mitchell, Senior Economist, Ottawa, for his valuable suggestions.

The Planning and Design Service of Industrial Development Branch are to be congratulated for the excellent art and design work contributed to the Programme.

The girls in the office spent many hours to create this final report and are to be highly commended.

Special Mention

Special mention must be made of Paul Peckham, Information Officer, Industrial Development Branch, whose skill and expertise contributed to creating this Report and whose untiring efforts made it possible to have the Report published in record time.

S.4.*

REFERENCES

SECTION 4

REFERENCES

- Fisheries Research Board of Canada - A History of Commercial Fishing
Manuscript Report Series in Inland Canada #871
(Biological) By: W. A. Kennedy
No. 871
- Department of Fisheries of Canada - Reprint from September 1969
"Trade News" By: J. E. Steen
- Department of Fisheries of Canada - Fisheries Fact Sheet
Information and Consumer Services Subject: Provincial Fishing
Manitoba
Number 24
- Department of Fisheries and - Fisheries Fact Sheet
Forestry Subject: Commercial Fishing
in Manitoba
By: J. G. K. Barrie
April, 1969.

PROJECT ADMINISTRATION, ORGANIZATION,
CONTROL AND STATUS

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Department of the Environment
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Chief, J. Rycroft

1972 MANITOBA
ROUGHFISH HARVESTING
PROJECT—1354—72

Co-Authors
Andrew and Ian B. Duthie

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UNIT 2

PROJECT ADMINISTRATION, ORGANIZATION, CONTROL AND STATUS

Unit Introduction

This provides information on the procedural aspects of the Program. It was felt necessary to bring concentration to bear on the Organizational and Procedural factors due to the complexity of the projects and the implications of conducting such projects.

Therefore, a strong structure was created which could deal competently with Federal and Provincial Government departments and agencies.

Objective

To give information on the procedural aspect of the Program.

S.1.*

MANAGEMENT STRUCTURE

SECTION 1

MANAGEMENT STRUCTURE

The Project Supervisor with the Exploratory Fishing Division of the Industrial Development Branch had overall responsibility for the Program. A Project Leader was chosen with the responsibility of coordinating the Program and handling the Management and Information Systems. He was directly responsible to the Project Supervisor in all matters.

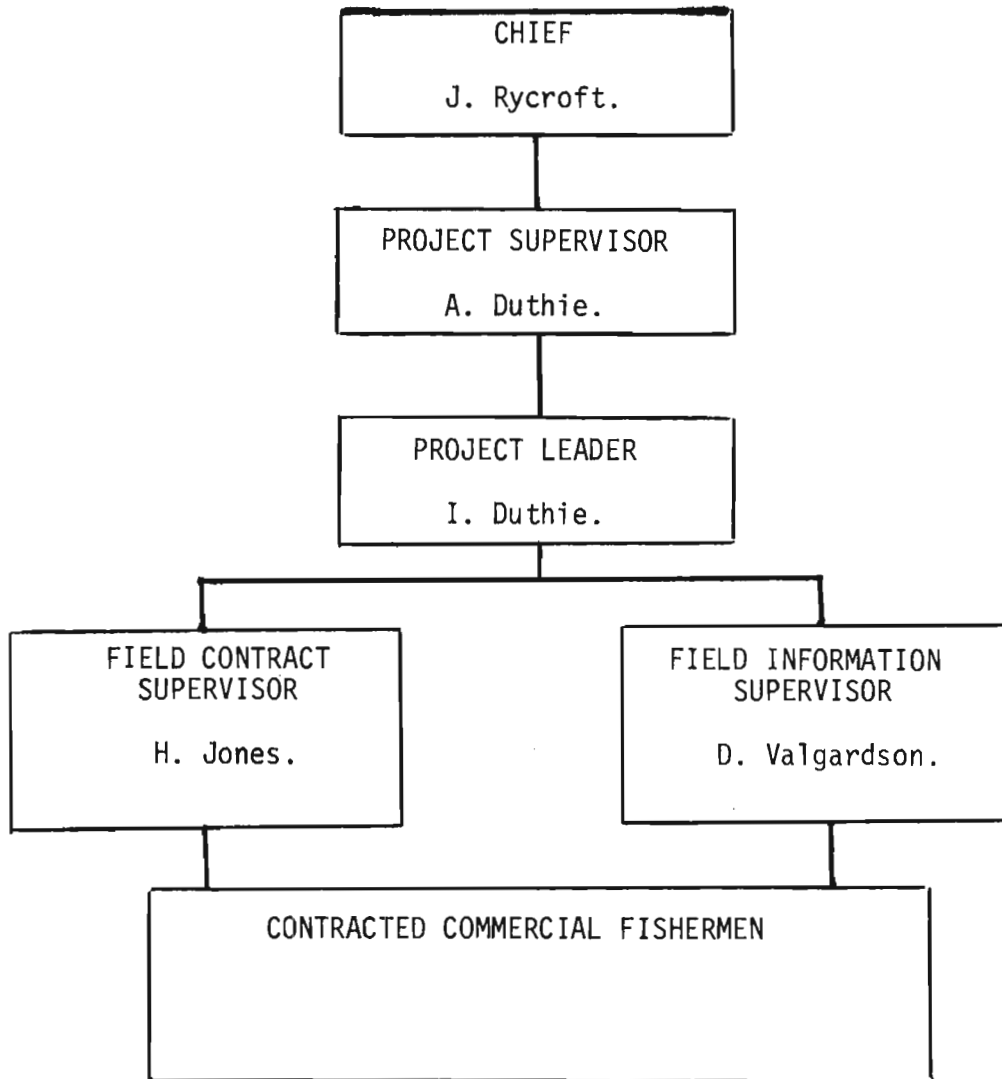
Two local men were then chosen to fill the roles of Contract Supervisor and Information Supervisor. These men were hired:

- 1) To fulfil a temporary supervisory role in the field,
- 2) Because of their intimate knowledge of the local areas and the people,
- 3) Due to the fact that they were the most influential fishermen on the local scene, and were used to sitting on Boards and representing fishermen at meetings.

Before any decision was made regarding the Program, the Management Team deliberated and came to a joint decision, and this was communicated to the interested parties at a public meeting with the recording secretary present.

EXPLORATORY FISHING DIVISION

MANAGEMENT STRUCTURE



S.2.*

ORGANIZATIONAL PROCEDURES

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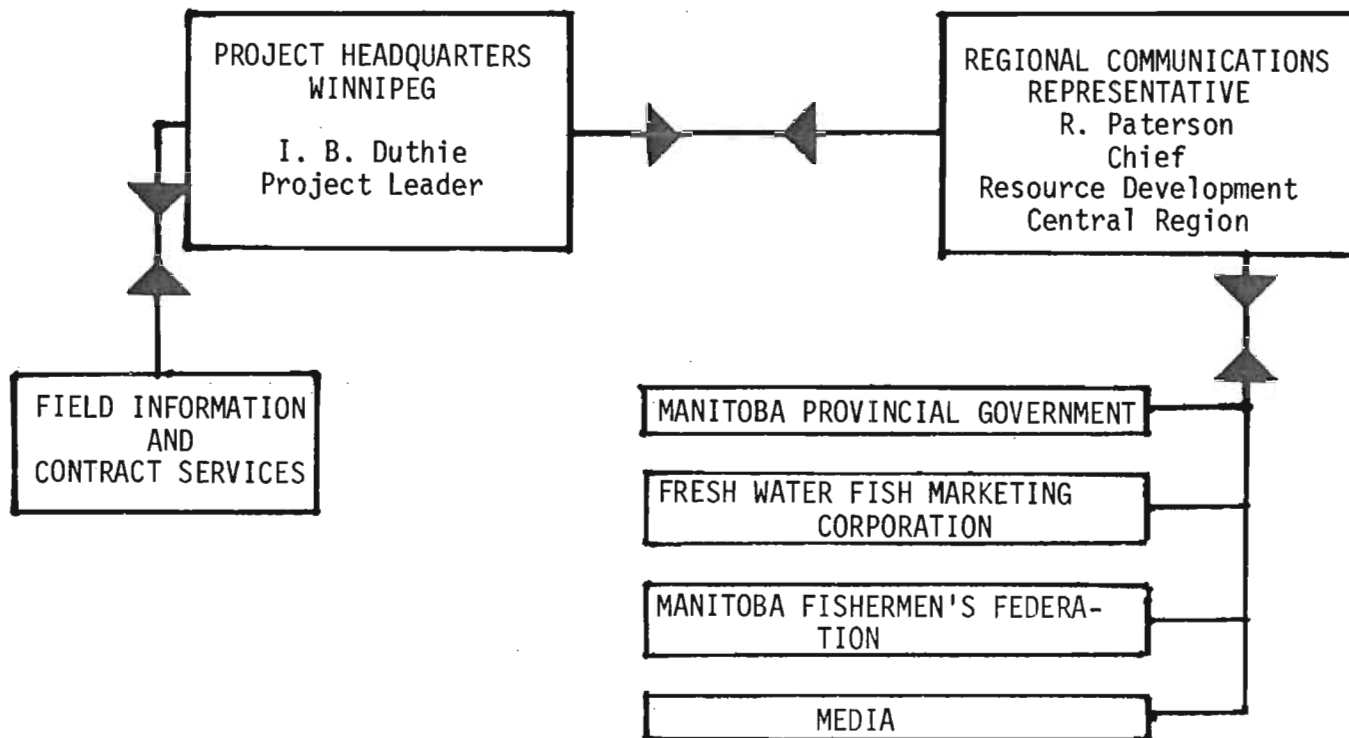
ORGANIZATIONAL PROCEDURES

a) Communication Links

Procedures

- All communications must be in writing.
- Communications can only travel through the appointed Regional Representative.
- All communications travelling through the appointed Regional Representative must be scanned by the Project Leader.
- All copies of Communications must go to J. Rycroft and A. Duthie, Industrial Development Branch.
- The Management Team in toto must be called together before any meeting can be held with outside Government bodies and corporations.
- Minutes will be taken of any communications between the Project Leader and the appointed Regional Representative.

REGIONAL COMMUNICATION LINK-UP

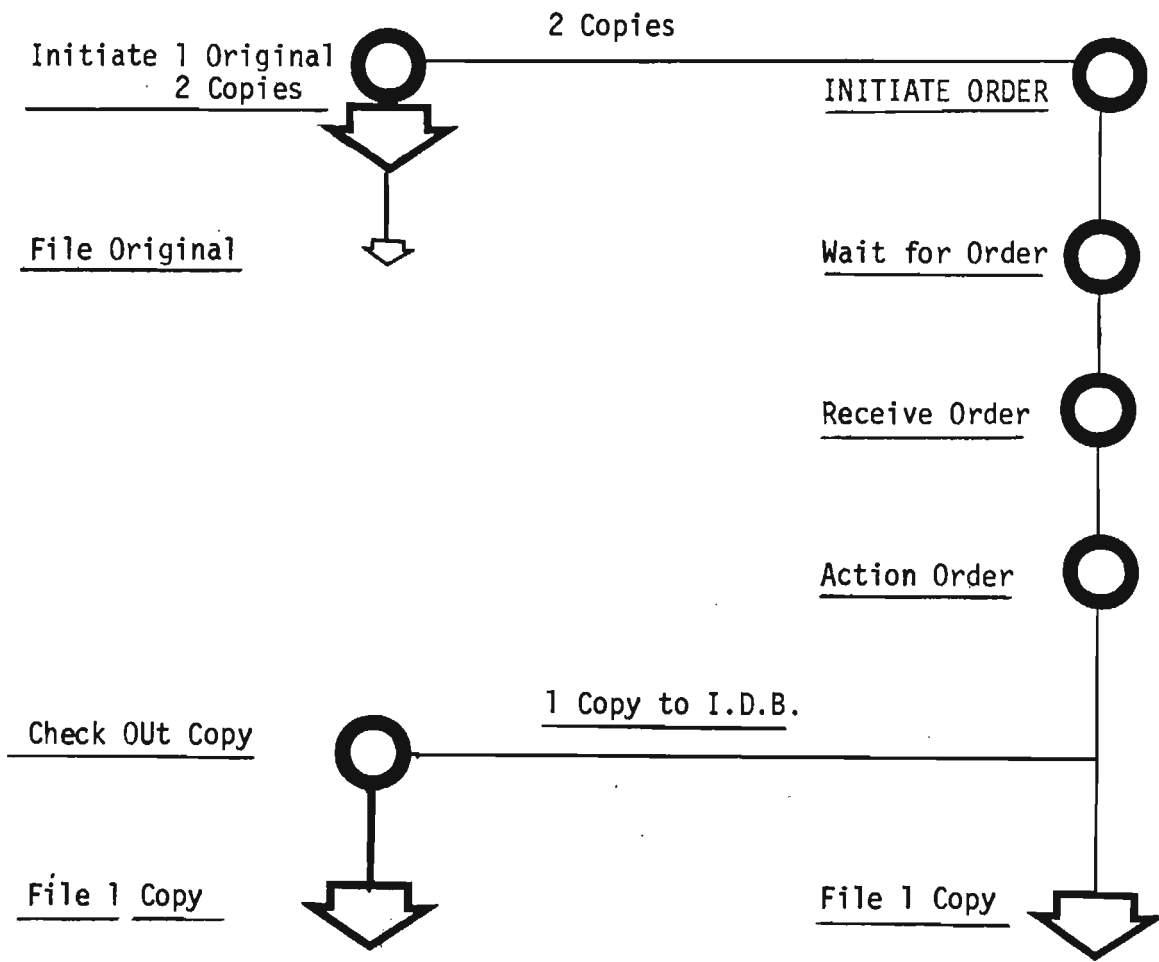


SECTION 2

ORGANIZATIONAL PROCEDURES

b) Purchasing System

An internal Purchasing System was initiated within the Program to handle costs at a Regional level.



SECTION 2

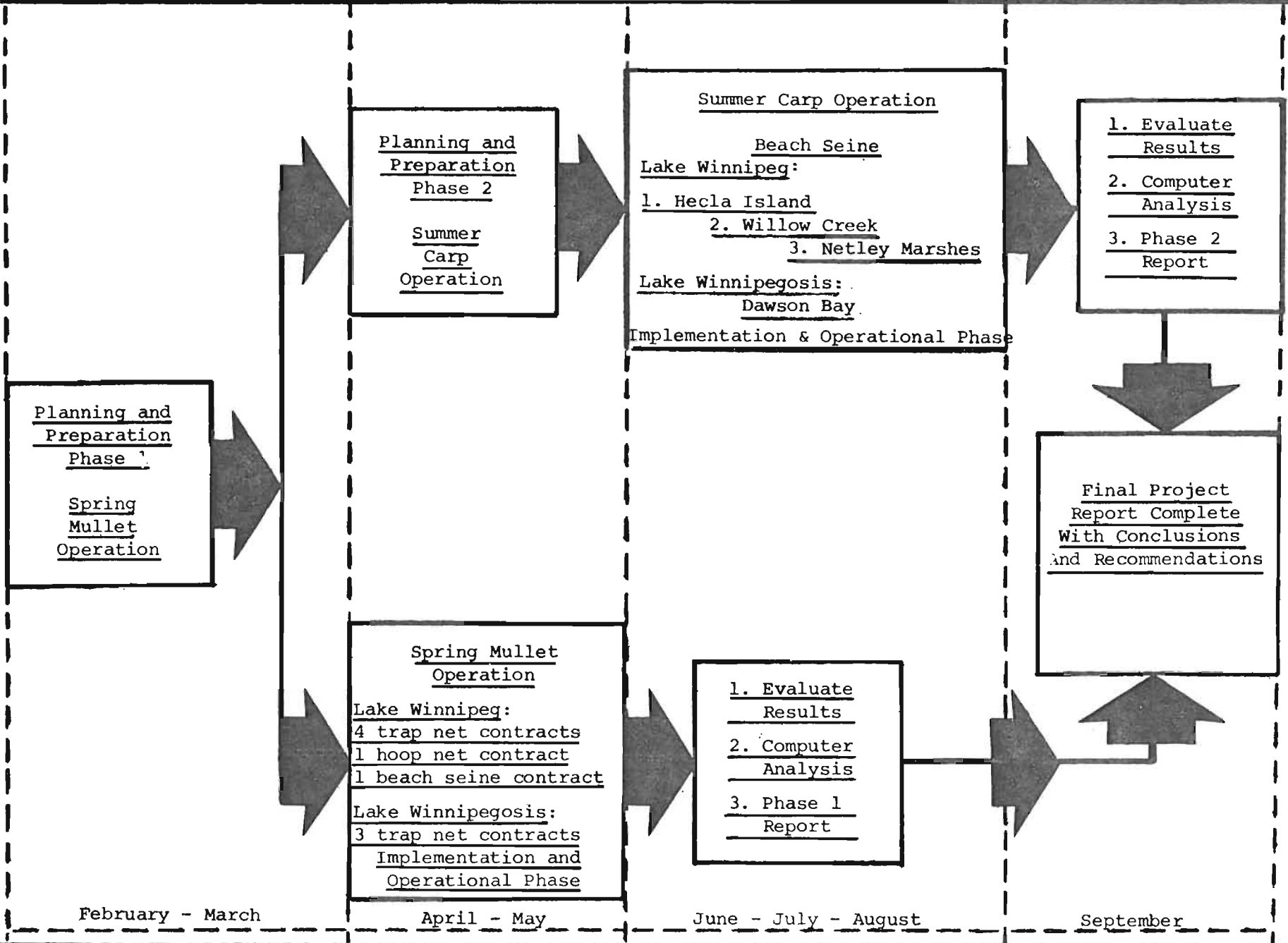
ORGANIZATIONAL PROCEDURES

c) Project Planning

We have enclosed an example of the Planning Set-up which was followed in this Program.

1972 MANITOBA ROUGHFISH HARVESTING PROJECT

PROJECT PLANNING DIAGRAM



6.....

SECTION 2

ORGANIZATIONAL PROCEDURES

d) Communication System and Data Rationalisation

This is an example of the Communication Set-up from field level to Operational Headquarters in Winnipeg.

COMMUNICATION SYSTEM AND ORGANIZATION OF PROJECT OPERATIONAL DATA

Manitoba

Field Personnel

- | |
|------------------------------|
| 1. Daily statistical records |
| 2. Daily chart records |
| 3. Weekly graph catch record |
| 4. Weekly progress report |

To be completed and forwarded on a weekly basis

OPERATIONAL GROUP HEADQUARTERS WINNIPEG

Central Regional Office

Operational Data System

Duplicate copies of field personnel data #3 and #4 plus a weekly chart record will be forwarded immediately to the Regional Director and Ottawa.

Manitoba Graph Record System

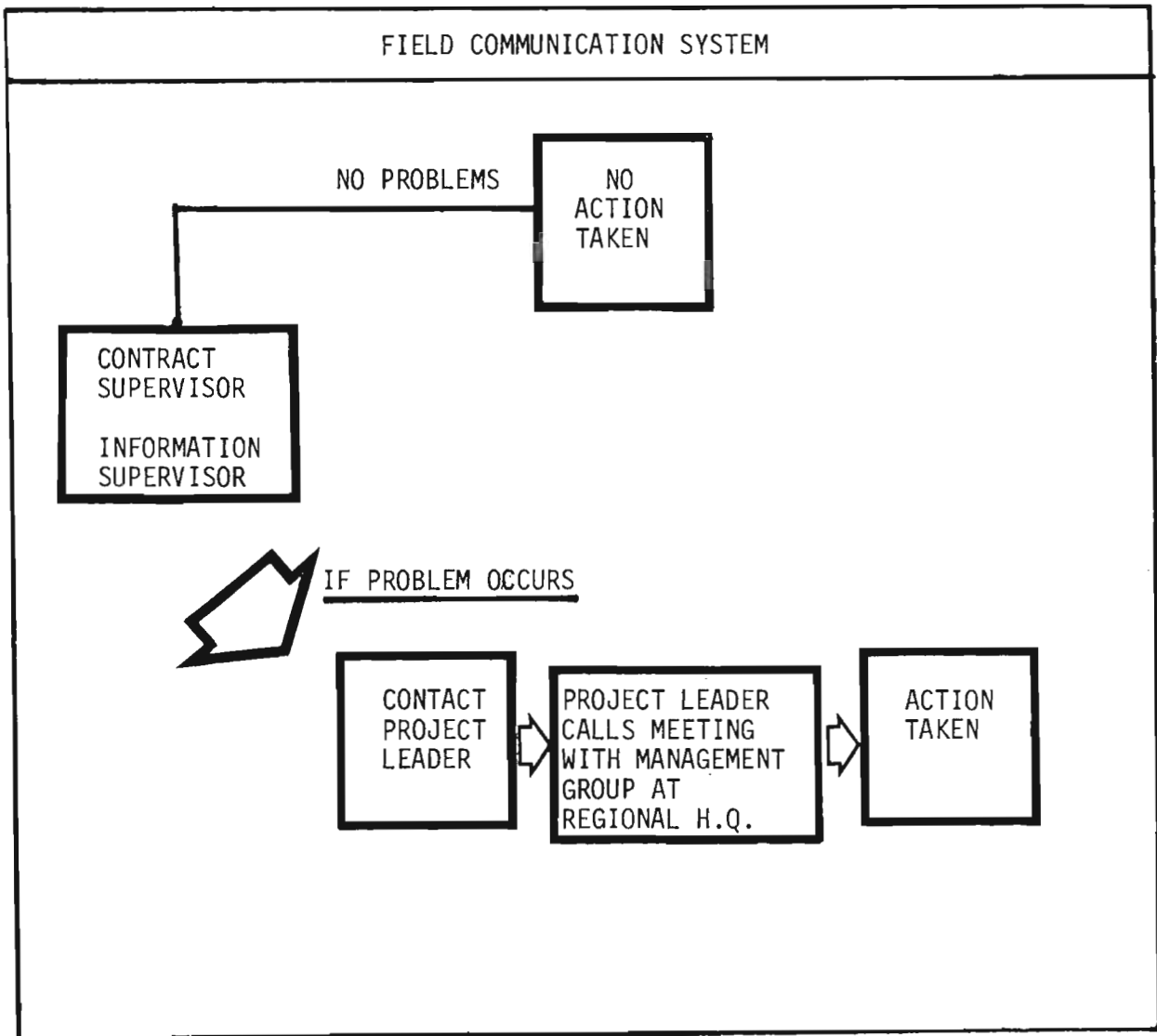
- | |
|--|
| 1. Catch statistics by technique, species and fishing effort. |
| 2. Catch statistics by area and technique, total volume catch. |
| 3. Catch statistics, total volume by species and area. |
| 4. Catch statistics, total volume landings by area. |

SECTION 2

ORGANIZATIONAL PROCEDURES

e) Field Communication System

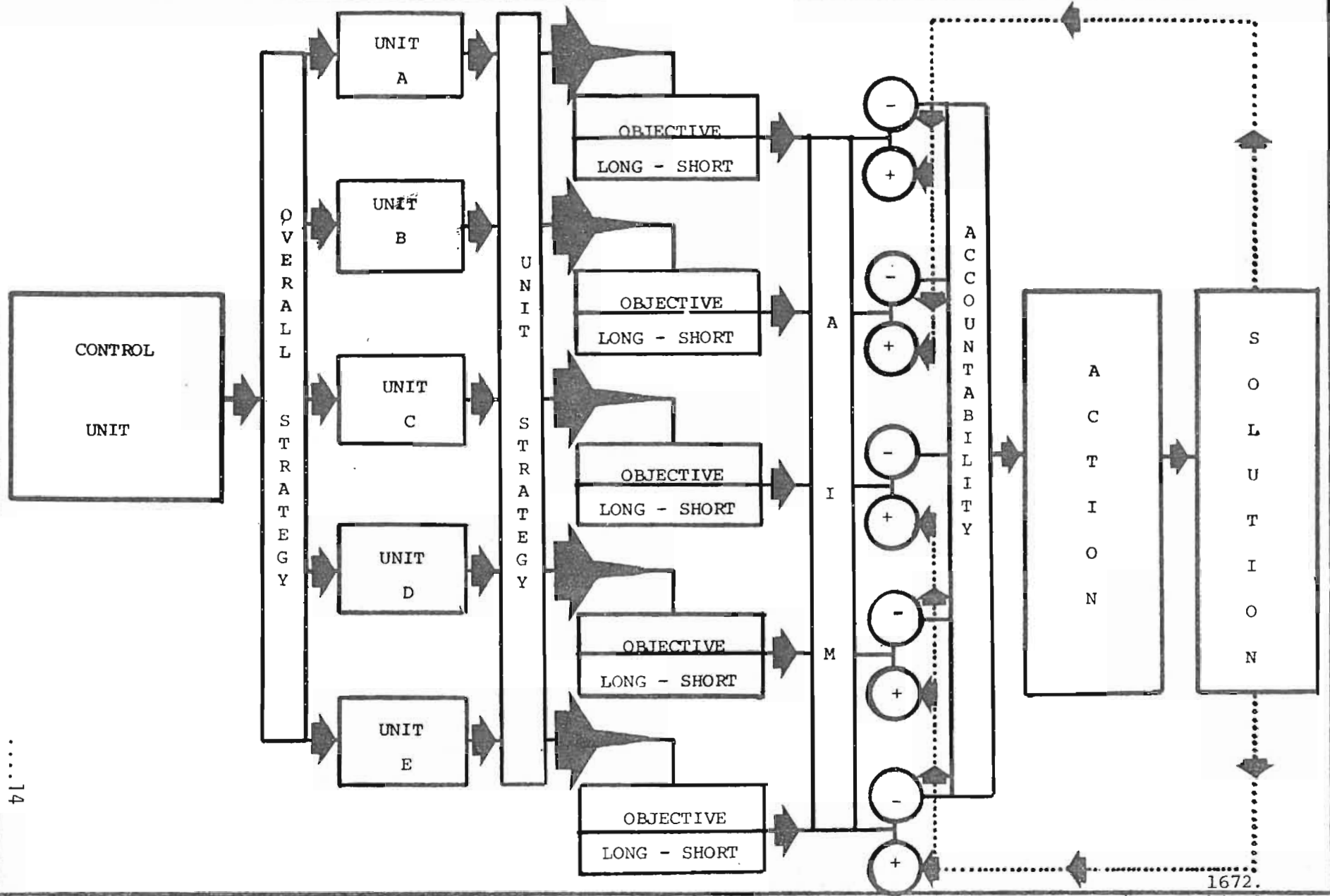
Following is the modus operandi of the Field Communication System which outlines the "Exception Principle".



f) MANAGEMENT BY OBJECTIVES
TERMS OF REFERENCE MODEL

1972 MANITOBA ROUGH FISH HARVESTING PROJECT

TERMS OF REFERENCE - MANAGEMENT BY OBJECTIVES MODEL



S.3.*

MINUTES OF PROJECT MEETINGS

SECTION 3

MINUTES OF PROJECT MEETINGS

This section contains copies of minutes of meetings held between the Management Group at Project Headquarters, Garry Street, Winnipeg and the interested agencies.

1972 MANITOBA ROUGH FISH HARVESTING PROJECT

Minutes of the meeting held in the Board Room at Central Regional Office, 114 Garry Street, Winnipeg on March 29th, 1972.

The following persons attended the meeting:

A. Duthie,
I.B. Duthie,
H. Jones.

Note: Mr. R.J. Paterson, Head, Fisheries Management Section was briefed prior to the meeting and the minutes will be forwarded to him as the unofficial Regional information link at Regional office during Mr. Cowley's absence.

Mr. Valgardson from Gimli was unable to attend due to illness, but was briefed by phone prior to the meeting and will be receiving the minutes.

Purpose of the meeting

1. Outline conditions of employment.
2. Finalize contract conditions with Contract Supervisor and Information Supervisor.
3. Discuss present status of Project.

Contract Supervisor -- Terms of Reference

The Contract Supervisor will be directly responsible to the Project Leader in all matters. He will play an advisory and supervisory role with reference to fishermen's contracts. It will be his responsibility to conduct spot checks on the nine projects, spending three days in the field for Lake Winnipeg, three days in the field for Lake Winnipegosis, and one day at Regional Office Headquarters for a debriefing meeting.

The reports compiled by the Contract Supervisor will record Project progress for each contract. In effect, he will be operating within a two week cycle. The Contract Supervisor will be part of the management team, and his supervision will operate along the following lines:

1. Problem noted.
2. Action taken.
3. If not solved.

If a problem is not solved, the Contract Supervisor, when he encounters a problem that is serious, has the right to suspend operations temporarily, on the contract concerned. A communique will then be sent from headquarters, Winnipeg, requesting the Contract Supervisor and the Contractor fisherman to appear at a meeting along with the Information Supervisor and the Regional Representative. The problem will then be discussed on a formal basis and appropriate action taken.

The Contract Supervisor will receive a list of all the key people with whom he will be concerned, plus a copy of the terms of reference of each contract. Any outside pressures or requests brought to the attention of the Contract Supervisor will be relayed to the Project Leader, and the matter will be discussed and action taken where applicable.

Information Supervisor - Terms of Reference

The Information Supervisor will be directly responsible to the Project Leader. His function will be to supervise the collation of information from the field; he will be responsible for the accurate collection of data, control of these statistics, compilation of reports and he will also be expected to ensure that all techniques being used are accurately described and all modifications noted. His duties will roughly parallel those of the Contract Supervisor.

Contract Fee Structure

Not less than seven days per two week cycle at a rate of \$X.00 per day plus normal government travelling expenses.

Field Statistical System

- A) Contractor Fisherman - Completes fishing records.
- B) Information Supervisor - Collects fishing records, compiles reports and forwards all relevant reports and fishing data on a weekly basis.

It was discussed at some length that possibly a large quantity of fish may be caught within the next month, and it was strongly recommended that a meeting be set up with the Freshwater Fish Marketing Corporation, to discuss this situation. The purpose of this proposed meeting would be to determine possible quota volumes from the various contracted areas.

Present status of Project re: Spring Mullet Operations.

| LAKE WINNIPEGOSIS | | | |
|--------------------------------|------------------------------------|-----------------|--|
| POTENTIAL CONTRACTED FISHERMAN | EQUIPMENT | AREA | PERIOD & DURATION |
| C. Fleming | Two men, one boat & two trap nets. | Mossey River | From 8th April, not to exceed 40 fishing days. |
| P. Matkowski | As above | Duck Bay | As above |
| J. Parker | As above | Red Deer River | As above |
| LAKE WINNIPEG | | | |
| B. Cochrane | Two men, one boat & six Hoop nets. | Fisher River | From 15th April not to exceed 25 fishing days. |
| T. Olson | Two men, one boat & two trap nets. | Icelandic River | As above |
| R. Smith | As above | Willow Creek | As above |
| F. David | As above | Victoria Beach | As above |
| C. Hendrickson | As above | Netley Marsh | As above |
| S. Johnson | Beach Seine Operation. | Hecla | As above |

1972 MANITOBA ROUGH FISH HARVESTING PROJECT

Minutes of the meeting held by the Management Group of the 1972
Rough fish Harvesting Program on the 6th of April, 1972 in the Board
Room of the Central Region Office, 114 Garry Street, Winnipeg.

Those in attendance were:

| <u>Name</u> | <u>Title</u> | <u>Function</u> |
|---------------|--------------------------------------|---------------------------------|
| I.B. Duthie | Project Leader | Management Team Member |
| A. Duthie | Project Supervisor | Management Team Adviser |
| D. Valgardson | Information Supervisor | Management Team Member |
| H. Jones | Contract Supervisor | Management Team Member |
| F. King | Project Supervisor | Contract Advisor |
| S. Sigurdson | Manager of Production | Freshwater Fish Marketing Corp. |
| P. Burrell | Contracted Fisherman | |
| D. Parker | Contracted Fisherman | |
| P. Matkowski | Contracted Fisherman | |
| R. Josephson | Elected Regional Rep- resentative | Liaison |
| H. Goshlak | Project Secretary | Recording |

The meeting was chaired by I. Duthie and took the following form.

The purpose of the meeting was explained.

PURPOSE

- To/
1. Outline the Objectives of the 1972 Rough fish Harvesting Program.
 2. Outline the Management Structure and Organizational set-up of the 1972 Rough fish Harvesting Program.
 3. Determine any problems which the contracted fishermen may encounter which may affect the project.
 4. Clarify the approaches the Freshwater Fish Marketing Corporation will take regarding possible handling and marketing problems.

MEETING OUTLINE

LAKE WINNIPEGOSIS

Phase 1 Spring Mullet Operation

| <u>Area to be fished</u> | <u>Fisherman</u> | <u>Gear Used</u> |
|--------------------------|------------------|------------------|
| Mossey River | Clarence Fleming | 2 Trap nets |
| Duck River | Pete Matkowski | 2 Trap nets |
| Red Deer River | Dave Parker | 2 Trap nets |

1. Objectives were stated:

To use effective fishing techniques to conduct selective rough fish harvesting in volume which will indicate that a potential viable secondary industry can be created.

2. The Management Structure and Organizational set-up of the 1972 Rough fish Harvesting Program was explained.
3. Problems were then discussed which may affect the fishermen on the Project, the traditional commercial fishermen and the Freshwater Fish Marketing Corporation and may also be detrimental to the success of the Project.

POINT 1

Flooding the Market

I. Duthie brought up the point that if a tremendous amount of mullet was caught during Phase 1 of the Spring mullet harvesting operation there may be a problem of a glut on the market.

General Group Discussion followed and S. Sigurdson felt that it seemed unlikely that the market would be flooded but that if it appeared obvious too many mullet were being harvested, the traditional commercial fishermen would be given top priority.

POINT 2

Commercial Fisheries Backlash

S. Sigurdson brought up the question of backlash from the Commercial Fishermen because of the fact that those fishermen on the lakes, whose only livelihood is the harvesting of Rough Fish due to the fact that there are no high priced species in this area, may be deprived of their only source of income. The group agreed this to be a most serious problem and that their market must not suffer. It was noted that there is a fixed annual market for mullet and the project management team agreed that the only solution in the event the Traditional Rough fish fishermen were being deprived would be for the Contracted fishermen to release the fish alive.

POINT 3

Handling & Transportation

The handling and transportation of fish was discussed to determine if this would affect the project. It was suggested that the fishermen were not used to handling high volume low priced fish as they were geared for low volume high priced fish. Therefore, the possibility of Transcona being flooded seemed unlikely from Winnipegosis. S. Sigurdson stressed the following responsibilities:

Contractor Fisherman

1. Harvests the Fish.
2. Lands the Fish.
3. Partially processes the fish in the field,
(headless dressed).
4. Supplies his own boxes or rents from F.F.M.C.

1972 MANITOBA ROUGHFISH HARVESTING PROJECT

Minutes of the meeting held by the Management Group of the 1972 Roughfish Harvesting Program on Friday, April 7th, 1972 in the Board Room of the Central Region Office, 114 Garry St., Winnipeg, 4:15 p.m.

Those in attendance were:

| <u>Name</u> | <u>Title</u> | <u>Function</u> |
|---------------|-------------------------------|---------------------------------------|
| I. B. Duthie | Project Leader | Management Team Member |
| A. Duthie | Project Supervisor | Management Team Advisor |
| D. Valgardson | Information supervisor | Management Team Member |
| H. Jones | Contract Supervisor | Management Team Member |
| S. Sigurdson | Manager of Production | Freshwater Fish Marketing Corporation |
| B. Cochrane | Contract Fisherman | |
| R. Smith | Contract Fisherman | |
| P. Olson | Contract Fisherman | |
| T. Olson | Contract Fisherman | |
| H. Goshlak | Project Secretary | Recording |
| **** | Elected Region Representative | Central Region Office |

* Note: As yet, no elected Region Representative has been appointed and there was no regional representative at this meeting.

I. Duthie, Project Leader, presided over the meeting, which took the following format:

The purpose of the meeting was outlined.

1. To outline the objectives of the 1972 Roughfish Harvesting Program.
2. To outline the operations being carried out in Phase 1 of the Spring Mullet Harvesting Program.
3. To define problems which may be encountered by
 - a) The Project
 - b) The Freshwater Fish Marketing Corporation
 - c) The Contracted Fishermen.

1. Objectives were stated:

To use effective fishing techniques to conduct selective rough fish harvesting in volume which will indicate that a potentially viable secondary industry may be created.

2. Meeting Outline

| <u>LAKE WINNIPEG</u> | | |
|--|------------------|------------------|
| <u>Phase 1 - Spring Mullet Operation</u> | | |
| <u>Area to be Fished</u> | <u>Fisherman</u> | <u>Gear Used</u> |
| Willow Creek | Ray Smith | 2 Trapnets |
| Fisher River | Ben Cochrane | 6 Hoop nets |
| Icelandic River | Ted Olson | 2 Trapnets |
| Netley Marsh | To be determined | |
| Victoria Beach | To be determined | |

All operations will be kicking off at the same time as soon as the ice goes.

It was emphasized by I. Duthie, Project Leader, that the project management team and the Freshwater Fish Marketing Corporation co-operate closely on a communication link-up so that the project does not interfere with the commercial fishermen.

3. Problem Areas

The question was raised as to what problems the fishermen may encounter when they catch high volume and send it to Transcona. Ben Cochrane from Koostatak, 140 miles from Transcona, mentioned the following problem areas.

- a) No facilities for processing fish.
- b) No facilities for storing fish.
- c) No facilities for storing ice.
- d) No transportation.

4. Prices

One solution mentioned was that Ben auger the ice himself or buy Arctic Ice at \$7.50 per ton. S. Sigurdson stated the following prices; the rate allowed for headless dressed mullet is 6 1/2 cents per pound F.O.B. Transcona. S. Sigurdson suggested to allow 1 cent for packing and 1 cent for box rental. After the packing and box rental fee is deducted, F.O.B. Transcona is 4 1/2 cents per pound.

A discussion followed regarding the types of Roughfish acceptable at Transcona and the following facts came to light.

- a) Mullet - There is a limited annual market for mullet with a certain percentage allowed for Manitoba, Saskatchewan and Alberta.
- b) Carp - The market for carp is practically non-existent except for one U.S. customer who buys limited quantities.
- c) Maria - No market exists for maria.

It was stressed that the this type of knowledge was necessary to the 1972 Roughfish Harvesting Program so that decisions can be made regarding what happens to the fish after being harvested.

BOXES

It appears that a shortage of boxes may also be an influencing factor as to whether fish can be brought to market. If a shortage did occur it would be up to the contracted fisherman to buy boxes at a suggested price of \$1.08 each.

CONSUMPTION

S. Sigurdson stated that it is impossible to give guidelines in consumption. Quote - "We will have to go along and take production as it comes at a suitable speed; fine, but if it comes too fast we will have to slow up. The traditional mullet fishermen must be given preference. Our approach is not to affect the economy in any way, shape or form. Setting quotas at the beginning of the project would be meaningless."

A. Duthie stated that a series of meetings should be held after operations start up to monitor progress.

S. Sigurdson mentioned that he would be visiting these areas first hand to see how the operations are coming along.

I. Duthie stated that as far as the purpose of the meeting was concerned, he felt that it had been achieved and that a good co-operative effort should result.

The meeting was formally closed at this point.

1972 ROUGH FISH HARVESTING PROGRAM

Minutes of the meeting held by the Management Team of the 1972
Rough Fish Harvesting Program in the Operational Room of the
Central Region Office, 114 Garry Street, Winnipeg, April 20, 1972

Those in attendance were:

| <u>Name</u> | <u>Title</u> | <u>Function</u> |
|---------------|------------------------|------------------------|
| A. Duthie | Project Supervisor | Advisory |
| I. Duthie | Project Leader | Management Team Member |
| D. Valgardson | Information Supervisor | Management Team Member |
| H. Jones | Contract Supervisor | Management Team Member |
| M. Goshlak | Project Secretary | Recording |

Appointed Regional Representative not yet chosen.

The meeting was chaired by I. Duthie and took the following form.

The purpose of the meeting was explained.

To:

- 1) Establish present project status.
- 2) Discuss and solve problems.
- 3) Lay out a two week plan of operations.

Present Project Status

Lake Winnipegosis

Dave Parker Dawson Bay

"Dave should be started by this time. He wishes to go ahead and rent two 14 ft. pound nets and try them out. Ted Olson and Clarence Fleming are going up Monday to help all the fishermen in the area"

Pete Matkowski Duck River

"Not seriously started up to this point. Rumoured 200 boxes two days ago. Fleming sends out round fish to Good Harbour Co-Op. 75 cents per 100 lbs. and 10 cents to cutter. Fish not being cut straight down the belly. It seems that Paul is doing the catching for Pete. This is to be checked out!"

Clarence Fleming Mossey River

"High performance from Clarence. Producing steady 7,000 lbs. daily. 54,000 lbs. caught to period ending April 19th. Possible catch to this point 100,000 lbs. This is to be checked out."

Carl Hendrickson Lake Winnipeg

"He is catching a lot of bullheads, approximately 3,000 lbs. but very few mullet. He is fishing Netley Creek and Cooks Creek. Not too much mullet up to this point. 3 mile walk up river. Best way to contact him is to arrange with him the day before."

Andrew Hourie Brokenhead River

"He has been helped by Carl to set his nets. Set 4 days ago. No known results to date. 3 mile walk to his operation or arrange to go by boat."

Ray Smith Willow Creek

"Fishing one net at the moment. Will be moving up river to lay 2 nets. Very few mullet at this time. Still ice out at mouth of river 200 yards from bridge down."

Paul Olson Icelandic River

Very fast flowing. Will be trying to set this morning. Bad mud problem on banks and limited access points. Access roads limited too."

Ben Cochrane Fisher Branch

"Shows some concern about license. This being arranged. Now has 6 Hoop Nets in water. Some flats being taken and few suckers. Caught 3 boxes of Pickere1.

Steve Johnson Icelandic River

Made one drag and caught 500 lbs. of carp. Offered \$5.00 per ton from Heath for rendering, i.e., 1/4 cent per pound but transportation cost 1 cent (?). There are restricted hauling conditions. F.F.M.C.

stated on April 28th that they will take headless carp at 5 1/2 cents per lb. FOB Transcona. He will be making a drag today. 'Husk' is now ready."

A new concept is being developed to create a central information system specifically designed to benefit the fishing industry in Central Canada by use of computer. C.C.F.I.S.

Sampling

Only one request for samples has come up (from Inspection Branch).

BATCH - 10 mullet of varying length.
2 carp
2 maria

Samples are being taken for sillenium content and acidic content.

Statistics

D. Hagborg is preparing a sheet for more statistics based on Fishing Vessesl.

Winches

The winches were taken off the boats of Palmi Holmes and Gusti Jacobson and shipped to Hay River.

Fishermen Information

Fleming

Uses anchor chains to hold down for a lead line.

Note: A gas boat anchor chain is being used. Nets must be cleaned out thoroughly.

PROBLEMS

- I. Lack of Production.
- II. Schedules of Fishermen's Location.
- III. Point of Contacts - Locations.
- IV. Too much Pickere1.
- V. Samples of different bays and creeks Mobile Unit.

Lack of Production

This could affect the final outcome of the project, but

- a) Each lake is different
- b) Varying cyclic times in some areas.
- c) Water temperature variance.
- d) More research needed on life habits. This is not considered a serious problem.

Dr. Falkner to meet with A. Duthie to discuss Experimental Licenses and the Jackfish situation, if possible. Point of contact:

Mines and Resources Building, The Pas, Manitoba, on May 1st, 1972.

| SCHEDULE | | | | |
|---|---------------------------------------|---|---------------------|----------------------------------|
| MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY |
| VALGARDSON | | | | |
| Phone Carl 405 Greenwood 482-6243 | Steve Johnson | Hendrickson Houri | To: Fisher River | Olson Smith |
| JONES | | | | |
| Fisher River | To: Fleming Matkowski Parker | From: Parker Matkowski Fleming | — | Steve Johnson Photos etc. |

| CONTRACTOR LIST | | |
|---------------------|---|--------------------------|
| TYPE | EITHER TRAP NET OR HOOP NET | |
| GRID LOCATION | See : "Grid Location" Sheet | e.g. 340 Fisher River |
| HOURS FISHED | This-net fishing (hours or time net spends in water.) | 20 Hours |
| HOURS FISHED BY MEN | This is man hours, i.e. 2 men cleaning a net of fish in 1 hr. = 2 man hours | |
| TYPE OF BOTTOM | Muddy | |
| SET TIME | This is the exact time the net is lifted. | 10 a.m. |

Policy on Samples

- . Let Steve put sample in box round.
- . Let Inspection Branch do pick-up from Transcona.

List of Contractors

| | | |
|------------------|----------------|-----------------|
| Andrew Hourie | 635-2663 | Selkirk |
| Carl Hendrickson | 482-6423 | |
| Ray Smith | 642-5271 | |
| Ted Olson | 642-5108 | |
| Steve Johnson | 642-8831 | |
| Ben Cochrane | Phone Kirkness | Fisher River 52 |
| Dave Parker | 301-22 | Mafeking |
| Pete Matkowski | 656-4736 | |
| Carl Fleming | 656-4469 | |

Regional Representative

The point was discussed at the meeting that the project has been operational since March 29th (30 days) and to date no Regional Representative has been appointed at Regional Office. The group stressed concern re the fact that the following relevant agencies have not yet been contacted re project status and that this could lead to serious repercussions due to the lack of a communication system.

Agencies Concerned.

1. F.F.M.C.
2. Provincial Governemnt.
3. Fishermen's Federation.
4. News Media.

WIND-UP

The meeting was brought to a conclusion at 1700.

1972 MANITOBA ROUGH FISH HARVESTING PROJECT

Minutes of Meeting held on Friday, May 12th, 1972 at 0915 at
114 Garry Street, Winnipeg, Manitoba.

Groups Represented

- Management Group 1972 Manitoba Rough Fish Harvesting Program.
- Provincial Government.
- Fishermen's Federation.
- Freshwater Fish Marketing Corporation.
- Regional Representative.

Those present:

| <u>Name</u> | <u>Title</u> | <u>Function</u> |
|------------------|---------------------------------------|------------------------------------|
| I. Duthie | Project Leader | Management Team Member |
| A. Duthie | Project Supervisor | Management Team Advisor |
| D. Hagborg | A/C Economics Branch | Management Team Advisor |
| R.J. Paterson | Chief, Resource Development | Regional Representative |
| M. Robertson | Head, Fisheries Management Section | Elected Regional Representative |
| Dr. Ward Falkner | | Provincial Liaison |
| G. Nelson | | Provincial Representative |
| R. Schlick | Biologist, North Manitoba | Provincial Representative |
| S. Sigurdson | Manitoba Manager of Production | F.F.M.C. |
| T. Olson | Contracted Fisherman | Information Source |
| J. Ateah | President, Fishermen's Federation | Federation Liaison |
| H. Jones | Contract Supervisor | Management Team Member |
| F. Nokes | Public Information Officer | Media Link |
| H. Goshlak | Project Secretary | Recorder |

I. Duthie, Project Leader, presided over the meeting, which took the following format:

The purpose of the meeting was outlined.

PURPOSE -- Information Exchange

TOPICS

1. General Terms of Reference.
2. Progress of Program to date.
3. a) Provincial feelings and opinions on Rough fish.
b) Freshwater Fish Marketing Corporation's present and future Rough Fish status.
c) Fishermen's Federation's opinion on the Rough Fish situation.

TOPIC 1

General Terms of Reference

The Manitoba 1972 Rough fish Harvesting Program was devised as a follow-up to the 1971 Rough Fish Harvesting Program. Whereas the 1971 Program was designed to meet a welfare type need, the 1972 Program has a pure economic slant, the objective being to utilize the most effective fishing techniques to selectively harvest coarse fish in volume.

Who will conduct the Operations?

Commercial fishermen, conducting commercial fishing operations on an experimental basis under Federal Contracts.

When will these operations take place?

April May June July August

What type of fish?

Mullet, Carp and Maria.

What kind of gear will be used?

Trap Nets
Hoop Nets
Beach Seines
Pound Nets

What are the anticipated results?

To increase general productivity of fishing orientated depressed areas by making available an unexploited food source.

Having explained the General Terms of Reference, I. Duthie went into an explanation of the Organizational Structure of the Manitoba 1972 Rough Fish Harvesting Program (viz. Enclosure - Organizational chart).

I. Duthie turned the chair over to R. Paterson, who stated that he had been remiss in fulfilling the role of Elected Representative but the situation was now altered.

M. Robertson will perform the function of Elected Regional Representative to be the information link between the Program and the relevant interested bodies and that R. Paterson will fulfil this role in the absence of M. Robertson.

F. Nokes, Public Information Supervisor, will fulfil the role of information link between the Program and the Media.

R. Paterson wished to know what sort of feed-in was expected from the Regional Office, what each agency expects from the Regional Office and what sort of level of publicity would be beneficial from the Industry's point of view.

It was agreed that the Experimental Nature of this Project be emphasized.

F. Nokes: "News releases are in order, but we must be cautious regarding over-publicity."

S. Sigurdson confirmed this point.

After a general discussion on Publicity, Ted Olson brought

out these points.

"Rough Fish resources should be exploited to the limit. I estimate it will take 7 years before any restrictions may be needed. These are ideal operations for between seasons. Rough fish harvesting should be done by fishermen whose livelihoods depend upon fish."

Ted Olson mentioned regarding marketing that: "Prior to the existence of the Marketing Corporation the 'hard sell' method was used. If we had fish to sell, we went out and sold them regardless of the species like Saugers which used to be 'rough fish'."

Provincial Feelings and Opinions on Rough Fish

Ward Falkner stated "I am extremely pleased that my department was asked to attend this meeting." Speaking for his department, he said, "My department is all for the exploitation of Rough Fish, but is wondering, as is everyone, regarding the present and future status of Rough Fish regarding disposal."

Freshwater Fish Marketing Corporation

S. Sigurdson stated, "Mullet harvesting will become part of the regular season with perhaps limits in years to come."

H. Jones stated, "Too much priority is given to pickerel and not enough to other species. I don't think mullet should be called a rough fish as it is good eating."

Computer Printouts

D. Hagborg was asked to elaborate on the Manitoba 1972 Rough Fish harvesting Computer Program and his feelings on the use of the data for information.

D. Hagborg stated,

- There seems to be little feedback of existing data to the fishermen to help them fish better.
- More analysis could be made of existing data.
- It is up to groups like us, with fishermen present, to decide what information is available to assist the fishermen.

- A Federal-Provincial type of set up like the proposed C.C.F.I.S. Program to provide relevant information would be a good step forward.

At the conclusion of D. Hagborg's presentation, Dr. Ward Falkner stated that he was very much in favour of the data system and would like copies of printouts for his department.

S. Sigurdson stated that he would find out if he needed printouts for the F.F.M.C.

Fishermen's Federation

John Ateah stated,

"I go along with the mullet harvesting, but what about carp? They are a menace to the lake. The Carp Harvesting Program should be extended."

Helgi Jones stated,

"Goldeye, pickerel, then sauger first inhabited Lake Winnipeg. Now carp has taken over major portions of the shallow areas and is a great menace as it has ruined the marshes. Where there is carp in large amounts, no other species will exist."

S. Sigurdson stated,

"I must emphasize this point. There is a limited annual market of 150,000 lbs. of carp fillets for the central region. But where is the rest going to go? Where is the market?"

I. Duthie answered:

"As far as I know, the contractor on the Project, Steve Johnson, figures that he perhaps can sell some to the mink ranchers but he will put the rest to Heath's Rendering Plant at Clandeboye for \$4.00 per ton."

As a wind-up of the meeting, the key points were summarized:

KEY POINTS

- . Information Structure now set up. - R. Paterson

- . Event Bulletin on basic information. - F. Nokes.
- . Printouts to Province regularly. - Dr. falkner.
- . Fishermen's weekly radio bulletin.

I. Duthie thanked all for attending and stated:

"I feel this has been a fruitful discussion. This group should meet again to look at the continuing progress of the Project."

The meeting was closed at this point.

S.4.*

SUPERVISORY REPORTS

SECTION 4
SUPERVISORY REPORTS

This Section is concerned with the Reports from field supervision during the Manitoba project.

The Mossey River operation started on April 10th, and the operator set his nets under the ice. From April 10 to April 13, he caught 46,000 lbs. of mullet, which was very encouraging. Production in this instance seems to be restricted by:

- a) Agent who transports the fish. He transports it 40 miles north, processes, and then ships south to Winnipeg.
- b) Agent who is limited by:
 - i. Lack of skilled help.
 - ii. Lack of ice and boxes.
 - iii. Transportation load restrictions.

The same conflict exists between fisherman and agent today as existed between fisherman and packer when the fish companies were in operation.

The Mossey River operation was the only operation conducted under the ice.

By April 25th, most of the Contractors were fishing in open water.

However, a late break-up of ice has taken place this year, which has resulted in:

- a) Abnormally high water.
- b) Excessive debris.

Due to the fact that the fishing is conducted at the mouths of creeks or rivers, the following factors hinder production to a great extent:

- a) Excessively fast flowing water makes it very difficult for a trap net to fish effectively unless the net is firmly staked.
- b) Pile up of debris can create irreparable damage to a net.

In the Netley Marsh area of Lake Winnipeg, there was a tremendous run of bullheads and jackfish and not too much mullet. The supervisors felt that perhaps the mullet had gone upstream under the ice and instructed the operators to turn their nets around, which seemed to help a little.

In Willow Creek, in Lake Winnipeg, very few mullet were caught and a fair quantity of bullheads. This was attributed to high water and sparse distribution of fish.

In Icelandic River, slightly more success was enjoyed with mullet but high water during break-up hampered fishing operations.

The Operator who was fishing with hoop nets in Fisher River did not enjoy much success due to the vast expanse of water which created sparse distribution of mullet. High water, of course, did not help the situation.

On Lake Winnipegosis, Mossey River and Duck Bay, which were highly successful areas, productive fishing took place but in Dawson Bay, heavy overruns and late break-up made it difficult to keep the nets in the water.

Beach Seine Operation

A Beach Seine Operation was conducted from April to August on Lake Winnipeg utilizing the same Beach Seine Barge and equipment as was used during the 1971 experiments.

The Operation was conducted in the following areas:

- A) Riverton.
- B) Willow Creek.
- C) Netley Marshes.

Heavy ice conditions and late break-up prevented the equipment being properly tried at Riverton. The Unit was moved south to Willow Creek where some measure of success was enjoyed. In fact, for a one hour drag, 40,000 lbs. of sunfish were caught. Only 14,000 lbs. could be harvested from this haul due to lack of holding facilities. Abnormally high water and late break-up caused the carp to spread wide through the marshes making harvesting extremely difficult in the shallow water. A six week period was spent experimenting in the Netley Marsh area with similar results to the Willow Creek operation.

TRAP NET OPERATION



- 1) Typical lifting operation conducted from a small wooden skiff on the Icelandic River, Lake Winnipeg.



- 2) Removing the Redfish from the trap.



3) The Primary Producer unloading his catch.

HOOP NET OPERATION

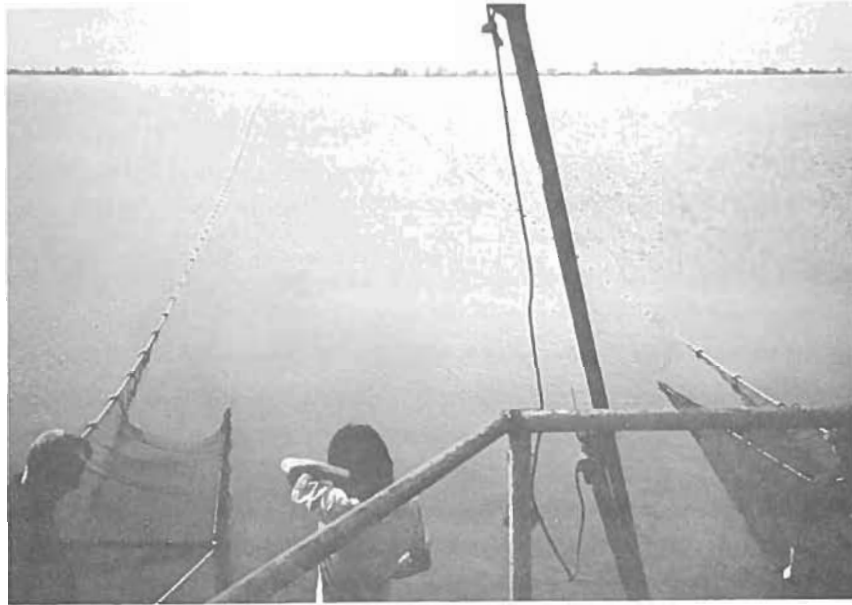


- 1) Lifting the Hoop nets from the Fisher River, beside Koostatak, Manitoba.



- 2) Manual methods employed in semi-processing (headless dressing) in the field.

BEACH SEINE OPERATION



- 1) Commencing to haul in the Beach Seine off Willow Island, Lake Winnipeg.



- 2) Removing the catch of Sunfish and transferring to the steel skiff. (Maximum Sunfish caught for a one hour haul in this area - 40,000 lbs.)

TRANSPORTATION AND ECONOMIC ANALYSIS STUDY

| | | | |
|--|--|---|--|
| | | 3 | |
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| | | | |

Department of the Environment
Industrial Development Branch
Exploratory Fishing Division
Chief, J. Rycroft

1972 MANITOBA
ROUGHFISH HARVESTING
PROJECT-1354-72

Co-Authors
Andrew and Ian B. Duthie

**From a
Study prepared by:
D. Topolniski.**

FORWARD

During the past three years, the Economics Branch in the Central Region has greatly accelerated its program of data collection and analyses. With the co-operation of the Provincial Governments, the Government of the North West Territories and the Freshwater Fish Marketing Corporation, a management, information system has been developed. The purpose of this system is to provide the means by which relationships among the factors affecting the commercial and recreational fishery can be explained, alternatives available to resource managers can be identified, and the efficacy of existing programs and their continuing relevance can be assessed.

One element of this work was the investigation of transportation problems peculiar to the freshwater commercial fishery. Mr. D. Topolniski, who was then a Master's candidate in the Natural Resource Institute of the University of Manitoba, commenced such an investigation during the summer of 1971. This past summer, with Mr. Topolniski working under the direction of Mr. David Hagborg, both data and methodology had been sufficiently refined to develop a tentative optimization model for fish transportation. The following information which was requested by Mr. I. B. Duthie, Project Leader for the 1972 Manitoba Rough Fish Harvesting Project draws only peripherally on the data and methodology that has been developed.

To the extent that the material is analytical, it does identify some basic economic relationships. However, the transportation problem is similar to other natural resource management problems in that it involves more than economic factors. It involves, for example, very significant concern for fish quality and for the conservation of the resource itself. In this area, like virtually all of the work undertaken by the Environmental Analysis Service of the Economics Branch, the branch function is to integrate, analyze and interpret complex inter-related, inter-disciplinary subjects.

In summary, the principal contribution of this report is not in its analysis but in its definition of several of the factors which influence the success or failure of the rough fish harvest. The study leaves many important questions unanswered, questions which can be answered only by further investigation. We hope that our continuing work will be of assistance into further investigations.

J. B. Stern, Chief,
Economics Branch,
Central Region.

TRANSPORTATION AND ECONOMIC ANALYSIS STUDY

From a
Study prepared
by D. Topolniski.

UNIT 3
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UNIT 3

TRANSPORTATION AND ECONOMIC ANALYSIS STUDY

Unit Introduction

Detailed transport information was gathered on rail and road freight charges, etc.

A list of franchised operators was prepared and a regression analysis devised to show the correlation between distance and transport rates.

Revenues and expenditures for contracted operators for the spring mullet operation were calculated.

Finally a breakdown of a hypothetical operator's revenues and costs was run through the computer, to show break even points under varying conditions.

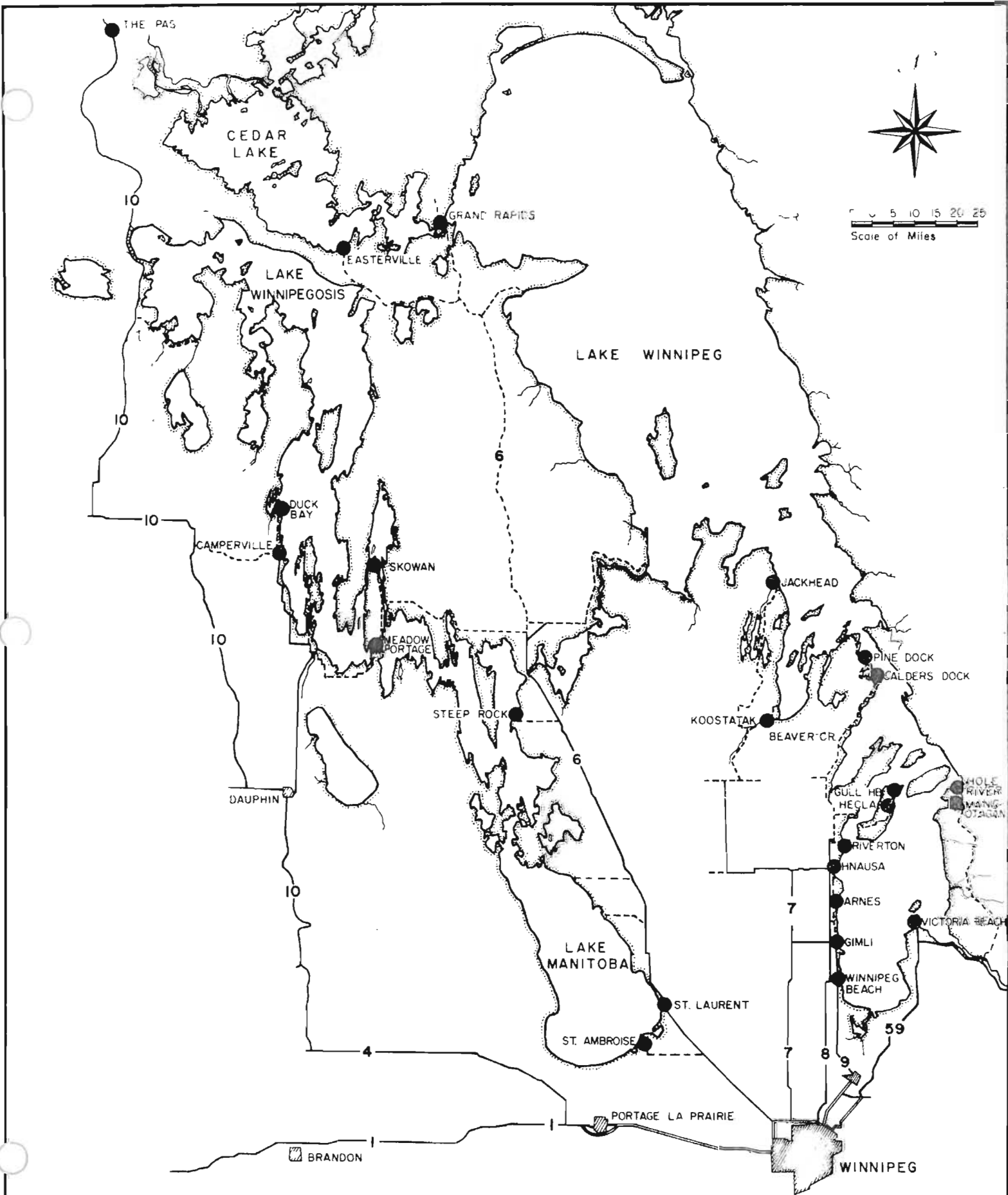
S.1.*

TRANSPORTATION INFORMATION

SECTION 1

TRANSPORTATION INFORMATION

One of the major costs of production for the commercial fisheries of Manitoba is that of transporting fish from lakeside to the plant of the Freshwater Fish Marketing Corporation in Transcona. This cost factor is of increased significance in the production of rough fish because of the low value of these species. Because of the importance of transport costs to the economic feasibility of the rough fish harvest, it was agreed that detailed transport information should be gathered for the region of study. (See map, page 4). Data are presented for road transport by public service vehicles and for rail transport by the Canadian National and Canadian Pacific Railways.



TRANSPORTATION LINK UP

1972 MANITOBA ROUGHFISH HARVESTING PROGRAM

S.2.*

REGRESSION ANALYSIS

SECTION 2
REGRESSION ANALYSIS

A regression analysis was conducted to show the relationship between distance and transport rates and a high degree of correlation was found to exist for all volumes, as indicated by the following printouts.

A brief explanation is as follows:

The X column signifies distance.

The Y column indicates transport cost.

Example:

When transporting fish weighing from 1 to 2,000 lbs. a distance of 305.5 miles the cost would be 2.15¢/lb.

| <u>SAMPLE #</u> | <u>X (Miles)</u> | <u>Y (Cost)</u> |
|-----------------|------------------|-----------------|
| 38 | 305.50000 | 2.15000 |

The Y expected and the Y adjusted serve only to prove the formula.

VIOLATIONS WILL BE PERSECUTED.

HASP-11 JOB STATISTICS -- 53 CARDS READ -- 436 LINES PRINTED -- 0 CARDS PUNCHED -- 0.36 MINUTES EXECUTI
UNIVERSITY OF MANITOBA -- 99 I/O COUNTS -- 934 K BYTE-SECONDS - 1.62 UNITS -- 0.04 MINUTES CPU TIM

ONLINE ACCOUNTING INFO -- 910 JOB(S) RUN --
//REGTAR JOB '0232,XXX,IDB,L=1,I=20,C=0,T=1M,C0=2,R=140K', 'D.ABRAMS', JOB 831

// MSGLEVEL=(2,0)

***ROUTEPRINT FISH

***ROUTEPUNCH FISH

// EXEC STATSI4

//GO.SYSIN DD *

//SYSIN DD *

GENERATED STATEMENT

IEF3731 STEP /GO / START 72172.1507

IEF3741 STEP /GO / STOP 72172.1507 CPU OMIN 02.40SEC MAIN 124K LCS OX

GO 21.99 SEC EXEC TIME 2.40 SEC CPU TIME 65 I/O COUNTS 124K REGION 124K USED

IEF3751 JOB /REGTAR / START 72172.1507

IEF3761 JOB /REGTAR / STOP 72172.1507 CPU OMIN 02.40SEC

REGTAR 21.99 SEC EXEC TIME 2.40 SEC CPU TIME DATE 72.172 UNIVERSITY OF MANITOBA

**** UNIVERSITY OF MANITOBA **** SIMPLE REGRESSION PROGRAM

STANDARD TARIFF OF TOLLS- 1 TO 1000 LBS

| INPUT DATA | 23.00 | 28.00 | 33.00 | 38.00 | 43.00 | 48.00 | 53.00 | 58.00 | 63.00 | 68.00 | 73.00 | 78.00 | 83.00 | 88.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 10.00 | 0.54 | 0.60 | 0.66 | 0.66 | 0.78 | 0.78 | 0.85 | 0.85 | 0.94 | 1.01 | 1.03 | 1.10 | 1.15 | 1.18 |
| 98.00 | 1.33 | 1.33 | 1.43 | 1.51 | 1.58 | 1.67 | 1.72 | 1.79 | 1.82 | 1.86 | 1.88 | 1.92 | 1.96 | 1.98 |
| 255.50 | 2.08 | 2.11 | 2.15 | 2.18 | 2.21 | 2.24 | 2.23 | 2.30 | 2.34 | 2.38 | 2.40 | 2.44 | 2.47 | 2.50 |
| 415.50 | 2.60 | 2.63 | 2.66 | 2.70 | 2.74 | 2.76 | 2.80 | 3.44 | 3.48 | 3.58 | 3.68 | 3.78 | 3.89 | 3.98 |
| 688.00 | 4.30 | 4.39 | 4.50 | 4.60 | 4.73 | | | | | | | | | 4.09 |

**** UNIVERSITY OF MANITOBA **** STANDARD TARIFF OF TOLLS- 1 TO 1000 LBS

MEAN 301.51 STANDARD DEVIATION 213.75

X 2.25 Y 1.11

CORRELATION COEFFICIENT = 0.99

REGRESSION COEFFICIENT = 0.01

INTERCEPT = 0.70

ANALYSIS OF VARIANCE

| SOURCE OF VARIATION | DF | SS | MS | F |
|---------------------|----|---------|--------|-----------|
| REGRESSION | 1 | 81.7960 | 81.796 | 2935.9846 |
| DEVIATION | 67 | 1.8666 | 0.028 | |
| TOTAL | 68 | 83.6626 | | |

STANDARD ERROR OF ESTIMATE = 0.17

STANDARD ERROR OF REGRESSION COEFFICIENT = 0.00

**** UNIVERSITY OF MANITOBA **** STANDARD TARIFF OF TOLLS- 1 TO 1000 LBS

EXPECTED AND ADJUSTED Y VALUE FOR VARIOUS VALUES OF X

| SAMPLE | X | Y | EXPECTED Y | ADJUSTED Y |
|--------|-----------|---------|------------|------------|
| 1 | 10.00000 | 0.54000 | 0.75366 | 2.03575 |
| 2 | 23.00000 | 0.60000 | 0.82037 | 2.02904 |
| 3 | 28.00000 | 0.66000 | 0.84602 | 2.06339 |
| 4 | 33.00000 | 0.66000 | 0.87168 | 2.03773 |
| 5 | 38.00000 | 0.78000 | 0.89733 | 2.13208 |
| 6 | 43.00000 | 0.78000 | 0.92299 | 2.10642 |
| 7 | 48.00000 | 0.85000 | 0.94865 | 2.15077 |
| 8 | 53.00000 | 0.95000 | 0.97430 | 2.12511 |
| 9 | 58.00000 | 0.94000 | 0.99996 | 2.18946 |
| 10 | 63.00000 | 1.01000 | 1.02561 | 2.23380 |
| 11 | 68.00000 | 1.03000 | 1.05127 | 2.22815 |
| 12 | 73.00000 | 1.10000 | 1.07692 | 2.27249 |
| 13 | 78.00000 | 1.15000 | 1.10258 | 2.29683 |
| 14 | 83.00000 | 1.18000 | 1.12823 | 2.30118 |
| 15 | 88.00000 | 1.25000 | 1.15389 | 2.34552 |
| 16 | 93.00000 | 1.26000 | 1.17954 | 2.32987 |
| 17 | 98.00000 | 1.33000 | 1.20520 | 2.37421 |
| 18 | 105.50000 | 1.33000 | 1.23086 | 2.33573 |
| 19 | 115.50000 | 1.43000 | 1.29499 | 2.38442 |
| 20 | 125.50000 | 1.51000 | 1.34630 | 2.41311 |
| 21 | 135.50000 | 1.58000 | 1.39762 | 2.43180 |
| 22 | 145.50000 | 1.69000 | 1.44893 | 2.49049 |
| 23 | 155.50000 | 1.72000 | 1.50024 | 2.46918 |
| 24 | 165.50000 | 1.79000 | 1.55155 | 2.48786 |
| 25 | 175.50000 | 1.82000 | 1.60286 | 2.46655 |
| 26 | 185.50000 | 1.86000 | 1.65417 | 2.45524 |
| 27 | 195.50000 | 1.88000 | 1.70548 | 2.42393 |
| 28 | 205.50000 | 1.92000 | 1.75679 | 2.41262 |
| 29 | 215.50000 | 1.96000 | 1.80810 | 2.40131 |
| 30 | 225.50000 | 1.98000 | 1.85941 | 2.37000 |
| 31 | 235.50000 | 2.02000 | 1.91073 | 2.35869 |
| 32 | 245.50000 | 2.05000 | 1.96204 | 2.33738 |
| 33 | 255.50000 | 2.08000 | 2.01335 | 2.31607 |
| 34 | 265.50000 | 2.11000 | 2.06466 | 2.29475 |
| 35 | 275.50000 | 2.15000 | 2.11597 | 2.28344 |
| 36 | 285.50000 | 2.18000 | 2.16728 | 2.26213 |
| 37 | 295.50000 | 2.21000 | 2.21859 | 2.24082 |
| 38 | 305.50000 | 2.24000 | 2.26990 | 2.21951 |
| 39 | 315.50000 | 2.28000 | 2.32121 | 2.20820 |
| 40 | 325.50000 | 2.30000 | 2.37252 | 2.17689 |
| 41 | 335.50000 | 2.34000 | 2.42383 | 2.16558 |
| 42 | 345.50000 | 2.38000 | 2.47515 | 2.15427 |
| 43 | 355.50000 | 2.40000 | 2.52646 | 2.12296 |
| 44 | 365.50000 | 2.44000 | 2.57777 | 2.11165 |
| 45 | 375.50000 | 2.47000 | 2.62908 | 2.09033 |
| 46 | 385.50000 | 2.50000 | 2.68039 | 2.06902 |
| 47 | 395.50000 | 2.53000 | 2.73170 | 2.04771 |
| 48 | 405.50000 | 2.57000 | 2.78301 | 2.03640 |
| 49 | 415.50000 | 2.60000 | 2.83432 | 2.01509 |
| 50 | 425.50000 | 2.63000 | 2.88563 | 1.99378 |
| 51 | 435.50000 | 2.66000 | 2.93694 | 1.97247 |
| 52 | 445.50000 | 2.70000 | 2.98825 | 1.96116 |
| 53 | 455.50000 | 2.74000 | 3.03957 | 1.94985 |
| 54 | 465.50000 | 2.76000 | 3.09088 | 1.91854 |
| 55 | 475.50000 | 2.80000 | 3.14219 | 1.90723 |
| 56 | 485.50000 | 3.44000 | 3.19350 | 2.49592 |
| 57 | 495.50000 | 3.48000 | 3.24481 | 2.48460 |
| 58 | 513.00000 | 3.58000 | 3.33460 | 2.49481 |
| 59 | 538.00000 | 3.68000 | 3.46288 | 2.46653 |
| 60 | 563.00000 | 3.78000 | 3.59116 | 2.43826 |
| 61 | 588.00000 | 3.89000 | 3.71943 | 2.41996 |
| 62 | 613.00000 | 3.98000 | 3.84771 | 2.38170 |
| 63 | 638.00000 | 4.09000 | 3.97599 | 2.36342 |
| 64 | 663.00000 | 4.19000 | 4.10427 | 2.33515 |
| 65 | 688.00000 | 4.30000 | 4.23254 | 2.31687 |
| 66 | 713.00000 | 4.39000 | 4.36082 | 2.27859 |
| 67 | 738.00000 | 4.50000 | 4.48910 | 2.26031 |
| 68 | 763.00000 | 4.60000 | 4.61738 | 2.23204 |
| 69 | 788.00000 | 4.73000 | 4.74565 | 2.23376 |

y = .005x + .7

***** UNIVERSITY OF MANITOBA ***** SIMPLE REGRESSION PROGRAM

STANDARD TARIFF OF TOLLS--1001 TO 2000 #

INPUT DATA 69 SAMPLES

| | | | | | | | | | | | | | | |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 10.00 | 23.00 | 28.00 | 33.00 | 38.00 | 43.00 | 48.00 | 53.00 | 58.00 | 63.00 | 68.00 | 73.00 | 78.00 | 83.00 | 88.00 |
| 0.52 | 0.58 | 0.63 | 0.63 | 0.75 | 0.75 | 0.82 | 0.82 | 0.90 | 0.97 | 0.99 | 1.06 | 1.10 | 1.13 | 1.20 |
| 98.00 | 105.50 | 115.50 | 125.50 | 135.50 | 145.50 | 155.50 | 165.50 | 175.50 | 185.50 | 195.50 | 205.50 | 215.50 | 225.50 | 235.50 |
| 1.28 | 1.28 | 1.37 | 1.45 | 1.52 | 1.62 | 1.64 | 1.71 | 1.75 | 1.78 | 1.81 | 1.84 | 1.87 | 1.90 | 1.93 |
| 255.50 | 265.50 | 275.50 | 285.50 | 295.50 | 305.50 | 315.50 | 325.50 | 335.50 | 345.50 | 355.50 | 365.50 | 375.50 | 385.50 | 395.50 |
| 1.99 | 2.02 | 2.06 | 2.09 | 2.12 | 2.15 | 2.19 | 2.21 | 2.24 | 2.28 | 2.30 | 2.33 | 2.37 | 2.39 | 2.43 |
| 415.50 | 425.50 | 435.50 | 445.50 | 455.50 | 465.50 | 475.50 | 485.50 | 495.50 | 513.00 | 538.00 | 563.00 | 588.00 | 613.00 | 638.00 |
| 2.50 | 2.52 | 2.55 | 2.59 | 2.62 | 2.65 | 2.68 | 3.30 | 3.34 | 3.43 | 3.53 | 3.62 | 3.73 | 3.82 | 3.92 |
| 688.00 | 713.00 | 738.00 | 763.00 | 788.00 | | | | | | | | | | |
| 4.12 | 4.21 | 4.31 | 4.40 | 4.53 | | | | | | | | | | |

***** UNIVERSITY OF MANITOBA ***** STANDARD TARIFF OF TOLLS--1001 TO 2000 #

MEAN STANDARD DEVIATION

X 301.51 213.75

Y 2.16 1.06

CORRELATION COEFFICIENT = 0.92

REGRESSION COEFFICIENT = 0.00

INTERCEPT = 0.68

ANALYSIS OF VARIANCE

| SOURCE OF VARIATION | DF | SS | MS | F |
|---------------------|----|---------|--------|-----------|
| REGRESSION | 1 | 74.9962 | 74.976 | 2928.7424 |
| DEVIATION | 67 | 1.7157 | 0.026 | |
| TOTAL | 68 | 76.7119 | | |

STANDARD ERROR OF ESTIMATE = 0.16

STANDARD ERROR OF REGRESSION COEFFICIENT = 0.00

***** UNIVERSITY OF MANITOBA ***** STANDARD TARIFF OF TOLLS--1001 TO 2000 #

EXPECTED AND ADJUSTED Y VALUE FOR VARIOUS VALUES OF X

| SAMPLE | X | Y | EXPECTED Y | ADJUSTED Y |
|--------|-----------|---------|------------|------------|
| 1 | 10.00000 | 0.52000 | 0.72414 | 1.95373 |
| 2 | 23.00000 | 0.58000 | 0.78001 | 1.94336 |
| 3 | 28.00000 | 0.63000 | 0.81258 | 1.97977 |
| 4 | 33.00000 | 0.63000 | 0.84715 | 1.94723 |
| 5 | 38.00000 | 0.75000 | 0.86171 | 2.04448 |
| 6 | 43.00000 | 0.75000 | 0.88628 | 2.03009 |
| 7 | 48.00000 | 0.82000 | 0.91084 | 2.06553 |
| 8 | 53.00000 | 0.82000 | 0.93541 | 2.04096 |
| 9 | 58.00000 | 0.90000 | 0.95998 | 2.09440 |
| 10 | 63.00000 | 0.97000 | 0.98454 | 2.14183 |
| 11 | 68.00000 | 0.99000 | 1.00911 | 2.13726 |
| 12 | 73.00000 | 1.06000 | 1.03367 | 2.18270 |
| 13 | 78.00000 | 1.10000 | 1.05824 | 2.19813 |
| 14 | 83.00000 | 1.13000 | 1.08281 | 2.20357 |
| 15 | 88.00000 | 1.20000 | 1.10737 | 2.24900 |
| 16 | 93.00000 | 1.21000 | 1.13194 | 2.23443 |
| 17 | 98.00000 | 1.28000 | 1.15650 | 2.27987 |
| 18 | 105.00000 | 1.28000 | 1.19335 | 2.24302 |
| 19 | 115.00000 | 1.37000 | 1.24248 | 2.28389 |
| 20 | 125.00000 | 1.45000 | 1.29162 | 2.31476 |
| 21 | 135.00000 | 1.52000 | 1.34075 | 2.33562 |
| 22 | 145.00000 | 1.62000 | 1.38989 | 2.38649 |
| 23 | 155.00000 | 1.64000 | 1.43901 | 2.35736 |
| 24 | 165.00000 | 1.71000 | 1.48814 | 2.37823 |
| 25 | 175.00000 | 1.75000 | 1.53728 | 2.36910 |
| 26 | 185.00000 | 1.78000 | 1.58641 | 2.34996 |
| 27 | 195.00000 | 1.81000 | 1.63554 | 2.33083 |
| 28 | 205.00000 | 1.84000 | 1.68467 | 2.31170 |
| 29 | 215.00000 | 1.87000 | 1.73380 | 2.29257 |
| 30 | 225.00000 | 1.90000 | 1.78294 | 2.27344 |
| 31 | 235.00000 | 1.93000 | 1.83207 | 2.25430 |
| 32 | 245.00000 | 1.97000 | 1.88120 | 2.23517 |
| 33 | 255.00000 | 1.99000 | 1.93033 | 2.21604 |
| 34 | 265.00000 | 2.02000 | 1.97946 | 2.19691 |
| 35 | 275.00000 | 2.06000 | 2.02859 | 2.18778 |
| 36 | 285.00000 | 2.09000 | 2.07773 | 2.16864 |
| 37 | 295.00000 | 2.12000 | 2.12686 | 2.14951 |
| 38 | 305.00000 | 2.15000 | 2.17599 | 2.13038 |
| 39 | 315.00000 | 2.19000 | 2.22512 | 2.12125 |
| 40 | 325.00000 | 2.21000 | 2.27425 | 2.09212 |
| 41 | 335.00000 | 2.24000 | 2.32339 | 2.07299 |
| 42 | 345.00000 | 2.28000 | 2.37252 | 2.06385 |
| 43 | 355.00000 | 2.30000 | 2.42165 | 2.03472 |
| 44 | 365.00000 | 2.33000 | 2.47078 | 2.01559 |
| 45 | 375.00000 | 2.37000 | 2.51991 | 2.00646 |
| 46 | 385.00000 | 2.39000 | 2.56904 | 1.97733 |
| 47 | 395.00000 | 2.43000 | 2.61818 | 1.96819 |
| 48 | 405.00000 | 2.46000 | 2.66731 | 1.94906 |
| 49 | 415.00000 | 2.50000 | 2.71644 | 1.93993 |
| 50 | 425.00000 | 2.52000 | 2.76557 | 1.91080 |
| 51 | 435.00000 | 2.55000 | 2.81471 | 1.89167 |
| 52 | 445.00000 | 2.59000 | 2.86384 | 1.88253 |
| 53 | 455.00000 | 2.62000 | 2.91297 | 1.86340 |
| 54 | 465.00000 | 2.65000 | 2.96210 | 1.84427 |
| 55 | 475.00000 | 2.68000 | 3.01123 | 1.82514 |
| 56 | 485.00000 | 2.70000 | 3.06036 | 1.80601 |
| 57 | 495.00000 | 2.74000 | 3.10949 | 1.78687 |
| 58 | 513.00000 | 2.83000 | 3.19548 | 1.79089 |
| 59 | 538.00000 | 2.93000 | 3.31831 | 1.76806 |
| 60 | 563.00000 | 3.02000 | 3.44114 | 1.73523 |
| 61 | 588.00000 | 3.13000 | 3.56397 | 1.70240 |
| 62 | 613.00000 | 3.22000 | 3.68680 | 1.66957 |
| 63 | 638.00000 | 3.32000 | 3.80963 | 1.63674 |
| 64 | 663.00000 | 4.01000 | 3.93246 | 1.62391 |
| 65 | 688.00000 | 4.12000 | 4.05529 | 1.622109 |
| 66 | 713.00000 | 4.21000 | 4.17812 | 1.618826 |
| 67 | 738.00000 | 4.31000 | 4.30095 | 1.615443 |
| 68 | 763.00000 | 4.40000 | 4.42378 | 1.612060 |
| 69 | 788.00000 | 4.53000 | 4.54661 | 1.613977 |

***** UNIVERSITY OF MANITOBA ***** SIMPLE REGRESSION PROGRAM

STANDARD TARIFF OF TOLLS--2001 TO 20000

INPUT DATA 69 SAMPLES

| | | | | | | | | | | | | | | |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 10.00 | 23.00 | 28.00 | 33.00 | 38.00 | 43.00 | 48.00 | 53.00 | 58.00 | 63.00 | 68.00 | 73.00 | 78.00 | 83.00 | 88.00 |
| 0.50 | 0.55 | 0.61 | 0.61 | 0.72 | 0.72 | 0.78 | 0.78 | 0.86 | 0.92 | 0.95 | 1.01 | 1.06 | 1.08 | 1.14 |
| 98.00 | 105.50 | 115.50 | 125.50 | 135.50 | 145.50 | 155.50 | 165.50 | 175.50 | 185.50 | 195.50 | 205.50 | 215.50 | 225.50 | 235.50 |
| 1.22 | 1.22 | 1.31 | 1.39 | 1.45 | 1.55 | 1.57 | 1.64 | 1.67 | 1.71 | 1.73 | 1.76 | 1.79 | 1.82 | 1.85 |
| 255.50 | 265.50 | 275.50 | 285.50 | 295.50 | 305.50 | 315.50 | 325.50 | 335.50 | 345.50 | 355.50 | 365.50 | 375.50 | 385.50 | 395.50 |
| 1.90 | 1.94 | 1.97 | 2.00 | 2.02 | 2.06 | 2.09 | 2.11 | 2.15 | 2.18 | 2.20 | 2.23 | 2.27 | 2.29 | 2.32 |
| 415.50 | 425.50 | 435.50 | 445.50 | 455.50 | 465.50 | 475.50 | 485.50 | 495.50 | 513.00 | 538.00 | 563.00 | 588.00 | 613.00 | 638.00 |
| 2.39 | 2.41 | 2.44 | 2.48 | 2.51 | 2.53 | 2.56 | 3.16 | 3.19 | 3.28 | 3.38 | 3.47 | 3.56 | 3.65 | 3.75 |
| 688.00 | 713.00 | 738.00 | 763.00 | 788.00 | | | | | | | | | | |
| 3.94 | 4.03 | 4.13 | 4.21 | 4.33 | | | | | | | | | | |

***** UNIVERSITY OF MANITOBA ***** STANDARD TARIFF OF TOLLS--2001 TO 20000

MEAN STANDARD DEVIATION
 X 301.51 213.75
 Y 2.06 1.02
 CORRELATION COEFFICIENT = 0.99
 REGRESSION COEFFICIENT = 0.00
 INTERCEPT = 0.65

ANALYSIS OF VARIANCE

| SOURCE OF VARIATION | DF | SS | MS | F |
|---------------------|----|---------|--------|-----------|
| REGRESSION | 1 | 68.6447 | 68.645 | 2928.6108 |
| DEVIATION | 67 | 1.3704 | 0.023 | |
| TOTAL | 68 | 70.2151 | | |

STANDARD ERROR OF ESTIMATE = 0.15
 STANDARD ERROR OF REGRESSION COEFFICIENT = 0.00

***** UNIVERSITY OF MANITOBA ***** STANDARD TARIFF OF TOLLS--2001 TO 20000

$y = .0093x + .65$

| EXPECTED AND ADJUSTED Y VALUE | FOR VARIOUS SAMPLE | VALUES OF X | Y | EXPECTED Y | ADJUSTED Y |
|-------------------------------|--------------------|-------------|---------|------------|------------|
| 1 | 10.00000 | 0.50000 | 0.69251 | 1.37024 | |
| 2 | 23.00000 | 0.55000 | 0.75362 | 1.85913 | |
| 3 | 28.00000 | 0.61000 | 0.77712 | 1.89563 | |
| 4 | 33.00000 | 0.61000 | 0.80062 | 1.87213 | |
| 5 | 38.00000 | 0.72000 | 0.82412 | 1.95862 | |
| 6 | 43.00000 | 0.72000 | 0.84763 | 1.93512 | |
| 7 | 48.00000 | 0.78000 | 0.87113 | 1.97162 | |
| 8 | 53.00000 | 0.78000 | 0.89463 | 1.94812 | |
| 9 | 58.00000 | 0.86000 | 0.91813 | 2.00461 | |
| 10 | 63.00000 | 0.92000 | 0.94164 | 2.04111 | |
| 11 | 68.00000 | 0.95000 | 0.96514 | 2.04761 | |
| 12 | 73.00000 | 1.01000 | 0.98864 | 2.08410 | |
| 13 | 78.00000 | 1.06000 | 1.01215 | 2.11060 | |
| 14 | 83.00000 | 1.08000 | 1.03565 | 2.10710 | |
| 15 | 88.00000 | 1.14000 | 1.05915 | 2.14360 | |
| 16 | 93.00000 | 1.16000 | 1.08265 | 2.14009 | |
| 17 | 98.00000 | 1.22000 | 1.10616 | 2.17659 | |
| 18 | 105.00000 | 1.22000 | 1.14141 | 2.14134 | |
| 19 | 115.00000 | 1.31000 | 1.18842 | 2.18433 | |
| 20 | 125.00000 | 1.39000 | 1.23542 | 2.21733 | |
| 21 | 135.00000 | 1.45000 | 1.28243 | 2.23032 | |
| 22 | 145.00000 | 1.55000 | 1.32943 | 2.28332 | |
| 23 | 155.00000 | 1.57000 | 1.37644 | 2.25631 | |
| 24 | 165.00000 | 1.64000 | 1.42344 | 2.27931 | |
| 25 | 175.00000 | 1.67000 | 1.47045 | 2.26230 | |
| 26 | 185.00000 | 1.71000 | 1.51745 | 2.25529 | |
| 27 | 195.00000 | 1.73000 | 1.56446 | 2.22829 | |
| 28 | 205.00000 | 1.76000 | 1.61146 | 2.21128 | |
| 29 | 215.00000 | 1.79000 | 1.65847 | 2.19428 | |
| 30 | 225.00000 | 1.82000 | 1.70547 | 2.17727 | |
| 31 | 235.00000 | 1.85000 | 1.75248 | 2.16027 | |
| 32 | 245.00000 | 1.88000 | 1.79948 | 2.14326 | |
| 33 | 255.00000 | 1.90000 | 1.84649 | 2.11626 | |
| 34 | 265.00000 | 1.94000 | 1.89350 | 2.10925 | |
| 35 | 275.00000 | 1.97000 | 1.94050 | 2.09225 | |
| 36 | 285.00000 | 2.00000 | 1.98751 | 2.07524 | |
| 37 | 295.00000 | 2.02000 | 2.03451 | 2.04824 | |
| 38 | 305.00000 | 2.06000 | 2.08152 | 2.04123 | |
| 39 | 315.00000 | 2.09000 | 2.12852 | 2.02423 | |
| 40 | 325.00000 | 2.11000 | 2.17553 | 1.99722 | |
| 41 | 335.00000 | 2.15000 | 2.22253 | 1.99022 | |
| 42 | 345.00000 | 2.18000 | 2.26954 | 1.97321 | |
| 43 | 355.00000 | 2.20000 | 2.31654 | 1.94620 | |
| 44 | 365.00000 | 2.23000 | 2.36355 | 1.92920 | |
| 45 | 375.00000 | 2.27000 | 2.41055 | 1.92219 | |
| 46 | 385.00000 | 2.29000 | 2.45756 | 1.89519 | |
| 47 | 395.00000 | 2.32000 | 2.50456 | 1.87818 | |
| 48 | 405.00000 | 2.35000 | 2.55157 | 1.86118 | |
| 49 | 415.00000 | 2.39000 | 2.59858 | 1.85417 | |
| 50 | 425.00000 | 2.41000 | 2.64558 | 1.82717 | |
| 51 | 435.00000 | 2.44000 | 2.69259 | 1.81016 | |
| 52 | 445.00000 | 2.48000 | 2.73959 | 1.80316 | |
| 53 | 455.00000 | 2.51000 | 2.78660 | 1.78615 | |
| 54 | 465.00000 | 2.53000 | 2.83360 | 1.75915 | |
| 55 | 475.00000 | 2.56000 | 2.88061 | 1.74214 | |
| 56 | 485.00000 | 3.16000 | 2.92761 | 2.29513 | |
| 57 | 495.00000 | 3.19000 | 2.97462 | 2.27813 | |
| 58 | 513.00000 | 3.28000 | 3.05888 | 2.28587 | |
| 59 | 538.00000 | 3.38000 | 3.17439 | 2.26036 | |
| 60 | 563.00000 | 3.47000 | 3.29190 | 2.24084 | |
| 61 | 588.00000 | 3.56000 | 3.40942 | 2.21333 | |
| 62 | 613.00000 | 3.65000 | 3.52693 | 2.18582 | |
| 63 | 638.00000 | 3.75000 | 3.64444 | 2.16830 | |
| 64 | 663.00000 | 3.84000 | 3.76196 | 2.14079 | |
| 65 | 688.00000 | 3.94000 | 3.87947 | 2.12328 | |
| 66 | 713.00000 | 4.03000 | 3.99698 | 2.09576 | |
| 67 | 738.00000 | 4.13000 | 4.11450 | 2.07825 | |
| 68 | 763.00000 | 4.21000 | 4.23201 | 2.04074 | |
| 69 | 788.00000 | 4.33000 | 4.34952 | 2.04322 | |

***** UNIVERSITY OF MANITOBA ***** SIMPLE REGRESSION PROGRAM

STANDARD TARIFF OF TOLLS--OVER 20000 LBS

| INPUT DATA | 69 SAMPLES | 10.00 | 23.00 | 28.00 | 33.00 | 38.00 | 43.00 | 48.00 | 53.00 | 58.00 | 63.00 | 68.00 | 73.00 | 78.00 | 83.00 | 88.00 | 98.00 |
|------------|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
| 0.45 | 0.50 | 0.55 | 0.55 | 0.65 | 0.65 | 0.71 | 0.71 | 0.78 | 0.84 | 0.86 | 0.92 | 0.96 | 0.98 | 1.04 | | | |
| 98.00 | 105.50 | 115.50 | 125.50 | 135.50 | 145.50 | 155.50 | 165.50 | 175.50 | 185.50 | 195.50 | 205.50 | 215.50 | 225.50 | 235.50 | | | |
| 1.11 | 1.11 | 1.19 | 1.26 | 1.32 | 1.41 | 1.43 | 1.49 | 1.52 | 1.55 | 1.57 | 1.60 | 1.63 | 1.65 | 1.68 | | | |
| 255.50 | 265.50 | 275.50 | 285.50 | 295.50 | 305.50 | 315.50 | 325.50 | 335.50 | 345.50 | 355.50 | 365.50 | 375.50 | 385.50 | 395.50 | | | |
| 1.73 | 1.76 | 1.79 | 1.82 | 1.84 | 1.87 | 1.90 | 1.92 | 1.95 | 1.98 | 2.00 | 2.03 | 2.06 | 2.08 | 2.11 | | | |
| 415.50 | 425.50 | 435.50 | 445.50 | 455.50 | 465.50 | 475.50 | 485.50 | 495.50 | 513.00 | 538.00 | 563.00 | 588.00 | 613.00 | 638.00 | | | |
| 2.17 | 2.19 | 2.22 | 2.25 | 2.25 | 2.28 | 2.30 | 2.33 | 2.87 | 2.90 | 2.98 | 3.07 | 3.15 | 3.24 | 3.32 | | | |
| 688.00 | 713.00 | 738.00 | 763.00 | 788.00 | | | | | | | | | | | | | |
| 3.49 | 3.58 | 3.66 | 3.75 | 3.83 | | | | | | | | | | | | | |

***** UNIVERSITY OF MANITOBA ***** STANDARD TARIFF OF TOLLS--OVER 20000 LBS

MEAN STANDARD DEVIATION
 X 301.51 213.75
 Y 1.95 0.89
 CORRELATION COEFFICIENT = 0.99
 REGRESSION COEFFICIENT = 0.00
 INTERCEPT = 0.81

ANALYSIS OF VARIANCE

| SOURCE OF VARIATION | DF | SS | MS | F |
|--|----|---------|--------|-----------|
| REGRESSION | 1 | 52.7024 | 52.702 | 2434.7952 |
| DEVIATION | 67 | 1.2032 | 0.019 | |
| TOTAL | 68 | 53.9056 | | |
| STANDARD ERROR OF ESTIMATE | | | | 0.13 |
| STANDARD ERROR OF REGRESSION COEFFICIENT | | | | 0.00 |

***** UNIVERSITY OF MANITOBA ***** STANDARD TARIFF OF TOLLS--OVER 20000 LBS
 EXPECTED AND ADJUSTED Y VALUE FOR VARIOUS VALUES OF X

$y = 0.04x + 1.61$

| SAMPLE | X | Y | EXPECTED Y | ADJUSTED Y |
|--------|-----------|---------|------------|------------|
| 1 | 10.00000 | 0.45000 | 0.64937 | 1.65063 |
| 2 | 23.00000 | 0.50000 | 0.70291 | 1.64708 |
| 3 | 28.00000 | 0.55000 | 0.72350 | 1.67649 |
| 4 | 33.00000 | 0.55000 | 0.74410 | 1.65590 |
| 5 | 38.00000 | 0.65000 | 0.76469 | 1.73530 |
| 6 | 43.00000 | 0.65000 | 0.78528 | 1.71471 |
| 7 | 48.00000 | 0.71000 | 0.80588 | 1.75412 |
| 8 | 53.00000 | 0.71000 | 0.82647 | 1.73352 |
| 9 | 58.00000 | 0.78000 | 0.84706 | 1.78293 |
| 10 | 63.00000 | 0.84000 | 0.86766 | 1.82234 |
| 11 | 68.00000 | 0.86000 | 0.88825 | 1.82174 |
| 12 | 73.00000 | 0.92000 | 0.90884 | 1.86115 |
| 13 | 78.00000 | 0.96000 | 0.92944 | 1.88056 |
| 14 | 83.00000 | 0.98000 | 0.95003 | 1.87996 |
| 15 | 88.00000 | 1.04000 | 0.97062 | 1.91937 |
| 16 | 93.00000 | 1.05000 | 0.99122 | 1.90877 |
| 17 | 98.00000 | 1.11000 | 1.01181 | 1.94818 |
| 18 | 105.00000 | 1.11000 | 1.04270 | 1.91729 |
| 19 | 115.00000 | 1.19000 | 1.08389 | 1.95611 |
| 20 | 125.00000 | 1.26000 | 1.12508 | 1.98492 |
| 21 | 135.00000 | 1.32000 | 1.16626 | 2.00373 |
| 22 | 145.00000 | 1.41000 | 1.20745 | 2.05254 |
| 23 | 155.00000 | 1.43000 | 1.24864 | 2.03136 |
| 24 | 165.00000 | 1.49000 | 1.28982 | 2.05017 |
| 25 | 175.00000 | 1.52000 | 1.33101 | 2.03898 |
| 26 | 185.00000 | 1.55000 | 1.37220 | 2.02780 |
| 27 | 195.00000 | 1.57000 | 1.41338 | 2.00661 |
| 28 | 205.00000 | 1.60000 | 1.45457 | 1.99542 |
| 29 | 215.00000 | 1.63000 | 1.49576 | 1.98424 |
| 30 | 225.00000 | 1.65000 | 1.53694 | 1.96305 |
| 31 | 235.00000 | 1.68000 | 1.57813 | 1.95186 |
| 32 | 245.00000 | 1.71000 | 1.61932 | 1.94067 |
| 33 | 255.00000 | 1.73000 | 1.66050 | 1.91949 |
| 34 | 265.00000 | 1.76000 | 1.70169 | 1.90830 |
| 35 | 275.00000 | 1.79000 | 1.74288 | 1.89712 |
| 36 | 285.00000 | 1.82000 | 1.78407 | 1.88593 |
| 37 | 295.00000 | 1.84000 | 1.82525 | 1.86474 |
| 38 | 305.00000 | 1.87000 | 1.86644 | 1.85355 |
| 39 | 315.00000 | 1.90000 | 1.90763 | 1.84237 |
| 40 | 325.00000 | 1.92000 | 1.94881 | 1.82118 |
| 41 | 335.00000 | 1.95000 | 1.99000 | 1.80999 |
| 42 | 345.00000 | 1.98000 | 2.03119 | 1.79881 |
| 43 | 355.00000 | 2.00000 | 2.07237 | 1.77762 |
| 44 | 365.00000 | 2.03000 | 2.11356 | 1.76643 |
| 45 | 375.00000 | 2.06000 | 2.15475 | 1.75525 |
| 46 | 385.00000 | 2.08000 | 2.19593 | 1.73406 |
| 47 | 395.00000 | 2.11000 | 2.23712 | 1.72287 |
| 48 | 405.00000 | 2.14000 | 2.27831 | 1.71169 |
| 49 | 415.00000 | 2.17000 | 2.31949 | 1.70050 |
| 50 | 425.00000 | 2.19000 | 2.36068 | 1.67931 |
| 51 | 435.00000 | 2.22000 | 2.40187 | 1.66812 |
| 52 | 445.00000 | 2.25000 | 2.44306 | 1.65694 |
| 53 | 455.00000 | 2.25000 | 2.48424 | 1.61575 |
| 54 | 465.00000 | 2.28000 | 2.52543 | 1.60456 |
| 55 | 475.00000 | 2.30000 | 2.56662 | 1.58338 |
| 56 | 485.00000 | 2.33000 | 2.60780 | 1.57219 |
| 57 | 495.00000 | 2.87000 | 2.64899 | 2.07100 |
| 58 | 513.00000 | 2.90000 | 2.72107 | 2.02893 |
| 59 | 538.00000 | 2.98000 | 2.82403 | 2.00596 |
| 60 | 563.00000 | 3.07000 | 2.92700 | 1.99299 |
| 61 | 588.00000 | 3.15000 | 3.02997 | 1.97003 |
| 62 | 613.00000 | 3.24000 | 3.13294 | 1.95706 |
| 63 | 638.00000 | 3.32000 | 3.23590 | 1.93409 |
| 64 | 663.00000 | 3.41000 | 3.33887 | 1.92112 |
| 65 | 688.00000 | 3.49000 | 3.44184 | 1.89816 |
| 66 | 713.00000 | 3.58000 | 3.54480 | 1.88519 |
| 67 | 738.00000 | 3.66000 | 3.64777 | 1.86222 |
| 68 | 763.00000 | 3.75000 | 3.75074 | 1.84925 |
| 69 | 788.00000 | 3.83000 | 3.85371 | 1.82629 |

15.07.24 JOB 831 15 ET 1.9 P 9 REGTAR D.ABRAMS
 15.07.50 JOB 831 END XEQ

DATASET NAMING CONVENTIONS FOR DISK ---
 DS NAMES MUST BE OF THE FORM: NAME.#NNNN.ANYTHING.GOES
 WHERE 'NAME' IS YOUR LAST NAME
 '#NNNN' IS YOUR ACCOUNT NUMBER PRECEDED BY AN ALPHABETIC OR NATIONAL CHARACTER

S.3.*

REVENUES AND EXPENDITURES OF CONTRACTED FISHERMEN

SECTION 3

REVENUES AND EXPENDITURES OF CONTRACTED FISHERMEN

Introduction

This section of the report contains the following:

- a) Calculations of revenues and expenditures for those individuals contracted for the 1972 Manitoba Rough Fish Harvest.
- b) Observations based on these accounts.
- c) Examination of the economic feasibility of a rough fish harvest under varying conditions of productivity, product transport costs and prices for fish.

Calculations of Revenues and Expenditures

Depreciation charges, perhaps the most difficult expenditures to evaluate, were calculated using a straight line method. To calculate the annual expenditure for an asset, individuals were asked the initial cost of the asset, the expected years of service of that asset, and the residual value of the asset, if any, at the end of its economic life.

In some cases, certain assets - boats, motors, holding facilities - are used not only for the rough fish harvest which occurs in early spring, but also for summer and fall fisheries. Where assets are used for operations other than the rough fish harvest, annual depreciation charges are spread over the seasons.

The net earnings to contractors are calculated under two assumptions, these being:

- a) Contractors did not have alternative employment; i.e., there is no opportunity cost to the contractor's labor.
- b) Contractors did have alternative employment; that is, there exists an opportunity cost to the contractor's labor.

The former assumption would seem to be more applicable, given prevailing conditions in the region of study.

Observations Based on Accounts

Net earnings of contracted fishermen are summarized in Table 1. If contract revenues and other allowances are deducted from net earnings, the return to the contractor is greatly reduced. Inferences as to the economic feasibility of the rough fish harvest under conditions other than experimental, should not be drawn without taking into account the close relationship between expenditures and conditions of contract. Continued fishing when catch/unit effort remains extremely low over a period of several days and the rental of equipment at high rates as opposed to the lower depreciation charges which would be assessed if equipment were owned are two examples of the inter-relationship between expenditures and conditions of contract.

In discussion with the contracted fishermen, several factors which influence the economic feasibility of the rough fish harvest became evident. In outline, these factors are:

a) Lack of alternative employment

The spring rough fish harvest is conducted prior to the start of the summer fishery. At this time of the year, the possibility of alternative employment is limited.

b) Use of idle equipment

In most cases, much of the equipment used for the rough fish harvest is purchased primarily for the summer and fall fisheries. Therefore, use of the equipment for the rough fish harvest can be equated to the use of idle equipment.

c) Availability of Fish

"Hitting" the run of fish, if such a run does exist in an area, is of prime importance to the economic feasibility of the harvest. What appears to be a very unproductive area might have been highly productive if fished at a different time. Thus, it would not be valid to say that on the basis of results for a given harvest an area cannot be economically fished. Such knowledge can only be acquired with experience.

In summary, inferences as to the economic feasibility of the rough fish harvest drawn from revenues and expenditures of individuals contracted for the 1972 harvest must be done subject to the following qualifications:

- a) The inter-relationships between expenditures and conditions of the contract are significant.
- b) Timing of the harvest to "hit" the run of fish, if such a run exists, is of the essence to the economic feasibility of the harvest.

In the opinion of the author, timing is the factor most critical to the feasibility of the harvest and it is the factor which must receive further attention if studies into the potential of the rough fish harvest continue.

Economic Feasibility - "Representative" Rough Fish Harvest

The economic feasibility of a "representative" rough fish harvest under varying conditions of availability of fish, product transport prices, and prices for fish can be calculated if certain assumptions are made. The assumptions:

1. A one month spring operation.
2. The operator employs one man to assist in fishing and in dressing production, at a rate of \$500 for the month.
3. There is no opportunity cost to the operator's labor.
4. Two trap nets, an 18 ft. wooden hull yawl, and a 25 h.p. out-board motor are used. The boat and motor are also used for the summer and fall fisheries. The annual depreciation charge for fishing gear, with initial cost of \$2,400 expected service life of 15 years, and 0 salvage value would be \$160. The charge ascribable to the rough fish harvest would be \$53.

For the boat, with the same expected life and salvage value, and initial cost of \$550, the charge ascribable to the rough fish harvest would be \$12.

Finally, for the motor, with initial cost of \$650, 0 salvage value, and expected service life of 5 years, the charge ascribable to the rough fish harvest would be \$43.

5. No facility is required for the operation.
6. The fisherman delivers direct to the plant of the F.F.M.C. in Transcona using the services of a commercial carrier.
7. Ice and boxes are purchased from the F.F.M.C. in Transcona.
8. Production is packed in a ratio of 70 lb. fish/30 lb. ice and boxes.
9. No revenues accrue from subsidies, offal sales, etc.
10. Only one species is marketable.
11. There is no license cost.
12. The expenditure for gasoline and oil is \$30.
13. There are no costs of capital associated with the purchase of capital assets.

14. There is no risk of either loss or severe damage to equipment.

$$\text{Earnings} = P \cdot Q - \sum_{i=1}^{11} C_i$$

where P price of fish in \$/lb., F.O.B. the plant of F.F.M.C.

Q quantity of fish in lb.

C₁ cost of ice per lb. fish in \$/lb. fish

C₂ cost of boxes per lb. fish in \$/lb. fish

C₃ cost of transport in \$/lb. fish

C₄ cost of labor employed in \$

C₅ maintenance of fishing gear, boat, motor and holding facility in \$

C₆ cost of gasoline and oil in \$

C₇ depreciation charge for fishing gear in \$

C₈ depreciation charge for boat in \$

C₉ depreciation charge for motor in \$

C₁₀ depreciation charge for holding facility in \$

C₁₁ license cost.

Values of Coefficients

Values of coefficients used in calculating the net earnings of the "representative" operator are outlined below.

| <u>Coefficient</u> | <u>Value (s)</u> |
|---|---------------------------|
| P Price of fish in \$/lb. | .05 .055 .06 .065 .07 .08 |
| Q Quantity of fish in lb. | 20,000 50,000 70,000 |
| C ₁ Cost of ice in \$/lb. fish | .01 |
| C ₂ Cost of boxes in \$/lb. fish | .01 |
| C ₃ Cost of transport in \$/lb. fish | .01 .01 5 .02 .02 5 .03 |
| C ₄ Cost of labor employed in \$ | 500 |
| C ₅ Maintenance cost in \$ | 40 |
| C ₆ Cost of gasoline and oil in \$ | 30 |
| C ₇ Depreciation for fishing gear in \$ | 160 |
| C ₈ Depreciation for boat in \$ | 12 |
| C ₉ Depreciation for motor in \$ | 43 |
| C ₁₀ Depreciation for holding facility in \$ | 0 |
| C ₁₁ Licence cost in \$ | 0 |

By assumption.

It must be noted that the values used and the assumptions of the analyses refer to a hypothetical rough fish harvest. In reality, the described operation would be directly applicable to very few operations. Some operators would use their own vehicles, would employ additional labor only if necessary, etc. In particular, the assumption that no facility is required may be somewhat tenuous.

Net earnings of the "representative" operator under the varying conditions are contained in Appendix C. A summary of the calculations contained in Appendix C is presented in Table 2. The dependence of the economic feasibility of the "representative" harvest upon large volume production is clear. As mentioned earlier, it is the opinion of the author that this is the factor most critical to the economic feasibility of the harvest. The calculations of Appendix C substantiate this opinion.

Location - Dawson Bay

Revenues

| | | |
|------------------|-------------------------|------------------------|
| fish sales | 24,800 lb. @ \$.035/lb. | \$ 868.00 |
| contract revenue | 25 days @ \$55/day | <u>1,355.00</u> |
| | Total revenue | <u><u>2,223.00</u></u> |

Expenditures

| | | |
|---|--------------------|----------------------|
| ice | | - |
| boxes | | - |
| transport | | - |
| gasoline and oil | | 15.00 |
| labor employed | | 248.00 |
| maintenance fishing gear | | - |
| boat | | 15.00 |
| motor | | 25.00 |
| holding facility | | - |
| fishing gear rental | | <u>300.00</u> |
| | Total expenditures | <u><u>603.00</u></u> |
| | net cash return | 1,620.00 |
| | less depreciation | <u>50.00</u> |
| net earnings of contractor - assuming no opportunity cost to individual labor | | 1,570.00 |
| net earnings of contractor - assuming opportunity cost to individual labor | | 1,514.00 |

Location - Brokenhead River

Revenues

| | | |
|------------------|-------------------------|------------------------|
| fish sales | 22,380 lb. @ \$.065/lb. | \$ 1,454.70 |
| contract revenue | 26 days @ \$50/day | <u>1,300.00</u> |
| | Total revenue | <u><u>2,754.70</u></u> |

Expenditures

| | | |
|---|--------------------|----------------------|
| ice | | 223.80 |
| boxes | | 223.80 |
| transport | | - |
| gasoline and oil | | 45.00 |
| labor employed | | - |
| maintenance of fishing gear | | - |
| | boat | 30.00 |
| | motor | 25.00 |
| | holding facility | - |
| net rental | | <u>-</u> |
| | Total expenditures | <u><u>547.60</u></u> |
| | net cash return | 2,207.10 |
| | less depreciation | <u><u>85.00</u></u> |
| net earnings of contractor - assuming no opportunity cost to individual labor | | 2,122.10 |
| net earnings of contractor - assuming opportunity cost to individual labor | | 1,644.10 |

Location - Winnipegosis

Revenues

| | | |
|------------------|---------------------------|-------------------------|
| fish sales | 374,690 lb. @ \$.0325/lb. | \$12,177.00 |
| contract revenue | 40 days @ \$50/day | <u>2,000.00</u> |
| | Total revenue | <u><u>14,177.00</u></u> |

Expenditures

| | | |
|---|--------------------|------------------------|
| ice | | - |
| boxes | | - |
| transport (to Good Harbor) | | 2,810.00 |
| gasoline and oil | | - |
| labor employed | | 3,772.00 |
| maintenance fishing gear | | - |
| boat | | 25.00 |
| motor | | - |
| holding facility | | <u>-</u> |
| | Total expenditures | <u><u>6,607.00</u></u> |
| | net cash return | 7,570.00 |
| | less depreciation | <u><u>141.00</u></u> |
| net earnings of contractor - assuming no opportunity cost to individual labor | | 7,429.00 |
| net earnings of contractor - under assumption of opportunity cost to individual labor | | 6,469.00 |

Location - Netley Marshes

Revenues

| | | |
|------------------|-------------------------|------------------------|
| fish sales | 16,488 lb. @ \$.025/lb. | \$ 412.20 |
| contract revenue | 29 days @ \$110/day | <u>3,190.00</u> |
| | Total revenue | <u><u>3,602.00</u></u> |

Expenditures

| | | |
|---|----------------------|------------------------|
| ice | | - |
| boxes | | - |
| transport | | - |
| gasoline and oil | | 40.00 |
| labor employed | 29 days @ \$20/day | 580.00 |
| maintenance fishing gear | | - |
| boat | | 15.00 |
| motor | | 20.00 |
| holding facility | | - |
| net rental | 4 nets @ \$150/month | 600.00 |
| boat rental | @ \$100/month | <u>100.00</u> |
| | Total expenditures | <u><u>1,355.00</u></u> |
| | net cash return | 2,247.20 |
| | less depreciation | <u><u>43.00</u></u> |
| net earnings of contractor - assuming no opportunity cost to individual labor | | 2,204.20 |
| net earnings of contractor - assuming opportunity cost to individual labor | | 1,864.20 |

Location - Koostatak

Revenues

| | | |
|--------------------------|----------------------|------------------------|
| fish sales | 954 lb. @ \$.065/lb. | \$ 62.00 |
| contract revenue | 28 days @ \$45/day | 1,260.00 |
| transportation allowance | 14 trips @ \$85/trip | <u>1,190.00</u> |
| | Total revenue | <u><u>2,512.00</u></u> |

Expenditures

| | | |
|--|--------------------|------------------------|
| ice | | 9.54 |
| boxes | | 9.54 |
| transport | | 1,190.00 |
| gasoline and oil | | 10.00 |
| labor employed | | 168.00 |
| maintenance of fishing gear | | - |
| | boat | 15.00 |
| | motor | 50.00 |
| | holding facility | - |
| net rental | | <u>-</u> |
| | Total expenditures | <u><u>1,451.08</u></u> |
| | net cash return | 1,060.92 |
| | less depreciation | <u>42.00</u> |
| net earnings of contractor - no opportunity cost to individual labor | | 1,018.92 |
| net earnings of contractor - opportunity cost to individual labor | | 748.92 |

Location - Icelandic River

Revenues

| | | |
|------------------|-------------------------|------------------------|
| fish sales | 15,540 lbs. @ \$.07/lb. | \$ 1,087.80 |
| contract revenue | 35 days @ \$55/day | <u>1,925.00</u> |
| | Total revenue | <u><u>3,012.80</u></u> |

Expenditures

| | | |
|--------------------------|--|----------|
| ice | | 77.70 |
| boxes | | 155.40 |
| transport | | 183.37 |
| gasoline and oil | | 21.85 |
| labor employed | | 70.00 |
| maintenance fishing gear | | - |
| boat | | 15.00 |
| motor | | - |
| holding facility | | <u>-</u> |

Total expenditures 685.32

net cash return 2,327.48

less depreciation 297.00

net earnings of contractor - assuming no opportunity cost to individual labor 2,030.48

net earnings of contractor - assuming opportunity cost to individual labor 1,736.48

Location - Willow Creek

Revenues

| | | |
|------------------|------------------------|------------------------|
| fish sales | 2,360 lb. @ \$.065/lb. | \$ 153.40 |
| contract revenue | 30 days @ \$55/day | <u>1,650.00</u> |
| | Total revenue | <u><u>1,803.40</u></u> |

Expenditures

| | | |
|---|--------------------|----------------------|
| ice | | 23.60 |
| boxes | | 23.60 |
| transport | | 27.85 |
| gasoline and oil | | 7.00 |
| labor employed | | - |
| maintenance fishing gear | | - |
| boat | | 15.00 |
| motor | | 10.00 |
| holding facility | | - |
| net rental | | <u>300.00</u> |
| | Total expenditures | <u><u>407.05</u></u> |
| | net cash return | 1,396.35 |
| | less depreciation | <u><u>58.00</u></u> |
| net earnings of contractor - assuming no opportunity cost to individual labor | | 1,338.35 |
| net earnings of contractor - assuming opportunity cost to individual labor | | 1,090.35 |

Location - Duck Bay

Revenues

| | | |
|------------------|-------------------------|-------------------------|
| fish sales | 337,561 lb. @ \$.03/lb. | \$10,126.80 |
| contract revenue | 37 days @ \$50/day | <u>1,850.00</u> |
| | Total revenue | <u><u>11,976.80</u></u> |

Expenditures

| | | |
|--|--------------------|----------------------|
| ice | | - |
| boxes | | - |
| transport | | - |
| gasoline and oil | | 50.00 |
| labor employed | | 564.00 |
| maintenance fishing gear | | 200.00 |
| boat | | 25.00 |
| motor | | - |
| holding facility | | <u>-</u> |
| | Total expenditures | <u><u>839.00</u></u> |
| | net cash return | 11,137.80 |
| | less depreciation | <u><u>97.00</u></u> |
| net earnings of contractor - under no assumption of opportunity cost to individual labor | | 11,040.80 |
| net earnings of contractor - under assumption of opportunity cost to individual labor | | 10,426.00 |

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TABLE 1

| CONTRACT LOCATION (1) | NET EARNINGS OF CONTRACTOR (NO OPPORTUNITY COST TO INDIVIDUAL LABOR) (2) in \$ | CONTRACT REVENUES PLUS OTHER ALLOWANCES (3) in \$ | NET EARNINGS LESS CONTRACT REVENUES (3) - (2) in \$ |
|------------------------------|--|---|---|
| Dawson Bay | 1,570 | 1,355 | 215 |
| Icelandic River | 2,030 | 1,925 | 105.48 |
| Koostatak | 1,018 | 2,450 | - 1,432 |
| Netley Marshes | 2,204 | 3,190 | - 986 |
| Brokenhead River | 2,122 | 1,300 | 822 |
| Willow Creek | 1,338 | 1,650 | - 312 |
| Duck Bay | 11,040 | 1,850 | 9,190 |
| Winnipegosis | 7,429 | 2,000 | 5,429 |

TABLE 2

Summary of Appendix C

Net Earnings - "Representative" Operator

| <u>Quantity Produced</u> (in lb.) | <u>Price of fish</u> (in \$/lb.) | <u>Transport Costs</u> (in \$/lb. fish) | <u>Net Earnings</u> (in \$) (positive, negative or 0) |
|--------------------------------------|-------------------------------------|--|---|
| 20,000 lb. | .050 | all values | negative (-) |
| " | .055 | " " | (-) |
| " | .060 | " " | (-) |
| " | .065 | " " | (-) |
| " | .070 | >.01 | positive (+) |
| " | .080 | ≤ .015 | (+) |
| " | .080 | >.015 | (-) |
| 50,000 lb. | .05 | >.01 | (+) |
| " | .05 | >.01 | (+) |
| " | .055 | ≤ .015 | (+) |
| " | " | >.015 | (-) |
| " | .060 | ≤ .02 | (+) |
| " | " | >.02 | (-) |
| " | .065 | ≤ .025 | (+) |
| " | " | >.025 | (-) |
| " | .070 | all values | (+) |
| " | .080 | all values | (+) |
| 70,000 lb. | .05 | ≤ .015 | (+) |
| " | " | >.015 | (-) |
| " | .055 | ≤ .02 | (+) |
| " | " | >.02 | (-) |
| " | .060 | ≤ .025 | (+) |
| " | " | >.025 | (-) |
| " | .065 | all values | (+) |
| " | .07 | " " | (+) |
| " | .08 | " " | (+) |

S.4.*

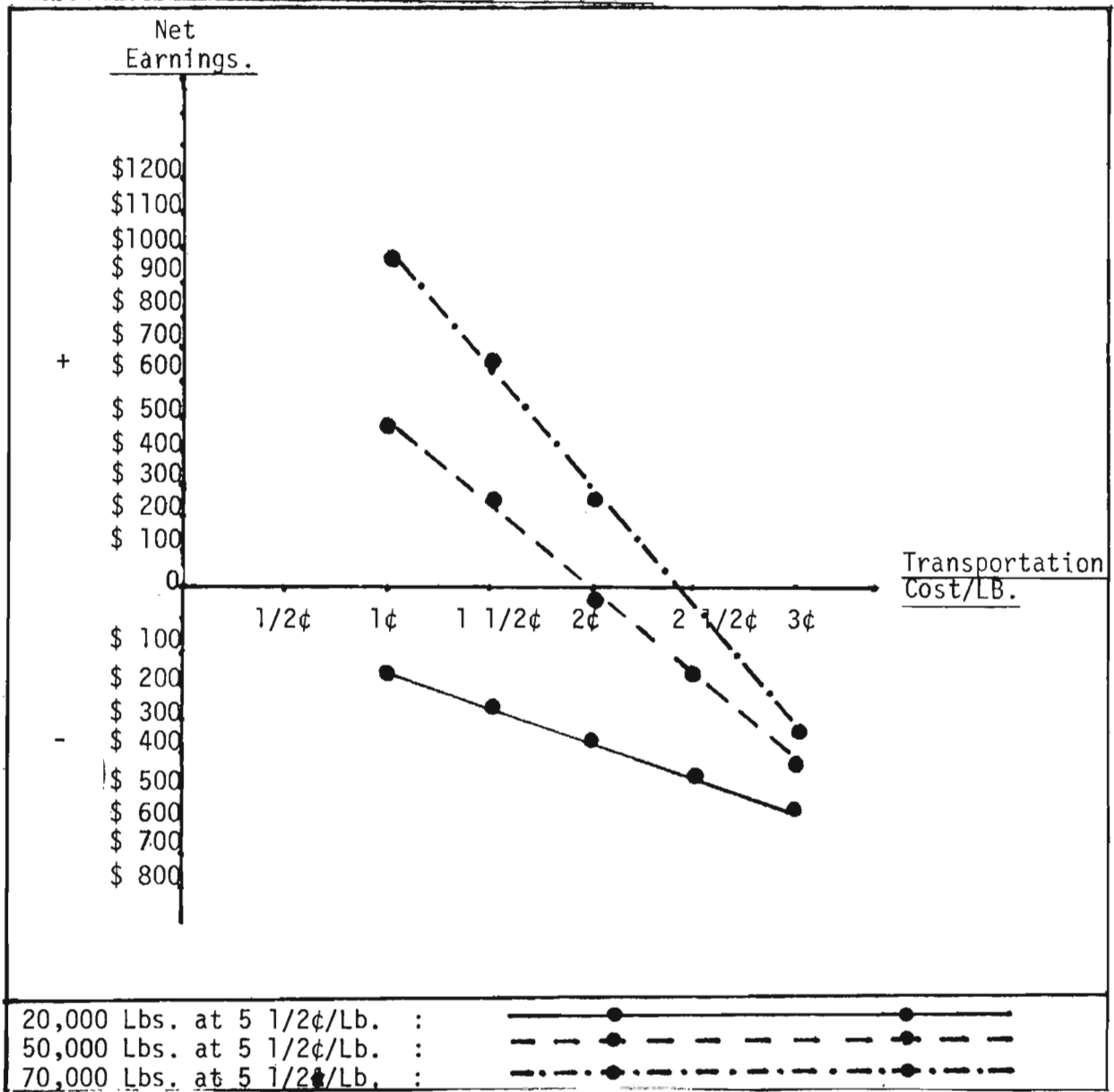
ECONOMIC FEASIBILITY PRINTOUT

SECTION 4

ECONOMIC FEASIBILITY PRINTOUTS

This particular section contains the original printouts indicating the breakeven points. The information has also been produced in graphical form to clarify the data.

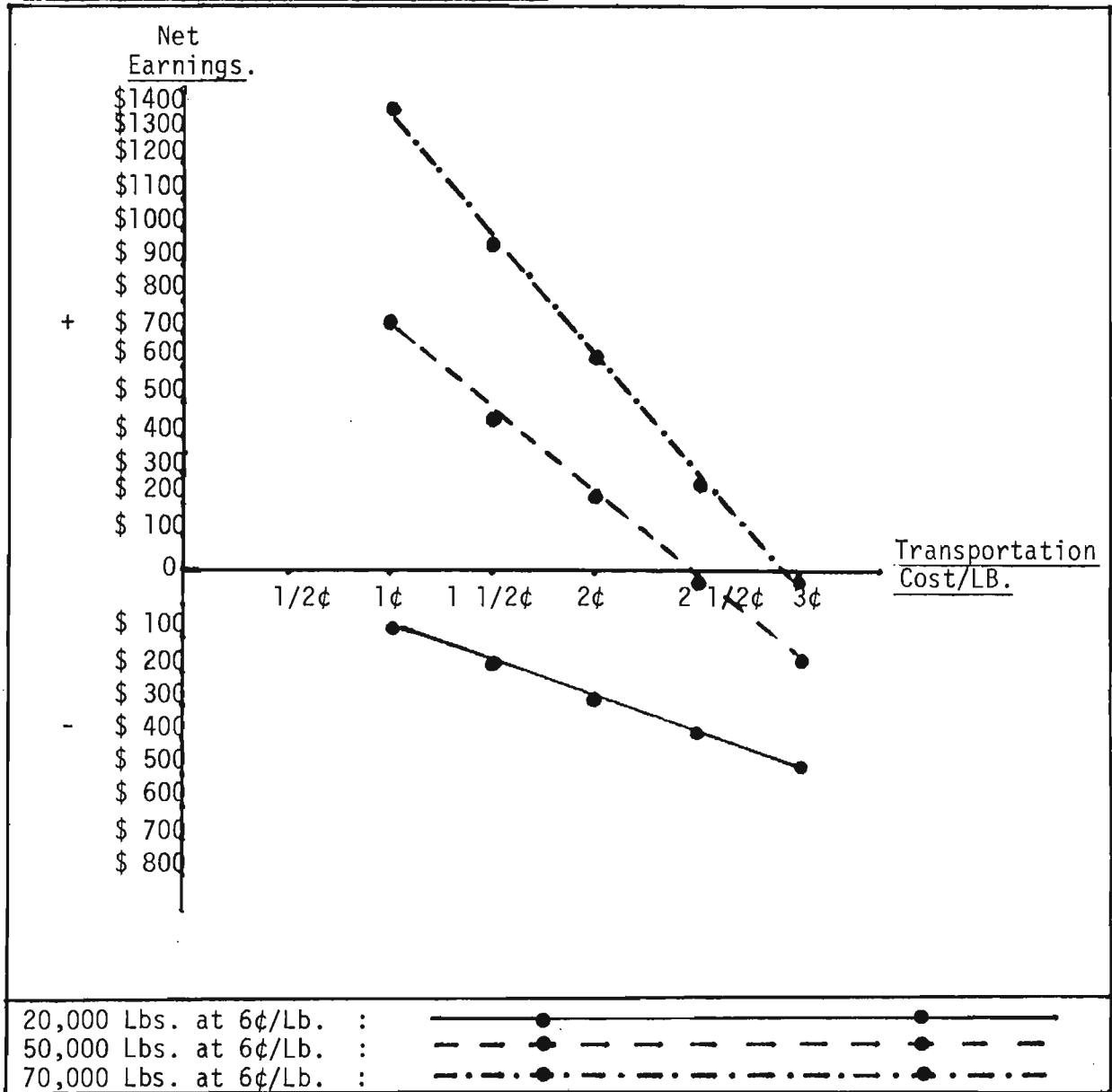
NET EARNINGS VS VARYING TRANSPORT RATES (B.)



Summary:

20,000 lbs. at 5 1/2¢ per lb. is completely uneconomic. If an operator can catch 50,000 lbs. and pay less than 2¢ transportation he can make some money out of it but probably would not make the effort. 70,000 lbs. harvest would show profit at less than 2 1/2¢ transportation cost.

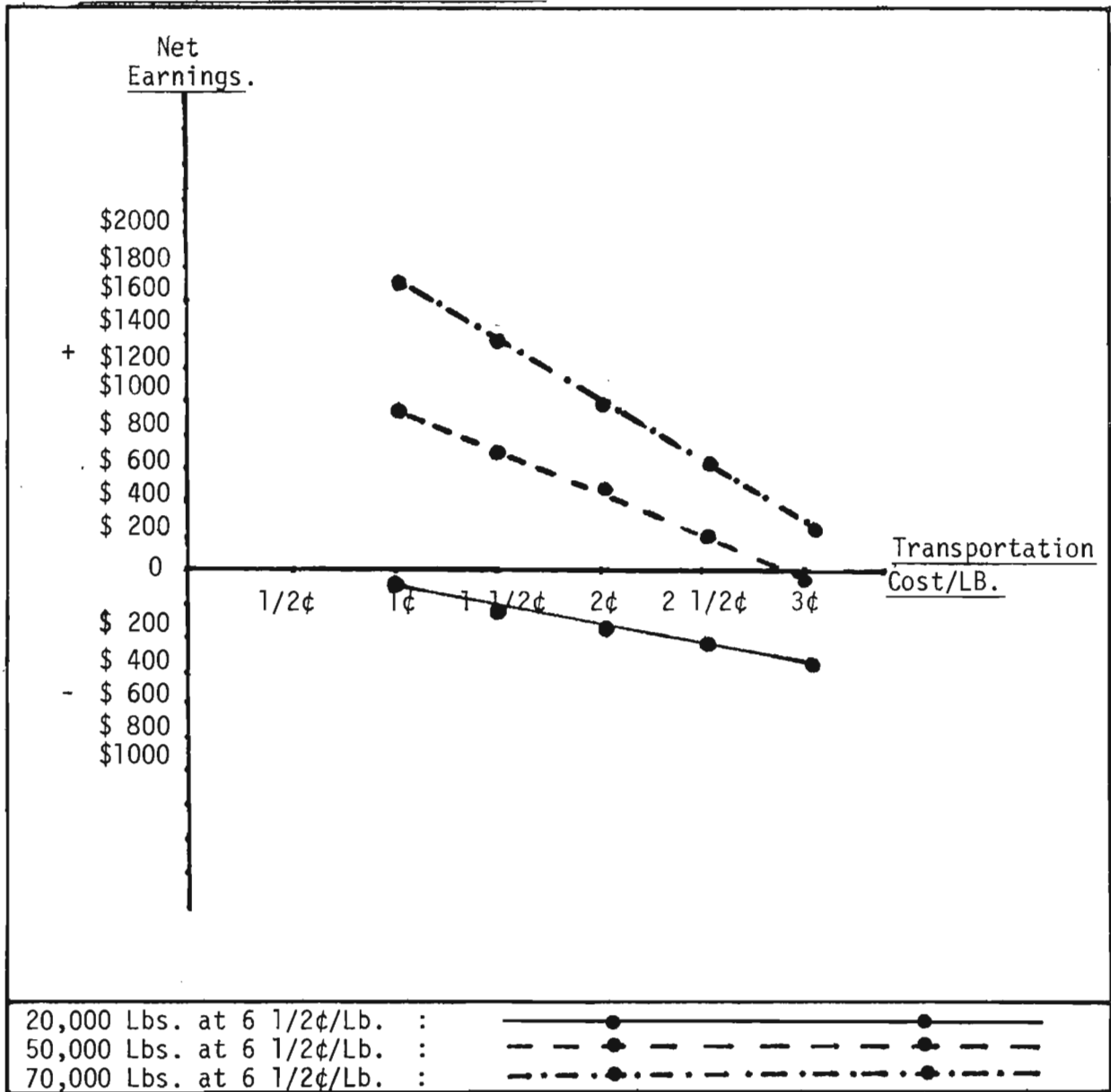
NET EARNINGS AT VARIOUS TRANSPORT RATES (C.)



Summary:

Up to 20,000 lbs. @ 6¢ per lb. is a losing proposition. However, 50,000 lbs. harvest with a transportation cost less than 2 1/2¢/lb. can conceivably show a profit. 70,000 lbs. at 6¢ per lb. with a transportation cost of less than 3¢ per lb. can show considerable profit.

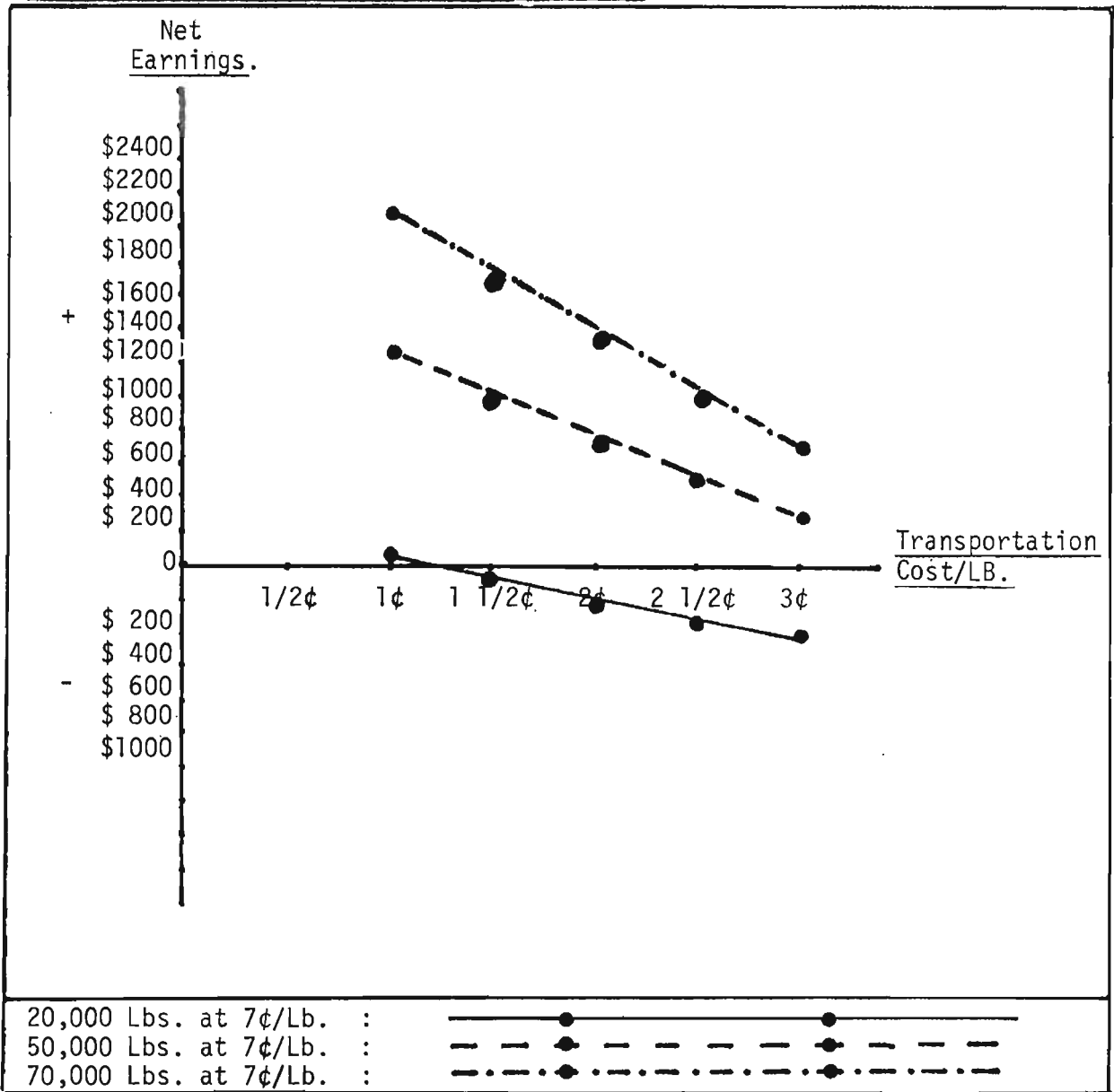
NET EARNINGS AT VARIOUS TRANSPORT RATES (D:



Summary:

20,000 lbs. at 6 1/2¢ per lb. is a losing proposition.
 However, 50,000 lbs. and above at 6 1/2¢ per pound would pay off at a transport rate less than 3¢ per lb.

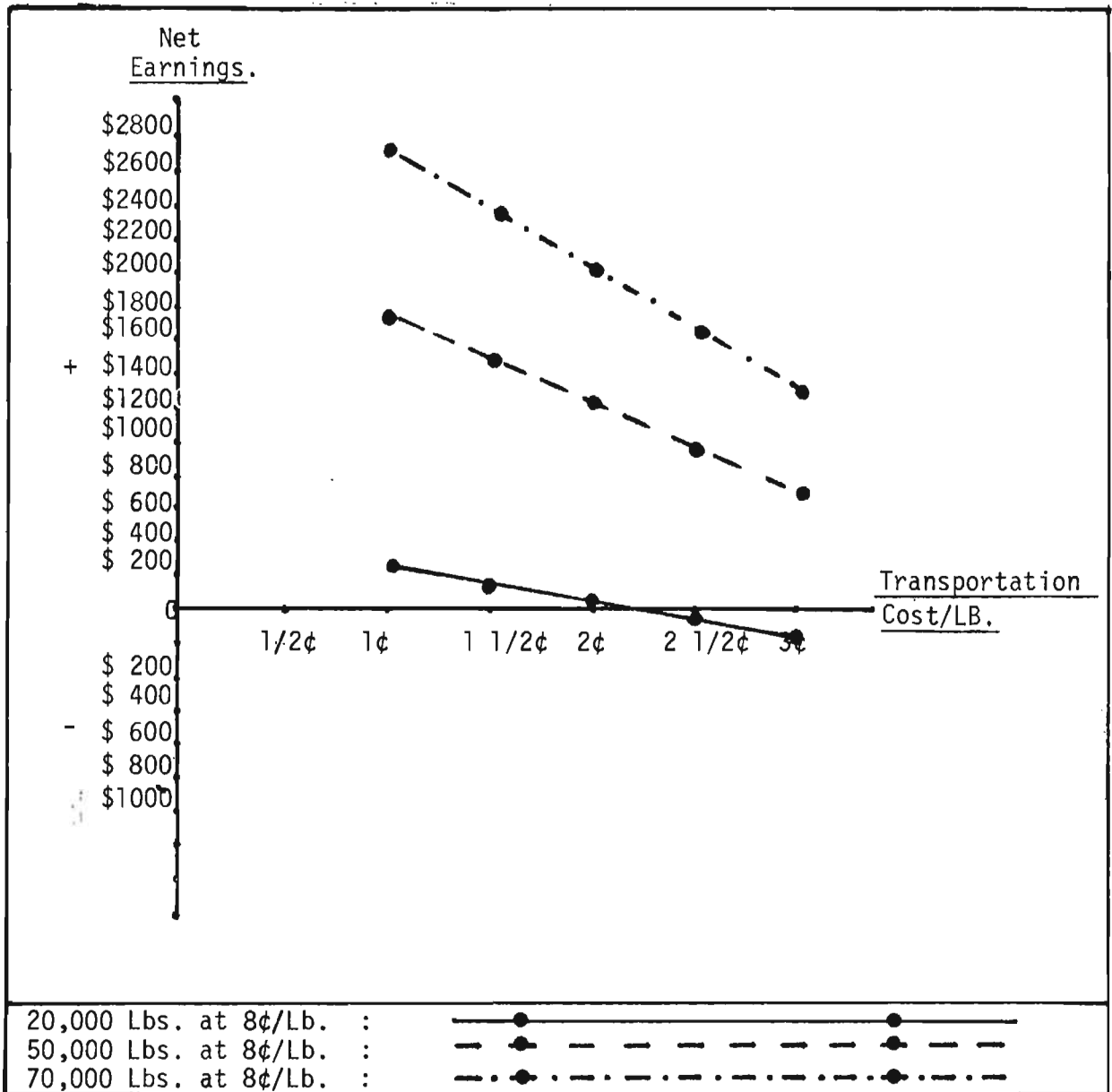
NET EARNINGS AT VARIOUS TRANSPORT RATES (E.)



Summary:

20,000 lbs. at 7¢ per lb. is uneconomic. However, 50,000 lbs. plus would produce good revenue for a fisherman who had to pay less than 3¢ per lb.

NET EARNINGS AT VARIOUS TRANSPORT RATES (F.



Summary: 20,000 lbs. at less than 2¢ per lb. would give a modest return at a market price of 8¢ per lb. 50,000 lbs. plus would derive good revenue for any fisherman.

- P - PRICE OF FISH IN \$/LB., F.O.B. TRANSCONA
- Q - QUANTITY OF FISH IN LBS.
- C1 - COST OF ICE PER LB. FISH IN \$/LB. FISH
- TC1 - COST OF ICE (C1*Q)
- C2 - COST OF BOXES PER LB. FISH IN \$/LB. FISH
- TC2 - COST OF BOXES (C2*Q)
- C3 - COST OF TRANSPORT PER LB. FISH IN \$/LB. FISH
- TC3 - COST OF TRANSPORT (C3*Q)
- C4 - COST OF LABOUR EMPLOYED PER LB. FISH IN \$/LB. FISH (TC4/Q)
- TC4 - COST OF LABOUR EMPLOYED IN \$
- C5 - COST OF MAINTENANCE OF FISHING GEAR, BOAT, MOTOR,
AND HOLDING FACILITY PER LB. FISH IN \$/LB. FISH (TC5/Q)
- TC5 - COST OF MAINTENANCE OF FISHING GEAR, BOAT, MOTOR, AND HOLDING FACILITY IN \$
- C6 - COST OF GASOLINE AND OIL PER LB. FISH IN \$/LB. FISH (TC6/Q)
- TC6 - COST OF GASOLINE AND OIL IN \$
- C7 - DEPRECIATION CHARGES FOR FISHING GEAR PER LB. FISH IN \$/LB. FISH (TC7/Q)
- TC7 - DEPRECIATION CHARGES FOR FISHING GEAR IN \$
- C8 - DEPRECIATION CHARGES FOR BOAT PER LB. FISH IN \$/LB. FISH (TC8/Q)
- TC8 - DEPRECIATION CHARGES FOR BOAT IN \$
- C9 - DEPRECIATION CHARGES FOR MOTOR PER LB. FISH IN \$/LB. FISH (TC9/Q)
- TC9 - DEPRECIATION CHARGE FOR MOTOR IN \$
- C10 - DEPRECIATION CHARGES FOR HOLDING FACILITY PER LB. FISH IN \$/LB. FISH (TC10/Q)
- TC10 - DEPRECIATION CHARGES FOR HOLDING FACILITY IN \$
- C11 - LICENCE COST PER LB. FISH IN \$/LB. FISH (TC11/Q)
- TC11 - LICENCE COST IN \$

QUANTITY PRODUCED(Q)= 20000 PRICE PER LB(P)=0.050 REVENUE(P*Q)= 1000.00

| C1 (TC1) | C2 (TC2) | C3 (TC3) | C4 (TC4) | C5 (TC5) | C6 (TC6) | C7 (TC7) | C8 (TC8) | C9 (TC9) | C10 (TC10) | C11 (TC11) | NET EARNINGS | NET EARNINGS (PER LB) | |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------------|-----------------|--------------------------|---------|
| .01 | .01 | .010 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -385.00 | -0.0192 |
| (200) | (200) | (200) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -485.00 | -0.0242 |
| .01 | .01 | .015 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -385.00 | -0.0242 |
| (200) | (200) | (300) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -485.00 | -0.0242 |
| .01 | .01 | .020 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -385.00 | -0.0292 |
| (200) | (200) | (400) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -485.00 | -0.0292 |
| .01 | .01 | .025 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -385.00 | -0.0342 |
| (200) | (200) | (500) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -485.00 | -0.0342 |
| .01 | .01 | .030 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -385.00 | -0.0392 |
| (200) | (200) | (600) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -485.00 | -0.0392 |

QUANTITY PRODUCED(Q)= 20000 PRICE PER LB(P)=0.055 REVENUE(P*Q)= 1100.00

| C1 (TC1) | C2 (TC2) | C3 (TC3) | C4 (TC4) | C5 (TC5) | C6 (TC6) | C7 (TC7) | C8 (TC8) | C9 (TC9) | C10 (TC10) | C11 (TC11) | NET EARNINGS | NET EARNINGS (PER LB) | |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------------|-----------------|--------------------------|---------|
| .01 | .01 | .010 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -285.00 | -0.0142 |
| (200) | (200) | (200) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -385.00 | -0.0192 |
| .01 | .01 | .015 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -385.00 | -0.0192 |
| (200) | (200) | (300) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -385.00 | -0.0192 |
| .01 | .01 | .020 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -385.00 | -0.0242 |
| (200) | (200) | (400) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -385.00 | -0.0242 |
| .01 | .01 | .025 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -385.00 | -0.0292 |
| (200) | (200) | (500) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -385.00 | -0.0292 |
| .01 | .01 | .030 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -385.00 | -0.0342 |
| (200) | (200) | (600) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -385.00 | -0.0342 |

QUANTITY PRODUCED(Q)= 20000 PRICE PER LB(P)=0.060 REVENUE(P*Q)= 1200.00

| C1 (TC1) | C2 (TC2) | C3 (TC3) | C4 (TC4) | C5 (TC5) | C6 (TC6) | C7 (TC7) | C8 (TC8) | C9 (TC9) | C10 (TC10) | C11 (TC11) | NET EARNINGS | NET EARNINGS (PER LB) | |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------------|-----------------|--------------------------|---------|
| .01 | .01 | .010 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -185.00 | -0.0092 |
| (200) | (200) | (200) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -285.00 | -0.0142 |
| .01 | .01 | .015 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -185.00 | -0.0142 |
| (200) | (200) | (300) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -285.00 | -0.0142 |
| .01 | .01 | .020 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -185.00 | -0.0192 |
| (200) | (200) | (400) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -285.00 | -0.0192 |
| .01 | .01 | .025 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -185.00 | -0.0242 |
| (200) | (200) | (500) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -285.00 | -0.0242 |
| .01 | .01 | .030 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -185.00 | -0.0292 |
| (200) | (200) | (600) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -285.00 | -0.0292 |

QUANTITY PRODUCED(Q)= 20000 PRICE PER LB(P)=0.065 REVENUE(P*Q)= 1300.00

| C1 (TC1) | C2 (TC2) | C3 (TC3) | C4 (TC4) | C5 (TC5) | C6 (TC6) | C7 (TC7) | C8 (TC8) | C9 (TC9) | C10 (TC10) | C11 (TC11) | NET EARNINGS | NET EARNINGS (PER LB) | |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------------|-----------------|--------------------------|---------|
| .01 | .01 | .010 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -85.00 | -0.0042 |
| (200) | (200) | (200) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -185.00 | -0.0092 |
| .01 | .01 | .015 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -85.00 | -0.0042 |
| (200) | (200) | (300) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -185.00 | -0.0092 |
| .01 | .01 | .020 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -85.00 | -0.0142 |
| (200) | (200) | (400) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -185.00 | -0.0142 |
| .01 | .01 | .025 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -85.00 | -0.0192 |
| (200) | (200) | (500) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -185.00 | -0.0192 |
| .01 | .01 | .030 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | (0) | -85.00 | -0.0242 |
| (200) | (200) | (600) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | (0) | -185.00 | -0.0242 |

| QUANTITY PRODUCED(Q)= 20000 | | | | | | | | | | | PRICE PER LB(P)=0.070 | | REVENUE(P*Q)= 1400.00 | |
|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------------|-----------------------|--------------------------|-----------------------|--|
| C1 (TC1) | C2 (TC2) | C3 (TC3) | C4 (TC4) | C5 (TC5) | C6 (TC6) | C7 (TC7) | C8 (TC8) | C9 (TC9) | C10 (TC10) | C11 (TC11) | NET EARNINGS | NET EARNINGS (PER LB) | | |
| .01 | .01 | .010 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | 15.00 | 0.0008 | | |
| (200) | (200) | (200) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | 15.00 | 0.0008 | | |
| .01 | .01 | .015 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | -85.00 | -0.0042 | | |
| (200) | (200) | (300) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | -85.00 | -0.0042 | | |
| .01 | .01 | .020 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | -185.00 | -0.0092 | | |
| (200) | (200) | (400) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | -185.00 | -0.0092 | | |
| .01 | .01 | .025 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | -285.00 | -0.0142 | | |
| (200) | (200) | (500) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | -285.00 | -0.0142 | | |
| .01 | .01 | .030 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | -385.00 | -0.0192 | | |
| (200) | (200) | (600) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | -385.00 | -0.0192 | | |

| QUANTITY PRODUCED(Q)= 20000 | | | | | | | | | | | PRICE PER LB(P)=0.080 | | REVENUE(P*Q)= 1600.00 | |
|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------------|-----------------------|--------------------------|-----------------------|--|
| C1 (TC1) | C2 (TC2) | C3 (TC3) | C4 (TC4) | C5 (TC5) | C6 (TC6) | C7 (TC7) | C8 (TC8) | C9 (TC9) | C10 (TC10) | C11 (TC11) | NET EARNINGS | NET EARNINGS (PER LB) | | |
| .01 | .01 | .010 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | 215.00 | 0.0108 | | |
| (200) | (200) | (200) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | 215.00 | 0.0108 | | |
| .01 | .01 | .015 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | 115.00 | 0.0058 | | |
| (200) | (200) | (300) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | 115.00 | 0.0058 | | |
| .01 | .01 | .020 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | 15.00 | 0.0008 | | |
| (200) | (200) | (400) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | 15.00 | 0.0008 | | |
| .01 | .01 | .025 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | -85.00 | -0.0042 | | |
| (200) | (200) | (500) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | -85.00 | -0.0042 | | |
| .01 | .01 | .030 | .0250 | .00200 | .00150 | .0080 | .00060 | .00215 | 0 | 0 | -185.00 | -0.0092 | | |
| (200) | (200) | (600) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | -185.00 | -0.0092 | | |

ENVIRONMENT CANADA CENTRAL REGION ECONOMICS BRANCH
 ENVIRONMENTAL ANALYSIS SERVICE
 EAS.SYSPROG.ECO.FISH42 ROUGH FISH HARVEST
 ECONOMIC FEASIBILITY 1972

- P - PRICE OF FISH IN \$/LB., F.O.B. TRANSCONA
- Q - QUANTITY OF FISH IN LBS.
- C1 - COST OF ICE PER LB. FISH IN \$/LB. FISH
- TC1 - COST OF ICE (C1*Q)
- C2 - COST OF BOXES PER LB. FISH IN \$/LB. FISH
- TC2 - COST OF BOXES (C2*Q)
- C3 - COST OF TRANSPORT PER LB. FISH IN \$/LB. FISH
- TC3 - COST OF TRANSPORT (C3*Q)
- C4 - COST OF LABOUR EMPLOYED PER LB. FISH IN \$/LB. FISH (TC4/Q)
- TC4 - COST OF LABOUR EMPLOYED IN \$
- C5 - COST OF MAINTENANCE OF FISHING GEAR, BOAT, MOTOR,
AND HOLDING FACILITY PER LB. FISH IN \$/LB. FISH (TC5/Q)
- TC5 - COST OF MAINTENANCE OF FISHING GEAR, BOAT, MOTOR, AND HOLDING FACILITY IN \$
- C6 - COST OF GASOLINE AND OIL PER LB. FISH IN \$/LB. FISH (TC6/Q)
- TC6 - COST OF GASOLINE AND OIL IN \$
- C7 - DEPRECIATION CHARGES FOR FISHING GEAR PER LB. FISH IN \$/LB. FISH (TC7/Q)
- TC7 - DEPRECIATION CHARGES FOR FISHING GEAR IN \$
- C8 - DEPRECIATION CHARGES FOR BOAT PER LB. FISH IN \$/LB. FISH (TC8/Q)
- TC8 - DEPRECIATION CHARGES FOR BOAT IN \$
- C9 - DEPRECIATION CHARGES FOR MOTOR PER LB. FISH IN \$/LB. FISH (TC9/Q)
- TC9 - DEPRECIATION CHARGES FOR MOTOR IN \$
- C10 - DEPRECIATION CHARGES FOR HOLDING FACILITY PER LB. FISH IN \$/LB. FISH (TC10/Q)
- TC10 - DEPRECIATION CHARGES FOR HOLDING FACILITY IN \$
- C11 - LICENCE COST PER LB. FISH IN \$/LB. FISH (TC11/Q)
- TC11 - LICENCE COST IN \$

QUANTITY PRODUCED(Q)= 50000 PRICE PER LB(P)=0.050 REVENUE(P*Q)= 2500.00

| C1 (TC1) | C2 (TC2) | C3 (TC3) | C4 (TC4) | C5 (TC5) | C6 (TC6) | C7 (TC7) | C8 (TC8) | C9 (TC9) | C10 (TC10) | C11 (TC11) | NET EARNINGS | NET EARNINGS (PER LB) |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------------|-----------------|--------------------------|
| .01 | .01 | .010 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | 215.00 | 0.0043 |
| (500) | (500) | (500) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |
| .01 | .01 | .015 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | -35.00 | -0.0007 |
| (500) | (500) | (750) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |
| .01 | .01 | .020 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | -285.00 | -0.0057 |
| (500) | (500) | (1000) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |
| .01 | .01 | .025 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | -535.00 | -0.0107 |
| (500) | (500) | (1250) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |
| .01 | .01 | .030 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | -785.00 | -0.0157 |
| (500) | (500) | (1500) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |

QUANTITY PRODUCED(Q)= 50000 PRICE PER LB(P)=0.055 REVENUE(P*Q)= 2750.00

| C1 (TC1) | C2 (TC2) | C3 (TC3) | C4 (TC4) | C5 (TC5) | C6 (TC6) | C7 (TC7) | C8 (TC8) | C9 (TC9) | C10 (TC10) | C11 (TC11) | NET EARNINGS | NET EARNINGS (PER LB) |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------------|-----------------|--------------------------|
| .01 | .01 | .010 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | 465.00 | 0.0093 |
| (500) | (500) | (500) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |
| .01 | .01 | .015 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | 215.00 | 0.0043 |
| (500) | (500) | (750) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |
| .01 | .01 | .020 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | -35.00 | -0.0007 |
| (500) | (500) | (1000) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |
| .01 | .01 | .025 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | -285.00 | -0.0057 |
| (500) | (500) | (1250) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |
| .01 | .01 | .030 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | -535.00 | -0.0107 |
| (500) | (500) | (1500) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |

QUANTITY PRODUCED(Q)= 50000 PRICE PER LB(P)=0.060 REVENUE(P*Q)= 3000.00

| C1 (TC1) | C2 (TC2) | C3 (TC3) | C4 (TC4) | C5 (TC5) | C6 (TC6) | C7 (TC7) | C8 (TC8) | C9 (TC9) | C10 (TC10) | C11 (TC11) | NET EARNINGS | NET EARNINGS (PER LB) |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------------|-----------------|--------------------------|
| .01 | .01 | .010 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | 715.00 | 0.0143 |
| (500) | (500) | (500) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |
| .01 | .01 | .015 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | 465.00 | 0.0093 |
| (500) | (500) | (750) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |
| .01 | .01 | .020 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | 215.00 | 0.0043 |
| (500) | (500) | (1000) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |
| .01 | .01 | .025 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | -35.00 | -0.0007 |
| (500) | (500) | (1250) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |
| .01 | .01 | .030 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | -285.00 | -0.0057 |
| (500) | (500) | (1500) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |

QUANTITY PRODUCED(Q)= 50000 PRICE PER LB(P)=0.065 REVENUE(P*Q)= 3250.00

| C1 (TC1) | C2 (TC2) | C3 (TC3) | C4 (TC4) | C5 (TC5) | C6 (TC6) | C7 (TC7) | C8 (TC8) | C9 (TC9) | C10 (TC10) | C11 (TC11) | NET EARNINGS | NET EARNINGS (PER LB) |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------------|-----------------|--------------------------|
| .01 | .01 | .010 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | 965.00 | 0.0193 |
| (500) | (500) | (500) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |
| .01 | .01 | .015 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | 715.00 | 0.0143 |
| (500) | (500) | (750) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |
| .01 | .01 | .020 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | 465.00 | 0.0093 |
| (500) | (500) | (1000) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |
| .01 | .01 | .025 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | 215.00 | 0.0043 |
| (500) | (500) | (1250) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |
| .01 | .01 | .030 | .0100 | .00080 | .00060 | .0032 | .00024 | .00086 | 0 | 0 | -35.00 | -0.0007 |
| (500) | (500) | (1500) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | |

| QUANTITY PRODUCED(Q)= 50000 | | | | | | | | | | | PRICE PER LB(P)=0.070 | | REVENUE(P*Q)= 3500.00 | |
|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------------|-----------------------|--------------------------|-----------------------|--|
| C1 (TC1) | C2 (TC2) | C3 (TC3) | C4 (TC4) | C5 (TC5) | C6 (TC6) | C7 (TC7) | C8 (TC8) | C9 (TC9) | C10 (TC10) | C11 (TC11) | NET EARNINGS | NET EARNINGS (PER LB) | | |
| .01 | .01 | .010 | .0100 | .00080 | .00060 | .0032 | -.00024 | .00086 | 0 | 0 | 1215.00 | 0.0243 | | |
| (500) | (500) | (500) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .015 | .0100 | .00080 | .00060 | .0032 | -.00024 | .00086 | 0 | 0 | 965.00 | 0.0193 | | |
| (500) | (500) | (750) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .020 | .0100 | .00080 | .00060 | .0032 | -.00024 | .00086 | 0 | 0 | 715.00 | 0.0143 | | |
| (500) | (500) | (1000) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .025 | .0100 | .00080 | .00060 | .0032 | -.00024 | .00086 | 0 | 0 | 465.00 | 0.0093 | | |
| (500) | (500) | (1250) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .030 | .0100 | .00080 | .00060 | .0032 | -.00024 | .00086 | 0 | 0 | 215.00 | 0.0043 | | |
| (500) | (500) | (1500) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |

| QUANTITY PRODUCED(Q)= 50000 | | | | | | | | | | | PRICE PER LB(P)=0.080 | | REVENUE(P*Q)= 4000.00 | |
|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------------|-----------------------|--------------------------|-----------------------|--|
| C1 (TC1) | C2 (TC2) | C3 (TC3) | C4 (TC4) | C5 (TC5) | C6 (TC6) | C7 (TC7) | C8 (TC8) | C9 (TC9) | C10 (TC10) | C11 (TC11) | NET EARNINGS | NET EARNINGS (PER LB) | | |
| .01 | .01 | .010 | .0100 | .00080 | .00060 | .0032 | -.00024 | .00086 | 0 | 0 | 1715.00 | 0.0343 | | |
| (500) | (500) | (500) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .015 | .0100 | .00080 | .00060 | .0032 | -.00024 | .00086 | 0 | 0 | 1465.00 | 0.0293 | | |
| (500) | (500) | (750) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .020 | .0100 | .00080 | .00060 | .0032 | -.00024 | .00086 | 0 | 0 | 1215.00 | 0.0243 | | |
| (500) | (500) | (1000) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .025 | .0100 | .00080 | .00060 | .0032 | -.00024 | .00086 | 0 | 0 | 965.00 | 0.0193 | | |
| (500) | (500) | (1250) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .030 | .0100 | .00080 | .00060 | .0032 | -.00024 | .00086 | 0 | 0 | 715.00 | 0.0143 | | |
| (500) | (500) | (1500) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |

- P - PRICE OF FISH IN \$/LB., F.O.B. TRANSCONA
- Q - QUANTITY OF FISH IN LBS.
- C1 - COST OF ICE PER LB. FISH IN \$/LB. FISH
- TC1 - COST OF ICE (C1*Q)
- C2 - COST OF BOXES PER LB. FISH IN \$/LB. FISH
- TC2 - COST OF BOXES (C2*Q)
- C3 - COST OF TRANSPORT PER LB. FISH IN \$/LB. FISH
- TC3 - COST OF TRANSPORT (C3*Q)
- C4 - COST OF LABOUR EMPLOYED PER LB. FISH IN \$/LB. FISH (TC4/Q)
- TC4 - COST OF LABOUR EMPLOYED IN \$
- C5 - COST OF MAINTENANCE OF FISHING GEAR, BOAT, MOTOR,
AND HOLDING FACILITY PER LB. FISH IN \$/LB. FISH (TC5/Q)
- TC5 - COST OF MAINTENANCE OF FISHING GEAR, BOAT, MOTOR, AND HOLDING FACILITY IN \$
- C6 - COST OF GASOLINE AND OIL PER LB. FISH IN \$/LB. FISH (TC6/Q)
- TC6 - COST OF GASOLINE AND OIL IN \$
- C7 - DEPRECIATION CHARGES FOR FISHING GEAR PER LB. FISH IN \$/LB. FISH (TC7/Q)
- TC7 - DEPRECIATION CHARGES FOR FISHING GEAR IN \$
- C8 - DEPRECIATION CHARGES FOR BOAT PER LB. FISH IN \$/LB. FISH (TC8/Q)
- TC8 - DEPRECIATION CHARGES FOR BOAT IN \$
- C9 - DEPRECIATION CHARGES FOR MOTOR PER LB. FISH IN \$/LB. FISH (TC9/Q)
- TC9 - DEPRECIATION CHARGE FOR MOTOR IN \$
- C10 - DEPRECIATION CHARGES FOR HOLDING FACILITY PER LB. FISH IN \$/LB. FISH (TC10/Q)
- TC10 - DEPRECIATION CHARGES FOR HOLDING FACILITY IN \$
- C11 - LICENCE COST PER LB. FISH IN \$/LB. FISH (TC11/Q)
- TC11 - LICENCE COST IN \$

| QUANTITY PRODUCED(Q)= 70000 | | | | | | | | | | | PRICE PER LB(P)=0.050 | | REVENUE(P*Q)= 3500.00 | |
|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------------|-----------------------|--------------------------|-----------------------|--|
| C1 (TC1) | C2 (TC2) | C3 (TC3) | C4 (TC4) | C5 (TC5) | C6 (TC6) | C7 (TC7) | C8 (TC8) | C9 (TC9) | C10 (TC10) | C11 (TC11) | NET EARNINGS | NET EARNINGS (PER LB) | | |
| .01 | .01 | .010 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | 615.00 | 0.0088 | | |
| (700) | (700) | (700) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .015 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | 265.00 | 0.0038 | | |
| (700) | (700) | (1050) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .020 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | -85.00 | -0.0012 | | |
| (700) | (700) | (1400) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .025 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | -435.00 | -0.0062 | | |
| (700) | (700) | (1750) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .030 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | -785.00 | -0.0112 | | |
| (700) | (700) | (2100) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |

| QUANTITY PRODUCED(Q)= 70000 | | | | | | | | | | | PRICE PER LB(P)=0.055 | | REVENUE(P*Q)= 3850.00 | |
|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------------|-----------------------|--------------------------|-----------------------|--|
| C1 (TC1) | C2 (TC2) | C3 (TC3) | C4 (TC4) | C5 (TC5) | C6 (TC6) | C7 (TC7) | C8 (TC8) | C9 (TC9) | C10 (TC10) | C11 (TC11) | NET EARNINGS | NET EARNINGS (PER LB) | | |
| .01 | .01 | .010 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | 965.00 | 0.0130 | | |
| (700) | (700) | (700) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .015 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | 615.00 | 0.0088 | | |
| (700) | (700) | (1050) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .020 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | 265.00 | 0.0038 | | |
| (700) | (700) | (1400) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .025 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | -85.00 | -0.0012 | | |
| (700) | (700) | (1750) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .030 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | -435.00 | -0.0062 | | |
| (700) | (700) | (2100) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |

| QUANTITY PRODUCED(Q)= 70000 | | | | | | | | | | | PRICE PER LB(P)=0.060 | | REVENUE(P*Q)= 4200.00 | |
|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------------|-----------------------|--------------------------|-----------------------|--|
| C1 (TC1) | C2 (TC2) | C3 (TC3) | C4 (TC4) | C5 (TC5) | C6 (TC6) | C7 (TC7) | C8 (TC8) | C9 (TC9) | C10 (TC10) | C11 (TC11) | NET EARNINGS | NET EARNINGS (PER LB) | | |
| .01 | .01 | .010 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | 1315.00 | 0.0188 | | |
| (700) | (700) | (700) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .015 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | 965.00 | 0.0130 | | |
| (700) | (700) | (1050) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .020 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | 615.00 | 0.0088 | | |
| (700) | (700) | (1400) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .025 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | 265.00 | 0.0038 | | |
| (700) | (700) | (1750) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .030 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | -85.00 | -0.0012 | | |
| (700) | (700) | (2100) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |

| QUANTITY PRODUCED(Q)= 70000 | | | | | | | | | | | PRICE PER LB(P)=0.065 | | REVENUE(P*Q)= 4550.00 | |
|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------------|-----------------------|--------------------------|-----------------------|--|
| C1 (TC1) | C2 (TC2) | C3 (TC3) | C4 (TC4) | C5 (TC5) | C6 (TC6) | C7 (TC7) | C8 (TC8) | C9 (TC9) | C10 (TC10) | C11 (TC11) | NET EARNINGS | NET EARNINGS (PER LB) | | |
| .01 | .01 | .010 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | 1665.00 | 0.0238 | | |
| (700) | (700) | (700) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .015 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | 1315.00 | 0.0188 | | |
| (700) | (700) | (1050) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .020 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | 965.00 | 0.0130 | | |
| (700) | (700) | (1400) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .025 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | 615.00 | 0.0088 | | |
| (700) | (700) | (1750) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |
| .01 | .01 | .030 | .0071 | .00057 | .00043 | .0023 | .00017 | .00061 | 0 | 0 | 265.00 | 0.0038 | | |
| (700) | (700) | (2100) | (500) | (40) | (30) | (160) | (12) | (43) | (0) | (0) | | | | |

| QUANTITY PRODUCED(Q)= 70000 | | | | | | | | | | | PRICE PER LB(P)=0.070 | | REVENUE(P*Q)= 4900.00 | |
|-----------------------------|--------------|----------------|----------------|-----------------|-----------------|----------------|-----------------|-----------------|---------------|---------------|-----------------------|--------------------------|-----------------------|--|
| C1 (TC1) | C2 (TC2) | C3 (TC3) | C4 (TC4) | C5 (TC5) | C6 (TC6) | C7 (TC7) | C8 (TC8) | C9 (TC9) | C10 (TC10) | C11 (TC11) | NET EARNINGS | NET EARNINGS (PER LB) | | |
| .01 (700) | .01 (700) | .010 (700) | .0071 (500) | .00057 (40) | .00043 (30) | .0023 (160) | .00017 (12) | .00061 (43) | 0 (0) | 0 (0) | 2015.00 | 0.0288 | | |
| .01 (700) | .01 (700) | .015 (1050) | .0071 (500) | .00057 (40) | .00043 (30) | .0023 (160) | .00017 (12) | .00061 (43) | 0 (0) | 0 (0) | 1665.00 | 0.0238 | | |
| .01 (700) | .01 (700) | .020 (1400) | .0071 (500) | .00057 (40) | .00043 (30) | .0023 (160) | .00017 (12) | .00061 (43) | 0 (0) | 0 (0) | 1315.00 | 0.0188 | | |
| .01 (700) | .01 (700) | .025 (1750) | .0071 (500) | .00057 (40) | .00043 (30) | .0023 (160) | .00017 (12) | .00061 (43) | 0 (0) | 0 (0) | 965.00 | 0.0138 | | |
| .01 (700) | .01 (700) | .030 (2100) | .0071 (500) | .00057 (40) | .00043 (30) | .0023 (160) | .00017 (12) | .00061 (43) | 0 (0) | 0 (0) | 615.00 | 0.0088 | | |

| QUANTITY PRODUCED(Q)= 70000 | | | | | | | | | | | PRICE PER LB(P)=0.080 | | REVENUE(P*Q)= 5600.00 | |
|-----------------------------|--------------|----------------|----------------|-----------------|-----------------|----------------|-----------------|-----------------|---------------|---------------|-----------------------|--------------------------|-----------------------|--|
| C1 (TC1) | C2 (TC2) | C3 (TC3) | C4 (TC4) | C5 (TC5) | C6 (TC6) | C7 (TC7) | C8 (TC8) | C9 (TC9) | C10 (TC10) | C11 (TC11) | NET EARNINGS | NET EARNINGS (PER LB) | | |
| .01 (700) | .01 (700) | .010 (700) | .0071 (500) | .00057 (40) | .00043 (30) | .0023 (160) | .00017 (12) | .00061 (43) | 0 (0) | 0 (0) | 2715.00 | 0.0388 | | |
| .01 (700) | .01 (700) | .015 (1050) | .0071 (500) | .00057 (40) | .00043 (30) | .0023 (160) | .00017 (12) | .00061 (43) | 0 (0) | 0 (0) | 2365.00 | 0.0338 | | |
| .01 (700) | .01 (700) | .020 (1400) | .0071 (500) | .00057 (40) | .00043 (30) | .0023 (160) | .00017 (12) | .00061 (43) | 0 (0) | 0 (0) | 2015.00 | 0.0288 | | |
| .01 (700) | .01 (700) | .025 (1750) | .0071 (500) | .00057 (40) | .00043 (30) | .0023 (160) | .00017 (12) | .00061 (43) | 0 (0) | 0 (0) | 1665.00 | 0.0238 | | |
| .01 (700) | .01 (700) | .030 (2100) | .0071 (500) | .00057 (40) | .00043 (30) | .0023 (160) | .00017 (12) | .00061 (43) | 0 (0) | 0 (0) | 1315.00 | 0.0188 | | |

```

1   PROFIT: PROC OPTIONS(MAIN);
2   DCL LST1 CHAR(58) INIT('***ENVIRONMENT CANADA*** CENTRAL REGION ECO
    NOMICS BRANCH') UNAL,LST2 CHAR(30) INIT ('ENVIRO
    NMENTAL ANALYSIS SERVICE') UNAL,
    LST3 CHAR(43) INIT('EAS.SYSPROO.ECO.FISH42 ROUGH FISH HARVEST
    ') UNAL,LST4 CHAR(25) INIT('ECONOMIC FEASIBILITY 1972') UNAL;
3   DCL (FC1,FC2,FC4,FC5, FC6,FC7,FC8,FC9,FC10,FC11) BIN
    FLOAT UNAL;
4   DCL (NP,NO,NC3) BIN FIXED UNAL, (TOT1,TOT2,SMCST,DSUM,PROF1,
    PROF2,TOT3,TOT4) BIN FLOAT UNAL;
5   DCL REV BIN FLOAT UNAL;
6   DCL (TC1,TC2,TC3,TC4,TC6,TC8,TC9,TC10,TC5,TC7,TC11) BIN FLOAT UNAL;
7   OPEN FILE(SYSPRINT) PAGESIZE(66);
8   GET FILE(SYSIN) EDIT(FC1,FC2,TC4,TC5, TC6,TC7,TC8,TC9,TC10,
    TC11)((3)F(4,0),(7)F(6,0));
9   FC1=FC1/100.1 FC2=FC2/100.1
11  GET FILE(SYSIN) EDIT(NP,NO,NC3)((SKIP,(3)F(4,0)))
12  TOT1=FC1+FC2;
13  TOT2=TC4+TC5+TC6+TC7+TC8+TC9+TC10+TC11;
14  BEGIN; DCL (QNT(NQ),PRC(NP),CST(NC3)) BIN FLOAT UNAL,(I,J,K)
    BIN FIXED UNAL,QUAN BIN FLOAT UNAL;
16  GET FILE(SYSIN) EDIT((QNT(I) DO I=1 TO NQ),
    (PRC(J) DO J=1 TO NP),(CST(K) DO K=1 TO NC3))((SKIP,(NO)F(6,0),
    SKIP,(NP)F(4,0),SKIP,(NC3)F(4,0));
17  DO J=1 TO NP; PRC(J)=PRC(J)/1000.; END;
20  DO K=1 TO NC3; CST(K)=CST(K)/1000.; END;
23  DO I=1 TO NQ; QUAN=QNT(I);
25  PUT FILE(SYSPRINT) EDIT(LST1,LST2,LST3,LST4)((PAGE,(3)SKIP,
    X(31),A,SKIP,X(45),A,SKIP,X(40),A,SKIP,X(47),A));
26  PUT FILE(SYSPRINT) EDIT('PAGE ',I) (X(41),A,F(2,0));
27  PUT FILE(SYSPRINT) EDIT(' ')((4)SKIP,A);
28  PUT FILE(SYSPRINT) EDIT('P - PRICE OF FISH IN $/LB., F.O.B. TRANSCO
    NA',Q - QUANTITY OF FISH IN LBS., 'C1 - COST OF ICE PER LB. FISH IN
    $/LB. FISH', 'TC1 - COST OF ICE (C1*Q)', 'C2 - COST OF BOXES PER LB. FI
    SH IN $/LB. FISH', 'TC2 - COST OF BOXES (C2*Q)',
    'C3 - COST OF TRANSPORT PER LB. FISH IN $/LB. FISH', 'TC3 - COST OF TR
    ANSPORT (C3*Q)', 'C4 - COST OF LABOUR EMPLOYED PER LB. FISH IN $/LB. F
    ISH (TC4/Q)', 'TC4 - COST OF LABOUR EMPLOYED IN $', 'C5 - COST OF MAINT
    ENANCE OF FISHING GEAR, BOAT, MOTOR,', 'AND HOLDING FACILITY PER LB. FIS
    H IN $/LB. FISH (TC5/Q)', 'TC5 - COST OF MAINTENANCE OF FISHING GEAR,
    BOAT, MOTOR, AND HOLDING FACILITY IN $', 'C6 - COST OF GASOLINE AND OI
    L PER LB. FISH IN $/LB. FISH (TC6/Q)', 'TC6 - COST OF GASOLINE AND OIL
    IN $', 'C7 - DEPRECIATION CHARGES FOR FISHING GEAR PER LB. FISH IN $/LB
    . FISH (TC7/Q)', 'TC7 - DEPRECIATION CHARGES FOR FISHING GEAR IN $',
    'C8 - DEPRECIATION CHARGES FOR BOAT PER LB. FISH IN $/LB. FISH (TC8/
    Q)', 'TC8 - DEPRECIATION CHARGES FOR BOAT IN $', 'C9 - DEPRECIATION
    CHARGES FOR MOTOR PER LB. FISH IN $/LB. FISH (TC9/Q)', 'TC9 - DEPRECIAT
    ION CHARGE FOR MOTOR IN $', 'C10 - DEPRECIATION CHARGES FOR HOLDING FACI
    LITY PER LB. FISH IN $/LB. FISH (TC10/Q)', 'TC10 - DEPRECIATION CHARGES
    FOR HOLDING FACILITY IN $', 'C11 - LICENCE COST PER LB.
    FISH IN $/LB. FISH (TC11/Q)', 'TC11 - LICENCE COST IN $')((3)SKIP,
    (11)SKIP,X(20),A,SKIP,X(26),A,(13)SKIP,X(20),A));
29  TOT3=TOT1*QUAN; DSUM=TOT1+TOT2;
31  DO J=1 TO NP; REV=QUAN*PRC(J);
33  PUT FILE(SYSPRINT) SKIP;
34  PUT FILE(SYSPRINT) EDIT('QUANTITY PRODUCED(Q)',QUAN,'PRICE PER LB(P)
    ',PRC(J),'REVENUE(P*Q)',REV)(( (4)SKIP,X(17),A,F(6,0),X(8),
    A,F(5,3),X(8),A,F(8,2));
35  PUT FILE(SYSPRINT) EDIT('C1','C2','C3','C4','C5','C6','C7','C8','C9',
    'C10','C11','NET ',NET EARNINGS', '(TC1)', '(TC2)', '(TC3)', '(TC4)',
    '(TC5)', '(TC6)', '(TC7)', '(TC8)', '(TC9)', '(TC10)', '(TC11)', 'EARNINGS',
    '(PER LB)')((2)SKIP,X(3),A,
    (10)X(7),A,X(3),A,X(2),A,SKIP,X(1),A,(10)X(4),A),X(1),A,X(3),A));
    PROFIT: PROC OPTIONS(MAIN); PAGE 3
36  PUT FILE(SYSPRINT) SKIP;
37  TC1=FC1*QUAN; TC2=FC2*QUAN; FC4=TC4/QUAN; FC5=TC5/QUAN;
41  FC6=TC6/QUAN; FC7=TC7/QUAN; FC8=TC8/QUAN; FC9=TC9/QUAN;FC10=TC10/QUAN;
46  FC11=TC11/QUAN;
47  DO K=1 TO NC3; TC3=CST(K)*QUAN; SMCST=DSUM+TC3;
50  PROF1=REV-SMCST; PROF2=PRC(J)-SMCST/QUAN;
52  PUT FILE(SYSPRINT) EDIT(FC1,FC2,CST(K),FC4,FC5,
    FC6,FC7,FC8,FC9,FC10,FC11)((SKIP,X(2),F(3,2),X(6),F(3,2),X(5),
    F(4,3),X(5),F(5,4),X(3),
    F(6,5),X(3),F(6,5),X(4),F(5,4), (2)X(3),F(6,5)),X(1),(2)X(4),
    F(4,0));
53  PUT FILE(SYSPRINT) EDIT('(','TC1,','(','TC2,','(','TC3,','
    ',('TC4,','(','TC5,','(','TC6,','(','TC7,','(','TC8,','
    ',('TC9,','(','TC10,','
    ',('TC11,','),PROF1,PROF2)((SKIP,X(1),(2)(A,F(3,0),A,X(4)),
    A, F(4,0),A, X(3),A, F(3,0),A, X(4),A, F(3,0),A,
    X(4),A, F(3,0),A, (2)X(4),A, F(3,0),A,
    X(4),A, F(3,0),A,(2)X(4),A,F(4,0),A), F(8,2),X(5),F(7,4));
54  END; END; END;
57  END;
58  PUT FILE(SYSPRINT) EDIT(' ')((6)SKIP,X(1),A));
59  END PROFIT;
    PROFIT: PROC OPTIONS(MAIN); PAGE 4
    STORAGE REQUIREMENTS.
    -----
    THE STORAGE AREA FOR THE PROCEDURE LABELLED PROFIT IS 504 BYTES LONG.
    THE STORAGE AREA FOR THE BEGIN BLOCK AT STATEMENT NO. 14 IS 1800 BYTES LONG.
    THE PROGRAM CSECT IS NAMED PROFIT AND IS 7184 BYTES LONG.
    THE STATIC CSECT IS NAMED *PROFITA AND IS 2666 BYTES LONG.
    *STATISTICS* SOURCE RECORDS = 85,PROG TEXT STMTS = 59,OBJECT BYTES = 7184
    PROFIT: PROC OPTIONS(MAIN); PAGE 5
    TABLE OF OFFSETS AND STATEMENT NUMBERS WITHIN PROCEDURE PROFIT
    OFFSET (HEX) 0000 0088 0092 014A 0156 0162 01CA 01D6 02F6 04C2 04D6 050A 051E 0532 0566 057A 0592 05B0 06BA 0710 0778
    STATEMENT NO 1 7 8 9 10 11 12 13 16 17 18 19 20 21 22 23 24 25 26 27 28
    OFFSET (HEX) 0BC6 0BD6 0BE2 0BF4 0C1A 0C2A 0D7E 1272 1282 1292 129E 12AA 12B6 12C2 12CE 12DA 12E6 12F2 12FE 1310 1336
    STATEMENT NO 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49
    OFFSET (HEX) 1342 134E 1376 1398 1B3E 1B56 1B6A 1B7E 1B84 1C0A
    STATEMENT NO 50 51 52 53 54 55 56 57 58 59
    NO ERRORS OR WARNINGS DETECTED.
    AUXILIARY STORAGE WILL NOT BE USED FOR DICTIONARY WHEN SIZE = 66K
    COMPILE TIME -12 MINS
    ELAPSED TIME .37 MINS
    OS/360 LOADER
    OPTIONS USED - PRINT,NOMAP,LET,CALL,RES,NOTERM,SIZE=88064,NAME=**00

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S.5.*

ACKNOWLEDGEMENTS

SECTION 5

ACKNOWLEDGEMENTS

The co-operation and informative commentary of individuals contracted by the Industrial Development Branch for the 1972 Rough Fish Harvesting Program is greatly appreciated. Advice received from J. B. Stern, Chief, Economics Branch and D. W. Hagborg, Head, Statistics Unit proved to be invaluable. Finally, I would like to thank systems analyst David Abrams for his efforts in preparing the linear program contained in this section of the report.

Methods and observations are those of the author; they are not necessarily those of the department.

Daniel Topolniski,
Economics Branch,
Central Region,
Fisheries Service.

A.A.*

APPENDIX A

PUBLIC SERVICE VEHICLE LICENSEES

APPENDIX A

Public Service Vehicle Licensees

Operating in Region of Study*

| <u>Company</u> | <u>Settlements Franchised to Serve</u> | <u>Commodities Franchised to Transport</u> |
|-------------------------------------|--|---|
| Alonsa | Amaranth District | Livestock Return Freight to Farmers |
| | Alonsa and District | General Freight Livestock Return Freight to Farmers Single Trip Loads |
| | Kinosota | Livestock Return Freight to Farmers |
| Ashern Freighters | Ashern | General Freight Return Freight to Farmers Livestock Petroleum Products |
| | Steep Rock | General Freight |
| Camperville Freighters | Camperville | General Freight Livestock Single Trip Loads/ General Freight |
| | Duck Bay | General Freight Livestock Single Trip Loads/ General Freight |
| Canadian National Transportation | St. Laurent | General Freight |
| | Oak Point | General Freight |
| | Lundar | General Freight |
| | St. Martin | General Freight |
| | Westbourne | General Freight |
| Canadian Pacific Transport Ltd. | Westbourne | General Freight |
| Dan's Transfer | Gimli | General Freight Livestock |
| | Husavick | General Freight |

| <u>Company</u> | <u>Settlements Franchised to Serve</u> | <u>Commodities Franchised to Transport</u> |
|--------------------------------------|--|--|
| Dan's Transfer (cont'd) | Sandy Hook | General Freight Livestock |
| | Wytewold | General Freight Livestock |
| | Matlock | General Freight Livestock Single Trip Loads/General Freight |
| | Netley | General Freight |
| Earnie's Transfer | Brokenhead River | |
| | Dencross | Livestock |
| | Ladywood | General Freight Livestock |
| | Lowland | General Freight Livestock |
| | Thalberg | |
| Gardewine & Sons Ltd. | St. Martin | General Freight Livestock Machinery |
| | Westbourne | General Freight Livestock |
| Goodbrandsons's Transfer Ltd. | Selkirk | General Freight Single Trip Loads/ General Freight |
| Fisher Branch-Hodgson Transport Ltd. | Koostatak | General Freight Livestock |
| | Broad Valley | General Freight Livestock |
| | Dallas | General Freight Livestock |
| | Jack Head | General Freight |
| | Kilkenny | General Freight Livestock |

| <u>Company</u> | <u>Settlements Franchised to Serve</u> | <u>Commodities Franchised to Transport</u> |
|---|--|--|
| Fisher Branch-Hodgson Transport Ltd. (cont'd) | Matheson Island | General Freight |
| | Zbaraz | General Freight Livestock |
| Gimli Transfer and Storage Ltd. | Gimli | General Freight Household Goods |
| | Husavick | General Freight |
| | Sandy Hook | General Freight |
| | Whytewold | General Freight |
| | Matlock | General Freight |
| Langruth Transfer | Amaranth | General Freight Single Trip Loads |
| | Langruth | General Freight Single Trip Loads Livestock |
| Lundar Transfer | St. Laurent | General Freight |
| | Oak Point | General Freight |
| | Lundar | General Freight |
| Oak Point Transfer | Oak Point | General Freight |
| | St. Laurent | General Freight |
| Parson's Transfer | Amaranth | General Freight Livestock Return Freight to Farmers Single Trip Loads |
| R.C. Owen Transport Co. | Brokenhead River District | Livestock Return Freight to Farmers |
| | Albert Beach | General Freight Livestock |
| | Amanda | General Freight Livestock |

| <u>Company</u> | <u>Settlements Franchised to Serve</u> | <u>Commodities Franchised to Transport</u> |
|----------------------------------|--|--|
| R.C. Owen Transport Co. (cont'd) | Beaconia | General Freight Livestock Single Trip Loads/ General Freight |
| | Bird River | General Freight Livestock |
| | Grand Marais | General Freight Single Trip Loads/ General Freight Livestock Return Freight to Farmers Fish Fisherman's Supplies |
| | Victoria Beach | General Freight Fish |
| Riverton Transfer | Riverton | General Freight Single Trip Loads |
| | Hnausa | General Freight Single Trip Loads |
| | Camp Morton | General Freight Livestock |
| St. Laurent Transfer | St. Laurent | General Freight |
| Steep Rock Transfer | Steep Rock | General Freight Livestock |
| Swan River-The Pas Transfer | Mafeking | General Freight Livestock |
| Veitch Transfer | Selkirk | General Freight Milk and Cream Petroleum Products Return Freight to Farmers Single Trip Loads |
| Winnipegosis Freighters | Winnipegosis | General Freight Livestock Machinery |

* Source: The M.T.A. Official SHIP BY TRUCK Directory,
1971-72 Edition, p. 11 - 15.

A.B.*

APPENDIX B

CONTRACT RATES - ROUGH FISH DELIVERY

APPENDIX B

CONTRACT RATES - ROUGH FISH DELIVERY

| <u>Company</u> | <u>Settlement</u> | <u>Total Volume</u> | <u>Rate (\$/100 lb. fish)</u> | |
|---|--------------------------------|-------------------------|--|---|
| Fisher Branch - Hodgson Transport | Koostatak | 1 - 10,000 lb. | 1.13 | |
| | | 10 - 20,000 | 0.85 | |
| | | over 20,000 | 0.70 | |
| | | | <i>boxes on return - no charge</i> | |
| Winnipegosis - Camperville Freighters | Winnipegosis | | 1.50 | |
| St. Laurent Transfer | St. Laurent | | 0.83 | |
| | | | <i>boxes on return - 10¢</i> | |
| Swan River - The Pas | Mafeking Dawson Bay | | 1.75 | |
| | | Animal food | 1.25 | |
| | | Refrigerated service | 2.00 | |
| | | | <i>boxes on return - 30¢</i> | |
| Riverton Transfer | Matheson Island Riverton | | 1.25 | |
| | | | <i>boxes on return - 12¢</i> | |
| | | | 0.65 | |
| | | | <i>boxes on return - 08¢</i> | |
| Steep Rock Transfer | Steep Rock | | 0.95 | |
| | | | <i>boxes on return - 10¢</i> | |
| R.C. Owen Transport | Grand Beach | 1 - 1,000 lb. | 1.01 | |
| | | 1,000 - 2,000 | 0.97 | |
| | | 2,000 - 20,000 | 0.92 | |
| | | | | <i>boxes on return - \$/100 lb. boxes</i> |
| | | 1 - 1,000 lb. | 0.71 | |
| | | 1,000 - 2,000 | 0.68 | |
| | | 2,000 - 20,000 | 0.65 | |
| | Victoria Beach | Victoria Beach | 1 - 1,000 lb. | 1.10 |
| | | | 1,000 - 2,000 | 1.06 |
| 2,000 - 20,000 | | | 1.01 | |
| | | | <i>boxes on return - \$/100 lb. boxes.</i> | |

| <u>Company</u> | <u>Settlement</u> | <u>Total Volume</u> | <u>Rate (\$/100 lb. fish)</u> |
|-----------------------------------|-------------------|---------------------|-------------------------------------|
| R. C. Owen Transport cont'd | Victoria | 1 - 1,000 lb. | 0.77 |
| | Beach | 1,000 - 2,000 | 0.74 |
| | | 2,000 - 20,000 | 0.70 |
| Veitch Truck Lines | Selkirk | 1 - 1,000 lb. | 0.60 |
| | | 1,000 - 2,000 | 0.58 |
| | | 2,000 - 20,000 | 0.55 |
| | | | <i>boxes on return - no charge</i> |
| Parson's Transfer | Amaranth | | 0.70 |
| | | | <i>boxes on return - 10¢</i> |
| Ashern Freighters | Ashern | | 0.75 |
| | | | <i>boxes on return - 10¢</i> |
| | | | <i>animal food in bags</i> 0.50 |

A.C.*

APPENDIX C

CORRESPONDENCE AND RATES



July 5, 1972

File: DE. 1954

Mr. D. Topolniski
Economics Branch
Central Region, Fisheries Service
114 Garry Street
Winnipeg, Manitoba R3C 1G1

Dear Mr. Topolniski:

Thank you for your letter of June 28 to our Mr. R.M. Follett regarding a request for quotations on the transportation of rough fish from the Gimli area to Winnipeg.

The only rail cars which are suitable for this type of service are mechanical refrigerator cars which are subject to the following rates:

In Cents Per 100 lbs.

| | | | |
|-------------------|-------------|-------------------|-------------|
| Riverton to Wpg. | - 1.04 | Gimli to Wpg. | - .90 |
| Wpg. to Transcona | - .55 | Wpg. to Transcona | - .55 |
| | <u>1.59</u> | | <u>1.45</u> |
| Wpg Beach to Wpg | - .83 | | |
| Wpg to Transcona | - .55 | | |
| | <u>1.38</u> | | |

Minimum 30,000 lbs. in M.R. 44 feet

Mechanical reefer charge \$128.84 extra.

Since the Freshwater Fish Marketing Corporation's plant in Transcona is on a CN siding and is outside of the interswitching limits, an additional rate of 55¢ per 100 lbs. is charged by the CN to move the cars from Winnipeg to Transcona.

We have a scheduled rail service to Gimli on Mondays and Thursdays. We do not have a regular service beyond Gimli.

letter to Mr. Topolniski cont'd

In view of the high service requirements, low weights, low product value, numerous loading points, etc., we feel that a refrigerated truck would be a more viable solution to your problem than would a rail car.

CP Transport has refrigerated trailer equipment and we would suggest that you contact them and request a quotation.

Yours very truly,

B. W. McDonald
Marketing Representative.

CP Transport



July 13th, 1972

File: ASM5-20-0

Mr. Daniel Topolniski,
Economics Branch,
Central Region,
Fisheries Service,
114 Garry Street,
Winnipeg, Manitoba R3C 1G1

Dear Mr. Topolniski:

I have received copies of a letter you wrote to Mr. R.M. Follett, Freight Sales Mnnager, Canadian Pacific, dated June 28th and Mr. B.W. McDonald's reply dated July 5th, in connection with the possible movement of fish from Lakes Winnipeg, Winnipegosis and Manitoba to Winnipeg, for the Freshwater Fish Marketing Corporation's Plant in Transcona.

The last paragraph of Mr. McDonald's letter indicates that CP Transport has refrigerated trailer equipment and he suggested that you contact us. We do indeed have the necessary equipment but unfortunately, we do not have operating authority to go to the Lakes in question and return with loads of fish to Winnipeg.

Gimli Transfer does have the authority and he is hauling a certain amount of fish at the present time. I would therefore suggest that you write to Gimli Transfer, Box 54, Gimli, Manitoba for the information required and I am sure they would be interested in supplying you with it.

This letter has all the earmarks of "passing the buck", but I assure you this is not the case. We would certainly be interested in meeting with you to discuss this move fully if we did have the authority to do it, but unfortunately we do not and there is no way we could handle this traffic for you.

Thank you for contacting Canadian Pacific.

Yours truly,

H. B. Evans,
Area Sales Manager.



Canadian National Express

Mr. Daniel Topolniski,
Economics Branch,
Fisheries Service,
Central Region,
114 Garry Street,
Winnipeg, Man. R3C 1G1.

Dear Sir:

Referring to your letter of June 28th, requesting information with respect to rate and services covering fresh fish from various points in Manitoba.

Attached, for your information, are lists containing rates applying in the different categories. In addition, CN serves the following points, with the exception of Westbourne, as shown hereunder:

- Mafeking: Wayfreight Train 570 ex Hudson Bay 07.00
Tues. and Thurs., arriving Swan River 11.40
connection Train 492 at Swan River Wed. and
Fri., arriving Winnipeg (Symington) 22.30.
- Winnipegosis: Wayfreight Train 284 ex Winnipegosis 12.45
Tues. only, arrive Dauphin 14.50, connection
Train 492 at Dauphin Wed., arrive Winnipeg
(Symington) 22.30. (If Train 492 late to
Dauphin, will connect Tues.).
- Amaranth: Langruth Transfer via highway to Winnipeg
Thurs. only. (Contract arrangement).
- Westbourne: CP point, on No. 4 highway to Winnipeg.
- St. Laurent: Via highway to Winnipeg Sat. only, arrive
C.N.X., Winnipeg 16.00.
- Oak Point: Via highway to Winnipeg Sat. only, arrive
C.N.X., Winnipeg, 16.00.
- Lundar: Via highway to Winnipeg Wed. and Sat.,
arrive C.N.X., Winnipeg 17.00 and 16.00.

letter to Mr. Topolniski, cont'd

Ashern: Via highway to Winnipeg Wed. and Sat.
arrive C.N.X., Winnipeg 17.00 and 16.00.

Steep Rock: Via highway to Winnipeg Wed. and Sat.,
arrive C.N.X., Winnipeg 17.00 and 16.00.

St. Martin: Via highway to Winnipeg Sat. only, arrive
C.N.X. Winnipeg 16.00.

However, our tariffs do not provide protective service on less than carload traffic. Consequently, commodities of a perishable nature, requiring protection by water ice during transit, will only be accepted if the container in which the goods are packed is so constructed as to prevent seepage. There are exceptions to this rule and, in some instances, apply to shipments of fish shipped from points north of The Pas. Fresh fish may be placed in empty cars being returned to Winnipeg daily without fear of seepage but these circumstances do not apply to the points listed in your letter. To sum up, the service is twice weekly at the best, consisting of non-refrigerated equipment, and the traffic must be packed in leakproof containers.

If we can be of further assistance, please do not hesitate to contact me.

Yours very truly,

E. C. Wilcott,
Marketing Officer,
Express and Intermodal Services,
EDW/ao

MANITOBA HIGHWAY RATES VIA CANADIAN NATIONAL

| BETWEEN | 1 to 1000 LBS. | 1001 to 2000 LBS. | 2001 to 20,000 LBS. | Over 20000 LBS. | 1001 to 2000 LBS. | 2001 to 20,000 LBS. | 1 to 1000 LBS. | 1001 to 2000 LBS. | 2001 to 20,000 LBS. | 1 to 1000 LBS. | 1001 to 2000 LBS. | 2001 to 20,000 LBS. | | |
|----------------|-----------------------------|-------------------------|---------------------------|-----------------------|-------------------------|---------------------------|----------------------|-------------------------|---------------------------|----------------------|-------------------------|---------------------------|-------------|-------------|
| WINNIPEG | CLASS 100 | CLASS 100 | CLASS 100 | CLASS 100 | CLASS 85 | CLASS 85 | CLASS 70 | CLASS 70 | CLASS 70 | CLASS 55 | CLASS 55 | CLASS 55 | CLASS 45 | CLASS 40 |
| AND | Rates in cents per 100 lbs. | | | | | | | | | | | | | |
| Ashern 115 mi | 143 | 137 | 131 | 119 | | | | | | | | | | |
| Lundar 75 | 110 | 106 | 101 | 92 | | | | | | | | | | |
| Oak Point 61 | 101 | 97 | 92 | 84 | | | | | | | | | | |
| St. Laurent 54 | 85 | 82 | 78 | 71 | | | | | | | | | | |
| St. Martin 161 | 172 | 164 | 157 | 143 | | | | | | | | | | |
| Steep Rock 146 | 169 | 162 | 155 | 141 | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

See NOTES on reverse side for explanation of rate applications.

E.T.A. 100 SCALE OF RATES VIA CANADIAN NATIONAL

| TABLE OF SHIPMENT CHARGES FOR A SHIPMENT OF ONE PIECE | | | | | | | | | | SCALE OF RATES FOR CHARGEABLE WEIGHTS OF OVER 300 LBS. | | | | | |
|---|--|----------|----------|-----------|------------|------------|------------|------------|--|--|-----|-------|-------|-------|------|
| BETWEEN | TOTAL SHIPMENT WEIGHT IN LBS. | | | | | | | | | MINIMUM WEIGHT IN LBS. | | | | | |
| | Up to 25 | 26 to 50 | 51 to 75 | 76 to 100 | 101 to 150 | 151 to 200 | 201 to 250 | 251 to 300 | Maximum Charge for Shipment less than 300 lbs. | 300 | 500 | 1,000 | 2,000 | 5,000 | 10,0 |
| WINNIPEG | | | | | | | | | | | | | | | |
| AND | Charges in cents for a shipment of one piece | | | | | | | | | Rates in cents per 100 lbs. | | | | | |
| Amaranth | | | | | | | | | | 162 | 151 | 133 | 120 | 112 | |
| Mafeking | | | | | | | | | | 232 | 220 | 202 | 186 | 163 | |
| Westbourne (C.P.) | | | | | | | | | | | | | | | |
| Winnipegosis | | | | | | | | | | 208 | 196 | 178 | 166 | 145 | |
|53 | | | | | | | | | | | | | | | |

See NOTE on reverse side for explanation of rate application.

STANDARD TARIFF OF TOLLS

FOR GENERAL FREIGHT TRAFFIC BOTH ORIGINATING AND TERMINATING IN MANITOBA (INTRA-PROVINCIAL) AS AUTHORIZED BY THE HIGHWAY TRAFFIC AND MOTOR TRANSPORT BOARD OF MANITOBA ORDER No. 11/69 AND EFFECTIVE MAY 10, 1969.

THE FOLLOWING RATES APPLY IN CENTS PER 100 LBS.

| MILES | 1 | 1001 | 2001 | OVER | 1 | 1001 | 2001 | OVER | 1 | 1001 | 2001 | OVER | 1 | 1001 | 2001 | OVER | LBS. | LBS. | |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | to | to | to | 20000 | to | to | to | 20000 | to | to | to | 20000 | to | to | to | 20000 | LBS. | LBS. | |
| | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS |
| | 100 | 100 | 100 | 100 | 85 | 85 | 85 | 85 | 70 | 70 | 70 | 70 | 55 | 55 | 55 | 55 | 45 | 40 | |
| 20 | 54 | 52 | 50 | 45 | 46 | 44 | 42 | 38 | 38 | 37 | 35 | 32 | 30 | 29 | 28 | 25 | 20 | 18 | |
| 25 | 60 | 58 | 55 | 50 | 52 | 49 | 47 | 43 | 42 | 40 | 39 | 35 | 34 | 32 | 31 | 28 | 22 | 20 | |
| 30 | 66 | 63 | 61 | 55 | 56 | 54 | 52 | 47 | 47 | 45 | 43 | 39 | 36 | 35 | 33 | 30 | 25 | 22 | |
| 35 | 66 | 63 | 61 | 55 | 56 | 54 | 52 | 47 | 47 | 45 | 43 | 39 | 36 | 35 | 33 | 30 | 25 | 22 | |
| 40 | 78 | 75 | 72 | 65 | 66 | 63 | 61 | 55 | 54 | 52 | 50 | 45 | 43 | 41 | 40 | 36 | 29 | 26 | |
| 45 | 78 | 75 | 72 | 65 | 66 | 63 | 61 | 55 | 54 | 52 | 50 | 45 | 43 | 41 | 40 | 36 | 29 | 26 | |
| 50 | 85 | 82 | 78 | 71 | 72 | 69 | 66 | 60 | 60 | 58 | 55 | 50 | 47 | 45 | 43 | 39 | 32 | 28 | |
| 55 | 85 | 82 | 78 | 71 | 72 | 69 | 66 | 60 | 60 | 58 | 55 | 50 | 47 | 45 | 43 | 39 | 32 | 28 | |
| 60 | 94 | 90 | 86 | 78 | 79 | 76 | 73 | 66 | 66 | 63 | 61 | 55 | 52 | 49 | 47 | 43 | 35 | 31 | |
| 65 | 101 | 97 | 92 | 84 | 85 | 82 | 78 | 71 | 71 | 68 | 65 | 59 | 55 | 53 | 51 | 46 | 38 | 34 | |
| 70 | 103 | 99 | 95 | 86 | 88 | 84 | 80 | 73 | 72 | 69 | 66 | 60 | 56 | 54 | 52 | 47 | 39 | 34 | |
| 75 | 110 | 106 | 101 | 92 | 94 | 90 | 86 | 78 | 77 | 74 | 70 | 64 | 61 | 59 | 56 | 51 | 41 | 37 | |
| 80 | 115 | 110 | 106 | 96 | 98 | 94 | 90 | 82 | 80 | 77 | 74 | 67 | 64 | 61 | 58 | 53 | 43 | 38 | |
| 85 | 118 | 113 | 108 | 98 | 100 | 95 | 91 | 83 | 83 | 79 | 76 | 69 | 65 | 62 | 59 | 54 | 44 | 39 | |
| 90 | 125 | 120 | 114 | 104 | 106 | 101 | 97 | 88 | 88 | 84 | 80 | 73 | 68 | 66 | 63 | 57 | 47 | 42 | |
| 95 | 126 | 121 | 116 | 105 | 107 | 102 | 98 | 89 | 89 | 85 | 81 | 74 | 70 | 67 | 64 | 58 | 47 | 42 | |
| 100 | 133 | 128 | 122 | 111 | 113 | 108 | 103 | 94 | 94 | 90 | 86 | 78 | 73 | 70 | 67 | 61 | 50 | 44 | |
| 110 | 133 | 128 | 122 | 111 | 113 | 108 | 103 | 94 | 94 | 90 | 86 | 78 | 73 | 70 | 67 | 61 | 50 | 44 | |
| 120 | 143 | 137 | 131 | 119 | 121 | 116 | 111 | 101 | 100 | 95 | 91 | 83 | 78 | 75 | 72 | 63 | 54 | 48 | |
| 130 | 151 | 145 | 139 | 126 | 128 | 123 | 118 | 107 | 106 | 101 | 97 | 88 | 83 | 79 | 76 | 69 | 57 | 50 | |
| 140 | 158 | 152 | 145 | 132 | 134 | 129 | 123 | 112 | 110 | 106 | 101 | 92 | 88 | 84 | 80 | 73 | 59 | 53 | |
| 150 | 169 | 162 | 155 | 141 | 144 | 138 | 132 | 120 | 119 | 114 | 109 | 99 | 93 | 90 | 86 | 78 | 63 | 56 | |
| 160 | 172 | 164 | 157 | 143 | 146 | 140 | 134 | 122 | 120 | 115 | 110 | 100 | 95 | 91 | 87 | 79 | 64 | 57 | |
| 170 | 179 | 171 | 164 | 149 | 152 | 146 | 140 | 127 | 125 | 120 | 114 | 104 | 98 | 94 | 90 | 82 | 67 | 60 | |
| 180 | 182 | 175 | 167 | 152 | 155 | 148 | 142 | 129 | 127 | 122 | 117 | 106 | 101 | 97 | 92 | 84 | 68 | 61 | |
| 190 | 186 | 178 | 171 | 155 | 158 | 152 | 145 | 132 | 131 | 125 | 120 | 109 | 102 | 98 | 94 | 85 | 70 | 62 | |

| MILES | 1 | 1001 | 2001 | OVER | 1 | 1001 | 2001 | OVER | 1 | 1001 | 2001 | OVER | 1 | 1001 | 2001 | OVER | LBS. | LBS. | LBS. | |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | to | to | to | LBS. | to | to | to | LBS. | to | to | to | LBS. | to | to | to | LBS. | LBS. | LBS. | LBS. | LBS. |
| | 1000 | 2000 | 20000 | 20000 | 1000 | 2000 | 20000 | 20000 | 1000 | 2000 | 20000 | 20000 | 1000 | 2000 | 20000 | 20000 | CLASS | CLASS | CLASS | |
| | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS | CLASS |
| | 100 | 100 | 100 | 100 | 85 | 85 | 85 | 85 | 70 | 70 | 70 | 70 | 55 | 55 | 55 | 55 | 45 | 40 | | |
| 200 | 188 | 181 | 173 | 157 | 160 | 153 | 146 | 133 | 132 | 127 | 121 | 110 | 103 | 99 | 95 | 86 | 71 | 63 | | |
| 210 | 192 | 184 | 176 | 160 | 163 | 156 | 150 | 136 | 134 | 129 | 123 | 112 | 106 | 101 | 97 | 88 | 72 | 64 | | |
| 220 | 196 | 187 | 179 | 163 | 167 | 160 | 153 | 139 | 137 | 131 | 125 | 114 | 108 | 104 | 99 | 90 | 73 | 65 | | |
| 230 | 199 | 190 | 182 | 165 | 168 | 161 | 154 | 140 | 139 | 133 | 128 | 116 | 109 | 105 | 100 | 91 | 74 | 66 | | |
| 240 | 202 | 193 | 185 | 168 | 172 | 164 | 157 | 143 | 142 | 136 | 130 | 118 | 110 | 106 | 101 | 92 | 76 | 67 | | |
| 250 | 205 | 197 | 188 | 171 | 174 | 167 | 160 | 145 | 144 | 138 | 132 | 120 | 113 | 108 | 103 | 94 | 77 | 68 | | |
| 260 | 208 | 199 | 190 | 173 | 176 | 169 | 162 | 147 | 146 | 140 | 134 | 122 | 114 | 109 | 105 | 95 | 78 | 69 | | |
| 270 | 211 | 202 | 194 | 176 | 180 | 173 | 165 | 150 | 149 | 143 | 136 | 124 | 116 | 112 | 107 | 97 | 79 | 70 | | |
| 280 | 215 | 206 | 197 | 179 | 182 | 175 | 167 | 152 | 151 | 145 | 139 | 126 | 119 | 114 | 109 | 99 | 80 | 72 | | |
| 290 | 218 | 209 | 200 | 182 | 186 | 178 | 171 | 155 | 154 | 147 | 141 | 128 | 120 | 115 | 110 | 100 | 82 | 73 | | |
| 300 | 221 | 212 | 202 | 184 | 187 | 179 | 172 | 156 | 155 | 148 | 142 | 129 | 122 | 117 | 112 | 102 | 83 | 74 | | |
| 310 | 224 | 215 | 206 | 187 | 191 | 183 | 175 | 159 | 157 | 151 | 144 | 131 | 125 | 120 | 114 | 104 | 84 | 75 | | |
| 320 | 228 | 219 | 209 | 190 | 194 | 186 | 178 | 162 | 160 | 153 | 146 | 133 | 126 | 121 | 116 | 105 | 85 | 76 | | |
| 330 | 230 | 221 | 211 | 192 | 196 | 187 | 179 | 163 | 162 | 155 | 149 | 135 | 127 | 122 | 117 | 106 | 86 | 77 | | |
| 340 | 234 | 224 | 215 | 195 | 199 | 191 | 183 | 166 | 164 | 158 | 151 | 137 | 128 | 123 | 118 | 107 | 87 | 78 | | |
| 350 | 238 | 228 | 218 | 198 | 201 | 193 | 185 | 168 | 167 | 160 | 153 | 139 | 131 | 125 | 120 | 109 | 89 | 79 | | |
| 360 | 240 | 230 | 220 | 200 | 204 | 196 | 187 | 170 | 168 | 161 | 154 | 140 | 133 | 128 | 122 | 111 | 90 | 80 | | |
| 370 | 244 | 233 | 223 | 203 | 208 | 199 | 190 | 173 | 170 | 163 | 156 | 142 | 134 | 129 | 123 | 112 | 91 | 81 | | |
| 380 | 247 | 237 | 227 | 206 | 210 | 201 | 193 | 175 | 173 | 166 | 158 | 144 | 136 | 130 | 124 | 113 | 93 | 82 | | |
| 390 | 250 | 239 | 229 | 208 | 212 | 204 | 195 | 177 | 175 | 168 | 161 | 146 | 137 | 131 | 125 | 114 | 94 | 83 | | |
| 400 | 253 | 243 | 232 | 211 | 215 | 206 | 197 | 179 | 178 | 170 | 163 | 148 | 139 | 133 | 128 | 116 | 95 | 84 | | |
| 410 | 257 | 246 | 235 | 214 | 218 | 209 | 200 | 182 | 180 | 173 | 165 | 150 | 142 | 136 | 130 | 118 | 96 | 85 | | |
| 420 | 260 | 250 | 239 | 217 | 221 | 212 | 202 | 184 | 182 | 175 | 167 | 152 | 143 | 137 | 131 | 119 | 98 | 86 | | |
| 430 | 263 | 252 | 241 | 219 | 223 | 214 | 205 | 186 | 185 | 177 | 169 | 154 | 144 | 138 | 132 | 120 | 99 | 87 | | |
| 440 | 266 | 255 | 244 | 222 | 227 | 217 | 208 | 189 | 186 | 178 | 171 | 155 | 146 | 140 | 134 | 122 | 100 | 89 | | |
| 450 | 270 | 259 | 248 | 225 | 229 | 220 | 210 | 191 | 188 | 181 | 173 | 157 | 149 | 143 | 136 | 124 | 101 | 90 | | |
| 460 | 274 | 262 | 251 | 228 | 233 | 223 | 213 | 194 | 191 | 183 | 175 | 159 | 151 | 145 | 139 | 126 | 102 | 91 | | |
| 470 | 276 | 265 | 253 | 230 | 235 | 225 | 216 | 196 | 193 | 185 | 177 | 161 | 152 | 146 | 140 | 127 | 103 | 92 | | |
| 480 | 280 | 268 | 256 | 233 | 238 | 228 | 218 | 198 | 196 | 187 | 179 | 163 | 154 | 147 | 141 | 128 | 105 | 93 | | |

1972 MANITOBA
ROUGHFISH HARVESTING
PROJECT-1354-72

PROJECT COMPUTER ANALYSIS

| | | | |
|---|---|---|----------|
| | | | 4 |
| | | | |
| | | ■ | ■ |
| ■ | ■ | ■ | ■ |

Department of the Environment
Industrial Development Branch
Exploratory Fishing Division
Chief, J. Rycroft

1972 MANITOBA
ROUGHFISH HARVESTING
PROJECT—1354—72

Co-Authors
Andrew and Ian B. Duthie

UNIT 4

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UNIT 4

PROJECT AND COMPUTER ANALYSIS

Unit Introduction

This Unit is a breakdown of the statistical data fed into the computer from source documents collected in the field. It is fairly comprehensive and gives an indication of useful computer applications. Highlighted in the Unit are the Production Statistics in graphical form - by time, area and key species. The interesting aspect of this exercise is the fact that all information is now stored in the Central Information Bank.

S.1.*

MANITOBA STATISTICAL SET UP

SECTION 1

A. Grid System

When we initially looked at an information retrieval system for the source material from the field, we found that no system in effect could handle the type of data that would be assembled. Therefore it was decided to design a grid system for the Lakes under observation. The primary consideration was to determine the optimum management unit and 25 square miles was chosen as the most suitable.

Charts were designed which proved to be ideal for the purpose of locating specific catch locations by area code. This is one of the data items needed for producing accurate catch statistics by means of a computer program. This section includes 3 of the charts generated to meet these criteria.

99° 00' 98° 30' 98° 00' 97° 30' 97° 00'

DEPARTMENT of the ENVIRONMENT
FISHERIES SERVICE
INDUSTRIAL DEVELOPMENT BRANCH
EXPLORATORY FISHING DIVISION

**LAKE WINNIPEG
NORTHERN SECTION
1972 MANITOBA ROUGHFISH
HARVESTING PROGRAM**

GRID AREAS

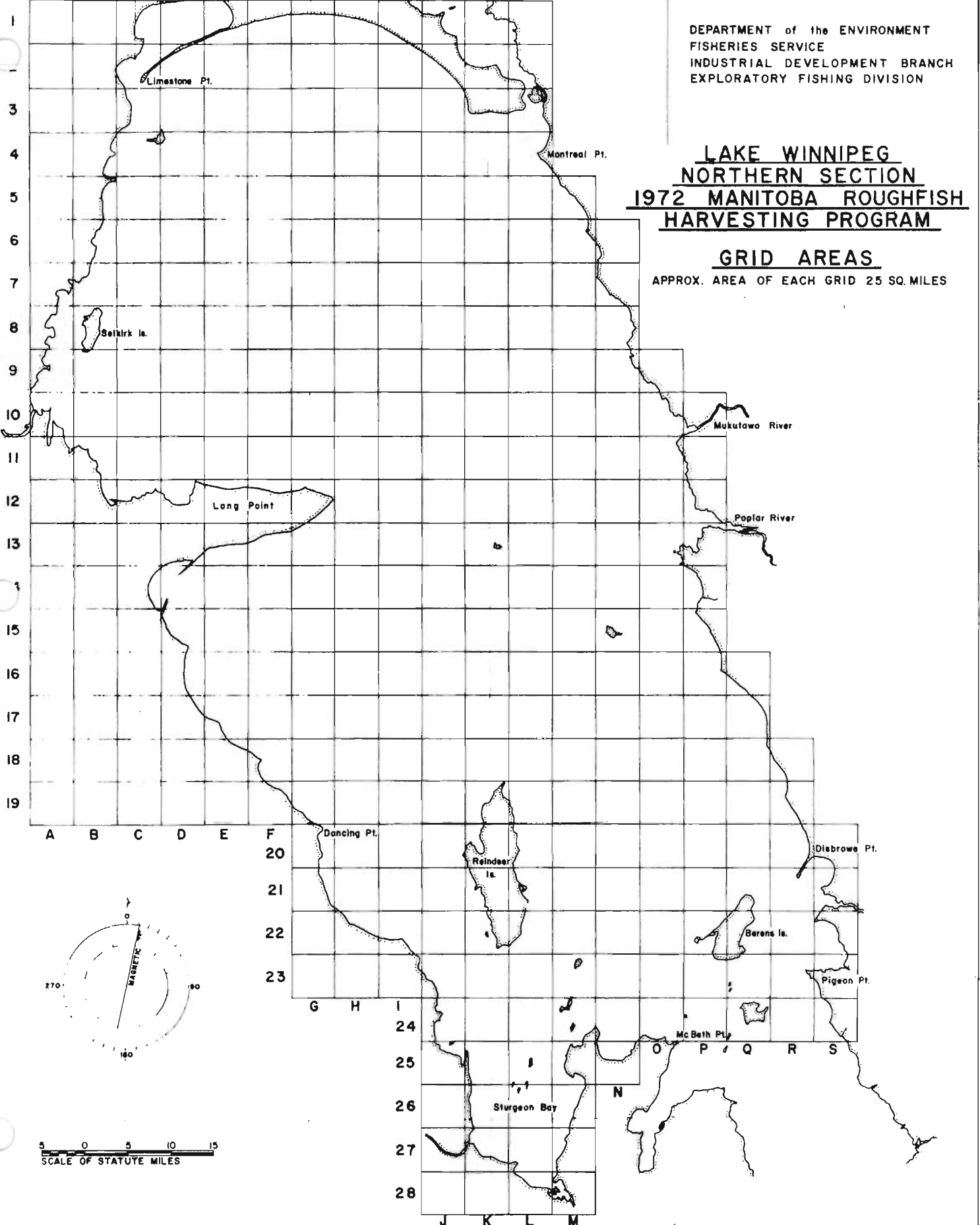
APPROX. AREA OF EACH GRID 25 SQ. MILES

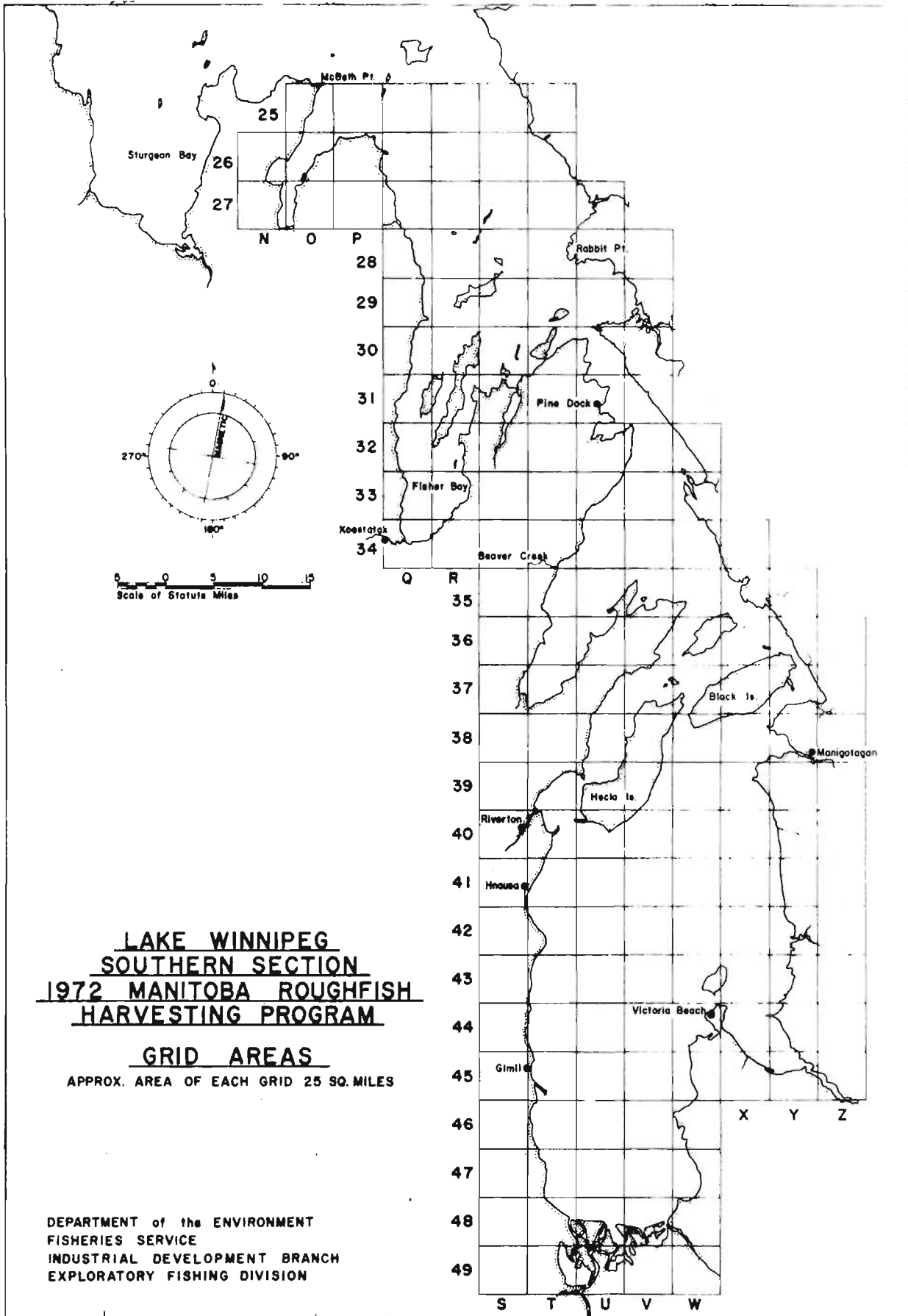
53° 30'

53° 00'

52° 30'

52° 00'



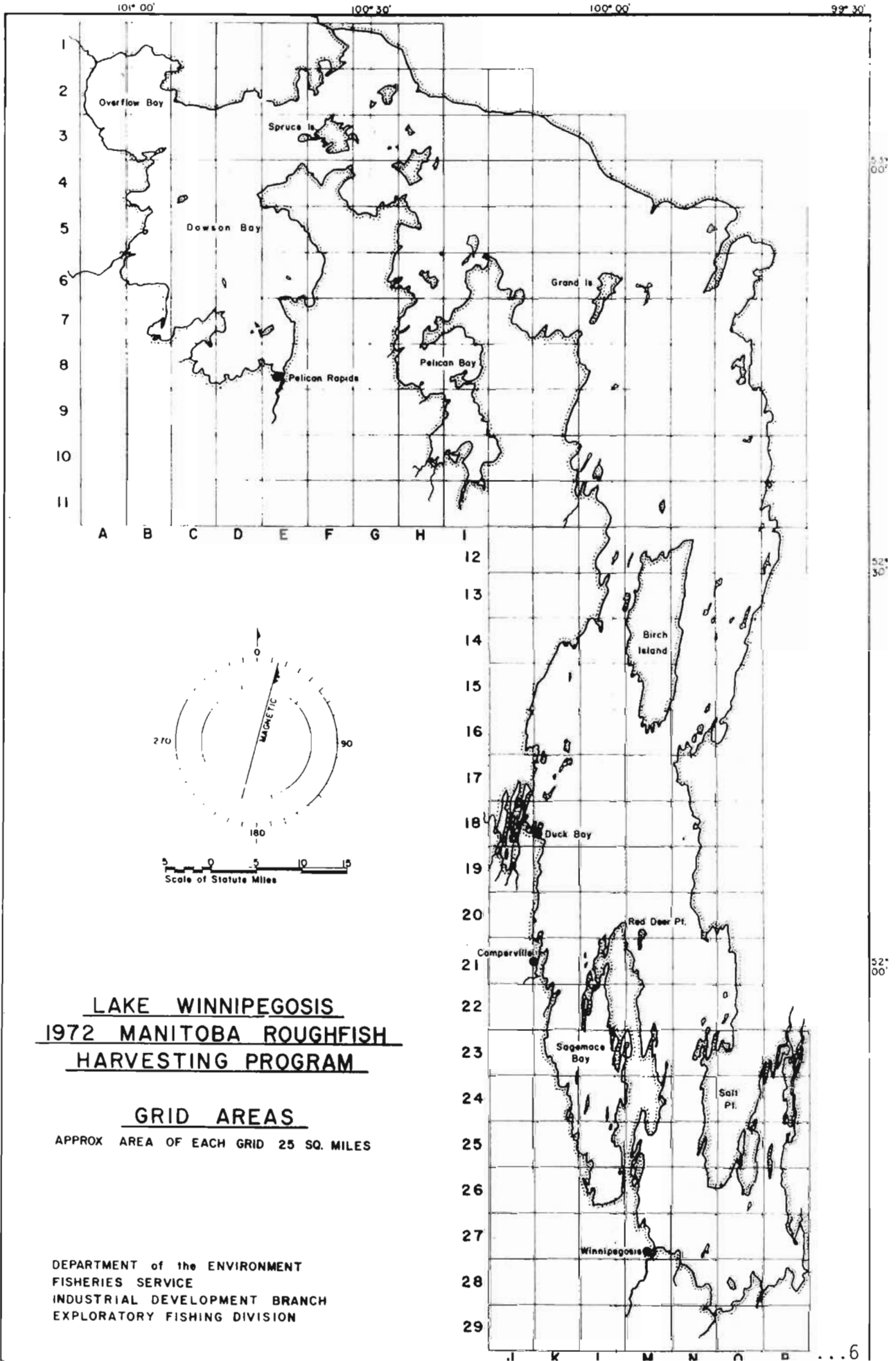


**LAKE WINNIPEG
SOUTHERN SECTION
1972 MANITOBA ROUGHFISH
HARVESTING PROGRAM**

GRID AREAS

APPROX. AREA OF EACH GRID 25 SQ. MILES

DEPARTMENT of the ENVIRONMENT
FISHERIES SERVICE
INDUSTRIAL DEVELOPMENT BRANCH
EXPLORATORY FISHING DIVISION



SECTION 1

B. Manitoba Data Composite

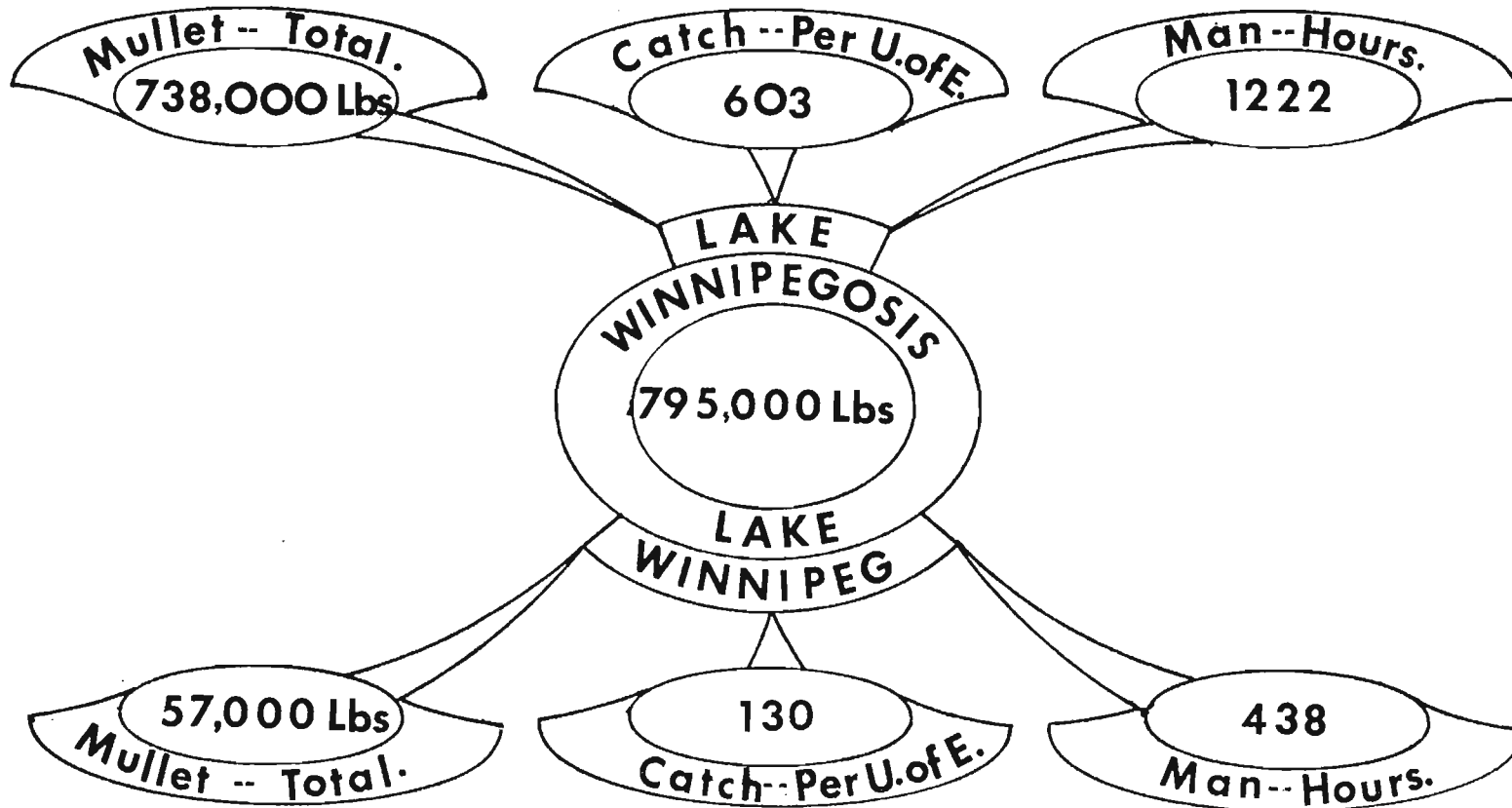
From the information derived from the Computer, the key data was taken and presented in visual form to make it easier to follow.

First chart: Total mullet catch statistics for Manitoba
Catch per Unit of Effort
Man hours spent

Second chart: Lake Winnipeg catch statistics by area
Total poundage for the lake

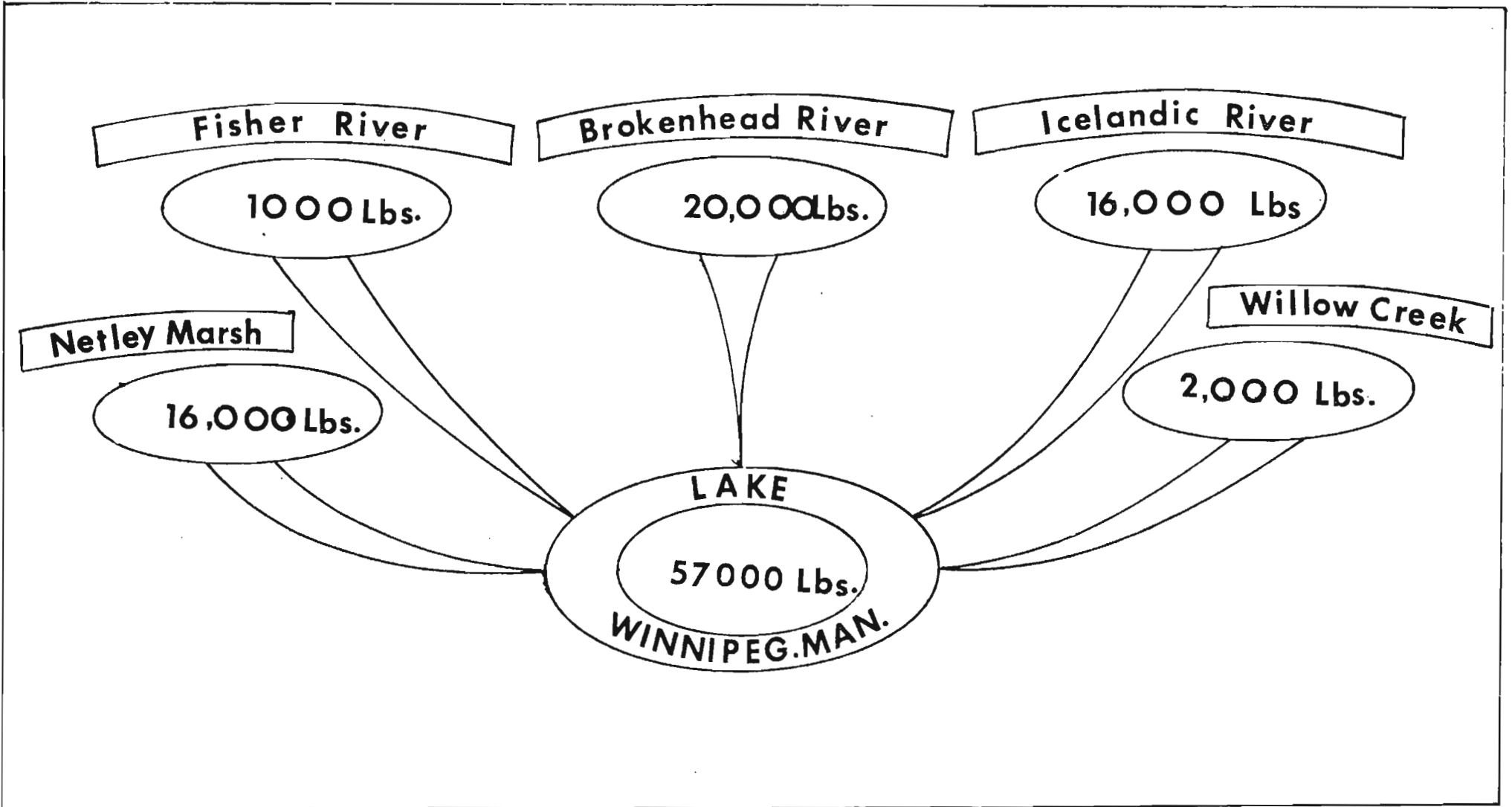
Third chart: Lake Winnipegosis catch statistics by area
Total poundage for the lake

ANALYSIS OF STATISTICAL DATA

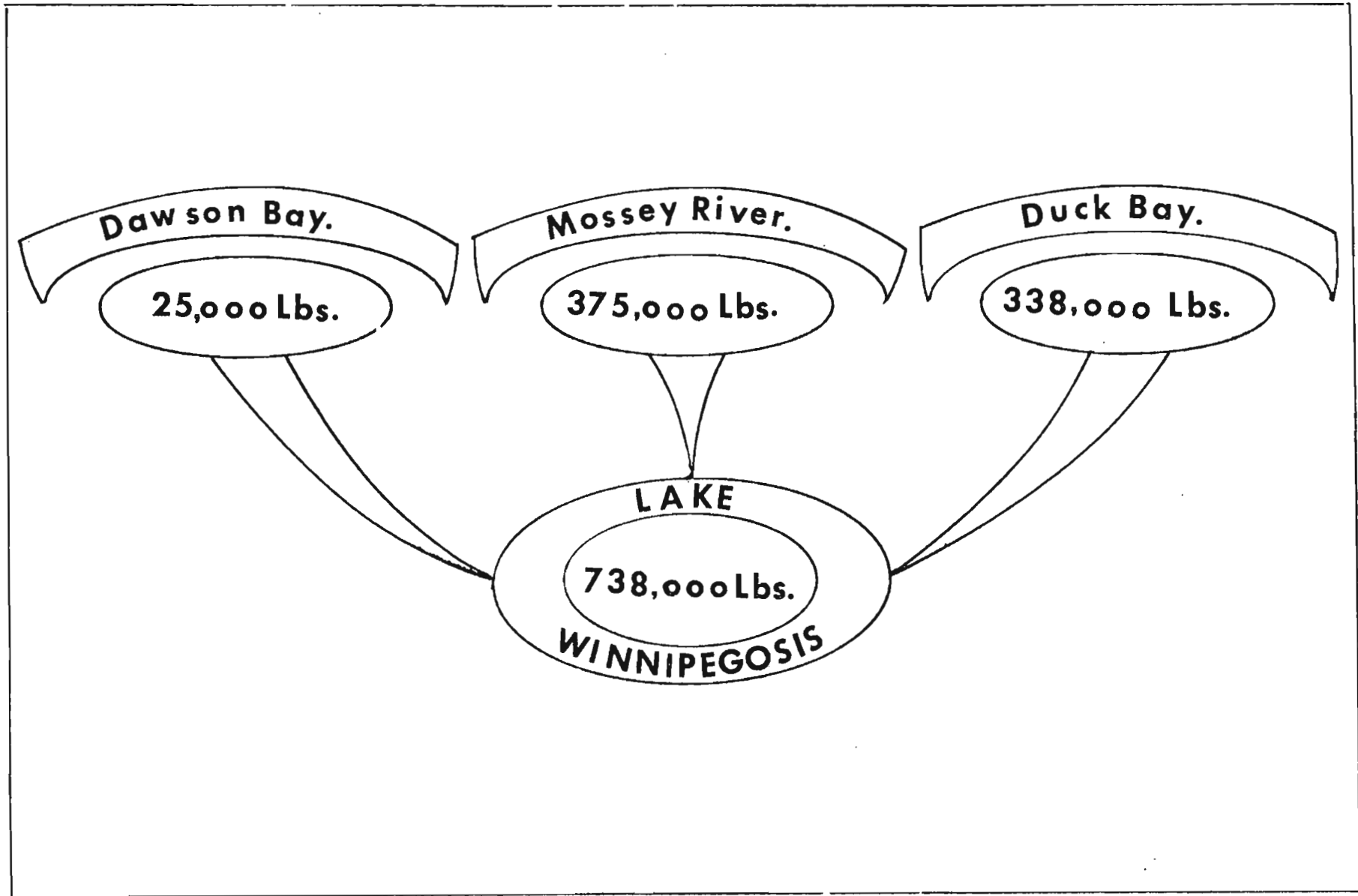


U.of E. = Unit of Effort. (LBS/MAN HOUR).

TOTAL MULLET PRODUCTION BY AREA - LAKE WINNIPEG



TOTAL MULLET PRODUCTION BY AREA - LAKE WINNIPEGOSIS



SECTION 1

C. Data Sheets and Applications

The source documents were designed for direct use by the key punch and verifier operator. When the regular batches of documents arrived from the field the data was punched directly onto cards at the Winnipeg terminal. It was subsequently fed to the computer. Fast feedback contributed to providing good real-time information on catch status.

The type of information stored in the computer at the University of Manitoba has applications not only for exploratory fishing, but also for biological use and the data is readily accessible.

The following sheet gives an indication of the information made available.

1972 MANITOBA ROUGH FISH HARVESTING PROJECT

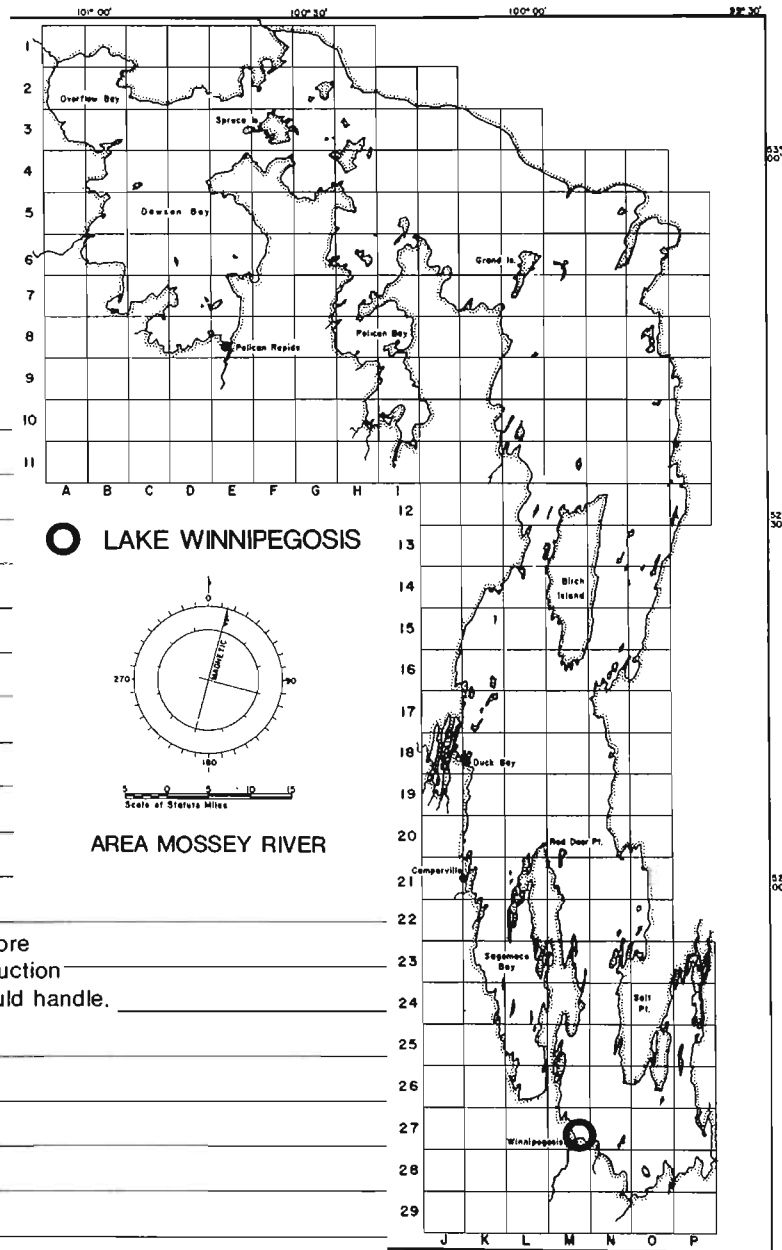
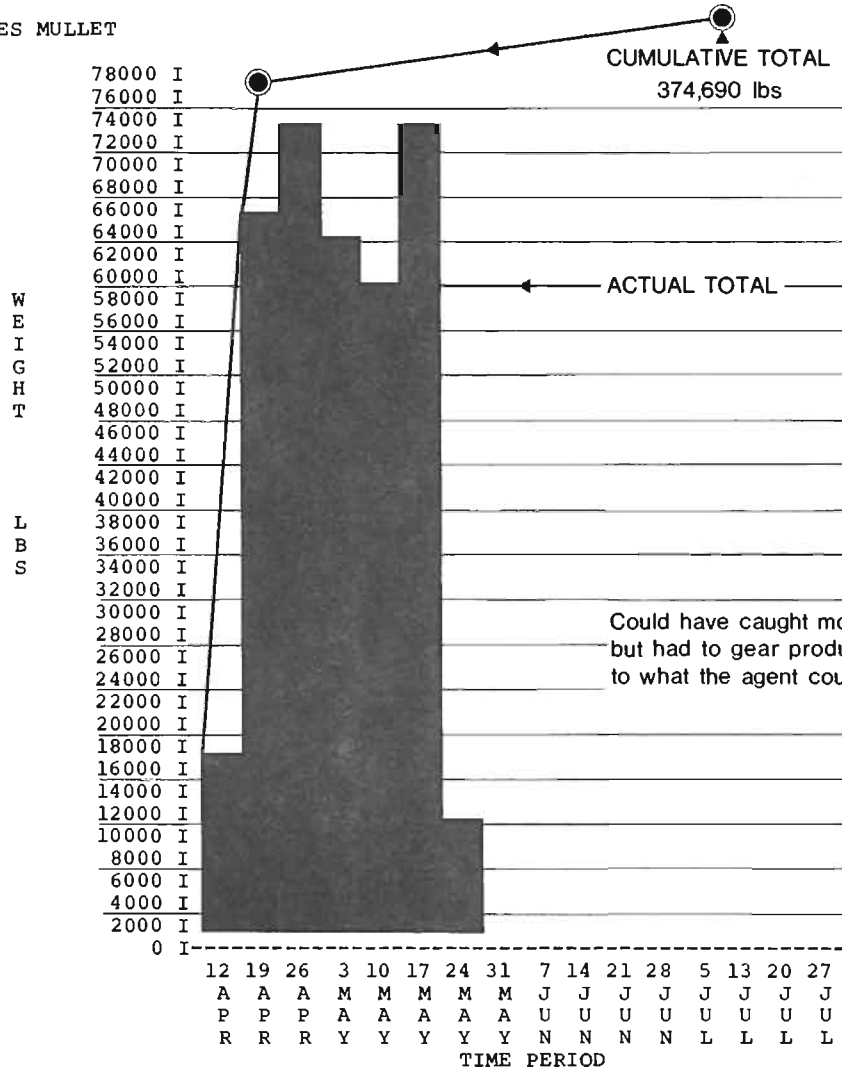
| | | | | | | | | | | |
|-------------------|--------|--------|----------------------------|---|---|---|-----------|---|---|-------|
| LAKE | CODE # | | IMPOUNDING GEAR OPERATIONS | | | | CODE # | | | |
| DAY | CODE # | | PORT OR HARBOUR | | | | CODE # | | | |
| MONTH | CODE # | | DEPARTURE TIME FROM PORT | | | | CODE # | | | |
| YEAR | CODE # | | ARRIVAL TIME AT PORT | | | | CODE # | | | |
| | CODE # | | TRAP NETS | | | | HOOP NETS | | | |
| | | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| TYPE | | | | | | | | | | |
| GRID LOCATION | | | | | | | | | | |
| TIME WHEN NET SET | | | | | | | | | | |
| NET HOURS/FISHING | | | | | | | | | | |
| MAN HOURS/FISHING | | | | | | | | | | |
| TYPE OF BOTTOM | | | | | | | | | | |
| SPECIES | | CODE # | CATCH WEIGHT IN LBS. | | | | | | | TOTAL |
| MULLET | | | | | | | | | | |
| MARIA | | | | | | | | | | |
| CARP | | | | | | | | | | |
| TULLIBEE | | | | | | | | | | |
| BULLHEAD | | | | | | | | | | |
| PERCH | | | | | | | | | | |
| PIKE | | | | | | | | | | |
| SUNFISH | | | | | | | | | | |
| WHITEFISH | | | | | | | | | | |
| TOTAL | | | | | | | | | | |
| COMMENTS: | | | | | | | | | | |

COARSE FISHERY DEVELOPMENT

MANITOBA FINAL
 UPDATED TO JUNE 30/72

YEAR OF 1972
 VOLUMES OF FISH BY SPECIES BY AREA BY TIME PERIOD

SPECIES MULLET



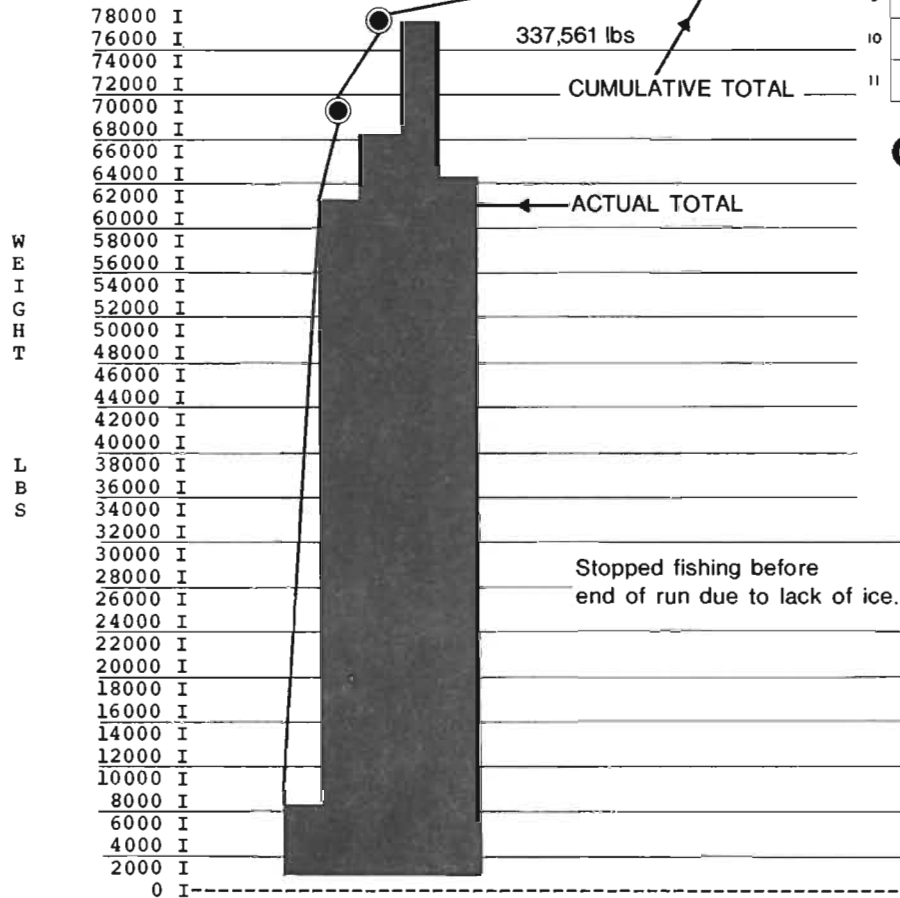
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----|----|----|---|----|----|----|----|---|----|----|----|---|----|----|----|---|----|----|----|----|---|----|----|----|---|----|----|----|---|---|---|
| 12 | 19 | 26 | 3 | 10 | 17 | 24 | 31 | 7 | 14 | 21 | 28 | 5 | 13 | 20 | 27 | 3 | 10 | 17 | 24 | 31 | 7 | 14 | 21 | 28 | 5 | 12 | 19 | 26 | 2 | 9 | |
| A | A | A | M | M | M | M | M | J | J | J | J | J | J | J | J | A | A | A | A | A | S | S | S | S | S | O | O | O | O | N | N |
| P | P | P | A | A | A | A | A | U | U | U | U | U | U | U | U | U | U | U | U | U | E | E | E | E | E | C | C | C | C | O | O |
| R | R | R | Y | Y | Y | Y | Y | N | N | N | N | L | L | L | L | G | G | G | G | G | P | P | P | P | T | T | T | T | V | V | |

COARSE FISHERY DEVELOPMENT

MANITOBA FINAL
 UPDATED TO JUNE 30/72

YEAR OF 1972
 VOLUMES OF FISH BY SPECIES BY AREA BY TIME PERIOD

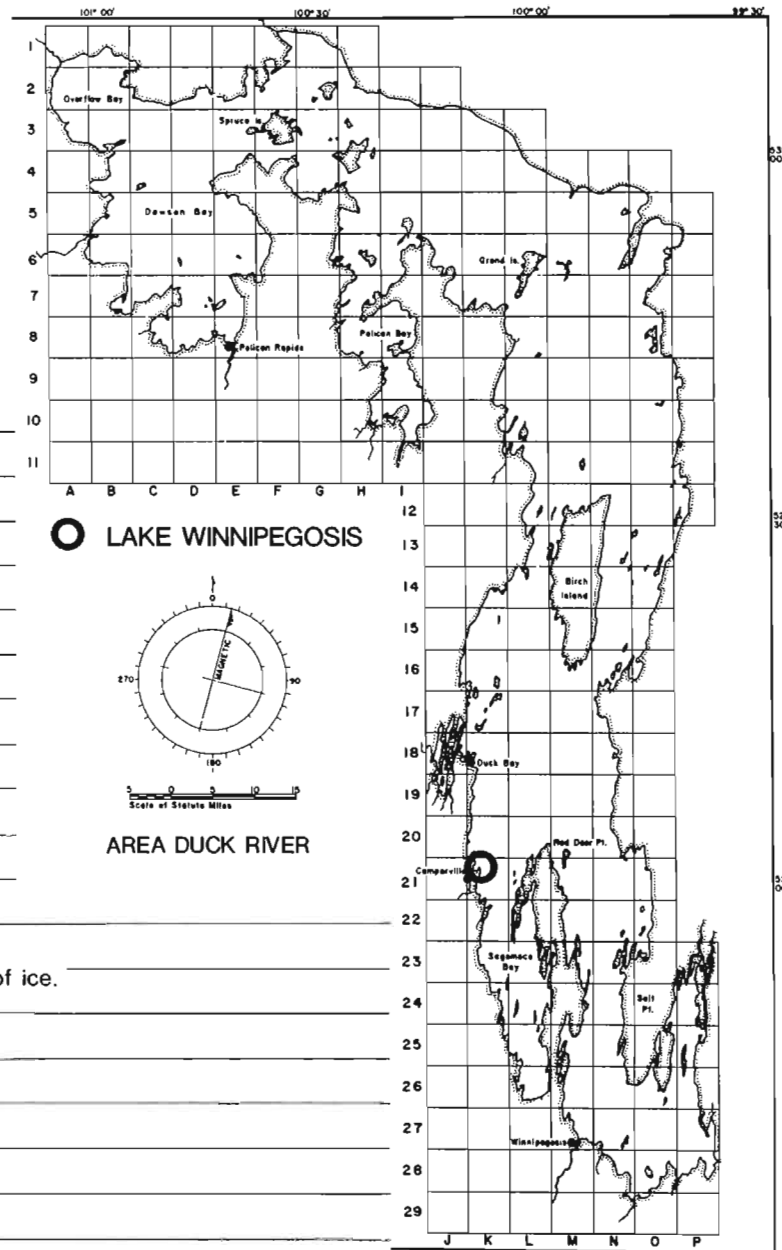
SPECIES MULLET



W
E
I
G
H
T

L
B
S

Stopped fishing before
 end of run due to lack of ice.



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----|----|----|---|----|----|----|----|---|----|----|----|---|----|----|----|---|----|----|----|----|---|----|----|----|---|----|----|----|---|---|
| 12 | 19 | 26 | 3 | 10 | 17 | 24 | 31 | 7 | 14 | 21 | 28 | 5 | 13 | 20 | 27 | 3 | 10 | 17 | 24 | 31 | 7 | 14 | 21 | 28 | 5 | 12 | 19 | 26 | 2 | 9 |
| A | A | A | M | M | M | M | M | J | J | J | J | J | J | J | J | A | A | A | A | A | S | S | S | S | O | O | O | O | N | N |
| P | P | P | A | A | A | A | A | U | U | U | U | U | U | U | U | U | U | U | U | U | E | E | E | E | C | C | C | C | O | O |
| R | R | R | Y | Y | Y | Y | Y | N | N | N | N | L | L | L | L | G | G | G | G | G | P | P | P | P | T | T | T | T | V | V |

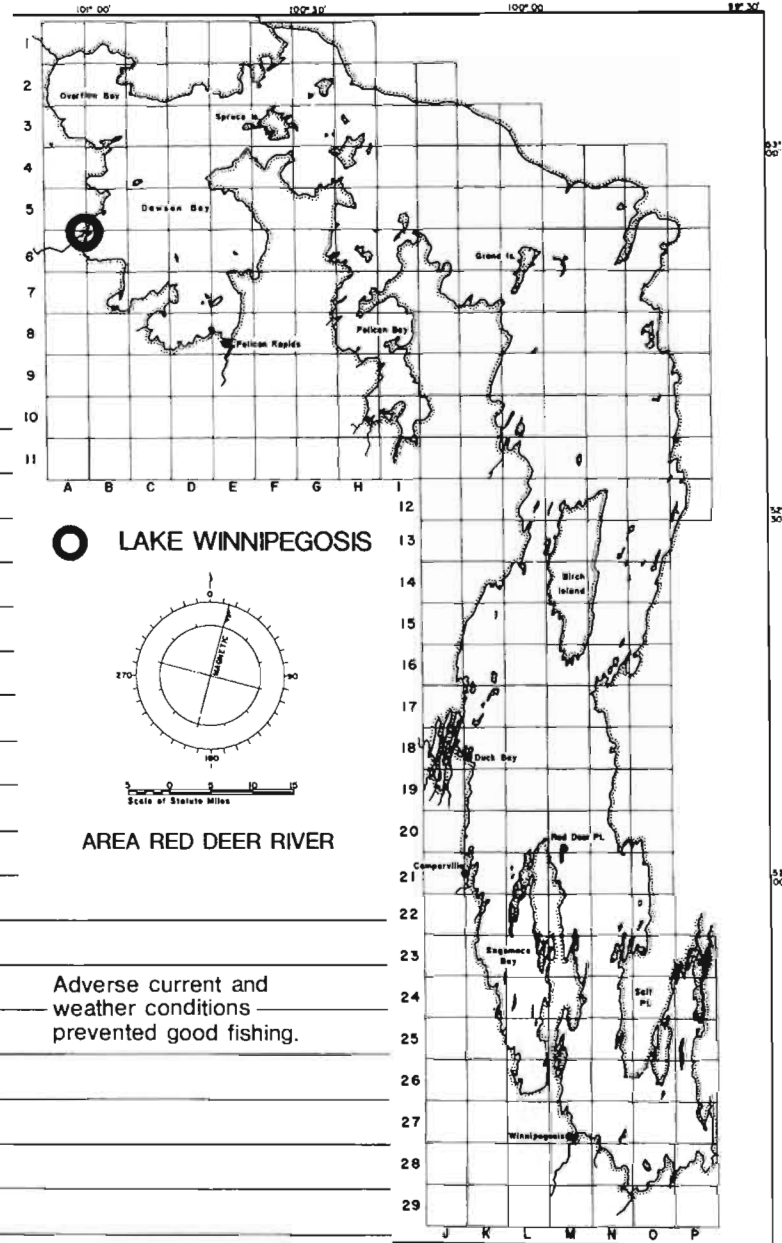
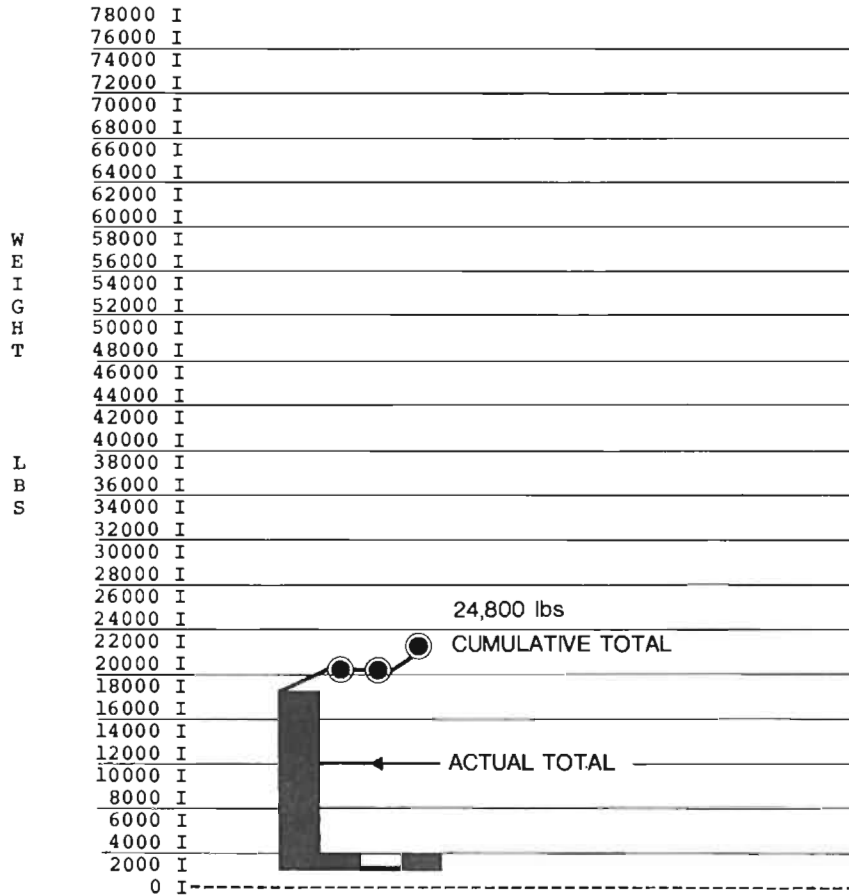
TIME PERIOD

COARSE FISHERY DEVELOPMENT

MANITOBA FINAL
 UPDATED TO JUNE 30/72

YEAR OF 1972
 VOLUMES OF FISH BY SPECIES BY AREA BY TIME PERIOD

SPECIES MULLET



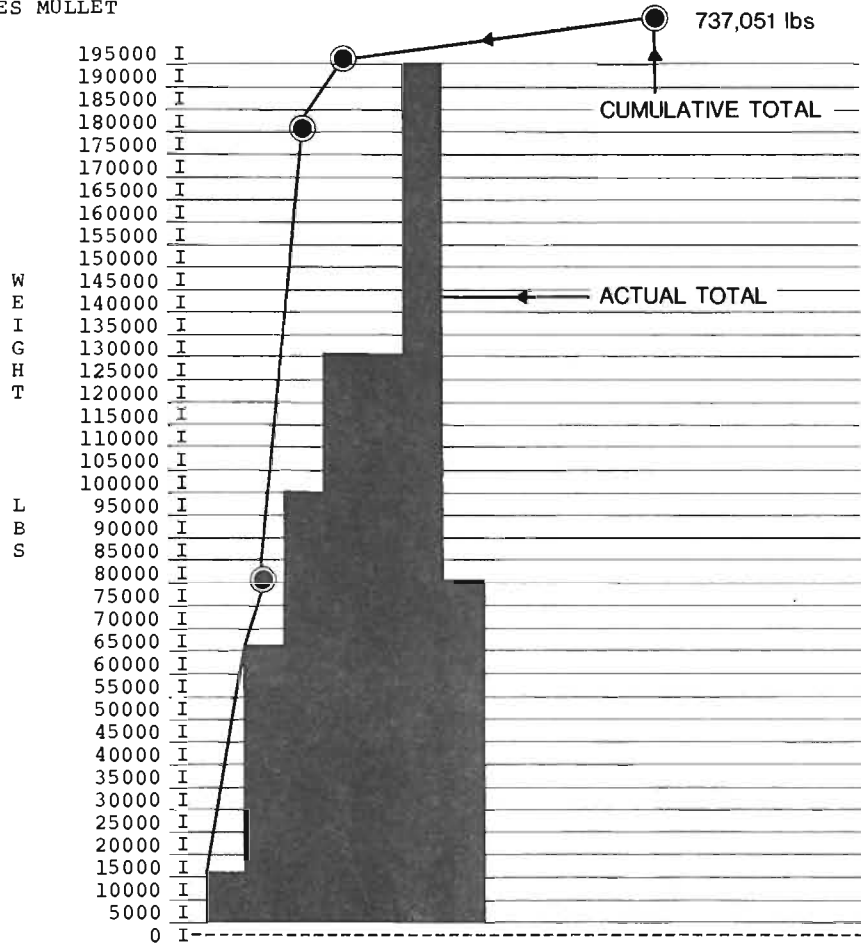
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----|----|----|---|----|----|----|----|---|----|----|----|---|----|----|----|---|----|----|----|----|---|----|----|----|---|----|----|----|---|---|
| 12 | 19 | 26 | 3 | 10 | 17 | 24 | 31 | 7 | 14 | 21 | 28 | 5 | 13 | 20 | 27 | 3 | 10 | 17 | 24 | 31 | 7 | 14 | 21 | 28 | 5 | 12 | 19 | 26 | 2 | 9 |
| A | A | A | M | M | M | M | M | J | J | J | J | J | J | J | J | A | A | A | A | A | S | S | S | S | O | O | O | O | N | N |
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COARSE FISHERY DEVELOPMENT

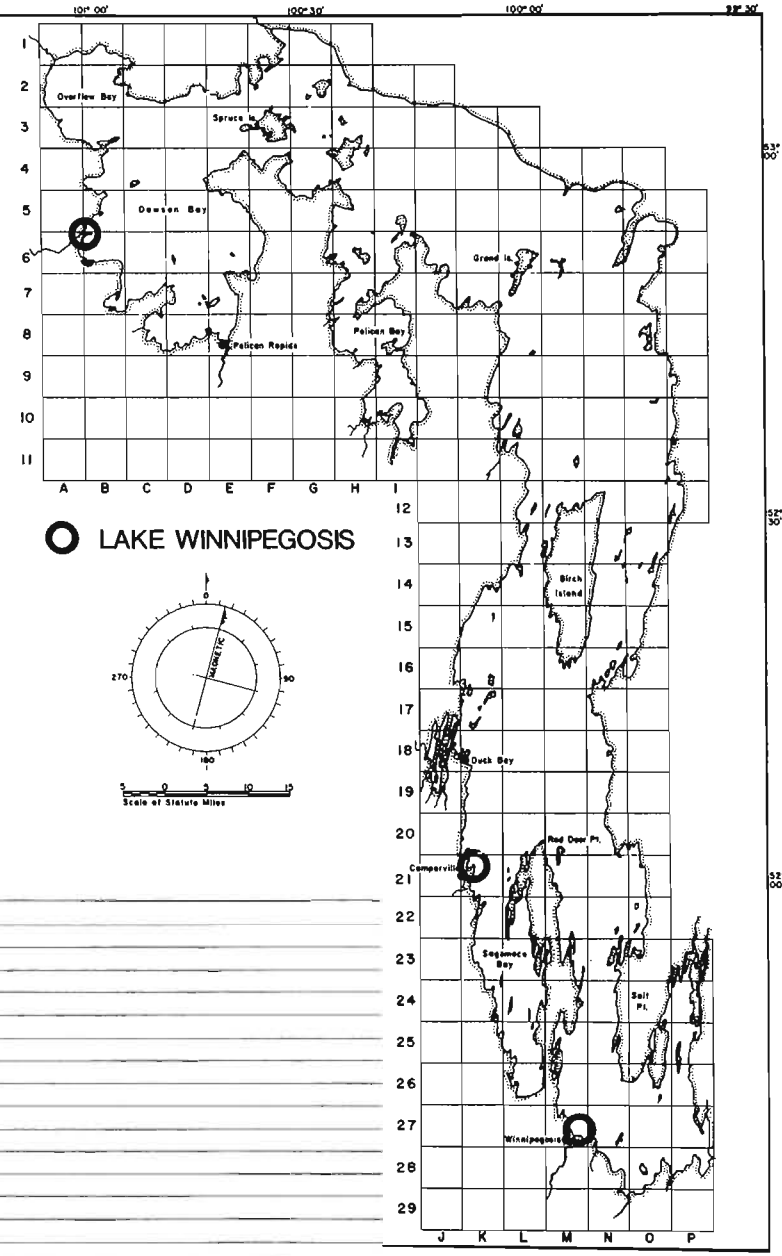
MANITOBA FINAL
 UPDATED TO JUNE 30/72

YEAR OF 1972
 VOLUMES OF FISH BY SPECIES BY AREA BY TIME PERIOD

SPECIES MULLET



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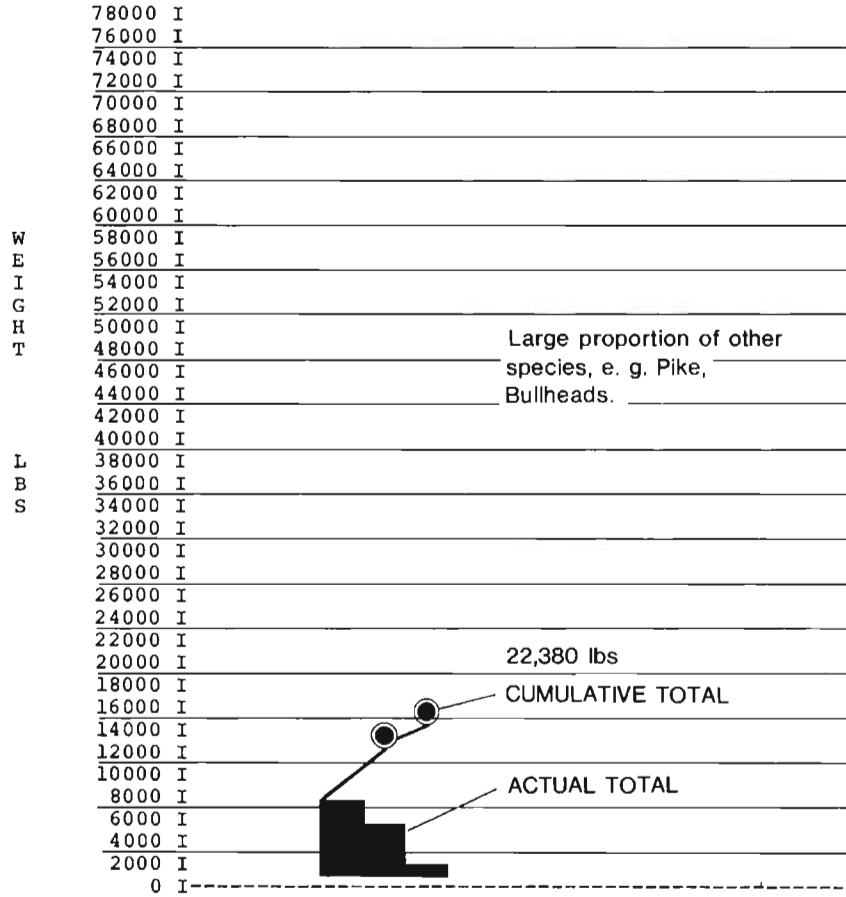


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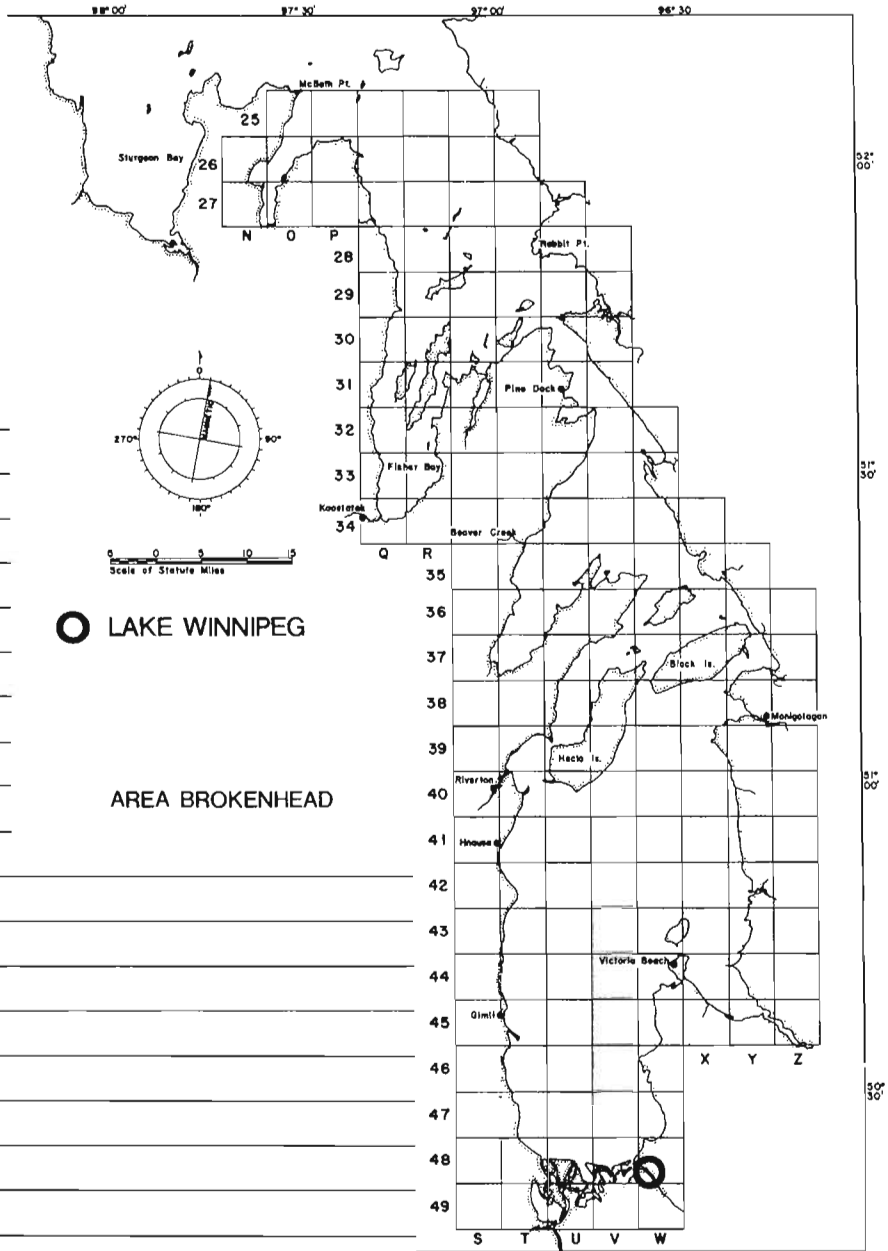
MANITOBA FINAL
 UPDATED TO JUNE 30/72

YEAR OF 1972
 VOLUMES OF FISH BY SPECIES BY AREA BY TIME PERIOD

SPECIES MULLET



Large proportion of other
 species, e. g. Pike,
 Bullheads.



LAKE WINNIPEG

AREA BROKENHEAD

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| R | R | R | Y | Y | Y | Y | Y | N | N | N | N | L | L | L | L | G | G | G | G | G | P | P | P | P | T | T | T | T | V | V | |

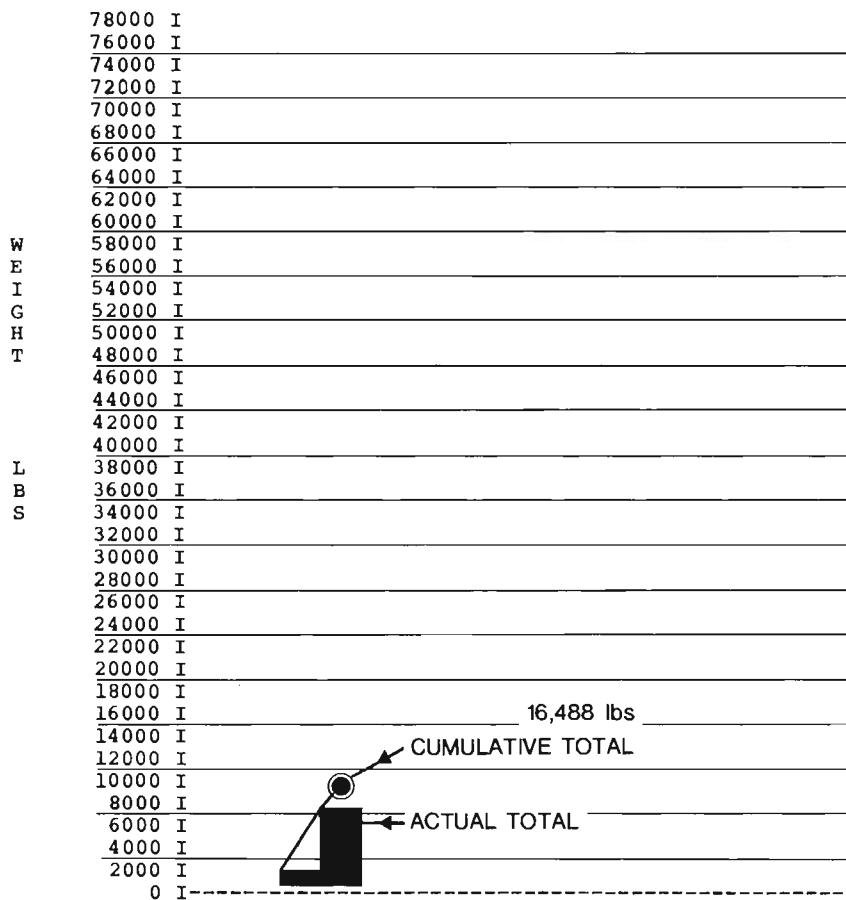
TIME PERIOD

COARSE FISHERY DEVELOPMENT

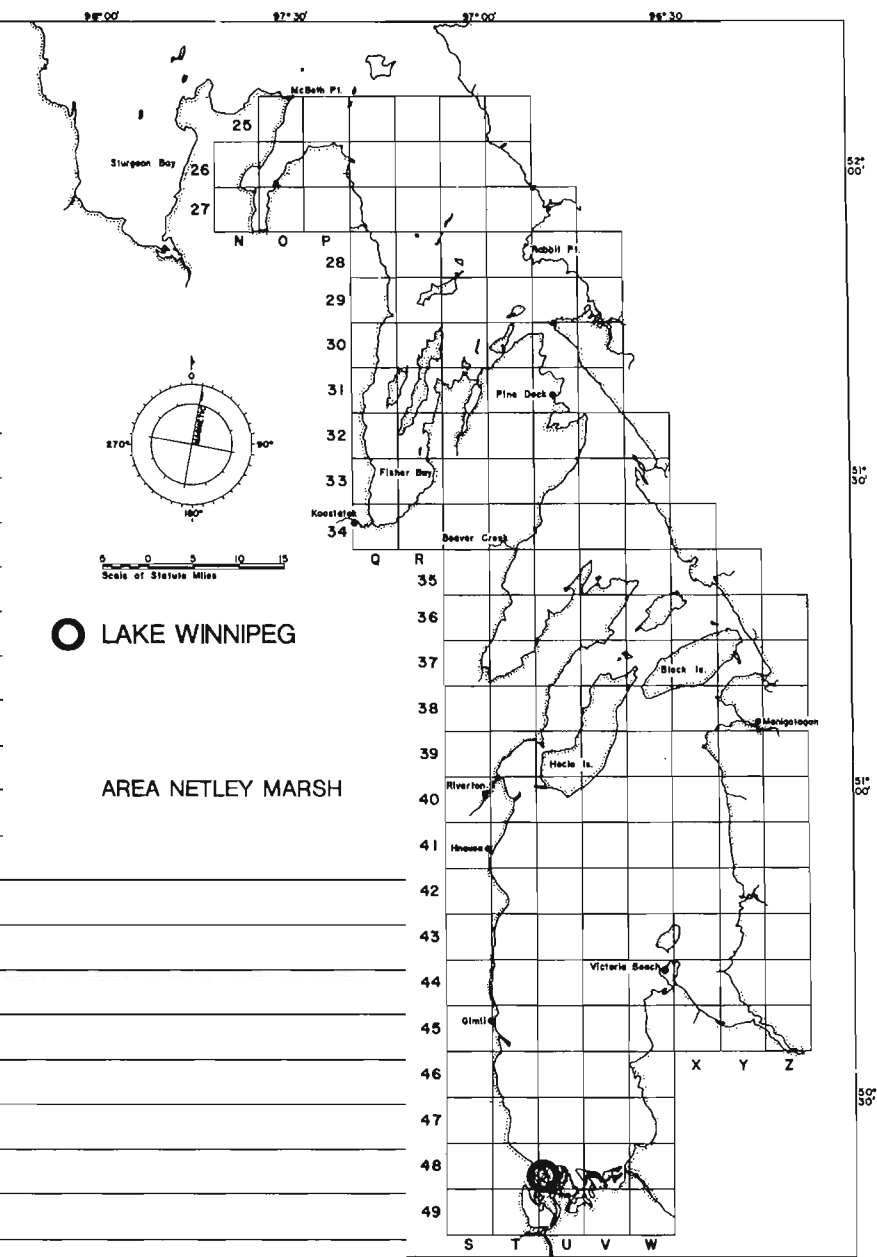
MANITOBA FINAL
 UPDATED TO JUNE 30/72

YEAR OF 1972
 VOLUMES OF FISH BY SPECIES BY AREA BY TIME PERIOD

SPECIES MULLET



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| R | R | R | Y | Y | Y | Y | Y | N | N | N | N | L | L | L | L | G | G | G | G | G | P | P | P | P | T | T | T | T | V | V | |
| TIME PERIOD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



COARSE FISHERY DEVELOPMENT

MANITOBA FINAL
 UPDATED TO JUNE 30/72

YEAR OF 1972
 VOLUMES OF FISH BY SPECIES BY AREA BY TIME PERIOD

SPECIES MULLET

| | | |
|---|-------|---|
| W | 78000 | I |
| E | 76000 | I |
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| G | 72000 | I |
| H | 70000 | I |
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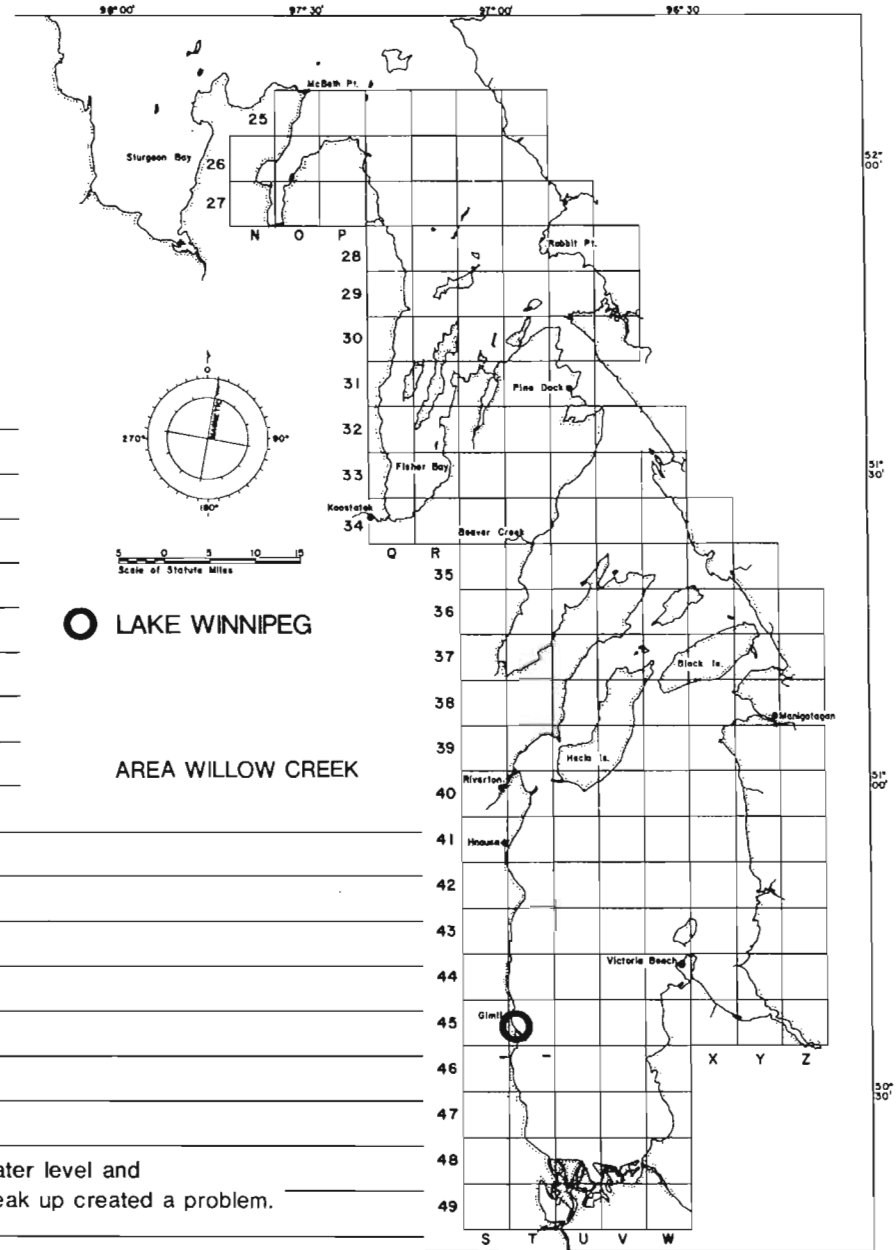
2,360 lbs

High water level and
 late break up created a problem.

CUMULATIVE TOTAL

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| R | R | R | Y | Y | Y | Y | Y | N | N | N | N | L | L | L | L | G | G | G | G | G | P | P | P | P | T | T | T | T | V | V | |

TIME PERIOD

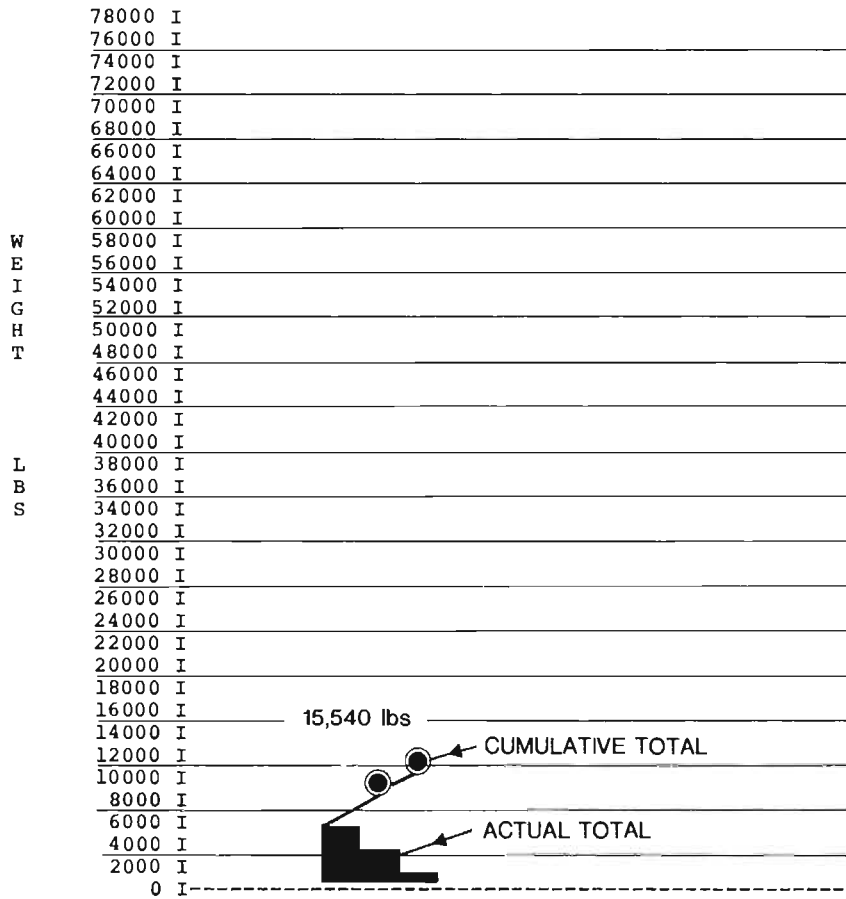


COARSE FISHERY DEVELOPMENT

MANITOBA FINAL
 UPDATED TO JUNE 30/72

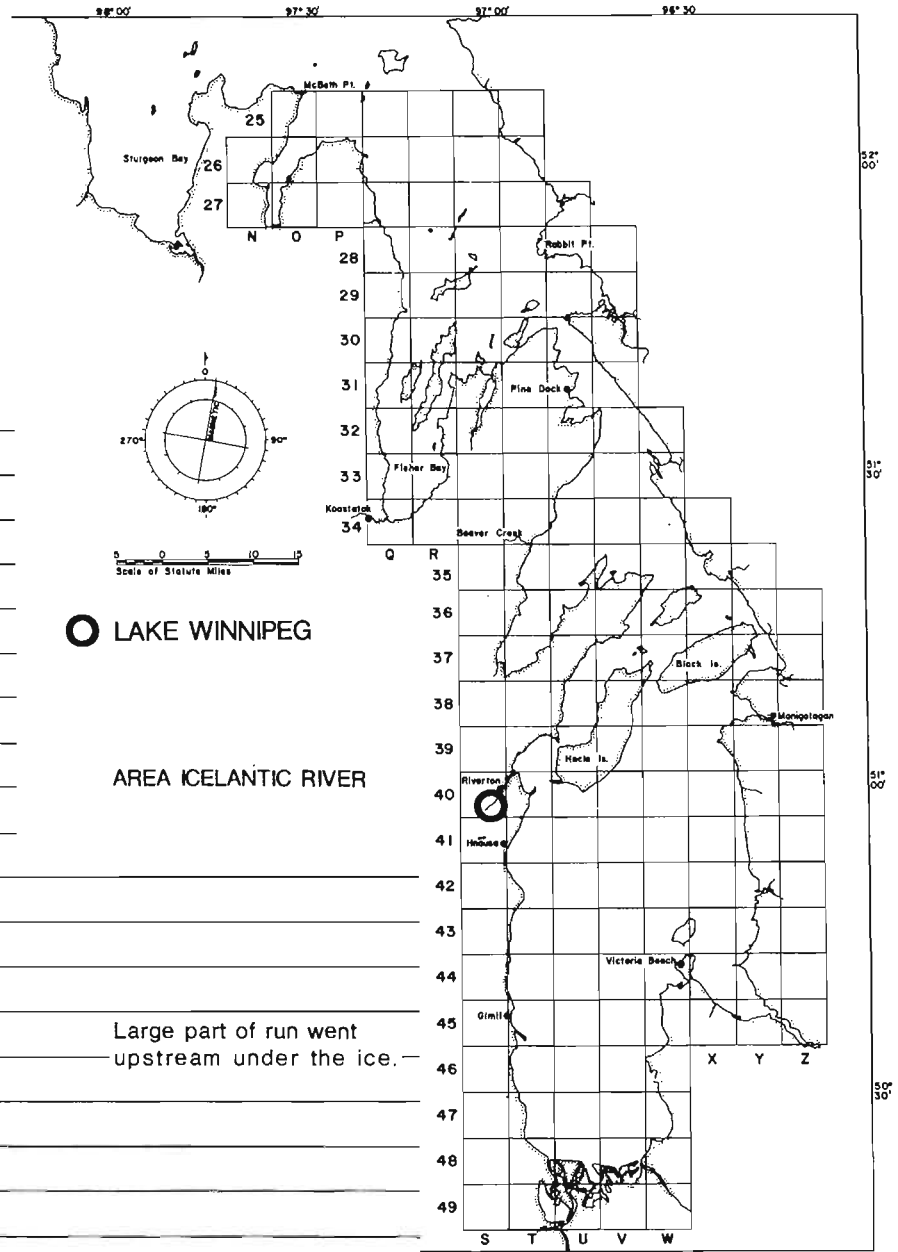
YEAR OF 1972
 VOLUMES OF FISH BY SPECIES BY AREA BY TIME PERIOD

SPECIES MULLET



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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TIME PERIOD

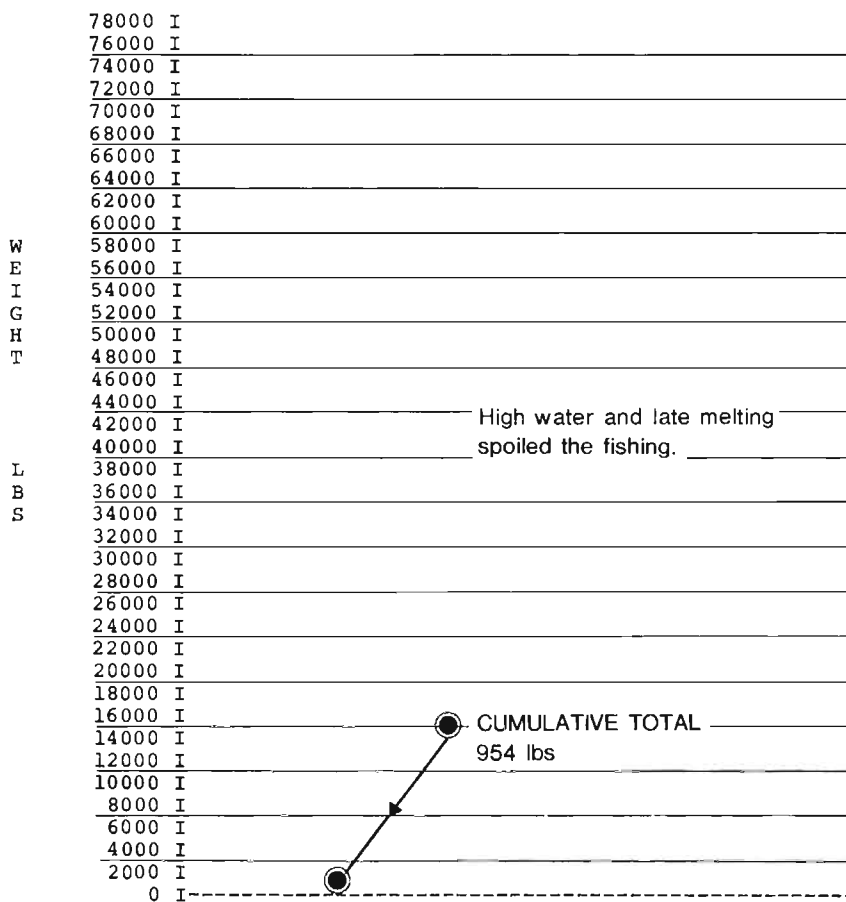


COARSE FISHERY DEVELOPMENT

MANITOBA FINAL
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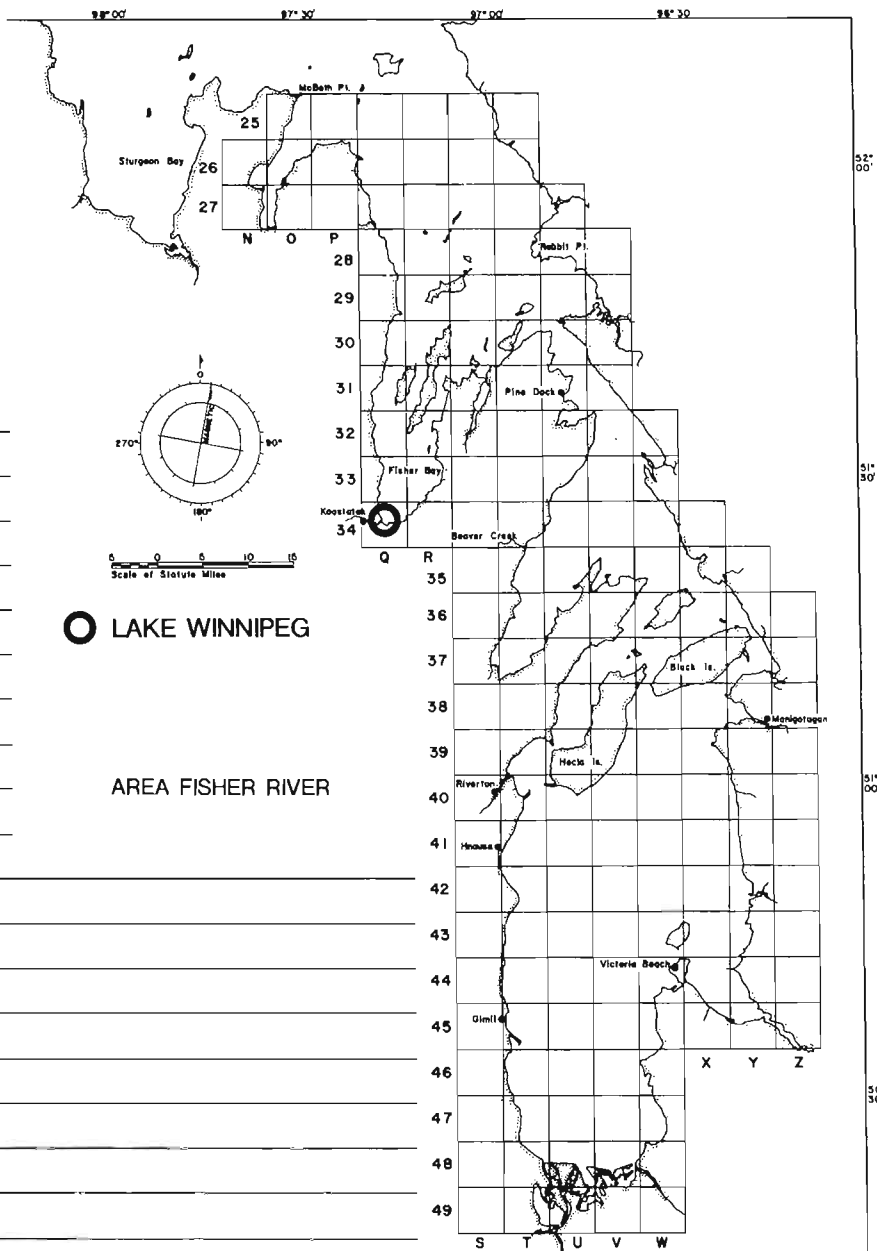
YEAR OF 1972
 VOLUMES OF FISH BY SPECIES BY AREA BY TIME PERIOD

SPECIES MULLET



High water and late melting
 spoiled the fishing.

L
B
S



LAKE WINNIPEG

AREA FISHER RIVER

| 12 | 19 | 26 | 3 | 10 | 17 | 24 | 31 | 7 | 14 | 21 | 28 | 5 | 13 | 20 | 27 | 3 | 10 | 17 | 24 | 31 | 7 | 14 | 21 | 28 | 5 | 12 | 19 | 26 | 2 | 9 | |
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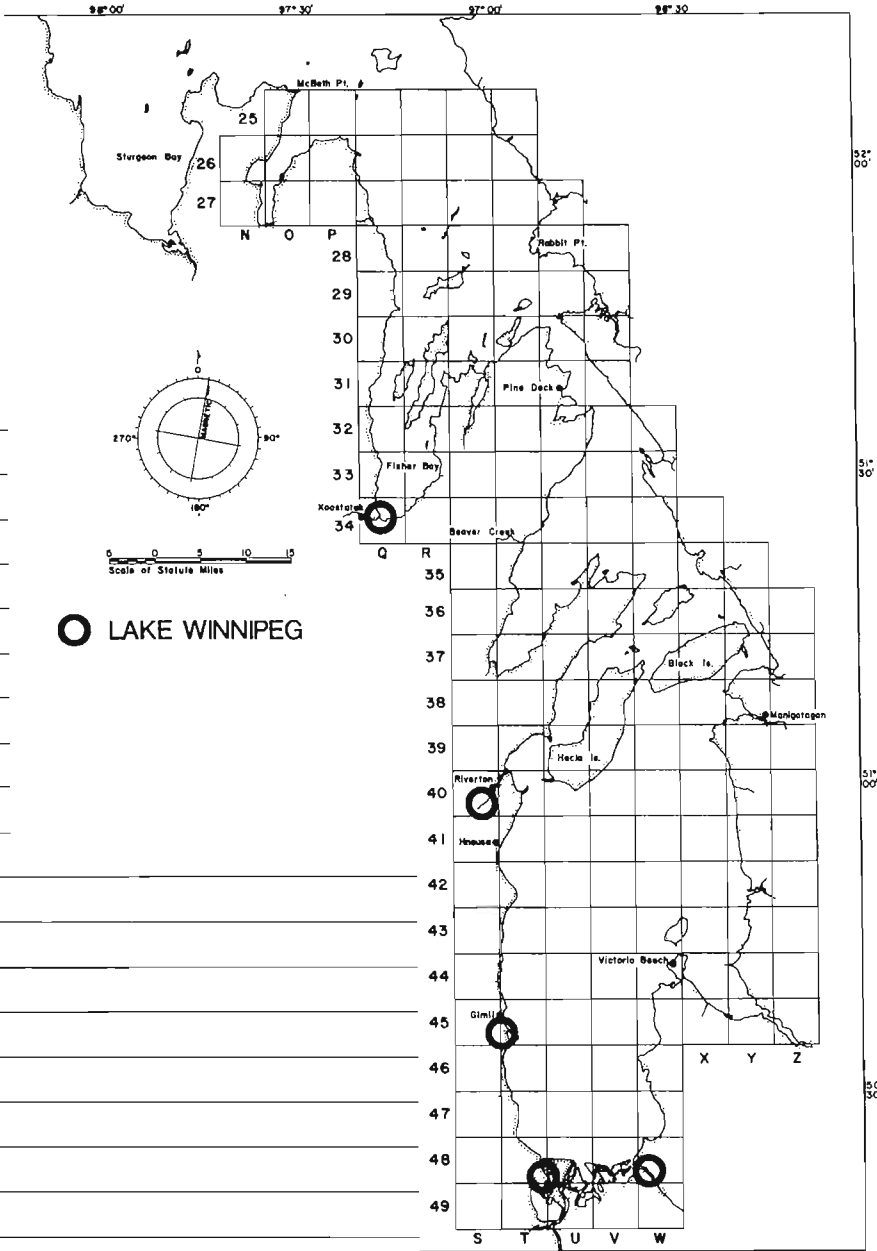
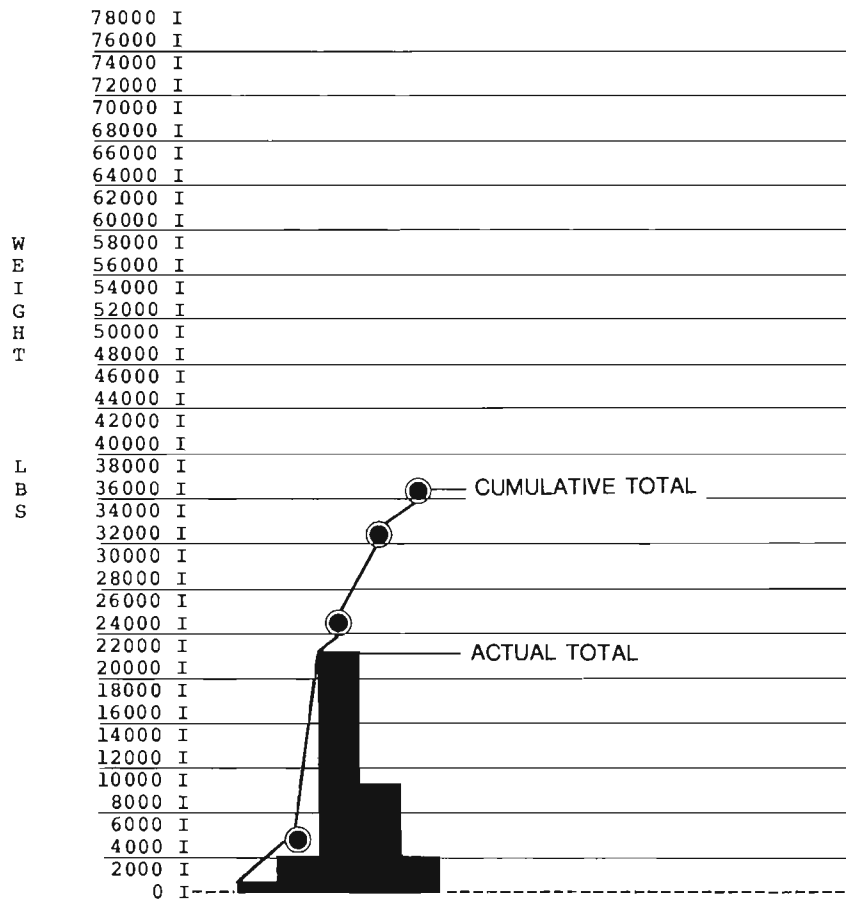
TIME PERIOD

COARSE FISHERY DEVELOPMENT

MANITOBA FINAL
 UPDATED TO JUNE 30/72

YEAR OF 1972
 VOLUMES OF FISH BY SPECIES BY AREA BY TIME PERIOD

SPECIES MULLET



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| R | R | R | Y | Y | Y | Y | Y | N | N | N | N | N | L | L | L | L | G | G | G | G | G | P | P | P | P | T | T | T | T | V | V |

TIME PERIOD

SECTION 1

D. Beach Seine Statistics

This section is a breakdown of the statistics from the 1972 Beach Seine Experimental Program carried on in Lake Winnipeg.

The figures indicate that relatively few carp were running but heavy concentrations of sunfish are noted.

| | Riverton Area | Willow Creek Area | Netley Area | Totals |
|-----------|---------------|-------------------|-------------|--------|
| | Lbs. | Lbs. | Lbs. | Lbs. |
| Totals | 6,068 | 55,034 | 10,590 | 71,692 |
| Species | % | % | % | % |
| Mullet | 10 | - | - | - |
| Carp | 10 | 13 | 25 | - |
| Sunfish | 80 | 79 | 60 | - |
| Bullheads | - | 8 | - | - |
| Others | - | - | 15 | - |

S.2.*

PROJECT SIDE BENEFITS

SECTION 2

A. Provincial Participation

The Manitoba government was most cooperative in the matter of data and information exchange. The Manitoba Economist, Mr. E. Davidoff, agreed with the Industrial Development Branch projects leader and Mr. D. Hagborg of the Environmental Analysis Services, Winnipeg, to use a common approach to data treatment. The 25 mile grid system then being used for Industrial Development Branch project requirements was accepted as a common data base. Special charts were drawn for the provincial government to enable the plotting of their data on the 25 mile grid base. Much credit for the success of this exchange must go to Mr. Frank Dopplinger, Chief, Planning and Design Services, Industrial Development Branch and to his staff for their excellent work.

SECTION 2

B. Central Region Participation

The Environmental Analysis Service in Winnipeg cooperated closely with us and assisted to establish the 25 mile grid system to process data.

The Resource Development Branch expressed willingness to utilize the grid system in a combined IDB/Resource Development project in another area.

A grid was also developed for a new project in South Indian Lake.

S.3.*

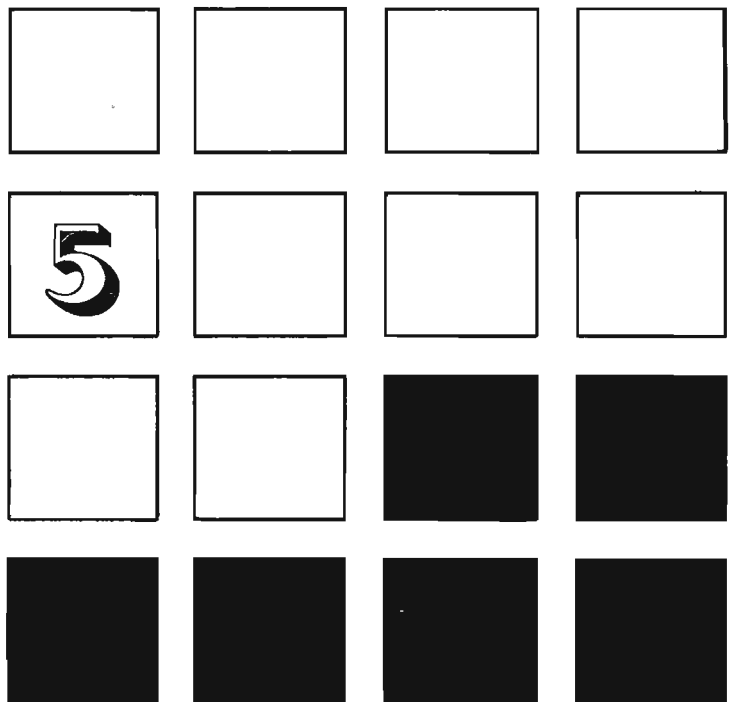
REFERENCES

SECTION 4

REFERENCES

1. Publication 1891 from Manitoba Fish Co. to Alexander McQueen, Esq., Inspector of Fisheries, Manitoba.
2. Commercial Fisheries Bulletin, May 1966, Volume 6, No. 1, Fisheries Branch, Department of Mines and Resources, Province of Manitoba.
3. K. Doane, Chief Fisheries Biologist, "Bulletin on Manitoba's Economic Future."
4. Commercial Fisheries Bulletin, August 1960.
5. Federal Indian Affairs. Article published, August 1960.
6. Trap Net Fishery Regulations - 1961 - March 1961, Volume 2, No. 3.
7. Commercial Fisheries, August 1961 - "Trap Net Effectiveness". Park Hanneson - Publication 1961, Manitoba.
8. B. Stephanson inter department memo, Province of Manitoba, November 13, 1964.
9. Manitoba 1971 Rough Fish Harvesting Program Statistics, Industrial Development Branch, Ottawa.
10. Manitoba, Provincial Annual Reports, 1963-1970.
11. Trammel Netting, Fisheries Research Branch publication, May 1966, Volume 6, No. 1.
12. G.E. Orvis, Trap Net Operation - Manitoba 1962.

DESIGN AND CONSTRUCTION OF TRAP NETS



Department of the Environment
Industrial Development Branch
Exploratory Fishing Division
Chief, J. Rycroft

1972 MANITOBA
ROUGHFISH HARVESTING
PROJECT—1354—72

Co-Authors
Andrew and Ian B. Duthie

UNIT 5

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UNIT 4

DESIGN AND CONSTRUCTION OF TRAP NETS

Unit Introduction

This unit was prepared as a result of research carried out on the Manitoba involvement with Trap Nets and Pound Nets from the technical viewpoint.

Although this unit cannot be regarded as a complete trap net breakdown, much valuable information can be derived which in itself can be a very useful handbook for the Canadian Freshwater Fisherman.

S.1.*

TRAP NET DESIGN RELATED TO PERFORMANCE

SECTION 1

TRAP NET DESIGN RELATED TO PERFORMANCE

A. Trap Nets - General

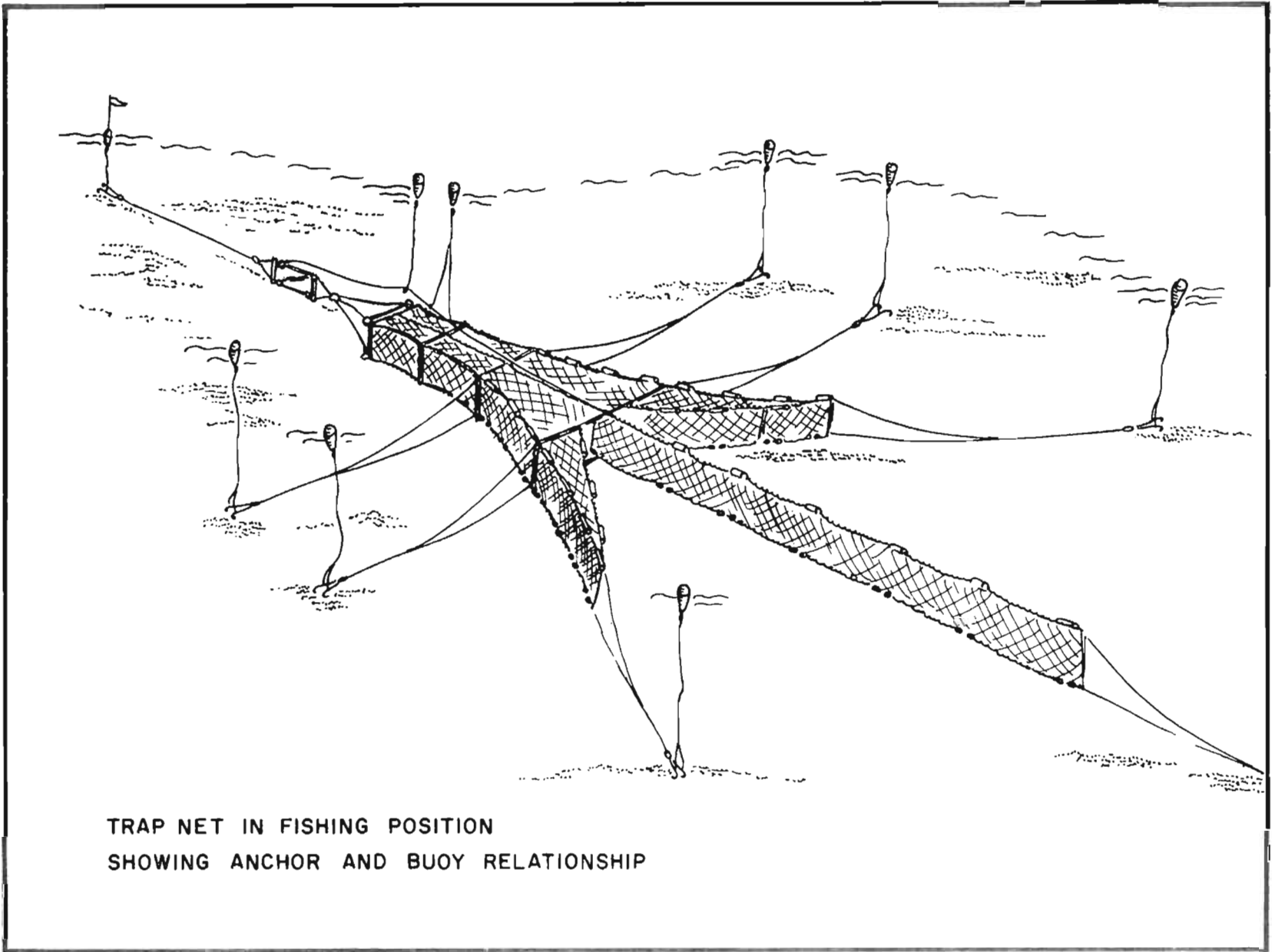
The operation of trap nets depends on the natural tendency of fish to follow webbing suspended in water. For this purpose a heavy web of 300 to 1,000 ft., called a leader, is used. Attached to the deep end of the leader is a Y-shaped construction (called the house). The fish following the leader enter the house between the spread wings of the net, go through a series of baffles and eventually enter the "crib" where they are entrapped until the net is lifted.

Several anchors, with buoys attached for recovery purposes, serve to hold the net taut in the water. To provide additional tension, a set of spread double blocks is used at the back of the net. The effectiveness of a trap net is determined by the position of the anchors, and the buoys give some indication as to the correctness of the position of the net in the water.

When the net is to be lifted, tension on the block is released and the crib raised to the surface.

On the question of the best mesh size to be used in the leader, there has been some controversy. Sizes up to 11 inches have been tried, and it has been found that fish will lead equally well to large or small meshes, 13 pound pickerel and 5 inch long smelt have been taken from the same net, with a leader of 8 inch mesh. This size has been found, from experience on Lake Erie, to be most practical. A small mesh leader, besides being comparatively high in cost, tends to bog down in murky water, and may, in time, sink with the weight of moss and dirt picked up. On the other hand, when a mesh size larger than 8 inches is used, there is a tendency for the leader to tangle with the floats, making setting a chore. It seems, therefore, that 8 inch mesh would be best for the leader.

Other dimensions are as follows - A net 8 ft. in depth will have wings 10 ft. long and hearts 10 ft. long, the length of the house will be 8 ft., the width across the breast 12 ft. The crib will be 14 ft. in length, 8 ft. in width, and the funnel 7 ft. 2 in. long with a 10 in. outlet opening.



TRAP NET IN FISHING POSITION
SHOWING ANCHOR AND BUOY RELATIONSHIP

A net 6 ft. in depth will have wings 8 ft. long and hearts 7 ft. long, the length of the house will be 16 ft. 6 in., width across the breast 9 ft. The crib in this case will be 12 ft. long, 6 ft. wide, and the funnel will be 6 ft. 6 in. long with a 10 in. outlet opening.

Loops are attached on wings and breast corners to facilitate attaching anchor bridles, and at the back of the crib are 10 in. loops (3 at top, 3 at bottom), to which the brails are attached.

Materials:

Rope being used for framing on the nylon nets is Nylon or Drumlene. The combination of 12 thread Primolite treated nylon web and Drumlene rope results in a net which is not subject to rot and requires comparatively little maintenance.

In addition to the hung net as delivered from the factory, the following rigging will be required:

Anchors:

6 anchors, specifically designed for trap nets, will be required for each single crib net, 8 will be required for a double crib net. These anchors are of a 2 fluke grapnel type.

Ropes:

Approximately 2,000 ft. of 1/2 in. sisal or manila rope will be required for each net. For ease of handling, this rope is not tarred, but a Bar-Rot preservative on the rope will increase the life somewhat.

Brails:

2 brails are required for each net, for attachment at the top and the bottom of the lifting crib. The top rail is simply a length of 2 x 4, 10 ft. long and fastened to loops at the top rear of the crib. The bottom rail is a length of 1 - 1/4 in. pipe, 10 ft. long, attached to lower rear crib loops. The necessary loops are seamed to the net during manufacture.

Bridles:

Bridles, made of 1/2 in. rope, will be required for each anchor line. These should be designed to hold the net upright in the water to resist the current. Loops have been seamed to the nets to facilitate attachment of the bridles.

Blocks:

A set of spread blocks is attached to the four corner bridles from the back of the crib. This block is used to dress up the net. About 200 ft. of rope should be used with the block.

Buoys:

A marker buoy will be required for each anchor line as well as one for the crib lifting lines and one for the recovery line on the block rope. Two eye bolts are attached to the anchor buoys, one for the anchor line and one for tightening the anchor.

Buoys are painted various colors for identification, i.e.,

| | | |
|---------------|---|-------|
| Anchor buoys | - | Black |
| Crib Buoy | - | White |
| Recovery Buoy | - | Red |

Flags:

Identification flags are required for the nets, one for each net. The flag is attached to the king anchor line and one extra is used in a gang, attached to the lead anchor of the first net.

Setting of the Net:

In this type of fishing, one of the most important steps is the loading of the net. This is the basis for a successful setting.

Two anchors, the lead anchor and the king anchor, are loaded with the net. The king anchor, blocks and brails, are loaded first, then the crib and house accorded into a neat pile with all bridle ropes coiled. The ends should be fastened to a point on the boat where they may be kept in proper sequence. The lead is fastened to the net and piled so that it will pay out evenly when setting. The lead anchor and line are placed on top.

The first step in setting the net is to fasten a lead flag to the lead anchor recovery line and set that over the side. The setting boat moves forward, and two men commence to guide the net over, one man on the float line and one on the sinker line. When the end of the lead is reached, forward motion of the setting boat is stopped. For use in tightening the lead, a line attached to the boat is run through a loop on the lead sinker line and the loose end of the rope fastened again to the boat.

Next an anchor is run out about 300 ft. in front of the setting boat. The line from that anchor is used for setting the lead anchor, tautening the lead and checking any drifting of the setting boat. This assures that the net is straight in the water.

At this point, if the net has been properly loaded, the wings should be on top of the pile. The anchor boat now comes into action, picking up the bridle of one of the wings and attaching to it an anchor line with anchor. Then the anchor boat is guided out, towing the wing at an angle to the lead float line, until some tension is attained. When the first wing is in position, the centre line of the net would be about 2 ft. off centre from the leader float line. The net is then past centre for the setting of the opposite wing, so that when the anchor sets the net will line up straight with the leader.

After the wings are set, the line attaching the lead sinker line to the boat is unfastened. The setting boat is then winched forward, plying over the house and crib. The side anchors are set in the same manner as the wing anchors were set.

Next the blocks are spread. A temporary line is attached to the block rope to give enough line to draw up when tightening. One end of this rope is attached to the block line, the other to a retaining line seamed into the framing rope at the wings. The recovery buoy is put over the side, then the king anchor is run out and set. The boat then returns over the crib, lifts the recovery buoy, and proceeds to tauten the net. When the proper tension is reached, the temporary line is removed and the block line fastened to the retaining line.

Lifting the Net:

When lifting the trap net, the boat is positioned over the net and the crib lifted and recovery buoys picked up. The block line is winched in, the temporary line is attached to the block line and tension released. The crib ropes are then lifted until the brails appear on the surface. The top brail is raised from the water and placed on two brackets extending from the side of the boat. The zipper string is removed and the crib webbing pulled into the boat, forcing the fish to the bottom and back of the crib. A dip net is used to remove the fish.

The zipper string is then replaced, the brail lowered into the water and the blocks drawn up in the same manner as in setting the net.

SECTION 1

TRAP NET DESIGN RELATED TO PERFORMANCE

B. Trap Net Design

Design of Trap Nets used on Lake Winnipeg

(by K. Doan, Director of Fisheries, Manitoba.)

1. Description

The nets fished on Lake Winnipeg for the initial year of experimental trap net fishing were of simple, compact design. A large variety of designs were available but a conservative approach was taken, so as not to involve a large monetary outlay, and yet produce a net which has proven effective elsewhere. A second consideration was the type of boats to be used in the experimental operations - it was anticipated that two men would handle these nets from skiffs 18 to 20' in length without the aid of larger boats in setting them. The inexperience of the fishermen was also a factor. A design meeting these requirements was found in a net used by the Ontario Department of Lands and Forests for testing purposes. (See diagrams A, B, for 8 ft. to 12 ft. traps).

The most controversial question on trap net design last year was that of mesh size in the leader, 2 1/2 in. to 6 in. mesh leaders were used, and it was found that the various mesh sizes did not noticeably affect the production of the net, however, small mesh leaders are much more costly and tend to bog down faster in murky water as well as being more vulnerable to debris and current. It would appear that generally, the larger mesh size would prove more practical. Also, it was found that double crib type nets are required.

The results of using this type of net for a commercial operation on Lake Winnipeg may not have appeared a great success, however, the idea of using trap net gear was proven to work, and the ideas for a basic design of net which should prove much more successful in our waters, was born. It was also pointed out at this time, the nets purchased last year would not prove to be a total loss, but that they could be brought up to a more practical design through modifications which incorporate all of the material and labor already paid for in the original price of the net.

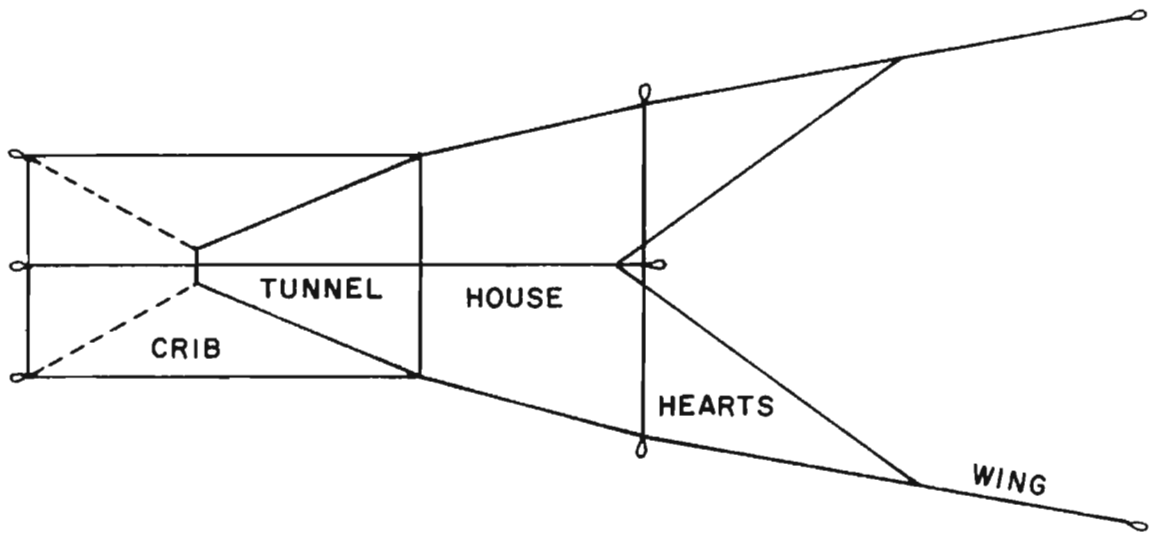
With the aid of the department's instructors, many small changes were made to the nets on the spot, in an effort to improve their production. They were handicapped in that materials were not readily available, and therefore were limited to very minor changes, some of which were enlarging the openings into the net, and some attempts at lengthening the body of the net. Various suggestions were also made at that time regarding possible modifications, and design of new nets. These suggestions were incorporated into a practical design. (See diagram C 8 ft. and D 12 ft.). These modifications are expected to increase the efficiency of the net manifold.

After a year's experience in trap net fishing, it was quite evident that the design of net used left something to be desired. A larger, more effective net was needed, under the same general fishing conditions as last year, and therefore would again have to be easily handled. It is thought that a net of 10 ft. depth could be handled quite readily from the small boats used for lifting, and also a net of larger dimensions throughout could be handled safely with little more difficulty. Perhaps setting the leader and net from separate boats instead of from one boat, as previously done, (See diagram E 10 ft. net), suggested net.

With the introduction of trap net boats to Lake Winnipeg, again nets will be changed to larger dimensions, quite possibly of different design, but over all dimensions similar to nets fished on Lake Erie. At that time the depth of the nets for pickerel fishing would not change too much, (possibly to 12 ft. or 15 ft.) as it will remain an inshore operation, it is also feasible that these shallow nets could be raised off the bottom, in fishing position so that they may also be used when fish are running close to the surface in deeper water (i.e. a net 10 ft. deep could be buoyed up to fish 2 ft. below the surface in 40 ft. of water).

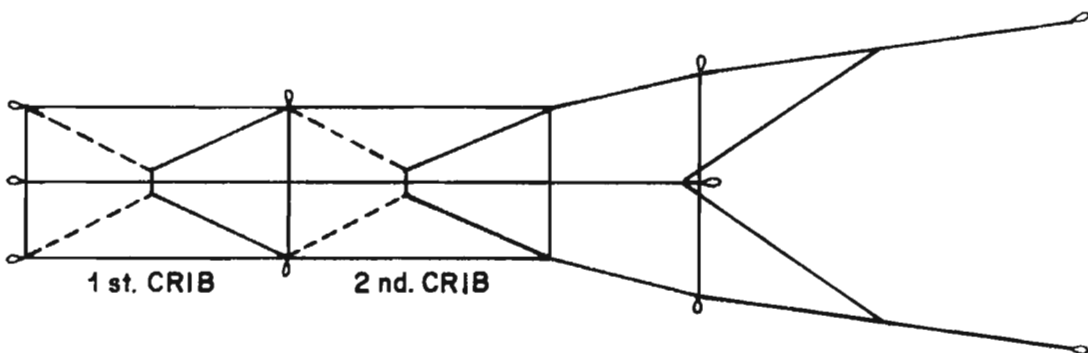
The types of nets so far discussed have been primarily for inshore pickerel fishing. As fishermen become familiar with this type of gear no doubt attempts will be made to take other species of fish in this method. Generally speaking the pickerel net will accommodate this, with the exception of whitefish, in which a net of much larger dimensions would be used, usually incorporating a taper in the depth of the net.

A.)



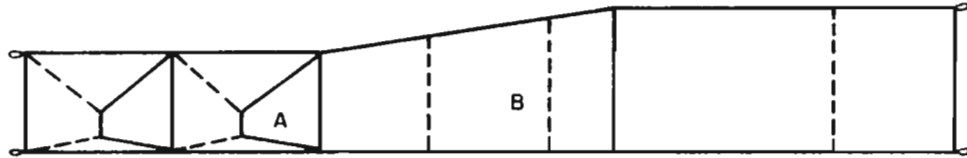
STANDARD NET.
LENGTH AP. 35' - TOP VIEW

B.)



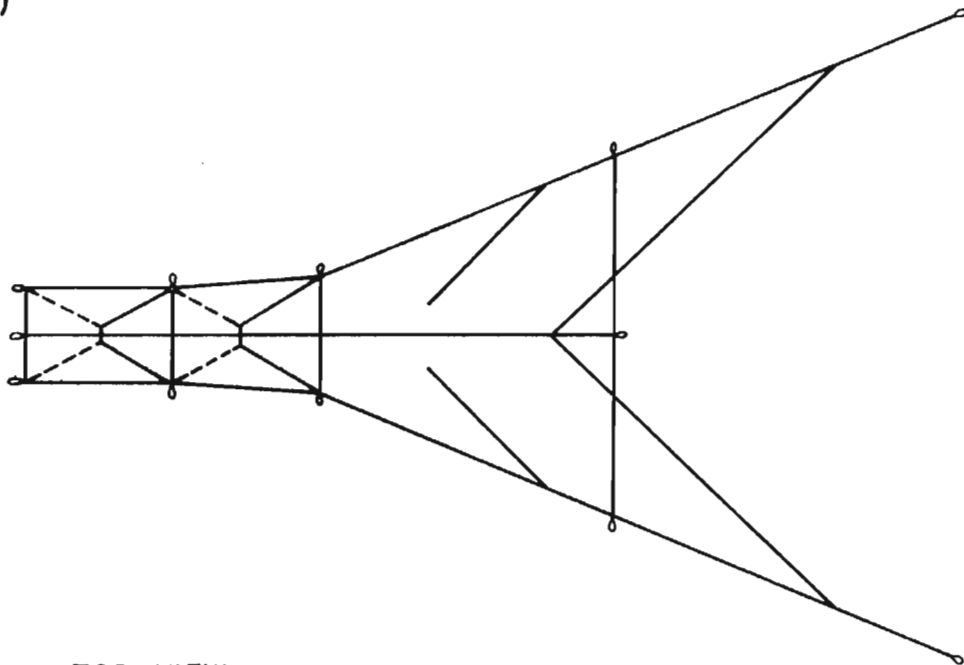
DOUBLE CRIB NET.
LENGTH AP. 50' - TOP VIEW

C.)



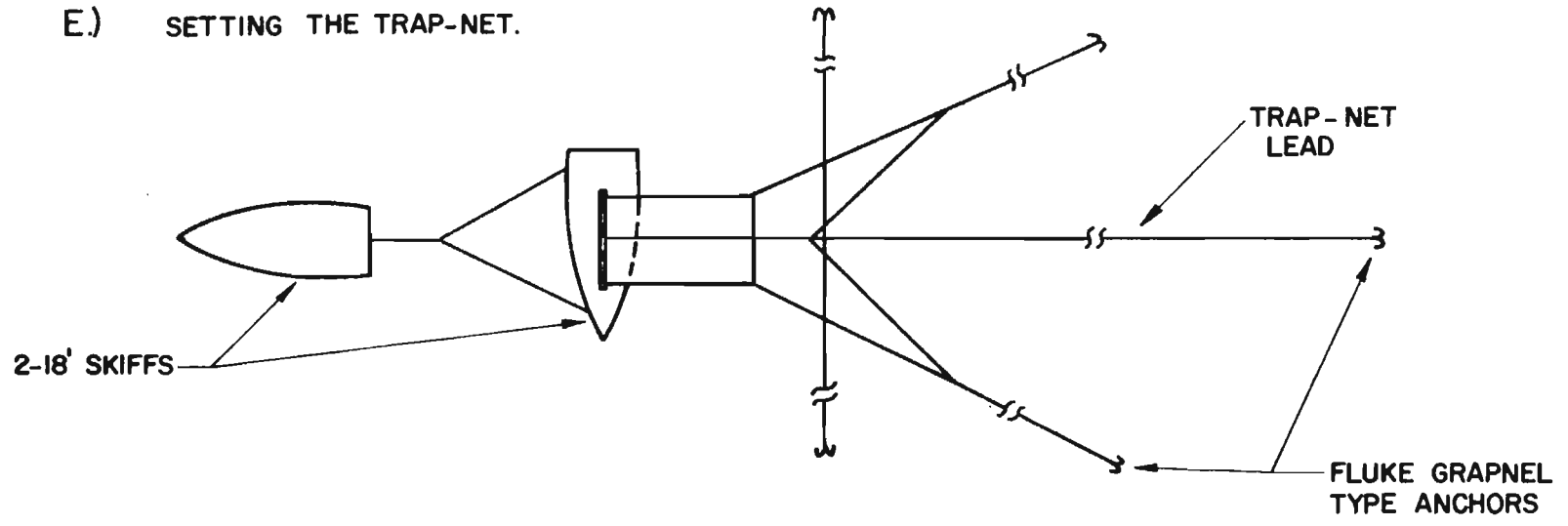
LARGE HOUSE NET - SIDEVIEW
NOTE - TAPERED HOUSE AND DROPPED TUNNELS

D.)

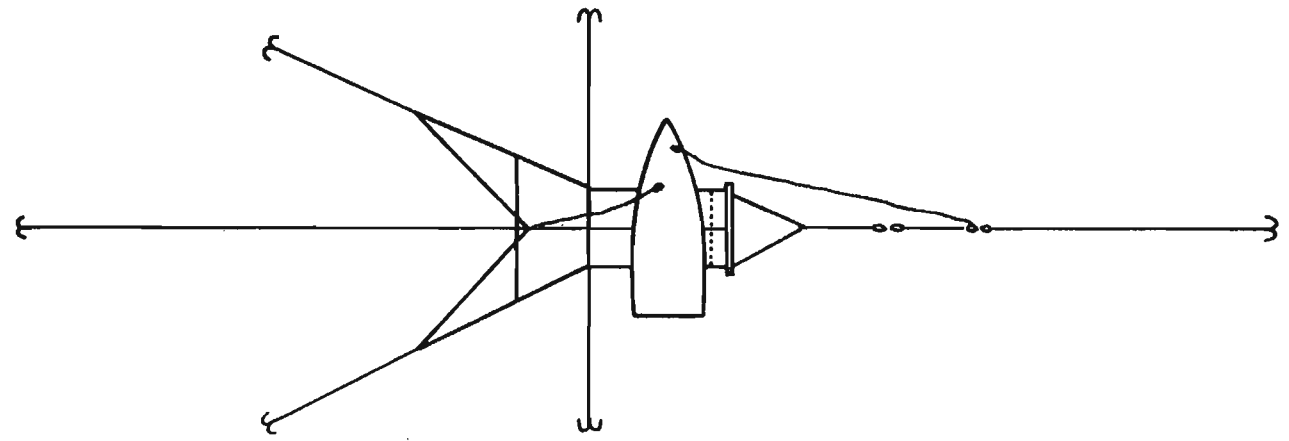


TOP VIEW
LARGE HOUSE PICKEREL NET. LENGTH AP. 80'
NOTE - WICKERS ADDED

E.) SETTING THE TRAP-NET.



F.) LIFTING THE TRAP-NET.



S.2.*

TRAP NET CONSTRUCTION

SECTION 2

TRAP NET CONSTRUCTION

This section would be of interest to the specialist in trap net construction who would be concerned with the fine specifications needed to construct a trap net.

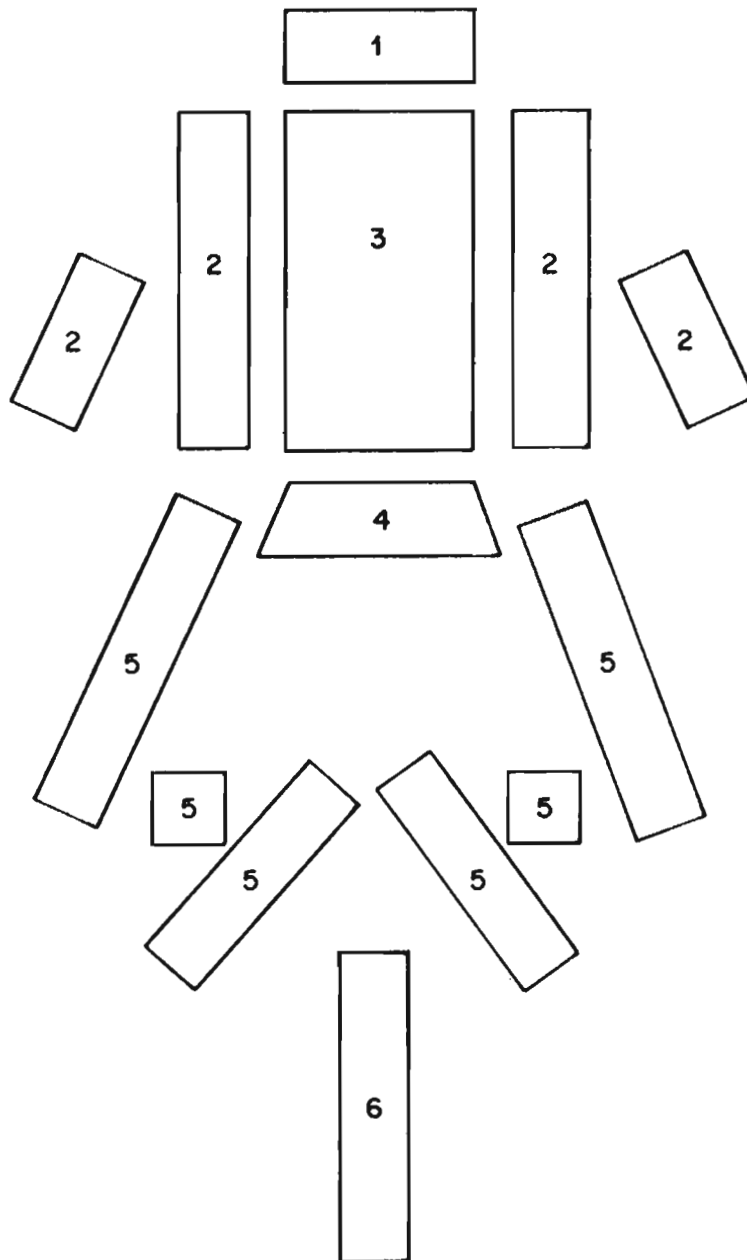
The first drawing shows the different parts which, when joined, form a complete trap net. The Russian net specialists use this type of diagram when constructing their nets and it appears a very logical approach.

The other sketches are detailed specifications on a 6 ft. trap net, showing mesh sizes, thicknesses, size of weights and floats, etc.

TRAP NET CONSTRUCTION

For the purpose of clarification only one terminology will be used which is set down as follows:

SINGLE CRIB TRAP NET WITH SINGLE HEART.



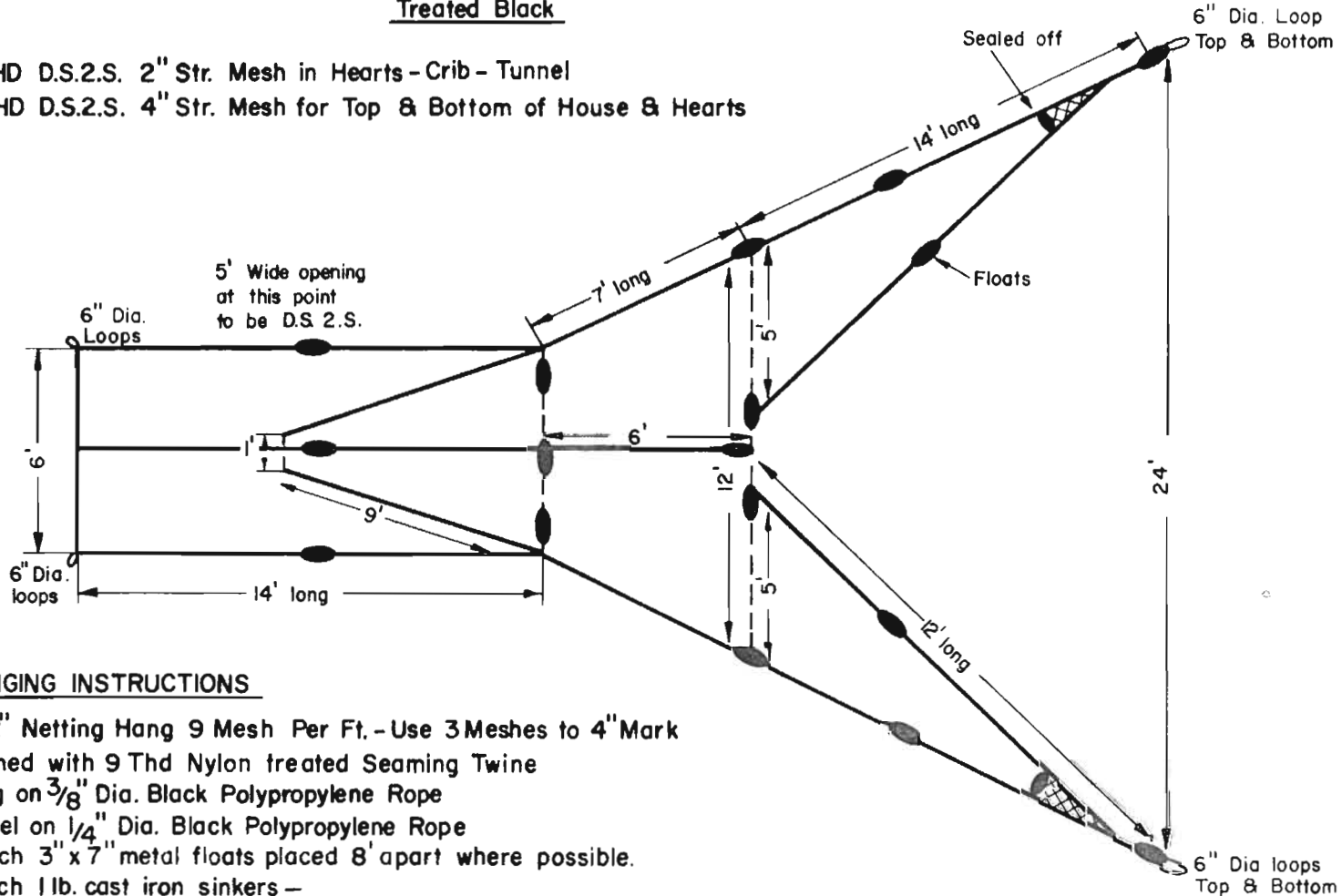
Definitions

1. Head
2. Sides and Hoods of Crib.
3. Floor of the Crib.
4. Floor of the Heart.
5. Sides and Front Walls of Heart.
6. Leader.

6' Trap Net

Made from Nylon Netting
Treated Black

15 THD D.S.2.S. 2" Str. Mesh in Hearts - Crib - Tunnel
18 THD D.S.2.S. 4" Str. Mesh for Top & Bottom of House & Hearts

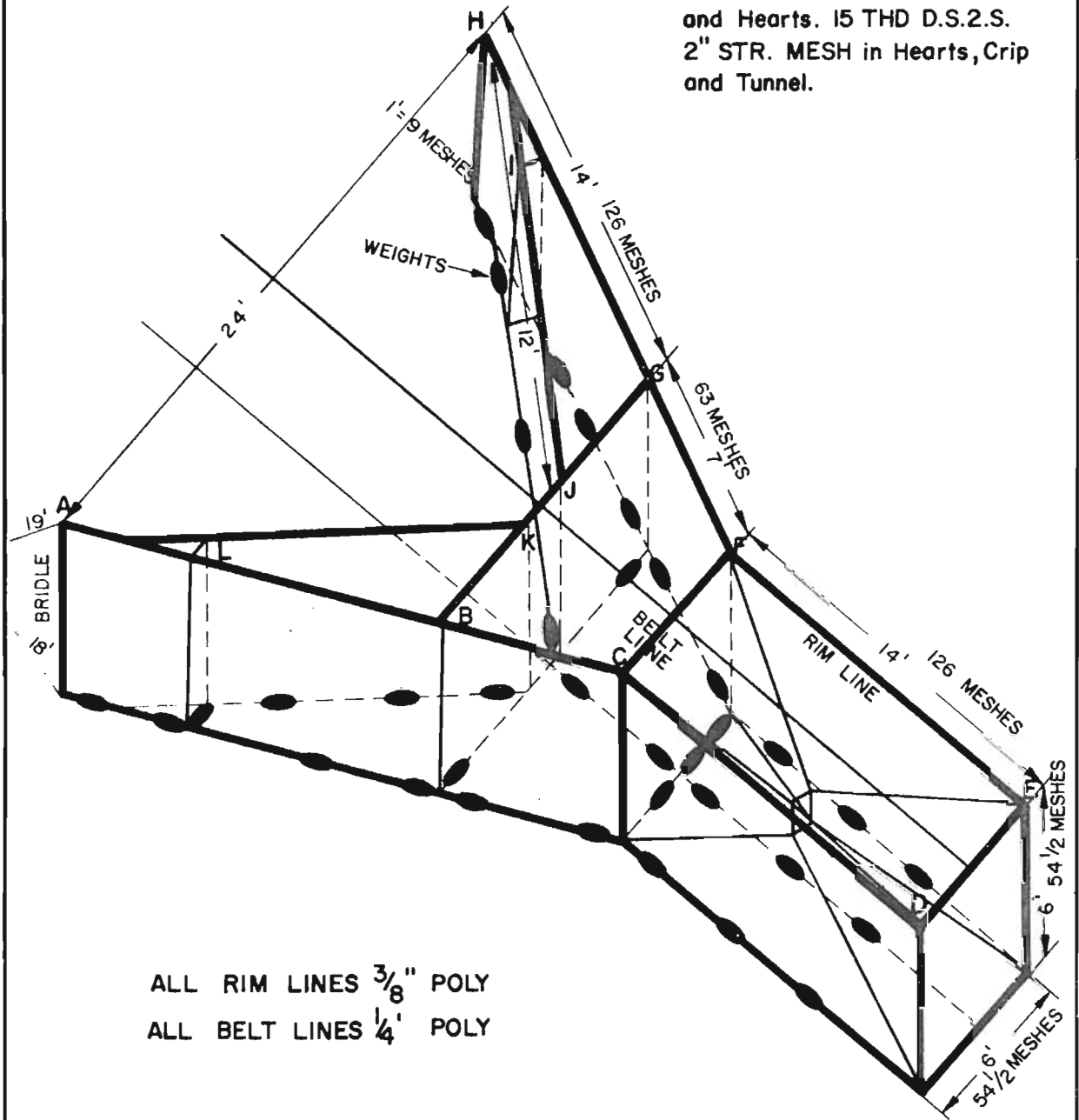


HANGING INSTRUCTIONS

All 2" Netting Hang 9 Mesh Per Ft. - Use 3 Meshes to 4" Mark
Seamed with 9 Thd Nylon treated Seaming Twine
Hang on $\frac{3}{8}$ " Dia. Black Polypropylene Rope
Tunnel on $\frac{1}{4}$ " Dia. Black Polypropylene Rope
Attach 3" x 7" metal floats placed 8' apart where possible.
Attach 1 lb. cast iron sinkers -
Place 1 lb. sinkers 4' closer at Gap.

TRAP NET 6'

18 THD D.S.2.S. 4" STR MESH
for top and bottom of Crib
and Hearts. 15 THD D.S.2.S.
2" STR. MESH in Hearts, Crip
and Tunnel.



ALL RIM LINES $\frac{3}{8}$ " POLY
ALL BELT LINES $\frac{1}{4}$ " POLY

S.3.*

UTILIZATION OF IMPOUNDING TYPE GEAR
(TRAP NETS) FOR WINTER FISHING OPERATIONS

Modified from original diagrams
which were compiled by

G. E. Orvis,

Province of Manitoba.

SECTION 3
UTILIZATION OF IMPOUNDING TYPE GEAR
(TRAP NETS) FOR WINTER FISHING OPERATIONS

As a result of the 1972 Manitoba Roughfish Harvesting Program it was observed that one of the contracted commercial fishermen had experienced very favourable results in the course of his trap net operation fishing under the ice. It was therefore decided to include this particular section which relates directly to trap net operations conducted under the ice.

Factors Affecting Winter Trap Net Operations

The following factors should be considered prior to the implementation of any winter trap net operation.

- a) Schooling habits of the species to be exploited.
- b) Marketing outlets and current price structures.
- c) Area of Operation.
- d) Access to Transportation.
- e) Adequate Resources e.g. type of trap nets etc.
- f) Depth of water.
- g) Type of bottom.
- h) Thickness of ice.
- i) Current speed and direction etc.

Winter Trap Net Fishing

Step One:

To establish the distance from the lifting hole to the lead anchor the following factors must be considered.

- a) Depth of water.
- b) Length of lead.
- c) Length of anchor line.
- d) Length of bridle.
- e) Size of trap net.

Mr. G. E. Orvis outlines the following specifications in relation to the above factors:

- a) Eight foot trap net with a 300 foot lead.

142 steps are taken with 100 foot anchor lines stepped in 35 feet from the outside end of the anchor line.

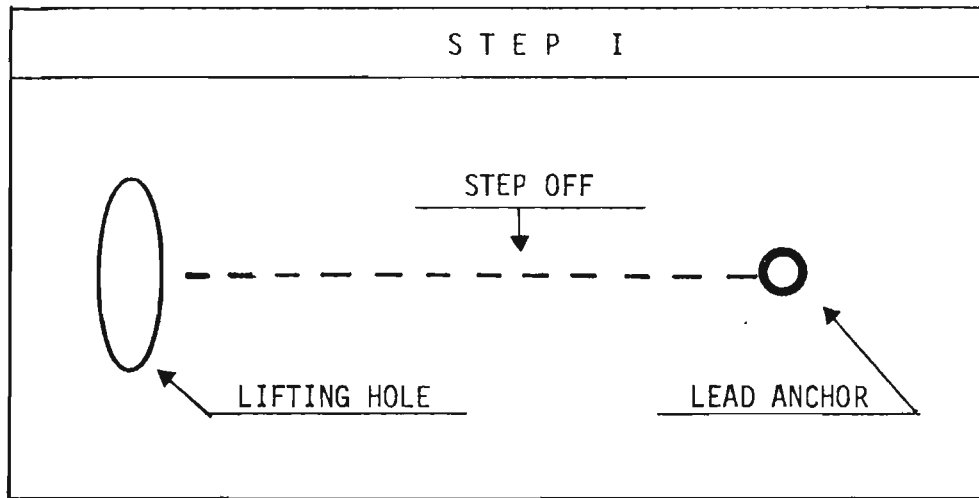
- b) (i) Ten foot trap net with a 500 foot lead

210 steps with 100 foot anchor lines stepped in 35 feet from the outside end of the anchor line.

(ii) 226 steps with 150 foot anchor lines.

- c) Twelve foot trap net with a 500 foot lead.

213 steps with 150 foot anchor lines stepped in 35 feet from the outside end of the anchor line.

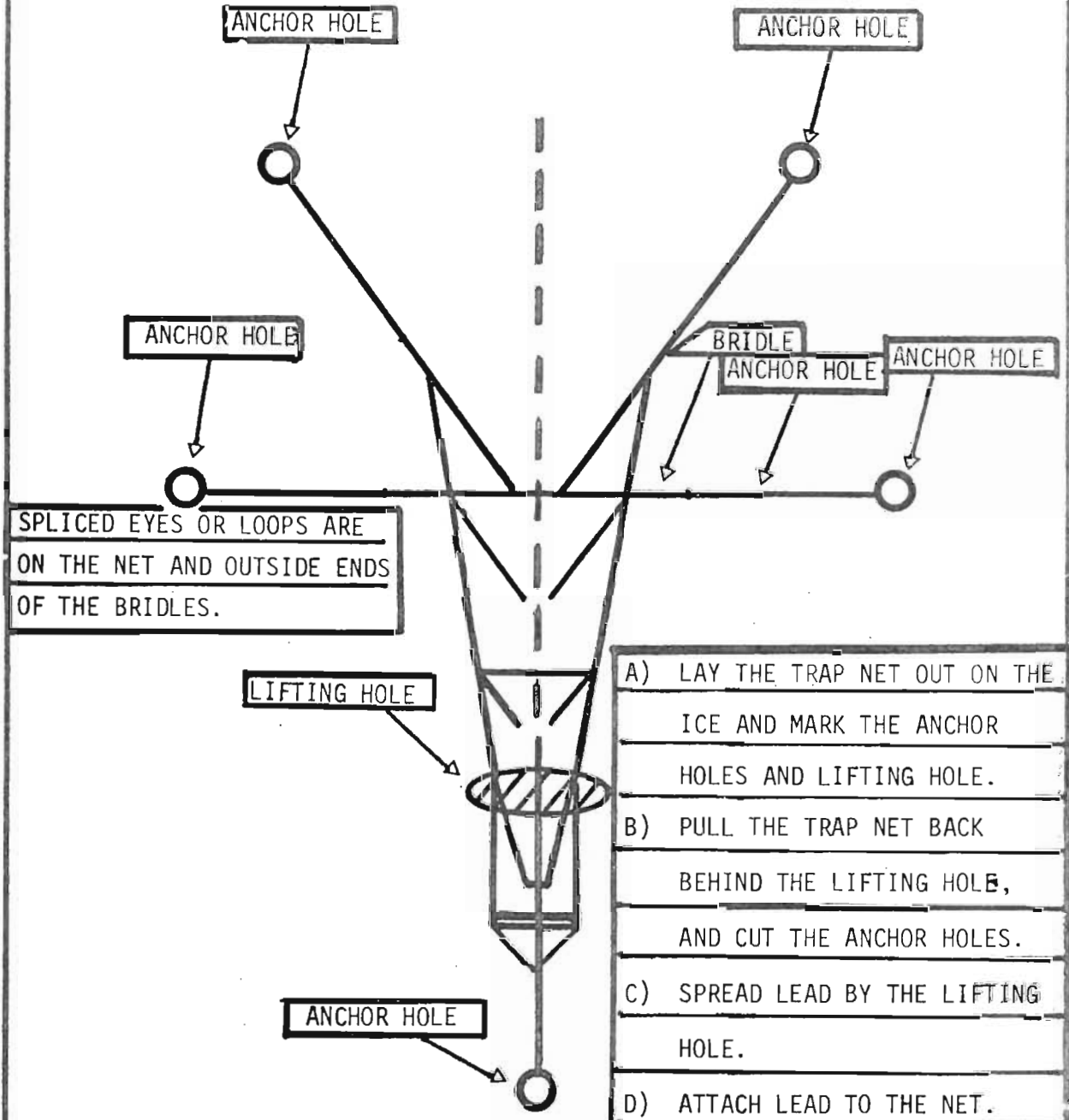


The length of the lead, bridle, anchor line and the length of the net from the lifting line to the lead ties minus the depth of water plus 10 feet on the anchor line.

Example:

20 feet of water plus 10 feet of line = 30 feet.

STEP II

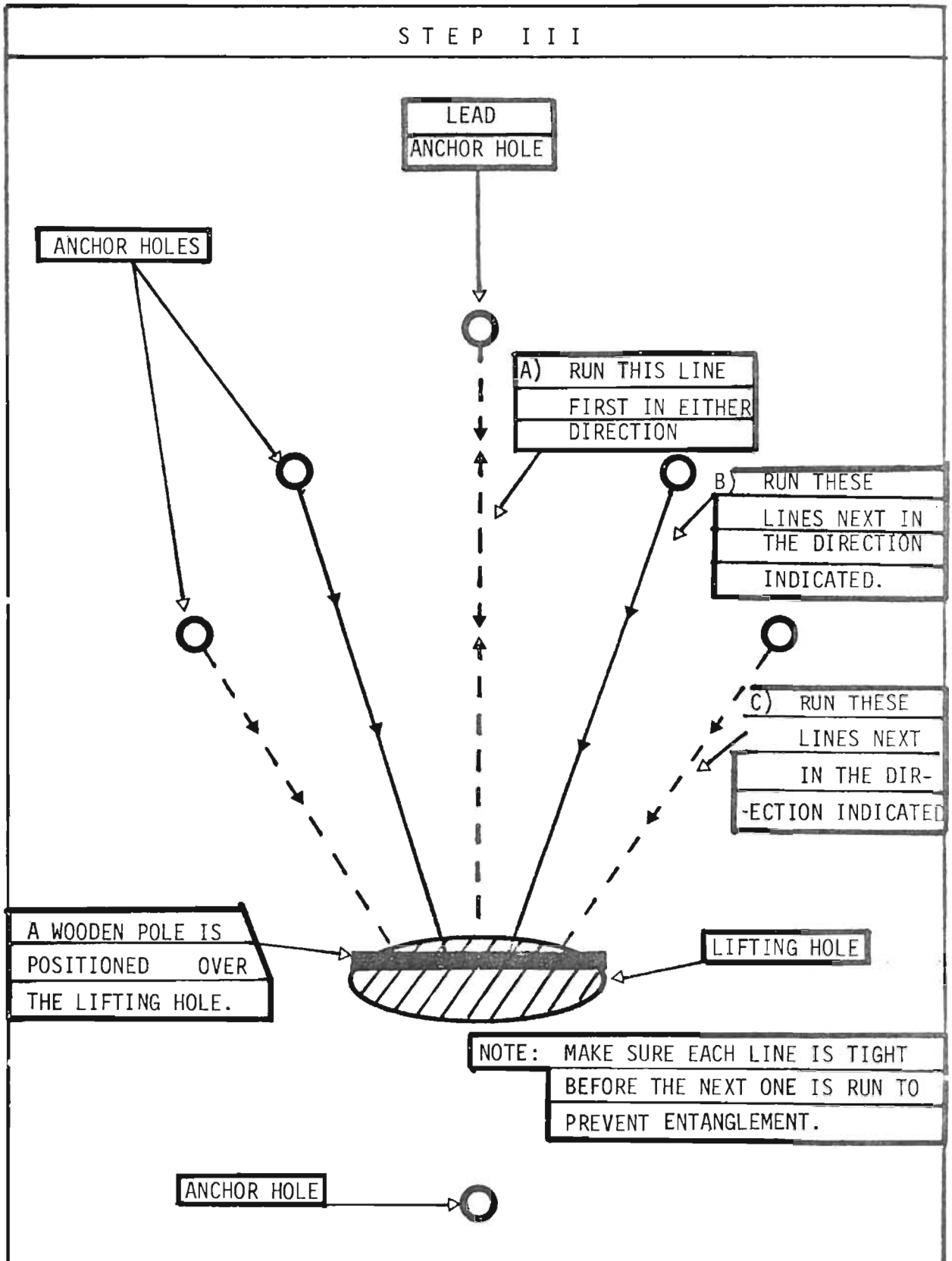


SPLICED EYES OR LOOPS ARE ON THE NET AND OUTSIDE ENDS OF THE BRIDLES.

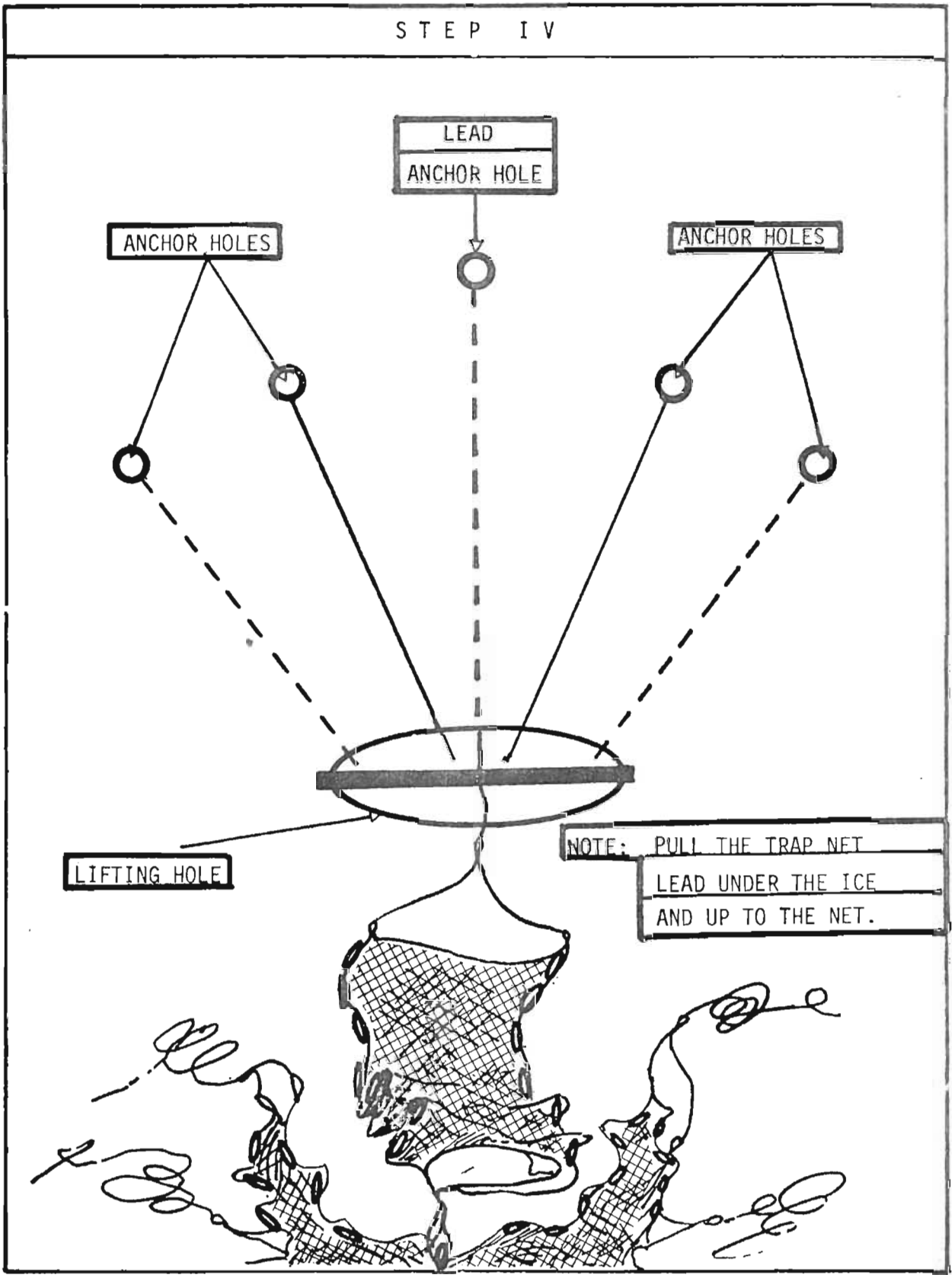
A DOUBLE SHEET BEND IS USED FOR TYING THE ANCHOR LINES AND BRIDLES.

- A) LAY THE TRAP NET OUT ON THE ICE AND MARK THE ANCHOR HOLES AND LIFTING HOLE.
- B) PULL THE TRAP NET BACK BEHIND THE LIFTING HOLE, AND CUT THE ANCHOR HOLES.
- C) SPREAD LEAD BY THE LIFTING HOLE.
- D) ATTACH LEAD TO THE NET.
- E) PREPARE TO RUN LINES.
- F) LAY POLE ACROSS THE FRONT EDGE OF THE LIFTING HOLE AND ATTACH RUNNING LINES.
- G) TAKE ONE POLE TO EACH OF THE ANCHOR HOLES.

STEP III



STEP IV



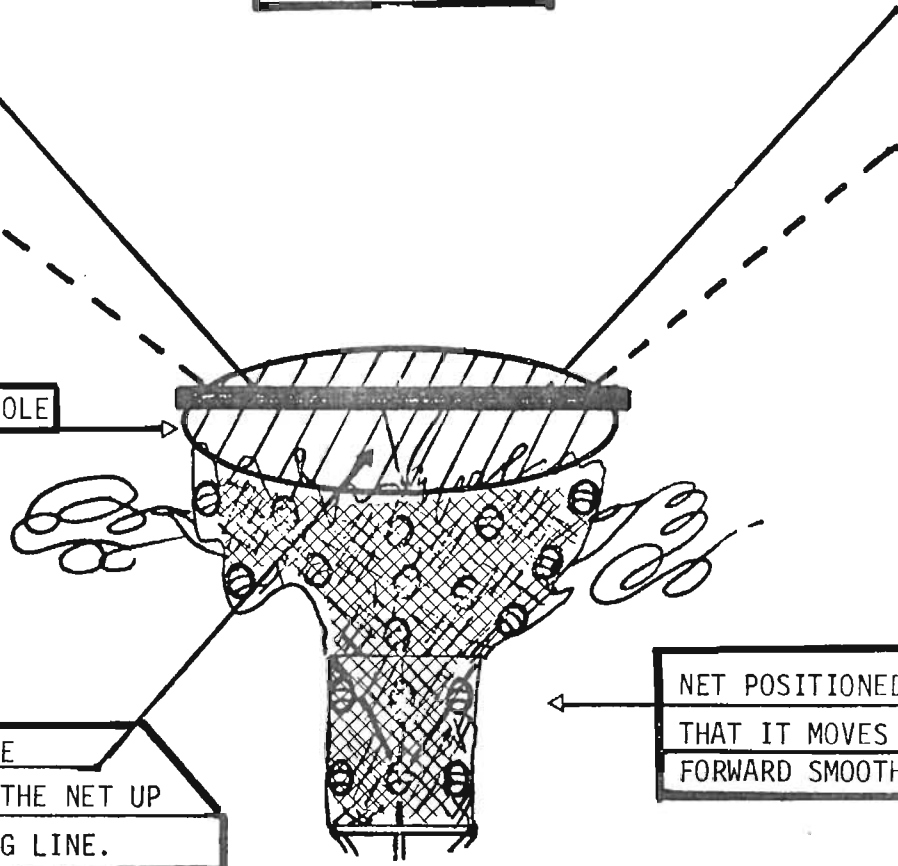
STEP V

THE LEAD OF THE
TRAP NET IS NOW
UNDER THE ICE.

LIFTING HOLE

PULL UNDER THE
REMAINDER OF THE NET UP
TO THE LIFTING LINE.

NET POSITIONED SO
THAT IT MOVES
FORWARD SMOOTHLY.



STEP VI

SLANT HOLES IN ICE, IN THE DIRECTION WHICH THE POLES HAVE TO GO.

THE ROPE AND THE METAL RING ARE DIRECTED TOWARDS THE NET.

PULL SIDE ANCHOR LINES TIGHT WHEN THE POLES ARE IN POSITION

THE LIFTING LINE IS ATTACHED TO THE POLE.

HEART LINES MAY BE TIGHTENED AS SOON AS THE LIFTING LINE IS TIED TO THE POLE ACROSS LIFTING HOLE.

ADD LENGTH OF ROPE TO THE LIFTING LINE - DEPTH OF WATER. TIE THE FREE END TO THE POLE WHICH IS LAID ACROSS THE LIFTING HOLE

NET PULLED UNDER TO THE LIFTING LINE.

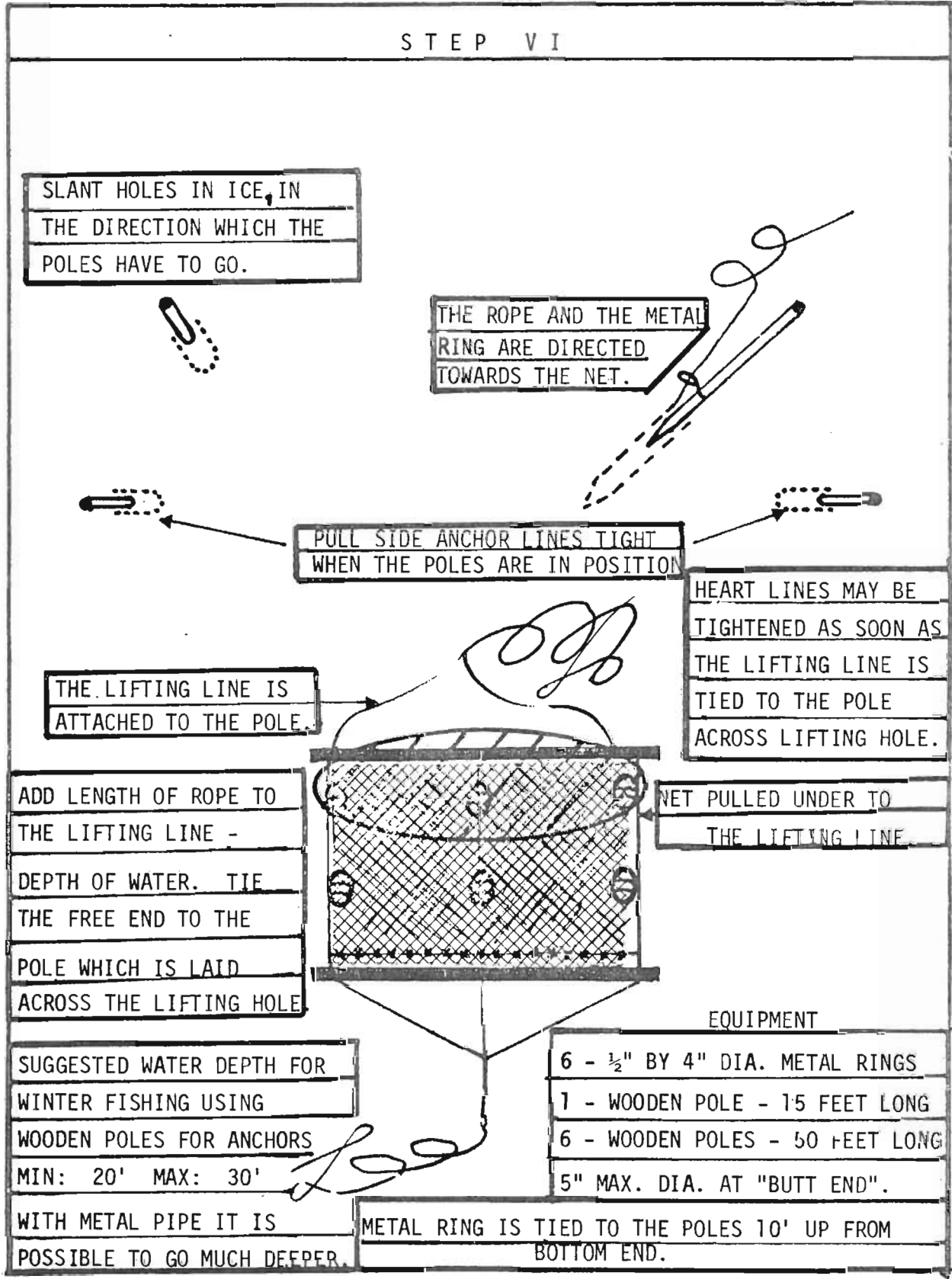
SUGGESTED WATER DEPTH FOR WINTER FISHING USING WOODEN POLES FOR ANCHORS

MIN: 20' MAX: 30'
WITH METAL PIPE IT IS POSSIBLE TO GO MUCH DEEPER.

METAL RING IS TIED TO THE POLES 10' UP FROM BOTTOM END.

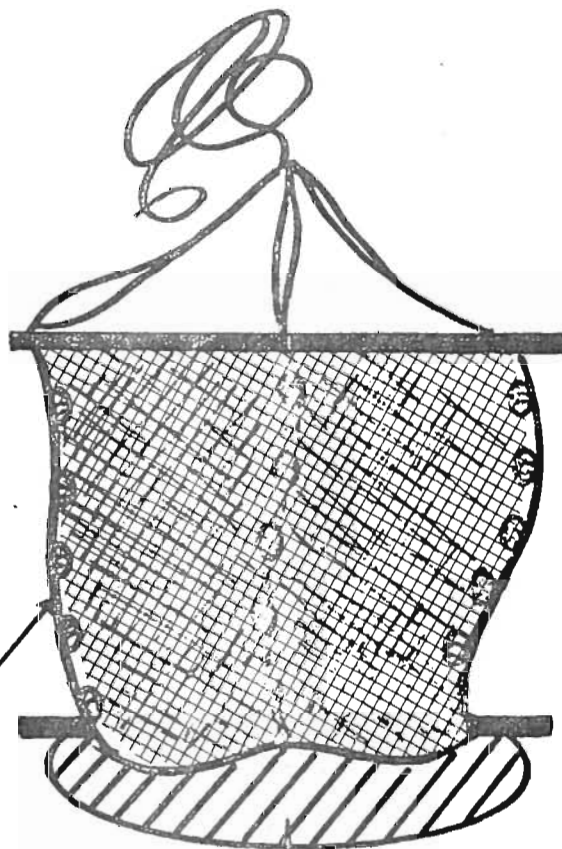
EQUIPMENT

- 6 - 1/2" BY 4" DIA. METAL RINGS
- 1 - WOODEN POLE - 15 FEET LONG
- 6 - WOODEN POLES - 50 FEET LONG
- 5" MAX. DIA. AT "BUTT END".



S T E P V I I

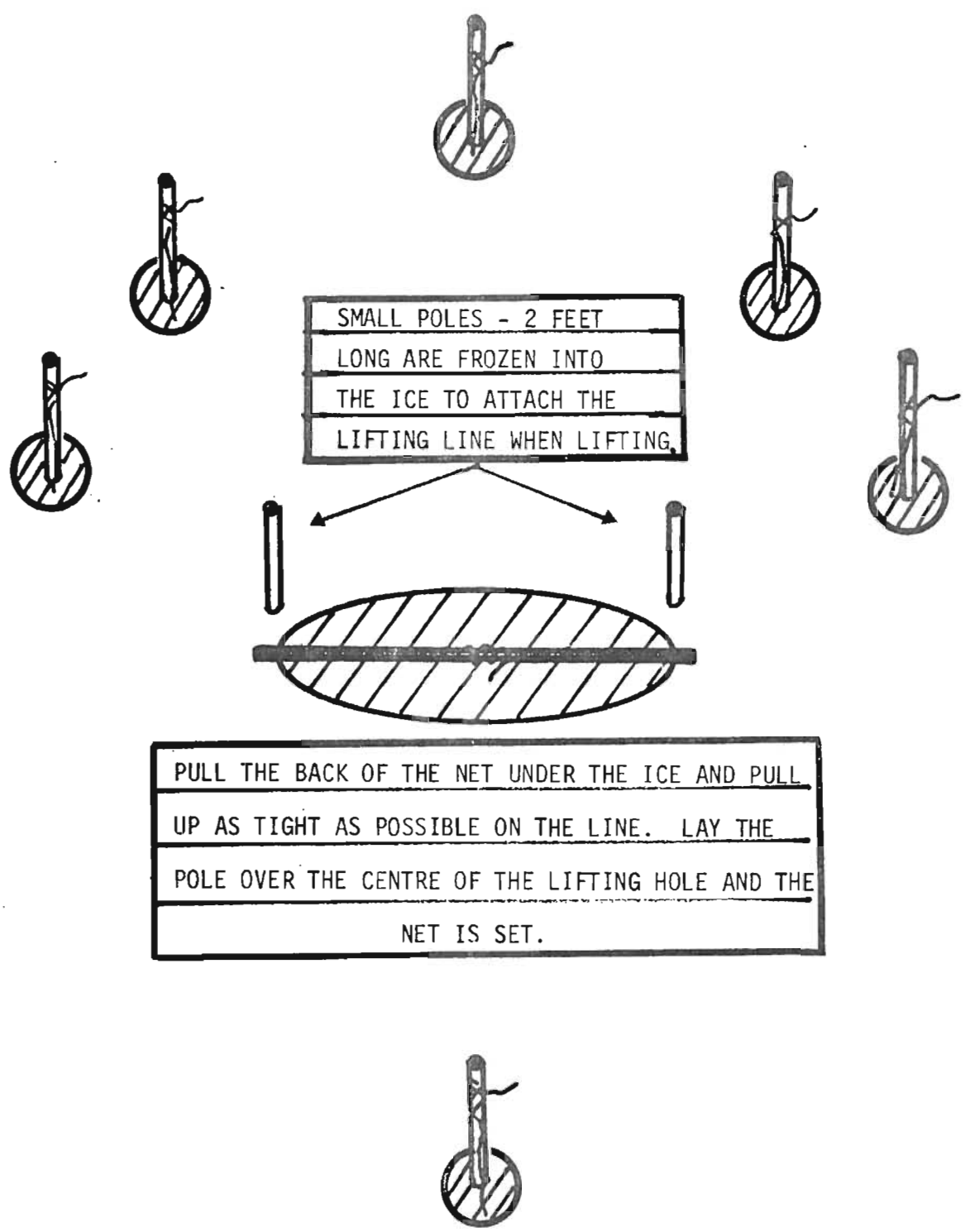
TIGHTEN UP ALL ROPES, ATTACH TO THE
ANCHOR POLES AND PUSH DOWN IN THE MUD
AS FAR AS POSSIBLE.



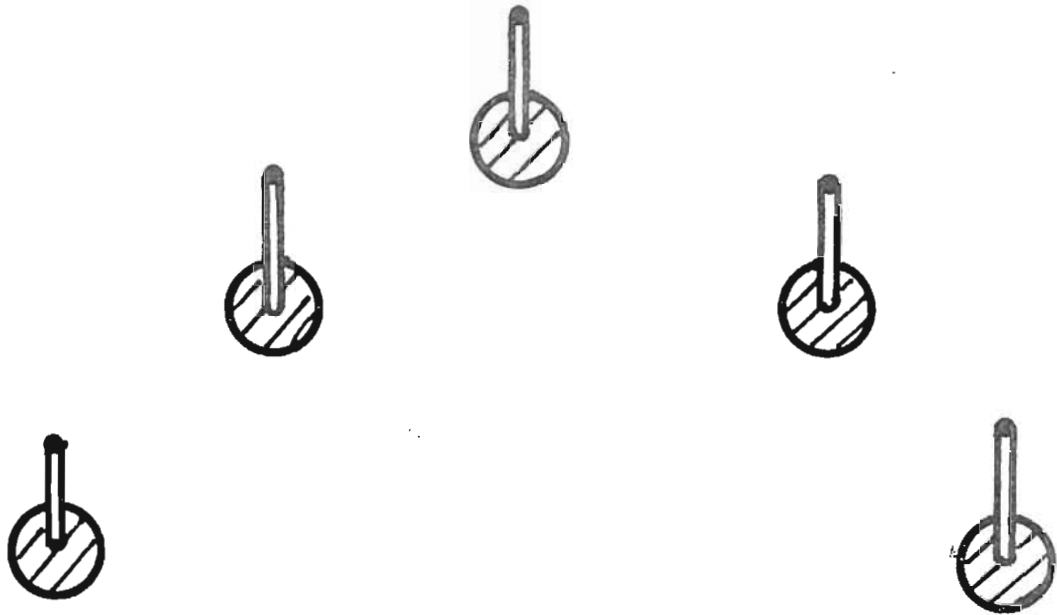
A) POSITION THE NET FORWARD
OVER THE FRONT OF THE
HOLE.

B) RUN THE LINE FROM THE
BACK ANCHOR HOLE TO
THE LIFTING HOLE.

STEP VIII



STEP IX



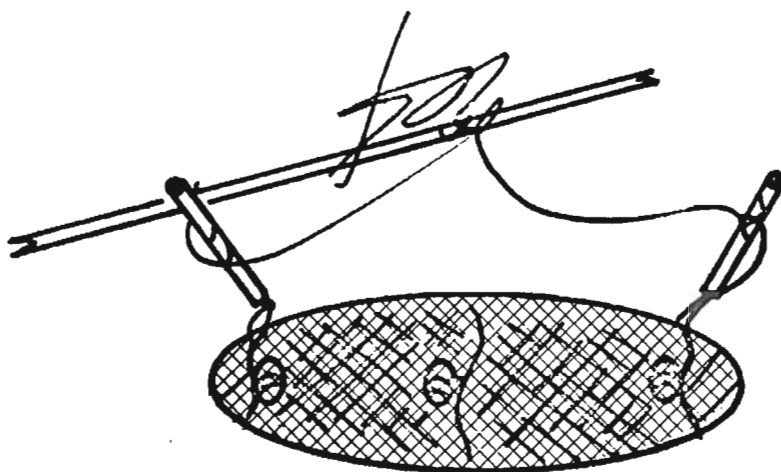
THESE ARE THE ONLY HOLES OPENED FOR
LIFTING THE NET

TIE THE END OF THE ROPE TO THE ANCHOR
POLE ALLOWING ENOUGH ROPE TO RAISE THE
NET UP.



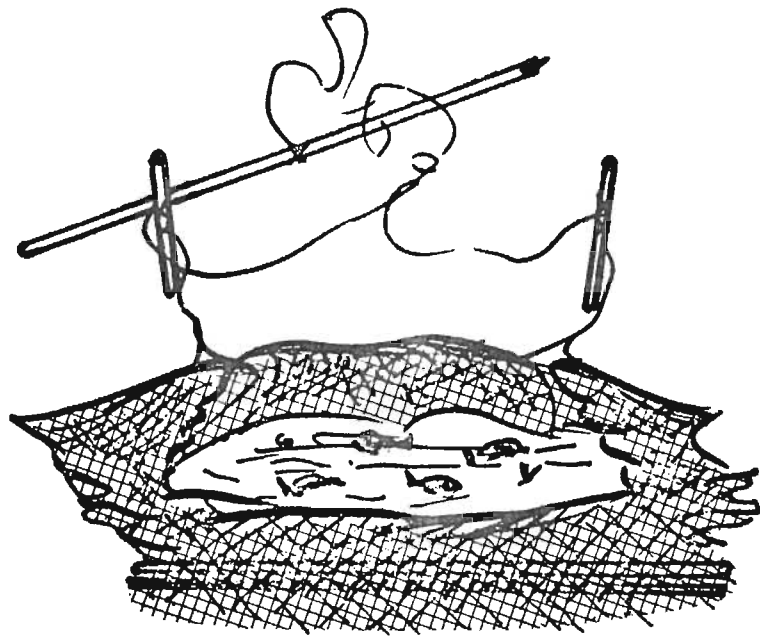
BACK ANCHOR HOLE

STEP X



- | |
|--|
| A) PULL UP ON THE LIFTING LINE UNTIL THE NET IS TIGHT AGAINST THE ICE. |
| B) FOLLOW THE SIDE (FLOAT) LINE OF THE NET UNTIL THE POLE COMES UP. |
| C) FOLLOW DOWN THE CORNER LINE UNTIL THE PIPE COMES UP. |
| D) THE TWO ARE PLACED ON TOP OF THE ICE CLOSE TO THE BACK OF THE LIFTING HOLE. |

STEP XI



- A) OPEN THE LACE HOLE, PULL UP THE TUNNEL AND FOLD OVER THE FRONT OF THE LIFTING HOLE.
- B) PULL UP THE BOTTOM AND SIDES OF THE NET AS THE FISH ARE BEING REMOVED.
- C) REVERSE THE ABOVE PROCEDURE MAKING SURE THAT THE BOTTOM OF THE NET IS PUT DOWN BEFORE THE TUNNEL IS FOLDED BACK.
- D) LACE THE HOLE, TYING THE LACE TWINE IN A DOUBLE BOW KNOT.
- E) MAKE SURE THAT THE BACK BRIDLE IS NOT TANGLE AROUND THE PIPE.
- F) PUT THE REST OF THE NET DOWN AND TIGHTEN THE BACK ANCHOR LINE.

S.4.*

REFERENCES

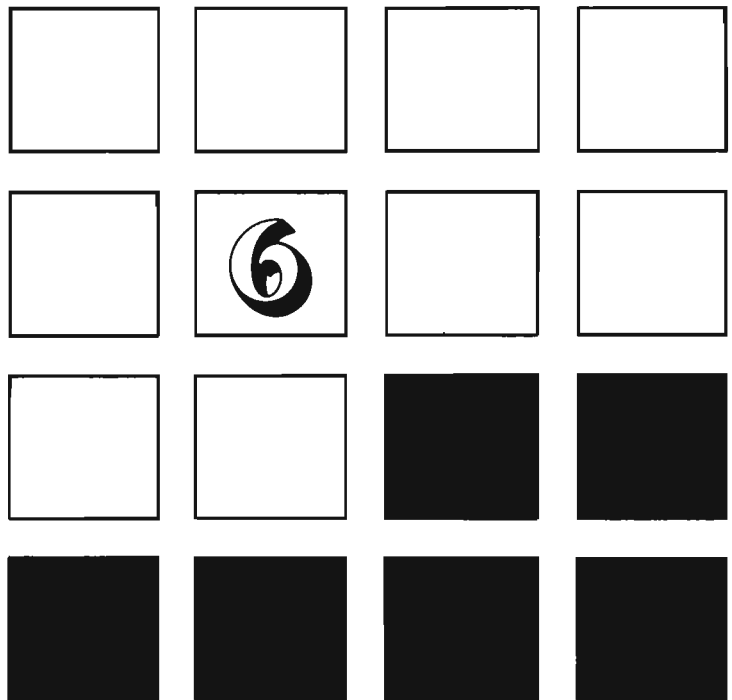
SECTION 4

REFERENCES

1. Park Hanneson, Publication 1960 - Winnipeg, Manitoba.
2. Trap Net Construction - K. Doan, Director of Fisheries, Province of Manitoba - 1959-60.
3. Province of Manitoba - Notes - G. Orvis - 1962.
4. Trap Net Construction and Design - Russian Source.

1972 MANITOBA
ROUGHFISH HARVESTING
PROJECT-1354-72

MANITOBA TRAP NET BACKGROUND DATA



Department of the Environment
Industrial Development Branch
Exploratory Fishing Division
Chief, J. Rycroft

1972 MANITOBA
ROUGHFISH HARVESTING
PROJECT—1354—72

Co-Authors
Andrew and Ian B. Duthie

UNIT 6

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UNIT 6

MANITOBA TRAP NET BACKGROUND AND INFORMATION

Unit Introduction

Contents

1. Up to this point in time, only fragmented information existed on the background of impounding gear.
2. Before any development can be carried out scientifically, the achievements of previous years should be considered.

It is interesting to note that trap nets were brought to the Great Lakes around 1850 and were introduced to Lake Winnipeg around 1875.

S.1.*

CONCLUSIONS AND RECOMMENDATIONS

SECTION 1

Conclusions and Recommendations

A conclusion drawn from the 1971 project was that impounding gear can be effectively utilized only on a seasonal basis for specific species of fish, e.g.

| | | |
|----------|---|-----------------|
| Mullet | - | Early spring |
| Carp | - | Mid-summer |
| Tullibee | - | Summer and fall |
| Maria | - | Late fall |

The 1972 project, of course, is the basis of this general report.

The conclusions and recommendations drawn from the data in this report are gathered as follows.

Conclusions - 1972 Report

1. Much information is available on trap nets.
2. A great deal of interest is still being shown in trap net operations
3. It would appear that trap nets are potentially capable of catching effectively
 - a) High priced species
 - b) Low priced species

Recommendations - 1972 Report

1. Enough information is available to determine the effectiveness of trap nets. A policy decision is now needed with respect to the use of these nets in the commercial context.

2. No more money should be spent on experimental trap net operations. Any future operations should be purely commercial with initial subsidies to get it going.

S.2.*

TRAP NET BACKGROUND AND HISTORICAL INFORMATION

SECTION 2

TRAP NET BACKGROUND AND HISTORICAL INFORMATION

Introduction

The following text consists largely of documents drawn from various sources. Together these documents portray the interest in and experience with impounding gear in Manitoba over the past 80 years.

Document 1:

When the Dominion Government Hatchery building at Selkirk was destroyed a few years ago (circa. 1950) this letter was found among other papers between the walls of the building. It is interesting to note that many of the sentiments expressed in this letter are held by today's primary producers.

West Selkirk, Manitoba,
March 6th, 1891.

Alexander McQueen Esq.,
Inspector of Fisheries.

Dear Sir:

In reply to yours of February 23rd requesting a reply to Copy of letter from Ottawa dated 17th Feb. 1891 - The Company desires to fish gill nets in Sturgeon Bay at the neighborhood of Little Saskatchewan River if the Co. did not fish there its business would be entirely ruined, for the reason that the weather in September is so very stormy that no fishing can be carried on in the open Lake by being sheltered from storms we can fish during September in Sturgeon Bay the prevailing winds during Sept. & Oct. are from North West, West, and South West, being protected by the West shore we can fish in Sturgeon Bay. As for Pound Net fishing in Lake Winnipeg it is only an experiment. The water is thick and riley most of the time and it is a question if pound nets can be successfully fished, some years ago Clark and Reid fished two pound nets near the little Saskatchewan River but they caught very few fish but I think perhaps the nets was not fished as they should have been.

Fish caught in gill nets often are not in first class condition, the gill nets are used up in a short time and cost from \$1.25 to \$1.50 per lb. Pound nets should last two or three years cost 35 cts per lb. and if a success in fishing the fish when caught are taken out of the water alive and in first class condition therefore they sell better and give good satisfaction to the trade. The fishing on Lake Winnipeg is capable of being greatly enlarged it is now in its infancy only a few white men are fishing on a great Lake filled with fish that would be able to employ ten times as many men as is now engaged in fishing. We consider the use of Pound Nets should be encouraged as the fish are so much better for the market and if a storm tears the net or washes out a stake the fish all escape uninjured and at times when caught in gill nets are of no use.

We remain yours respectfully,

The Manitoba Fish Co. per. W.O.

From 1891 to the 1930's few records are available. In 1932 three Manitoba operators appealed for licences to use submarine pound nets for experimental fishing under the supervision of the Department of Mines and Natural Resources. The following points were stressed in the applications.

1. Similar nets are being used in Ontario and U. S. waters similar to Lake Winnipeg with great success.
2. These fish caught are taken live from the nets and are not mutilated as in Gill nets.
3. Small fish can be released without harm.
4. Better prices can be realized due to better quality.
5. The initial cost is the same but the life of the trap net is 4 years compared to the gill net's one and a half seasons.
6. This net will fish all kinds of fish.

In letters written to Ottawa (circa 1932), the then Provincial Director of Game and Fisheries, A. C. Cunningham indicates that trap nets have been used on Lake Winnipeg since 1932. He also indicates that fish taken in pound nets (trap nets) bring from 2¢ to 3¢ a pound more than fish taken in gill nets.

The Manitoba records do not show any significant trap net activity between 1932 and 1958. In August of 1958, B. Kooyman, Fisheries Biologist, (Manitoba), made approaches to the Director, F.R.B., London, Ontario, to find out if 2 trap nets could be made available to him, to try in the Spider Islands area for whitefish. The approaches were made as a result of a successful demonstration observed in the Fort Frances area by B. Stephanson, Commercial Fisheries Supervisor, Manitoba. One trap net was set for six nights and caught 411 whitefish, 350 marias, 1 pickerel, 2 sunfish and one sucker. The fish were all alive after 6 days whereas fish caught in gill nets at the same time were in the main part dead and rotten. Experiments carried out at the same time in northern lakes around Flin Flon were not too successful. Up till 1959 it seemed obvious that a good deal more must be found out about trap nets before they could be fished profitably either for valuable commercial species or for rough fish. In the fall of 1959, 4 trap nets were again fished experimentally.

Document 2:

The following report was compiled by Dr. K. H. Doane, Chief Fisheries Biologist and deals with the period 1959 to 1961. Dr. Doane is well known for his extensive contributions to the development of Manitoba fisheries.

LAKE MANITOBA TRAP-NETTING

By

K.H. Doan,
Chief Fisheries Biologist.Re: Manitoba's Economic Future

Experimental trap-netting was conducted by the Fisheries Branch in 1960 in the Dauphin River vicinity of Lake Winnipeg. Detailed poundages have been converted to values, based on fishermen's prices at that time, sturgeon omitted. A report was prepared showing catch details, and it was concluded that 2-night lifts of 10 and 12 foot traps yielded the best return. Estimated earnings of a hypothetical trap-net outfit indicated a higher return to the operators than commonly received by gill-net fishermen, but the capital investment for trap-netting is considerably higher too. A longer season than was authorized in 1960 (June 1 to July 22) would lower the weekly operating costs to \$550.00 for a 25-net outfit if the season ran to October 31st.

Experimental trap-netting in 1961 was undertaken in June and part of July in the Gull Bay region of Lake Winnipeg. An assortment of net sizes averaged 450 pounds worth \$52.00 per net lift, and a two-day lift schedule produced the heaviest average catch. The most valuable catches were taken in 10-foot double crib, double heart traps. The addition of another heart and crib to simple 8-foot traps greatly increased their effectiveness compared to 1960.

The commercial trap-net catch in Lake Winnipeg in 1960 and 1961 has been compared to catches from gill-netting in "pickerel pockets" in the 1955-59 period, Table 4. Trap-nets produced over twice the marketed catch per man in 1961 than from the former gill-netting, and the catch of pickerel per man was 2½ times better. Cost estimates in Table 3 are based on a theoretical "big outfit" and there is actually nothing in operation approaching this size. Most commercial traps have been operated on a small scale with makeshift equipment, and their operations costs are unknown. Based on pickerel at 15 cents, and all other fish marketed at 8 cents, the trap-nets produced a gross income of \$856 per man, and the former gill-netting average catch would be worth \$372 per man.

Experimental trap-net fishing in a sport fishing lake, Falcon Lake in the Whiteshell, was done in the fall of 1960. Similar trials have been made in lakes near Cranberry Portage. So far, catches have not been heavy enough to make rough fish removal a commercial proposition without killing some game fish. The dual harvest --- by anglers and by impounding nets --- is not yet practical on sport fishing lakes.

Trap-nets were fished for the Fisheries Branch in March of 1961 to intercept a spawning run of suckers under the ice in a river mouth at the south end of Lake Manitoba. This was done successfully, and would make money for an operator. The drawback is the limited area that is suitable, and only a short period of run occurs.

Experimental trap-netting under the ice of Lake Winnipeg in December 1961 and January 1962 showed that one 10-foot double crib trap could catch as much as 17,800 lbs. of burbot (maria) in a single lift. Fishing success declined later in January, but apparently there are opportunities to take rough fish in large amounts and even at low prices this could be profitable if commercially organized.

K.H. Doan,
Chief Fisheries Biologist.

Fisheries Branch,
February 13, 1962.

TABLE 1

Average dollar value of fish caught in trap-nets by the Fisheries Branch in the Dauphin River region of Lake Winnipeg, summer 1960 according to number of nights out. Expected monthly gross corresponding to period of lift, 10 and 12 foot nets. Sturgeon omitted.

| Period of Lift | June, 30 days | | | July, 22 days | | | Season's expected gross per net |
|---------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------------------------|
| | No. of Lifts | Average Value | Monthly Gross | No. of Lifts | Average Value | Monthly Gross | |
| Nets fished 1 night | 30 | \$ 8.50 | \$ 255. | 22 | \$ 5.00 o | \$ 110. o | \$ 365. |
| Nets fished 2 night | 15 | 68.00 | 1,020. | 11 | 32.00 | 352. | 1,372. |
| Nets fished 3 night | 10 | 57.00 | 570. | 7.3 | 23.00 | 168. | 738. |
| Nets fished 4 night | 7.5 | 40.00 | 300. | 5.5 | 20.00 o | 110. o | 410. |
| Nets fished 5 night | 6 | 40.00 o | 240. o | 4.4 | 33.00 | 145. | 385. |

KEY -- o -- estimated

TABLE 2

Potential value of catch of a theoretical trap-net outfit of 30 nets, with two partners and two helpers, according to period of lift. Based on Dauphin River region of Lake Winnipeg, 1960 season June 1 to July 22. Assume a maximum daily lift of 10 nets, 10 and 12 foot size.

| <u>June 1 - 30</u> | Number Lifted | No. in Reverse | Av. Value per net lift | No. of lifts in period | Gross Value |
|---------------------------------|---------------|----------------|------------------------|--|-------------|
| Nets fished 1 night | 10 | 20 | \$ 8.50 | 10 x 29 | \$ 2,465. |
| " " 2 " | 10 | 10 | 68.00 | 10 x 28 | 19,040. |
| " " 3 " | 10 | 0 | 57.00 | 10 x 27 | 15,390. |
| " " 4 " 7 or 8 | | 0 | 40.00 | 7 x 7 } 8 x 7 } 206 8 x 7 } 7 x 6.5 } | 8,240. |
| <u>July 1 - 22</u> | | | | | |
| Nets fished 1 night | 10 | 20 | 5.00 | 10 x 22 | 1,100. |
| " " 2 " | 10 | 10 | 32.00 | 10 x 21 | 6,720. |
| " " 3 " | 10 | 0 | 23.00 | 10 x 20 | 2,860. |
| " " 4 " 7 or 8 | | 0 | 20.00 | 7.5 x 19 | 4,600. |
| <u>Total, June 1 to July 22</u> | | | | | |
| Nets fished 1 night | | | | | 3,565. |
| " " 2 " | | | | | 25,760. |
| " " 3 " | | | | | 19,990. |
| " " 4 " | | | | | 11,100. |

...12

Document 2

TABLE 3

Estimated expenses of a theoretical trap-net outfit of 25 trap-nets, with two partners and two helpers, in Dauphin River region of Lake Winnipeg, based on June 1 to July 22 season, 1960.

Capital Costs

| | |
|---|-------------|
| 25 12-foot trap nets, complete @ \$800.00 | \$20,000.00 |
| 1 trap-net boat, second hand | 5,000.00 |
| 1 small boat and engine | 1,000.00 |

Expenses

| | |
|------------------------------------|-----------------|
| Interest on invested capital at 6% | 1,560.00 |
| Depreciation on trap-nets at 20% | 4,000.00 |
| Depreciation on boats at 10% | 600.00 |
| Net Repairs | 100.00 |
| Boat repairs and maintenance | 300.00 |
| Boat operation | 400.00 |
| Board, 4 men @ \$2.50 x 60 days | 600.00 |
| Wages, 2 men x \$300.00 x 2 months | <u>1,200.00</u> |
| | 8,760.00 |

Estimated earnings, 2-night lifts.

| | |
|----------------------|-----------|
| Gross sales of fish | 25,760.00 |
| Expenses | 8,760.00 |
| Earnings | 17,000.00 |
| Each partner's share | 8,500.00 |

TABLE 4

Information on the catch of commercial trap-nets in Lake Winnipeg in the summer seasons of 1960 and 1961, and the catch in four pickerel pockets (Barene R., Big Black R., Grand Rapids and Sturgeon Bay) by gill-nets in the last five years with an open season (1955 to 1959).

| <u>Trap-nets, 1960</u> | <u>Marketed Catch</u> | <u>Pickerel Catch</u> | <u>No. of Traps</u> | <u>No. of Men</u> |
|--|---------------------------|---------------------------|-------------------------|-----------------------|
| Lbs. | 154,300 | 83,800 | 74 | 37 |
| Lbs. per trap | 2,085 | 1,132 | -- | -- |
| Lbs. per man | 4,170 | 2,265 | -- | -- |
| <u>Trap-nets, 1961</u> | | | | |
| Lbs. | 653,500 | 475,300 | 154 | 100 |
| Lbs. per trap | 4,244 | 3,086 | -- | -- |
| Lbs. per man | 6,535 | 4,753 | -- | -- |
| <u>Pickerel Pockets, 1955-59 Total</u> | | | | |
| Lbs. | 4,832,302 | 2,977,324 | -- | 1,601 |
| Lbs. per man | 3,018 | 1,860 | -- | -- |

Document 3:

In the August 1960 edition of Commercial Fisheries, Volume II, #2 the following article appeared describing the experimental fall program.

LAKE WINNIPEG TRAP-NET FISHERY

August, 1960

Most of the single crib nets with only one heart (winker) provided by industry and Indian Affairs did not catch any quantity of fish. Although the trap-net instructors were able to make a few modifications in the net on the lake, facilities, twine, etc., were not available to make major changes to a large number of nets.

A total of 67 trap-nets were used in the commercial operation and in addition the Fisheries Branch fished eleven nets from a special trap-net boat. Full production statistics are not available from the regular commercial operation but figures from the experimental fishery in Sturgeon Bay are tabulated below. The experimental fishery in Sturgeon Bay are tabulated below. The experimental fishery used five 8-foot single crib nets and six 10- and 12-foot double crib nets. The single crib nets were set and lifted five times to give an effort of 25 net-lifts and produced less than 500 pounds of fish. The other six nets were set and lifted a sufficient number of times to give an effort of 62 net lifts and produced the bulk of the tabulated production.

| | | | |
|---------------------|----------|-------------------------|------------|
| Whitefish (Dressed) | 765 lbs. | Pike (Headless Dressed) | 1,285 lbs. |
| Pickereel (Dressed) | 5,511 " | Mulletts | 9,014 " |
| Pickereel (Round) | 1,324 " | Sunfish | 3,371 " |
| Sauger | 229 " | Sturgeon (Dressed) | 413 " |

Total production 21,912 lbs. - Total value \$2,503.27

Since the single crib nets produced practically nothing, this means each lift of a double crib net produced \$40.38 worth of fish. These figures show what a good trap-netter can expect to handle PER WEEK in a full scale operation.

In other words, a ten-week season in the Sturgeon Bay area can produce for a trap-net fisherman well over 200,000 pounds of fish, worth between \$20,000 and \$25,000 dollars, using an outfit costing about \$15,000 with a seasonal operating cost similar to a whitefish boat. Even if this outlook is too optimistic and only half the poundage is produced, this is still at least twice the gross income of the average whitefish boat nowadays.

Document 4:

Although the Doane report and the Lake Winnipeg trap net fishery report indicated good results, the following article, published by the Department of Indian Affairs in August, 1960, was not encouraging.

THE INDIANS AND LAKE WINNIPEG TRAPNET OPERATIONS

(contribution by the Federal Indian Affairs Branch)

Following the change in policy announced by the Provincial Fisheries Branch with regard to the fishing of pickerel pockets on Lake Winnipeg during the 1960 Spring Season, Indian Affairs officers consulted with provincial and federal fisheries' officials, representatives of the fish companies and Indian fishermen. It was realized that cessation of gill-netting would affect some 200 Indian fishermen on Lake Winnipeg. Two major problems were; first, securing alternative employment for these Indians; secondly, what could be done to include as many of them as possible in a program designed to familiarize them with trap-net techniques.

Any problems adopted would have to be mainly instructive and to a large extent subsidized by the Indian Affairs Branch. Advice was sought from the Federal Fisheries and from the trade as to type and size of trap-nets suitable. A single crib 8' net was decided upon as best suited to the type of operation possible to the Indians. Authority was obtained for the purchase of twenty trap-nets for use at Berens and Poplar River.

With co-operation of the Federal Fisheries Mr. C. Elgie was engaged to supervise the Indian Affairs program on the lake. The Indian superintendent held meetings with the Indians of the Berens and Poplar River bands. Experienced Indian fishermen agreed to take part in the program. Orders for nets had been placed in March but unfortunately considerable delay in delivery occurred. Ten nets were in operation at Berens River by July 12th. Indians of the Poplar River band finally fished with trap-nets supplied by the trade at Black River.

Mr. Elgie reports that he found no difficulty in teaching the Indians setting and lifting operations, but that a good deal more instruction would be required before they would be capable of readying and rigging-up the nets. The Indians set and lifted the nets using ordinary 16' skiffs. Four men were needed to set while two men handled the lifting easily. Larger yawls, however, would be more efficient and safer. Five Indians participating in this year's experiment at Berens River would be quite capable of instructing other Indians next season.

Production from ten nets at Berens River was poor, totalling some 2,500 pounds between July 7th and July 18th. Comparison of the single - crib type of net used in the Indian program with the double-crib nets used by the fish companies showed the latter to be superior in production. The leads used on the Indian nets were 300' in length, 8' in depth, 2 ½" mesh -- dyed black. Fish did not gill in these leads to any great extent but considerable gilling of all sizes took place in the 2 ½" mesh cribs. Experiments made by covering the dark lead with ordinary white twine almost doubled production. Inferences drawn were that the light color lead might be more effective in this area and that the use of 5" or 6" mesh leads would effectively prevent gilling of small fish.

It is difficult to decide whether the poor production obtained was due to the type of net used, to starting late in the season, or to a combination of these two factors.

Obstacles to the extension of the program among the Indians are the large investment necessary for nets and boats and the necessity for continued instruction and supervision. Carried out under more favourable circumstances, however, it is hoped that the program might be expanded next season.

Document 5:

The following regulations illustrate the extensive use of trap nets as permitted in 1961 for harvesting low volume, high priced species.

TRAP-NET FISHERY REGULATIONS

1961

Commercial fishing with trap-nets for Pickerel, Sauger and Whitefish is permitted in that portion of Lake Winnipeg lying to the north and west of a straight line drawn from the extreme northern tip of Turnagain (Saskatchewan) Point to the most southerly point of Berens (Swampy) Island, thence in an easterly direction to the most westerly tip of Pigeon Point on the East shore of the said lake, including therein the entire area of Sturgeon Bay,

- (a) to a limit of one million pounds of Pickerel, Sauger and Whitefish,
- (b) for the period in each year from the 1st of June to the 8th of August, both days inclusive, and
- (c) by paying a licence fee of ten dollars for each trap-net.

For the purposes of the trap-net fishery, no fish shall be marketed in the province that is smaller than

- (i) fifteen inches in the case of Whitefish,
- (ii) fourteen inches in the case of Pickerel, and
- (iii) eleven inches in the case of Sauger,

measured from the snout to the fork of the tail, and every Whitefish, Pickerel and Sauger that is smaller than the size set out in paragraphs (i) to (iii) shall be returned to the water unharmed.

Coarse fish taken in trap-net fishing shall be removed from the water and either marketed or deposited on shore in a gurry ground designated by a fishery officer.

Document 6:

In August of 1961, an article appeared in Commercial Fisheries on trap net effectiveness; it points out the extent to which net design had progressed.

TRAP NETS

Two New Changes

The Fisheries Branch trap-nets, which appeared to offer commercial possibilities last year in the Sturgeon Bay region of Lake Winnipeg, this year are being fished further north in the Long Point region.

During early June the first lifts took quantities of pike, suckers and marias. By mid-June the nets were proving particularly effective in catching pickerel commercially. Individual net lifts were running as high as 20 boxes from one 10-foot double crib net.

Similar catches were also being experienced in June by commercial operators in the Grand Rapids area.

The whole matter of trap net design and operation is still regarded as experimental. Both the Fisheries Branch and commercial operators are seeking the most effective gear possible and continue to experiment on the basis of their experiences.

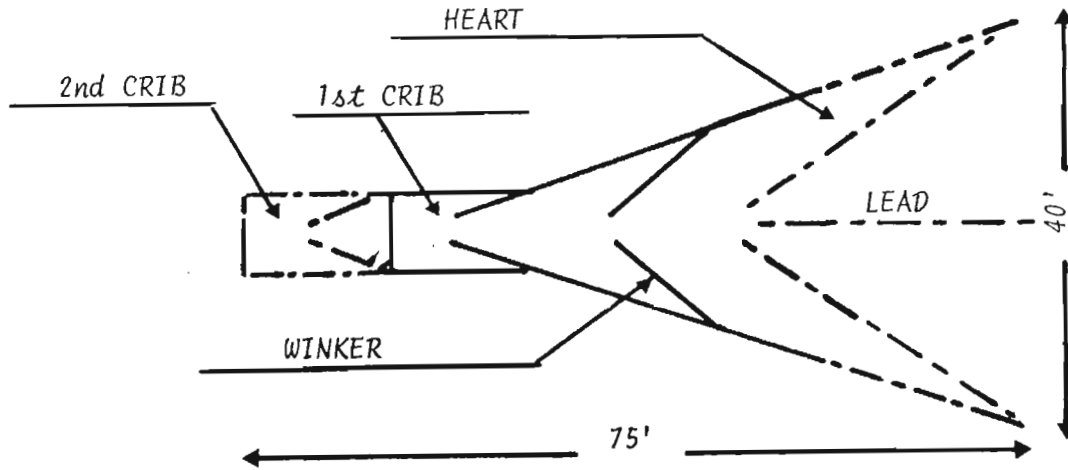
8 - Foot Trap Net with 1961 Modifications

The net now has an overall length of 75 feet with a wingspread of 40 feet. The 1961 modifications are shown by the broken line.

The original 1960 model with only the single crib at some locations on Lake Winnipeg was not particularly effective as a commercial gear.

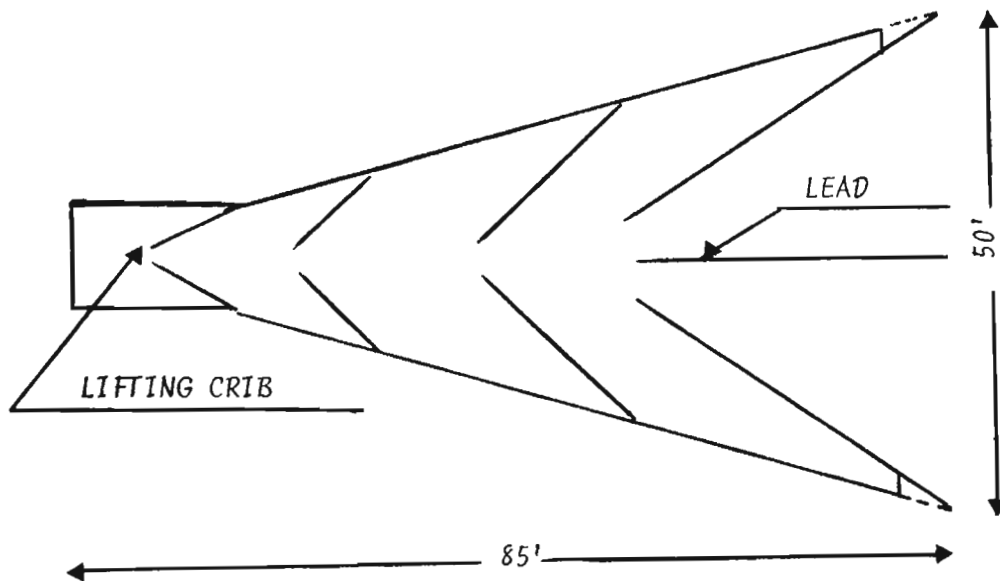
The 1961 additions of a second crib and new hearts, leaving the original heart as a winker, is expected to improve the efficiency of the small trap net.

8-foot Trap Net with 1961 Modifications



The 1961 Park-Hanneson Design

The overall length of this net is 85 feet, the wingspread 50 feet and the depth 10 feet. The net has only one lifting crib but it has two sets of winkers as well as hearts. This trap net is being used commercially this year.



Document 7:

A spring mullet operation was carried out in March and April of 1961 at the south end of Lake Manitoba. The results at that time were most promising as can be seen by the following article.

\$270 IN 3 DAYS ...

One Trap Net

Three lifts of a double-crib trap net last March 27, 28 and 29, produced 27,287 pounds of mullet worth 1¢ a pound round weight at point of production for a total minimum market price of \$270.00.

In only three days this net paid about half of its cost of \$600.00

The mouth of the Whitemud River at the south end of Lake Manitoba was selected for this winter trap net experimental program in rough fish removal. Two 8-foot traps were set through the ice immediately inside the mouth of the river in a 12-foot depth of water. One of the nets was a double-crib modified trap and the other a standard single-crib type.

The single crib net was set further up-river. The catch from this net in the same three-day period amounted to 18,293 pounds of mullet.

Both nets were left in the water until April 12. The catch over the whole period totalled 53,940 pounds of mullet (sucker) and 4,750 pounds of burbot(maria).

Bud and Jim Scharien and E. Skatfield, commercial fishermen from Westbourne, assisted with the operation. Most of the fish were shipped direct to Selkirk for processing.

Document 8:

In August of 1961, strong interest was being expressed in the exploitation of Rough Fish by winter fishing of trap and hoop nets on Lake Winnipeg, in an operation similar to the Winter Fisheries of Minnesota as outlined in the communique below.

WINTER FISHING TRAP NETS IN MINNESOTA

Minnesota fishermen fish trap nets through the ice on Lake of the Woods during the winter season and take between 1,000 and 2,000 pounds of rough fish -- mostly Maria worth \$40 to \$80 -- each lift. The trap nets are generally lifted every second or third day.

In Minnesota, at around 4¢ per pound for rough fish, the fishermen are the main producers of winter feed for the mink ranches.

Manitoba has a \$3.5 million mink ranching industry and the price paid Manitoba fishermen during last winter's season for maria remained fairly steady at around 3¢ per pound. At present mink ranches obtain a large proportion of their mink feed from outside of Manitoba. Both whole fish and fish blocks are imported into the province at prices considerably in excess of local rough fish prices.

It is estimated that the mink ranching industry could take up to 3,000,000 pounds of rough fish yearly from local fishermen.

The provincial fisheries branch arranged a meeting last mid-February for a group of Manitoba's fishermen to visit their opposite numbers at Warroad, Minnesota. Members of the Manitoba party were:

| | | |
|----------------|----------------------------|---------------|
| Charles Sette | Commercial Fisherman | Lake Winnipeg |
| M. Brynjolfson | " " | " " |
| Ted Olson | " " | " " |
| J. Jacobson | " " | " " |
| W. Bessason | " " | " " |
| Arnie Suhr | Mink Rancher | " " |
| O. Fredrickson | Commercial Fisherman | Lake Wpgosis. |
| B. Fredrickson | " " | " " |
| J. Gunnlaugson | " " | Lake Manitoba |
| J. Clearwater | " " | " " |
| Helgi Tomasson | Fishermen's Representative | |
| Alex Fedoruk | Fisheries Biologist | |

Buffalo Bay is the general fishing area for this operation. Nets were set in association with reefs and the sand bar running up to Stony Point. Both trap nets and the somewhat-similar hoop nets were fished.

Subsequent to the August 1961 Publication Trap net experimentation was carried out on an experimental basis without significant results. A 1962/63 winter Experimental Trap net Program was carried out in the Channel Area of Lake Winnipeg for marias. Twenty nets were to be set and it was arranged that local fishermen lift the nets. The fishermen were paid 1 ½¢ per pound lakeside and the McGregor plant would handle the Maria. Up to December 19th, 1962 only 2,800 lbs. of maria had been lifted from 4 nets due to the adverse freeze-up conditions. By January, 1963 the overall production from the total operation of 15 - 20 trap nets, just under 50,000 lbs. of maria had been harvested.

In October, 1964 a trap net crew was assigned to set 10 trap nets in the vicinity of Doghead Point and up to that time a total of 7,500 lbs. was removed and indications were that a heavy run was about to begin. W. H. McGregor was buying these fish F.O.B. Selkirk for

| | | |
|----------|---|----------|
| marias | - | 2 ½¢ lb. |
| tullibee | - | 3 ½¢ lb. |
| sunfish | - | 3¢ lb. |

On November 17th, 1964 a report indicates that on the Rough Fish Removal Operation, the total catch was about 13,000 lbs. more than 1963. All rough fish were sold.

Document 9:

The following is a verbatim report on the 1964 trap net operations on Lake Winnipeg.

At the conclusion of this operation on September 9th, the crew returned to the channel area and located at Doghead Point station for the fall maria removal program. A total of 10 trapnets was prepared and set in the lake at Big Bullhead Bay, and Doghead, including 2 traps set along the east shore for an initial test to compare catches. It was quite obvious throughout the fall operation that a greater volume of marias is available on the east shore. However, severe current conditions make it very difficult to operate on these grounds with trapnets, unless selected settings can be made in the more sheltered bays.

The total catch taken in this operation was as follows:

| | | |
|--------|------|-------------------|
| 62,670 | lbs. | marias |
| 3,495 | " | mulletts |
| 2,465 | " | sunfish |
| 303 | " | sauger & pickerel |
| 422 | " | other fish |
| <hr/> | | |
| 69,355 | lbs | - TOTAL |

Severe storms that prevailed during the fall season has caused a serious slump in production. Under normal conditions it is conceivable that twice the poundage could be produced with a similar effort.

B. Stephanson

BS/dg

The 1964/65 winter trap net fishery got underway late due to adverse ice conditions; only 12 trap nets were set by December 31st. These were placed as follows.

- 4 - Rabbit Point
- 2 - Matheson Island
- 6 - Doghead Point

Four more nets were then set around Matheson Island and Rabbit Point. The catches to January 11th were 13,500 lbs. compared with 50,000 lbs. the previous year.

The year 1964 proved to be very disappointing due to adverse weather conditions and the fact that the fish did not seem to run. A total of 30,000 lbs. were produced in 1964 compared to 150,000 lbs. in 1963.

The 1965/66 trap net winter fishery encountered many difficulties due to heavy slush and bad travelling conditions. Seven trap nets only were used for a total catch of 13,400 lbs. which was far below the production of previous years. No major run of marias was expected after January 19, 1966.

The 1967/68 trap net operation at Islandview netted 13,400 lbs. of maria round.

Note that the operation carried on from 1962 to 1967 were strictly on an exploratory basis to determine the feasibility of using this kind of gear for under-ice fishing in the commercial fisheries, as a means of taking marias in large quantity for animal food.

It became evident, during these years that severe climatic conditions in Manitoba do not lend themselves to a successful trap net fishery particularly not for low value fish. Freeze-up conditions are also a major factor in this type of operation as slush or rough ice make it impossible to set this gear under such conditions.

Document 10:

The status of the commercial rough fish fishery is clearly outlined in the extracts from the 1971 project report.

REPORT EXTRACTS 1971 MANITOBA COARSE FISH
AND GEAR DEVELOPMENT PROJECT

In 1971, the Exploratory Fishing Division of the Industrial Development Branch of the Department of the Environment carried out a Coarse Fish and Gear Development Program at the latter end of June at extremely short notice to fulfil two purposes.

1. Utilization of experimental and traditional type fishing techniques to investigate the feasibility of increased coarse fish production.
2. Give meaningful employment to as many fishermen as possible from Lake Winnipeg and Cedar Lake who were unemployed due to the mercury situation in the area.

Trap net experiments were carried out as part of the program.

Project Seven

Summary

Two seven-foot and six ten-foot trap nets were used in the Gimli area for a six week period till the 5th of November. These nets produced a total of 24,730 lbs. of fish from 36 lifts. Bad weather hampered operations in October. Four fishermen were involved using 2 x 20' wooden boats.

Project Eight

Summary (Eight A) - Trap Nets

A total of six ten-foot trap nets were operated for a period of four weeks at Frog Bay in the central area of Lake Winnipeg. Over this period twenty-five trap nets were lifted producing a total of 13,335 lbs. of fish. Three fishermen and two, twenty-foot wooden boats were involved in this operation.

Eight B - Hoop Nets

Eight hoop nets were operated for a period of three weeks in Frog Bay in conjunction with the trap nets which were utilized above. The hoop nets were lifted a total of sixty-one times and produced 2,478 pounds of fish. Two fishermen and one boat were involved in this operation.

It was observed that while the hoop nets were a much easier piece of equipment to handle they did not produce as effectively as the trap nets in this particular area.

(See following pages re statistics on above).

S.3.*

BACKGROUND - OTHER EXPERIMENTAL TECHNIQUES

SECTION 3

Background - Other Experimental Techniques

Other techniques used to effectively harvest various species are:

1. Trawling
2. Pair-Seining
3. Beach Seining
4. Trammel Netting

Trawling

From 1961 onwards experiments have been carried out in Manitoba. In 1961, Ron Rybicki, commercial fisheries biologist, experimented with 18 foot otter trawls built by Fisheries Branch Equipment Technician "Holly Burrell." Various tests were made to try out the gear. In 1964, trawling operations were still being carried out on Lake Winnipeg but without much success. Experimental dragging was carried on sporadically until 1965 when the federal Industrial Development Service conducted an experimental dragging program. It was found during that summer that the dispersal of fish was such that no large quantities could be caught at any one time. This was attributed to the abnormally high lake level with resulting lower temperatures.

Very little success has been enjoyed with the trawling experiments carried out to date.

Observations

1. Water is too muddy - fish won't lead.
2. Boats have insufficient power.
3. Fish are too widely scattered.
4. Species caught in any volume have little commercial value.

Recommendations

1. Find markets for rough fish that can be caught in volume by trawl. (e.g. Tullibee, Sunfish)
2. Commence a subsidized commercial trawl program for the above species.

Pair Seining & Pair Trawling

A pair seining and pair trawling project was carried out in 1971 and was successful in catching a fair quantity of tullibee. For tullibee, however, there is no market. Thus, the conclusion we derived from the experiments is the same as for trawling.

Beach Seining

The use of beach seines is not new to Manitoba. Chiefly, manual methods were used up until 1970. Manual methods were fairly successful for carp operations, but were limited because the number of people needed to haul a net increases with the net size.

In 1971 a mechanized Beach Seine experiment was carried out using a mechanized barge from Lake Erie. This barge caught 23,453 lbs. of fish in 34 drags. The 1972 experiments are now underway.

Trammel Netting

This is a **d**escription of a net used in 1949 by Dr. Herb Lawler of the Fisheries Research Board. The extract was originally published in Commercial Fisheries, May 1966, Volume 6, No. 1; this publication is produced by the Fisheries Branch, Department of Mines and Natural Resources, Province of Manitoba

TRAMMEL NETS

A New Net for Rough Fish

All Manitoba fishermen have had experience with gill nets and some have used hoop nets, seine nets, pound nets and trap nets. But very few have used the trammel net. The trammel net has not been used commercially in Canada although it is used in the United States, particularly in the Mississippi River. More than 6 1/4 million pounds of commercial fish, mainly carp, buffalo, catfish and sheepshead were caught with trammel nets in the United States in 1959. They have also been used for catching salmon and halibut.

Trammel nets were tested in Manitoba by Dr. Herb Lawler of the Fisheries Research Board during his program at Heming Lake, east of Flin Flon. A 100-yard trammel net was tested in August and September, 1949, and it caught jackfish. It was tested again in the spring of 1950 with highly satisfactory results.

The trammel net was used because Dr. Lawler wanted a net that would be good for catching jackfish in inshore areas. He also wanted a net that would allow him to release any other fish that he caught alive. The trammel net was very good for this purpose.

Here is how the trammel net works:

Three pieces of web are hung from the same side line and floated from the same set of corks. The outside webs are of a coarse twine with a big enough mesh so the fish can swim through them. The middle web is small mesh made of fine twine hung loosely. When a fish swims through the big-mesh outer net, it runs into the small-mesh middle net and pushes it through the big-mesh outer net on the other side. The fish is trapped alive in its own little cage and it can't get back out.

The method used in setting the trammel net may differ from area to area. At Heming Lake one end of the net was fastened to the shore, run out for a distance of 10 to 40 feet and then moved back to the shoreline where it was anchored.

If the water was only as deep as the depth of the net, a barrier was created and the fish could not swim under it or over it. After setting the net the area between the net and the shore was disturbed by running a small boat or canoe through it. By making a lot of noise and beating the water with paddles the fish were driven toward the deep water. They swam into the net.

It took two men an average of 20 minutes to complete one trammel net operation. This included setting the net, disturbing the fish, taking the fish out of the net and putting the net back in the box.

Dr. Lawler used a poison to find out how effective the net was in moving fish from an area. He set the net, disturbed the fish and then took the fish out of the net without removing the net from the water. He then poisoned the area surrounded by the net. Whatever fish were left in the area were killed by the poison. These tests show that the trammel net had removed about 1/3 of the jackfish present in the area. The average size of the fish caught in the net was greater than the average size of fish killed by poison.

At Heming Lake the net also caught yellows, white suckers and marias. The net itself is more costly than a gill net and in 1961 an all-nylon trammel net cost slightly more than \$300 a piece. Dr. Lawler found, however, that because the net was so rugged, it lasted for a much longer time than the gill net. A trammel net purchased as new was still in good condition 10 years later.

The trammel net is not a legal net in Manitoba, but Dr. Doan, Provincial Fisheries, says it may be permitted for rough fish removal on a permit basis only, in a similar manner to the permission granted to seine net operators. Fishermen interested in using the trammel net for this purpose should apply directly to the Fisheries Branch.

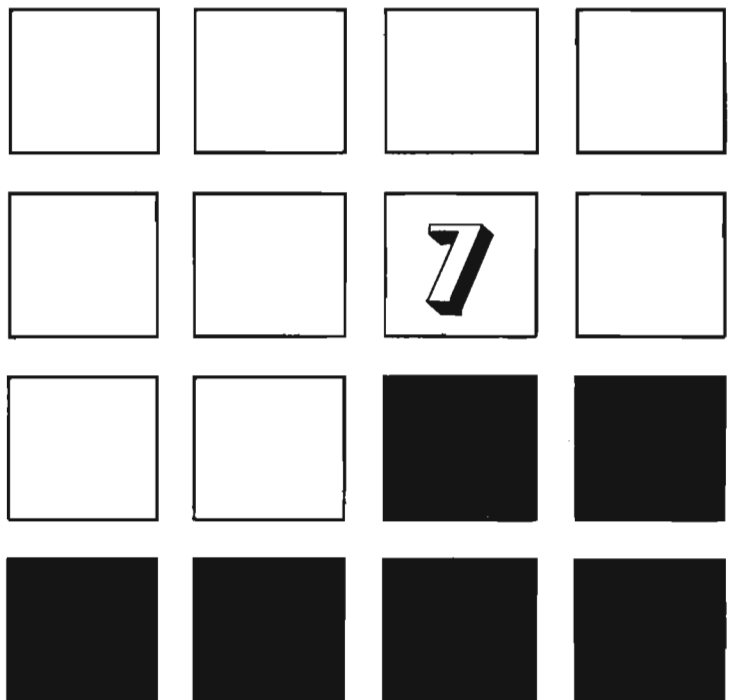
S.4.*

REFERENCES

REFERENCES

1. Correspondence from Manitoba Fish Company to Alexander McQueen, Esq., Inspector of Fisheries, Manitoba 1891.
2. "Fishing" Bulletin, Volume 6, No. 1. Many 1966.
3. Manitoba's Economic Future by K. Doan, Director of Fisheries, Manitoba, February 13, 1962.
4. "Fishing" Bulletin. August 1960
5. "Trap Nets and the Indians"
Federal Department of Indian Affairs. August 1960.
6. "Fishing", Trap Net Fishery Regulations.
Volume 2, No. 3. March 1961.
7. "Fishing", Trap Net Effectiveness
Park Hanneson Publication 1961.
8. Correspondence - Interdepartment Memo.
B. Stephanson. November 13, 1964.
9. Manitoba 1971 Rough Fish Harvesting Program Statistics,
Industrial Development Branch - Ottawa.
10. Manitoba Provincial Annual Statistics. 1963 - 1970.
11. "Fishing" Trammel Netting,
Volume 6, No. 1. May 1966.
12. Correspondence, G. E. Orvis, Trap Net Operator. 1962.

CRITICAL EXAMINATION REVIEW TECHNIQUE (CERT)



Department of the Environment
Industrial Development Branch
Exploratory Fishing Division
Chief, J. Rycroft

1972 MANITOBA
ROUGHFISH HARVESTING
PROJECT—1354—72

Co-Authors
Andrew and Ian B. Duthie

UNIT 7
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UNIT 7

CRITICAL EXAMINATION AND REVIEW TECHNIQUE

Unit Introduction

This technique is used to:

1. Completely understand problems.
2. Formulate alternative decisions based upon economic considerations.

The approach is as follows:

1. Question the Achievements.
2. Get the Facts.
3. Question the Facts.
4. Analyse the Facts.
5. Create Optimum Alternatives.
6. Submit Proposals.
7. Implement and Follow Up.

It was decided to study the operation which seemed likely to benefit from analysis - the area being the Mossey River on Lake Winnipegosis.

The Conclusions and Recommendations presented apply only to Mossey River, but it would have been interesting to similarly investigate all the other areas and correlate the information to come up with an overall conclusion.

Note that as a result of the analysis carried on in this section, it was decided to conduct the Transportation Study outlined in UNIT 3.

S.1.*

CONCLUSIONS AND RECOMMENDATIONS

SECTION 1

CONCLUSIONS AND RECOMMENDATIONS

Conclusions:

1. The Mossey River operation is limited by these factors:
 - a) The Operation is regulated by the amount of trips made by the Good Harbor Co-op.
 - b) The Operation is limited by the Capacity of the processing unit at Good Harbor Co-op.
 - c) Money is being lost due to the fact that the fish is being shipped 40 miles north of the Mossey River, processed, and then shipped south to Transcona, resulting in the fish being double handled and travelling 80 miles at extra cost.

Recommendations:

1. Build a small packing plant at Mossey River.
2. Ship directly to Transcona.

S.2.*

PROPOSAL - MOSSEY RIVER OPERATION

SECTION 2

PROPOSAL - MOSSEY RIVER OPERATION

A. Description and Benefits

Assume an initial capital cost of \$12,000.00, this to include miscellaneous equipment and interest over a 5 year period.

From the Credit Corporation a 15% deposit would be required or \$1,800.00. This deposit could be covered by the Department of Regional Economic Expansion under the expansion scheme.

$$\begin{aligned} \text{Payback over 5 years would be } & \frac{\$10,200.00}{5} \\ & = \$ 2,040.00 \text{ per annum.} \end{aligned}$$

$$\begin{aligned} \text{Net gain} & = \$7,111.80 \\ \text{Payback} & = \underline{2,040.00} \\ \text{Profit} & = \underline{\underline{\$5,071.80}} \end{aligned}$$

N.B.

No account has been taken of the Rough Fish that can be processed during the summer or fall fisheries which would substantially increase the profit margin.

Immediate Benefit to the Area - Employment for 10 operatives.

Potential Benefit

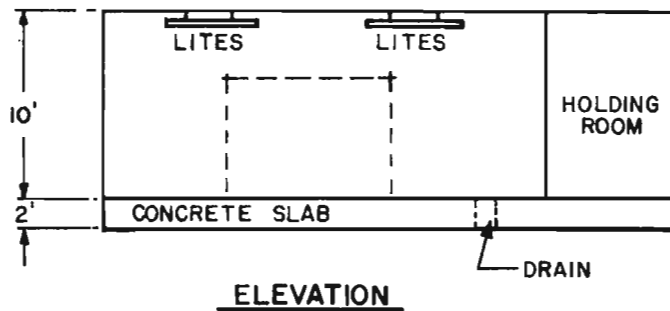
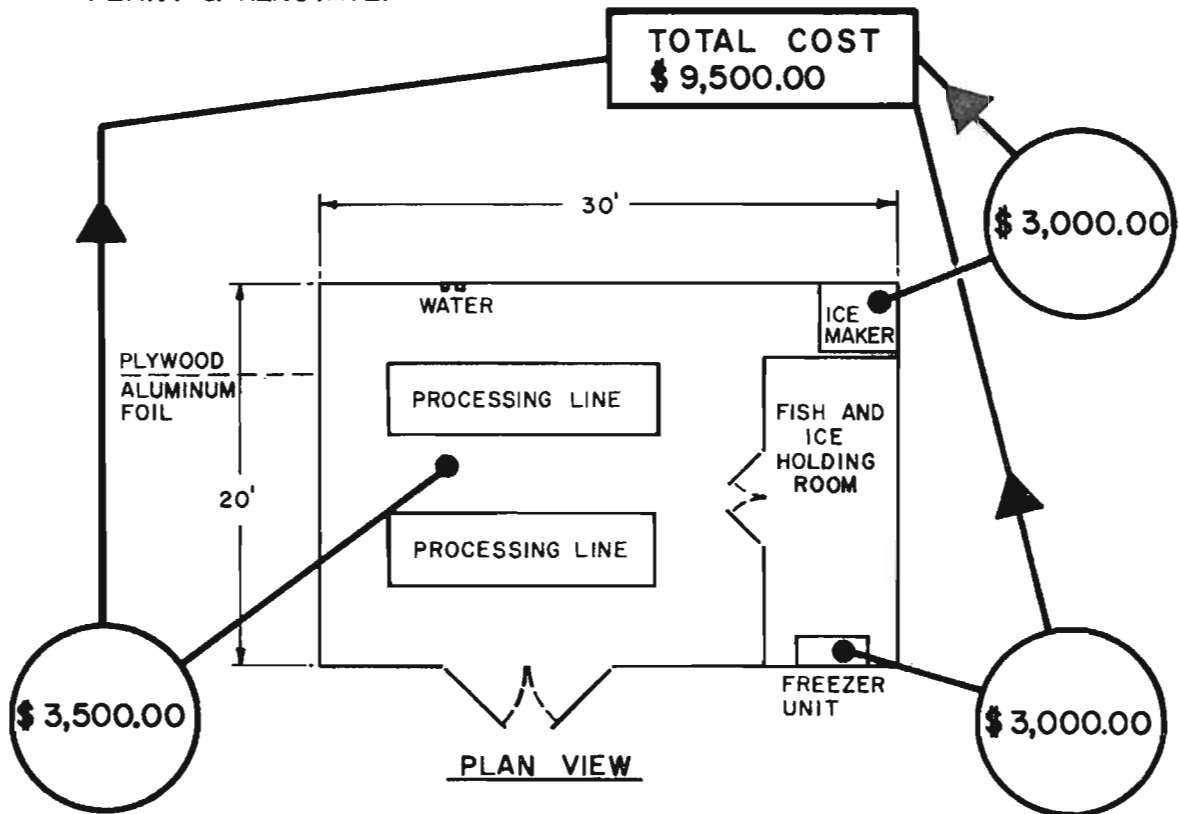
- Permanent trap net operation on a year round basis.
- Potential Employment on a year round basis 30 - 40 people.
- Potential Investment - Smokehouse.

PROPOSED POTENTIAL NEW PROCESSING UNIT
CRITICAL EXAMINATION
ECONOMIC FEASIBILITY

FLEMING OPERATION - WINNIPEGOSIS
PREMISE - SEMI-PROCESS AT WINNIPEGOSIS
 NEED - SUITABLE PREMISES.

ALTERNATIVES

1. BUILD NEW
2. TAKE OVER SECTION OF B.C. PACKERS PLANT & RENOVATE.



S.3.*

CRITICAL EXAMINATION PROCEDURE

SECTION 3

CRITICAL EXAMINATION PROCEDURE

A. Background

Trap nets and hoop nets have been used in the designated areas with fair success but have never been fully accepted as a commercially acceptable method of harvesting. It is now illegal, according to Provincial Legislation, to fish for high price, low volume species with impounding gear and the practice has been discouraged.

The analysis of production figures over the past years and the knowledge gained from the local fishermen, firmly indicated the fact that the mullet start their run upstream at the end of March and continue through April and May. It was surmised at the time that many mullet make their run under the ice prior to the break up. It was also surmised that in certain areas a fairly large proportion of the mullet are already on their way back downstream by mid-April.

The contracts to the fishermen were structured to fit within these time parameters.

It is well known in the local areas that Lake Winnipegosis is basically a "rough fish" lake and that a large volume of mullet has been caught.

Therefore, the areas chosen were:

- a) Extreme south.
- b) Centre area.
- c) Extreme north.

Lake Winnipeg, on the other hand, still has a fairly lucrative high priced species production. It was felt that a concentration of effort should be made in the southern section in proximity to areas of population as there seemed little point at that stage to conduct an experiment in distant non-populated areas. The areas in South Lake Winnipeg were chosen on the strength of local advice.

A. Background cont'd

Area of Study:

1. Brokenhead River
2. Netley Marshes
3. Willow Creek
4. Icelandic River
5. Mossey River
6. Duck River
7. Dawson Bay
8. Fisher River

No accurate statistics have been obtained up to this point regarding mullet population and ecology. However, it is a well known fact that during the period April/May the mullet goes up the rivers and creeks of Lake Winnipeg and Lake Winnipegosis in volume to spawn.

B. Procedure

When we questioned the statement:

"Mullet are being harvested and semi-processed and sent to Transcona."

as to whether it was necessary, the following points came up:

1. Not only mullet could be harvested, but also other rough fish species such as:
 - Maria
 - Tulibee
 - Bullheads
 - Carp
 - Catfish
 - Sunfish
 - Pike.
2. We questioned the method of harvesting and discarded the idea of utilizing the gill net technique due to the fact that this method was uneconomic for harvesting high volume low priced rough fish. The possibility of permanent pound nets was discussed and discarded in favour of trap nets.
3. The decision for the experimental trap net operation being in the spring, resulted from the fact that mullet school during their spawning runs upriver (anadromous) at that time.
4. The fact that the fish were being headless dressed invited the question "Why?". Many alternatives were discussed, such as:

B. Procedure

- a) Do not headless dress.
- b) Fillet the fish.
- c) Can the fish.
- d) Instant quick freeze the fish.
- e) Fry and freeze the fish.
- f) De-bone the fish.
- g) Smoke the fish.
- h) Brine the fish.

Due to the time factor involved it was decided not to investigate these alternatives to any depth but Alternative C, F and G are certainly worthy of study.

5. The question was asked "Where are they being headless dressed?", which provoked some interesting speculation. However, working within the imposed restrictions the conclusion drawn was that some costing should be done to determine if the mullet could be processed more cheaply at Mossey River. This was checked and it was found that it would be cheaper to process at Mossey River.
6. The question of transportation was discussed at length and the following factors were considered:
 - a) Process and debone fish at source.
 - b) Freeze into blocks.
 - c) Ship directly to market.

It was generally felt that this approach would result in a tremendous improvement in the quality of the product.

S.4.*

REFERENCES

SECTION 4

REFERENCES

1. Motion and Time Study - Marvin E. Mundel, 1955.
2. Work Study - R. M. Currie - B.I.M. Publication - 1960.
3. Introduction to Work Study - The International Labour Organization, Geneva - 1966.
4. Methods Time Measurement (MTM) - H. Maynard - 1948.

PRIMARY PRODUCERS' CRITIQUE EVALUATION

| | | | |
|--|--|--|---|
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| | | | 8 |
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| | | | |

Department of the Environment
Industrial Development Branch
Exploratory Fishing Division
Chief, J. Rycroft

1972 MANITOBA
ROUGHFISH HARVESTING
PROJECT—1354—72

Co-Authors
Andrew and Ian B. Duthie

UNIT 8

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UNIT 8

PRIMARY PRODUCERS CRITIQUE EVALUATION

Unit Introduction

The purpose of this critique was to provide some insight into the thinking of the commercial fishermen regarding the future of their industry.

While the project was in operation, we had many talks with the fishermen regarding their outlooks and opinions on the future potential of rough fish harvesting in Manitoba.

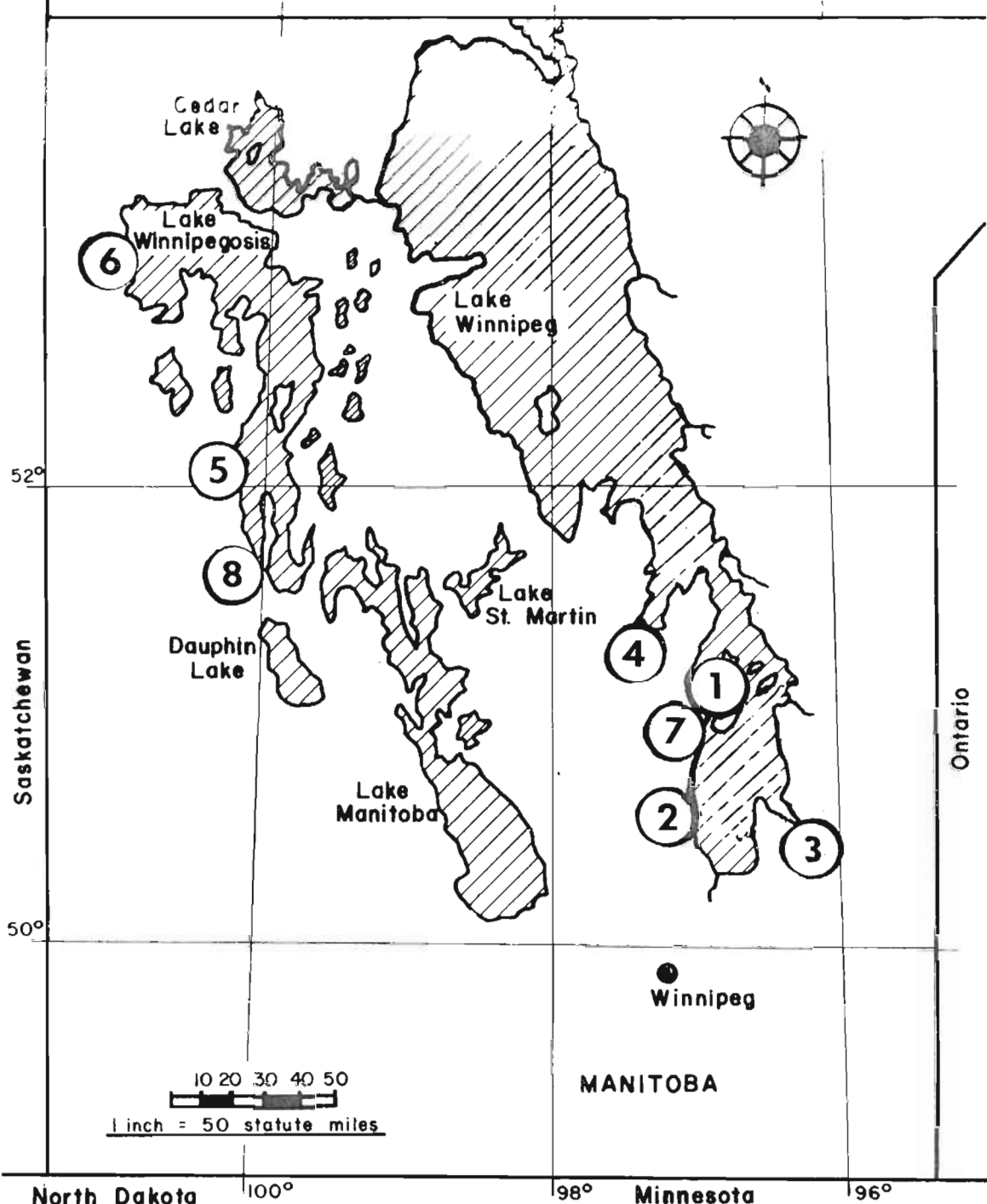
The map on the following page indicates the areas of operation covered within the critique.

S.1.*

CRITIQUE QUESTIONNAIRE

AREA OF STUDY

SOUTHERN LAKES OF MANITOBA



| | | | |
|---|--------------|---|------------------|
| 6 | Dawson Bay | 1 | Hecla |
| 5 | Duck Bay | 7 | Riverton |
| 8 | Winnipegosis | 2 | Gimli |
| 4 | Fisher River | 3 | Brokenhead River |

SECTION 1
CRITIQUE QUESTIONNAIRE

1. What did you think of the project?
2. What did you think of the way it was organized?
3. Can you see any future in harvesting rough fish? Why?
4. Would it be worth your while to harvest rough fish? Why?
5. What do you think are the marketing prospects for the species listed below and why do you think so?
 - a) Maria?
 - b) Tullibee?
 - c) Suckers?
 - d) Carp?
 - e) Bullheads?
 - f) Sunfish?
6. General Comments.

S.2.*

FISHERMEN'S CRITIQUE

SECTION 2

FISHERMEN'S CRITIQUE

QUESTION 1:

"WHAT DID YOU THINK OF THE PROJECT?"

RESPONSE:

1. Very important project. Coarse fish must be eliminated as they are outnumbering the pickereel in the major lakes whereas it was the reverse at one time.
2. Future benefits will be derived from this project in that products made from the different species of fish will be available to the general public.
3. It was a good idea as it proved that there is a lot of rough fish in the lakes.
4. This project was a good idea. Should be of benefit to the fishermen in the future.
5. I believe it is the only way of gathering information. It enabled us to find out that it is not possible to trap net fish any place at all.
6. I thought it was a very good project. I was not able to capitalize on it at this end of the lake due to tremendous run-offs this season. The project should have worked well for others at the other end of the lake.
7. It was a worthwhile project. A great deal of knowledge has been acquired in a much wider area, especially in the Lake Winnipeg area.
8. The idea of the project was very good.

AUTHORS' COMMENTS

The contracted fishermen involved in the project were in general agreement that the Rough Fish program was of benefit to the Fisheries. Response 1 points up a very important element in Rough Fish Harvesting.

1. Because the rough fish species are not being exploited and the high priced species are being fished in a concentrated way, the rough fish seem to be squeezing out the high priced stock. A good example of this phenomenon is the present status of Lake Winnipegosis which over a short period of time developed into a Rough Fish Lake.

QUESTION 2:

"WHAT DID YOU THINK OF THE WAY IT WAS ORGANIZED?"

RESPONSE:

1. It was well organized and much valuable information was recorded although the start was late due to unseasonable weather. Coarse fish should be harvested under ice as well, as in many places the mullets run upstream before ice breaks. High water made it difficult this spring.
2. It was well organized.
3. It was okay although the permits should have been out before we started.
4. It was well organized. The only problem was there was no place to store ice.
5. It was not too badly organized. We could have used a little more advice during operations.
6. The project lacked nothing in organization. Everything worked out very well.
7. It was very well organized. The board meetings in particular gave all concerned a good insight into the aspects of everyone else's job.
8. It was quite well organized.

QUESTION 3:

"CAN YOU SEE ANY FUTURE IN HARVESTING ROUGH FISH? WHY?"

RESPONSE:

1. Yes, providing markets are extended, also species like jacks, bullhead, suckers, marias, should not have to be released from the traps as spring records show in some areas most of the fish from the traps was thrown back into the lake or river.
2. Yes, there should be a good future for rough fish as the demand for pre-cooked foods increases.
3. Yes. A lot of rough fish, properly prepared, make very good eating.
4. Yes. It can be used for human consumption and could be in great demand in the future.
5. Yes, providing it can be done on a massive scale.
6. Yes. More people are eating fish now, especially with the cheaper grade on the market. It is also an extra source of revenue for fishermen in the off season.
7. Yes. With the small limits being set on the lakes on the high priced commercial species (pickrel, sauger, whitefish) the fisherman can augment his income by fishing for the less expensive species which do not go on the former limits.
8. Yes, as there is a large amount of rough fish in our lake and we can harvest them in large amounts. We do need a better price to make it profitable though.

AUTHORS' COMMENTS

Unanimous Yes. The fishermen see a good future in Rough Fish Harvesting as their responses verify.

Response 2 is very significant and with a concentration on Product Development no problem can be seen to market these species.

The only dubious point currently is the low price being paid for rough fish but with the development of markets, the problem should resolve itself.

QUESTION 4:

"WOULD IT BE WORTHWHILE TO HARVEST ROUGH FISH? WHY?"

RESPONSE:

1. Yes, especially now when fishermen on Lake Winnipeg operate on a quota system and there is a long lay off between seasons, also species such as jacks, bullheads, etc. should be allowed to be sold as well as mullets and carp.
- N.B. Proper facilities for handling the fish need to be organized in certain areas. This was a major problem this spring as in one area there was a lot of fish but no ice or sheds.
2. Yes, with the proper gear and providing the markets are available. I believe that in the not too distant future all rough fish will be used in various ways.
3. Yes. The lake is overcrowded now. All we need is the permission and the market.
4. Yes, because there is enough rough fish here in Fisher River and the area is large.
5. Yes. If we were able to get a better price for rough fish, it would create more employment with fair wages as at present day prices, unless you can get enough production out of your trap nets, it is not a profitable operation.
6. Yes. If I could capture enough rough fish it would certainly be worth my while seeing the price on rough fish is slowly increasing.
7. In the past the fisherman always produced a great deal of rough fish along with his commercial fish. The mink rancher took the heads of the commercial species and the small fish that were not large enough for the market. With the larger and marketable rough fish we had built up a large market within the provinces of Manitoba and also into the border States. This fish was usually sold round with the minimum of labour.

7. cont'd

I believe the Marketing board should be an export board only and that the fishermen of each province should be allowed to sell their product within the borders of their own province and then it would be worthwhile to harvest rough fish.

8. It is hardly worthwhile harvesting rough fish at the present time due to the low prices and the cost of freight.

AUTHORS' COMMENTS

There is general agreement among the fisherman that rough fish harvesting would be worthwhile if the following steps are taken.

- a) Get markets,
- b) Concentrate on Product Development,
- c) Let Marketing Corporation be for export only.

QUESTION 5:

- a) "WHAT DO YOU THINK ARE THE MARKETING PROSPECTS FOR SPECIES LISTED BELOW AND WHY DO YOU THINK SO?"

RESPONSE:

| <u>Maria</u> | <u>Marketing Prospects</u> | <u>Why do you think so?</u> |
|--------------|--|--|
| 1. | Negative until we set up a plant that will handle this fish. | As far as I know, presently this fish is not being handled because it hasn't any scales and therefore has no market value. |
| 2. | Good. | With proper promotion, maria fillets, fish sticks and fish patties should be marketable. |
| 3. | Should be good. | Heard they were delicious when prepared. Could also possibly be used for pet food. |
| 4. | The Marketing Corporation should buy all these instead of the fishermen throwing it overboard. | This fish is boneless and ideal for fillets. Very good eating. The Government should buy all of this species. |
| 5. | Good. | If some kind of fish steaks, weiners or other fish product could be developed, it should bring a good price. |
| 6. | Not very good. | People have not accepted the maria as an eating fish as yet although the flesh is very high in food value. |
| 7. | | It is hard to assess the marketing possibility of rough fish when the marketing of high priced fish is in such a mess. |

Maria

Marketing Prospects

Why do you think so?

8.

Have no idea, as we catch so little of this type of fish.

AUTHORS' COMMENTS

Response 1 indicates that there is too much emphasis being placed on the gefilte fish market to the extent that non gefilte fish are being ignored, e.g. maria, bullheads, etc. for which good markets could be developed.

Response 2 is very true and Product Development is needed in this area.

QUESTION 5:

- b) "WHAT DO YOU THINK ARE THE MARKETING PROSPECTS FOR SPECIES LISTED BELOW AND WHY DO YOU THINK SO?"

RESPONSE:

| <u>Tullibee</u> | <u>Marketing Prospects</u> | <u>Why do you think so?</u> |
|-----------------|----------------------------|--|
| 1. | Fair. | This species is not harmful to our lakes and seems to be decreasing. It can only be sold on local market because of the ban on it. I think a Canadian market could be established for it when smoked. It would have to be promoted more. |
| 2. | Quite possible. | This fish is good smoked and is in the proper price range for the average family. |
| 3. | Should be good. | Delicious when smoked. |
| 4. | Good. | |
| 5. | Good. | If more Canadian markets could be developed our tullibee would bring a good price. |
| 6. | | There is no market size in this lake at present. |
| 7. | | It is hard to assess the marketing possibility of rough fish when the marketing of the high priced fish is in such a mess. |
| 8. | ----- | ----- |

AUTHORS' COMMENTS

The general response indicates that smoked tullibee is an attractive marketing prospect. Tullibee abound in the major central Canadian lakes.

It would be beneficial, in our opinion, to harvest a thousand pounds of tullibee, smoke them in one of the local kilns and conduct market probes. Need for Product Development is a must with this species.

QUESTION 5:

- c) "WHAT DO YOU THINK ARE THE MARKETING PROSPECTS FOR SPECIES LISTED BELOW AND WHY DO YOU THINK SO?"

RESPONSE:

| <u>Suckers</u> | <u>Marketing Prospects</u> | <u>Why do you think so?</u> |
|----------------|----------------------------|--|
| (Mullet) | | |
| 1. | Good. | With the abundance we have in Manitoba lakes we should be looking at a <u>cannery</u> . The mullets that have been canned by local people are equal to salmon that comes from the coast and which is a high priced fish. |
| 2. | Good. | With the new equipment today to remove the flesh from the bones, prospects should be good for marketing fish cakes, etc. This is also a good canning fish. |
| 3. | Very good. | We know of many people who can this fish for their own use. It would help if there were canneries set up. |
| 4. | Good. | This species can be canned like salmon, also smoked. |
| 5. | Very good. | We should explore the possibility of exporting this fish possibly to underdeveloped countries where it could be sold cheaper than the high priced fish. |
| 6. | Very good. | Due to better advertising, people seem to be accepting this species on the general market. It is also very acceptable price-wise. |

| <u>Suckers</u> | <u>Marketing Prospects</u> | <u>Why do you think so?</u> |
|----------------|----------------------------|--|
| (Mulletts) | | |
| 7. | | It is hard to assess the marketing possibility of rough fish when the marketing of the high priced fish is in such a mess. |
| 8. | Very good. | This type of fish can be processed in many different ways and is a very tasty food if properly prepared. |

AUTHORS' COMMENTS

The fishermen feel that there is good justification for building small canneries to process mullet.

A market probe of a canned product would certainly be a constructive step forward. Also, a trap net experiment as suggested for Fisher River would justify the economics of a cannery.

QUESTION 5:

- d) "WHAT DO YOU THINK ARE THE MARKETING PROSPECTS FOR SPECIES LISTED BELOW AND WHY DO YOU THINK SO?"

RESPONSE:

| <u>Carp</u> | <u>Marketing Prospects</u> | <u>Why do you think so?</u> |
|-------------|----------------------------|---|
| 1. | Fair to good. | More promotion is needed, if we can sell ½ million, why not 2 million. |
| 2. | Fair. | This fish can be used for fish cakes or smoked. Pet food. |
| 3. | Very good. | There are many different ways of preparing this fish. |
| 4. | Good. | This fish is very nice smoked. Can also be used for different kinds of food (pet?). |
| 5. | Good. | Good for fish cakes, etc., or pet food. |
| 6. | Not very good at present. | The Marketing Corporation is not advertising and selling the carp as well as they could. They seem to have the attitude that if people want carp meat they will come to the Marketing Corporation and ask for carp. This is erroneous as "you have to sell the fish to the people". |
| 7. | | It is hard to assess the marketing possibility of the rough fish when the marketing of the high priced fish is in such a mess. |
| 8. | ? | |

AUTHORS' COMMENTS

There is agreement among the fishermen that product development is needed to create marketable products from carp. The suggestion of the fishermen is to:

- a) Smoke,
- b) Convert to fried product,
- c) Pet food.

In our opinion product development should begin as soon as possible and markets be developed. If not, there seems little point in continuing to promote Rough Fish Harvesting.

QUESTION 5:

- e) "WHAT DO YOU THINK ARE THE MARKETING PROSPECTS FOR SPECIES LISTED BELOW AND WHY DO YOU THINK SO?"

RESPONSE:

| <u>Bullheads</u> | <u>Marketing Prospects</u> | <u>Why do you think so?</u> |
|------------------|---|--|
| 1. | Good. | Before the closing of our lake and before the new marketing system there was a good market for this fish. This fish is caught mostly in creeks and rivers and in the spring, March through April. If we have the market this fish can be harvested between the Winter and Spring season. |
| 2. | Limited. | (No reason given as to why.) |
| 3. | Should be good. | Many people used this fish for years. Could also be used for pet food. |
| 4. | Should be good. | It can be used in many ways, even as a fertilizer. |
| 5. | Not known. | |
| 6. | We do not have this species in this lake. | |
| 7. | | It is hard to assess the marketing possibility of the rough fish when the marketing of the high priced fish is in such a mess. |
| 8. | Unknown. | |

AUTHORS' COMMENTS

As the primary producers indicate, there used to be a market for this species before the new marketing system was introduced. This market can be redeveloped.

QUESTION 5:

f) "WHAT DO YOU THINK ARE THE MARKETING PROSPECTS FOR SPECIES LISTED BELOW AND WHY DO YOU THINK SO?"

RESPONSE:

| <u>Sunfish</u> | <u>Marketing Prospects</u> | <u>Why do you think so?</u> |
|----------------|----------------------------|---|
| 1. | Good. | There is a considerable rural and local market for this species, both fresh and smoked. Most of the sunfish is caught in the south basin of Lake Winnipeg, close to local markets. Prior to 1970, there was no problem in selling this species locally but fishermen have to be allowed to catch and market it. |
| 2. | Limited. | Good when smoked, canned or pickled. Should have good possibilities. |
| 3. | Very good. | This is a good eating fish. |
| 4. | Good. | This is one of the best fish you can eat. Corporation should really look for a market for this species. |
| 5. | Not known. | |
| 6. | Not known. | We do not have sunfish in our lake. |
| 7. | | It is hard to assess the marketing possibility of the rough fish when the marketing of the high priced fish is in such a mess. |
| 8. | Unknown. | |

AUTHORS' COMMENTS

The fishermen feel that they can create their own local markets for this species if they were allowed.

Another point noted is the lack of product development with this species.

QUESTION 6:

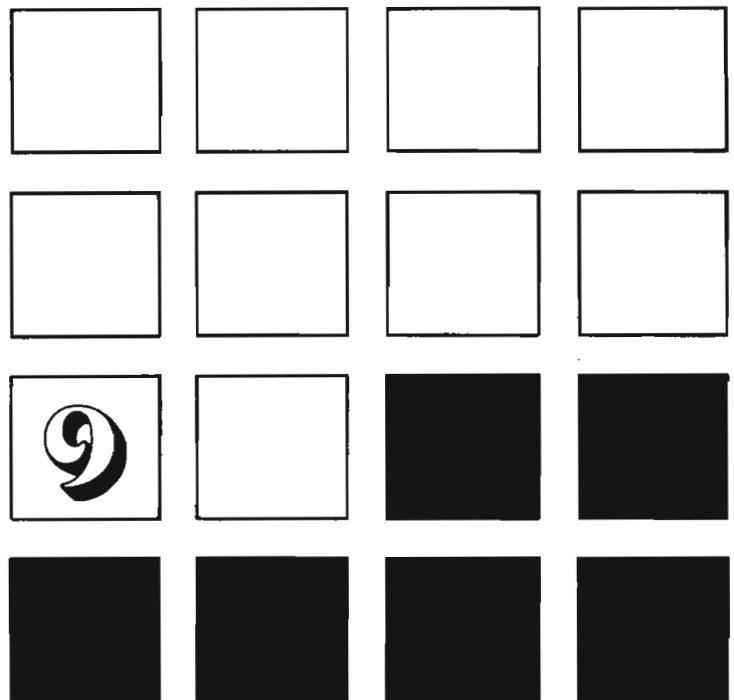
6. FISHERMEN'S GENERAL COMMENTS

1. The key to rough fish removal is:
 - a) To establish markets with a price that will encourage the fishermen to harvest these species.
 - b) Fishermen will have to be allowed to use the kind of gear that produces at a minimum cost; also to be able to fish at the right time and the places that these species are.
 - c) Fishermen will continue to need assistance in learning to use the proper gear needed in a coarse fish removal program. Little has been offered by our local government and I think it important that Federal Fisheries keep involved until this type of program is well on its way.
2. It is hoped that markets can be found for all the Rough Fish that can be fished in the lakes and that the Marketing Board put more effort in this direction.
3. A few canning factories should be set up around the lake to get the fish while it is still fresh. Why not move industry to the smaller communities thereby creating employment and making use of the good rough fish that is available there.
4. The fishermen are looking forward to Rough fish harvesting. We would like the Government to put up a proper packing plant for fish though as transportation is very handy and we could ship three or four times a week. Wider markets should be explored as this fish, when cooked different ways, i.e. patties, fish sticks is very good eating.
5. The Marketing Corporation can and should do a lot better on our rough fish, as well as on the whitefish, as the prices are too low. There should be a greater effort made in this direction. The Marketing Corporation should be working on the interests of the fishermen and I believe they are trying whereas in the past the private fish companies concentrated on making money on the high priced species.

6. FISHERMEN'S GENERAL COMMENTS cont'd

6. I would like to see the value of rough fish increased still a little more. With the present situation of the "good" fish being not too plentiful in Lake Winnipegosis it would give the fishermen a boost.
7. The reason the fishermen went along with the Marketing Board set-up was the tremendous pressure brought upon the fishing industry by both Federal and Provincial bodies, i.e.
 - a) pressure re health regulations,
 - b) setting up a credit corporation which is the best thing that has happened to the industry to date.

MARKETING INFORMATION



Department of the Environment
Industrial Development Branch
Exploratory Fishing Division
Chief, J. Rycroft

1972 MANITOBA
ROUGHFISH HARVESTING
PROJECT-1354-72

Co-Authors
Andrew and Ian B. Duthie

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UNIT 9

MARKETING INFORMATION

Unit Introduction

This is not a Market Analysis but purely a report of findings which we encountered in the process of researching the background information on the Manitoba Fishery.

S.1.*

MANITOBA MARKETING INFORMATION BACKGROUND

SECTION 1

MANITOBA MARKETING INFORMATION BACKGROUND

Markets

More than 70% of Manitoba fish is consumed in the United States. Although certain products are marketed abroad, the demand for Manitoba fish relies upon the size of the North American population, and upon the taste habits of the consumers in respect to race, religion and income and the related prices of parallel food products.

Race and Religion have been the prime factors affecting freshwater fishing in Manitoba. The fact that many ethnic groups have settled in urban and industrial areas near the lakes and that these groups are accustomed to eating fish has provided flourishing markets for new species. Jewish immigrants, from New York, Philadelphia, Chicago and Montreal, who prefer freshwater fish during their religious festivals, have been the key consumer source for lake fish. Also the food habits of Roman Catholic people, and of certain other sects, have affected marketing patterns considerably.

The New York Jewish population has made the largest contribution to the creation of healthy markets for trout and whitefish. There has been in the past decade a progressive decline in the quantities of some of the species and also the Manitoba Fisheries have suffered some setbacks due to the strong competition from the Great Lakes.

Flux in Consumer Preferences:

As the stocks of freshwater fish have been declining, so has the demand for whole or dressed freshwater species.

The tastes and habits of the average consumer have changed radically; pre-prepared foods are in vogue because they save time and effort on the part of the housewife.

Fresh and frozen fillets have taken precedence; block packs are also prepared and shipped for further processing into fish sticks and fish patties.

Distribution

The Retail Trade

The day of the small shopkeeper with his limited fish resource is over. Quick freezing, packing and improved transportation and storage has created the situation where consumer frozen fish products are now available to the modern supermarket. When frozen fish products are in plentiful supply, the supermarkets use promotion sales to move large amounts of fish. In urban markets, large specialty stores thrive by selling round, dressed and live fish to satisfy the "Gefilte" trade. However, fish consumers are turning more and more to fillets, to "Gefilte fish" pickled in jars and to breaded and cooked frozen products.

In some Manitoba fishing centres, particularly during the tourist season, some of the fishermen carried on a small retail trade selling fresh fish or fillets to tourists who came on the wharf. There was also a fisherman retail supply system with the local hotels and restaurants.

The Wholesale Trade

The bulk of fishermen's sales were made to wholesalers or agents, who may be packers in their own right. The New York market is a premium market for high quality freshwater fish. Many of the smaller wholesale firms in the Peck Slip market went bankrupt and the market was then controlled by 2 to 3 firms only. The volume of business, however, in whole and dressed fish was declining due to the changes in buying patterns of the various ethnic groups.

Historic Conditions in Marketing in Manitoba.

Too little attention was paid in the past to the law of supply and demand. Quite often, more fish was produced than could be sold, thus creating a low price situation.

There was never a measure of control of the price by the producer. In fact, no initial contract price was agreed upon and the producer never knew until the end of the season what price he got for his fish.

The fact that a proliferation of middle men existed between the retailer and the fisherman, left the Canadian processor in a weak position. The fish companies and exporters were not united and had to take what the importers were willing to pay. The skilled fisherman, who headless dressed his fish and used good packing, processing and icing techniques received more money for his fish but there was no discipline to ensure that all fishermen did this.

Old fashioned methods of storing and preserving were generally used and there was an overabundance of small, antiquated fish processing plants which were incapable of meeting modern fisheries production requirements.

Before the introduction of the Freshwater Fish Marketing Corporation the fish companies were the source of financing for the fishermen. Due to the unstable marketing and price structures many of the fishermen were in permanent debt to the fish companies.

Marketing Process - Background

The bombardier and snowmobile have for some years been the most common means of winter transportation for the fishermen. In the past, some fishermen kept their fish in small packing sheds near the catch area while waiting to build up enough stock for a delivery trip to the fish packer. The fish were usually iced and delivered to the packer every other day. The packer, usually a company station, shipped direct to Winnipeg. Truck and train were normally used to transport to the city. Sometimes, fish were delivered by aeroplane. The processed fish were then shipped by truck or train to the U. S. market. The shipments were inspected on the Canadian side and also on the American side. As soon as the shipment was cleared on the U. S. side, the U. S. broker immediately tried to sell the fish. If a shipment of fish was rejected on the U. S. side it was immediately shipped back to Canada; such rejections caused heavy financial losses to the Canadian fish plant.

Normally the Winnipeg fish brokers dealt directly with large U. S. interests in New York, Chicago, Detroit and Illinois. The American buyer usually contacted a few of the small Winnipeg brokers before a deal was closed. In this kind of trading, the Winnipeg broker was forced to accept a low price which correspondingly affected the price to the fishermen.

S.2.*

CURRENT MARKETING INFORMATION

SECTION 2

CURRENT MARKETING INFORMATION

In 1965, George H. McIvor was appointed as Commissioner of an inquiry into the problems of the freshwater fishery. The Commission report of 1966 stated that international markets were unstable and were controlled by a few entrepreneurs; the formation of a single freshwater fish marketing unit for the prairie provinces was recommended. As a result, the Freshwater Fish Marketing Corporation, a crown corporation, was formed.

The Corporation was created to trade in and to market fish, fish products and by-products in both domestic and export markets. The Corporation has the sole responsibility for marketing all freshwater fish in the designated areas. The principal aim of the corporation is to increase the return to the primary producer. It is also hoped that it will make consumer quality fish available at reasonable cost.

The areas of jurisdiction of the Freshwater Fish Marketing Corporation are the waters of Northwestern Ontario, Manitoba, Saskatchewan, Alberta and the North West Territories. The Corporation, directly or through its agents, purchases all species of freshwater fish from these areas; the commercial fishermen can also sell direct to the consumer. Approximately 6,000 fishermen from the provinces mentioned, a large percentage of whom are Indian and Metis, deal with the Corporation to market their catch.

As recommended by the McIvor Commission, the Corporation establishes a price, related to market, for all species of fish at the beginning of each season, (summer and winter). As a result of this, every fisherman knows what he is to be paid at the start of the season and any surpluses made by the Corporation are paid out to the fishermen at the end of the season in the form of a final payment.

In May of 1969, the Freshwater Fish Marketing Corporation began operations with its head office in Winnipeg. The Corporation has a board of 11 directors including a chairman and a president. Allied with it is an Advisory Committee of 15 members, mainly from the freshwater fishing industry. Of the 11 directors, 5 are recommended by the provincial governments concerned; this is necessary because the federal crown corporation works in close co-operation with the provinces.

It is interesting to note that the area within the jurisdiction of the Corporation contains almost 20% of the world's fresh water. Also 70% of the fish caught in this area is exported to the United States.

In 1969, the decision was taken to invest in a new plant at Transcona, Manitoba. This plant is now in operation and is the central receiving, handling and shipping point serving Manitoba and other parts of the fishery. The plant has the capability to produce new and diversified projects and is capable of freezing up to 70,000 pounds of freshwater fish per day, with cold storage space for nearly 3 million pounds of products.

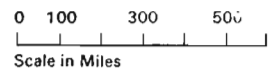
Within Manitoba a series of agents plants are operated, some of which are equipped with processing and freezing facilities. (e.g. Island Lake Fishermen's Co-operative, Leaf Rapids Fishermen's Co-operative, Lynn Lake Fishermen's Co-operative).

The processing plant at Selkirk was re-opened for a period during 1972 to contend with the overflow from Transcona.

S.3.*

CURRENT PRICE STRUCTURES

FRESHWATER FISH MARKETING CORPORATION AREA OF JURISDICTION



Prices to Fishermen

(Basis packed fish F.O.B. Corporation Receiving depot at Winnipeg)

| Species | Summer 1969 | Winter 69/70 | Summer 1970 | Winter 70/71 | Summer 1971 |
|-----------------------------|----------------|-----------------|----------------|-----------------|----------------|
| Whitefish: | | | | | |
| <i>(Export grade)</i> | | | | | |
| Jumbo | .53 | .64 | .53 | .52 | .53 |
| Large | .43 | .54 | .45 | .45 | .45 |
| Medium | .30 | .34 | .35 | .37 | .35 |
| Small | .20 | .19 | .19 | .18 | .19 |
| Whitefish: | | | | | |
| <i>(Continental grade)</i> | | | | | |
| Jumbo | .39 | .50 | .39 | .41 | .38 |
| Large | .34 | .40 | .34 | .33 | .33 |
| Medium | .29 | .30 | .28 | .28 | .28 |
| Small | .19 | .17 | .17 | .15 | .16 |
| Smoker Whitefish: | | | | | |
| Medium | .53 | — | .52 | — | .47 |
| Small | .34 | — | .33 | — | .20 |
| Cutter Whites | .15 | — | .13 | .13 | .14 |
| Pickeral: | | | | | |
| <i>Round</i> | | | | | |
| Large & Medium | .30 | .43 | .46 | .47 | .46 |
| Small | .25 | .33 | .41 | .42 | .41 |
| <i>Dressed</i> | | | | | |
| Large & Medium | .34 | — | .54 | .55 | .54 |
| Small | .29 | — | .48 | .50 | .48 |
| <i>Headless and dressed</i> | | | | | |
| Large & Medium | .39 | .51 | .58 | .59 | .58 |
| Small | .34 | .46 | .51 | .54 | .51 |
| Trout: | | | | | |
| <i>Standard</i> | | | | | |
| Under 4 lb. | — | .46 | .35 | .40 | .31 |
| 4-8 lb. | — | .46 | .35 | .45 | .36 |
| H & D | .35 | .46 | .35 | .38 | .36 |
| Cutters | — | — | .28 | .30 | .28 |
| Saugers: | | | | | |
| <i>H & D</i> | | | | | |
| Large | .29 | — | .51 | .54 | .51 |
| Medium | .23 | — | .41 | — | .41 |
| <i>Round</i> | | | | | |
| Large | — | .35 | — | .42 | .41 |
| Medium | — | .25 | — | — | .36 |

| Species | Summer 1969 | Winter 69/70 | Summer 1970 | Winter 70/71 | Summer 1971 |
|-----------------------|----------------|-----------------|----------------|-----------------|----------------|
| Northern Pike: | | | | | |
| <i>Dsd.</i> | | | | | |
| Large | .22 | .23 | .23 | .21 | .22 |
| H & D | .16 | .18 | .17 | .17 | .17 |
| Perch: | | | | | |
| <i>Dsd.</i> | | | | | |
| ½-¾ lb. | .12 | .13 | .13 | .15 | .14 |
| Over ¾ lb. | — | .21 | .16 | .23 | .18 |
| Goldeye: | | | | | |
| <i>Dsd.</i> | | | | | |
| Large | .32 | .31 | .32 | .32 | .32 |
| Medium | .23 | .21 | .27 | .27 | .27 |
| Small | .18 | .16 | .17 | .17 | .14 |
| Tullibee: | | | | | |
| <i>Export</i> | | | | | |
| Large | .21 | .35 | .24 | .24 | .25 |
| Medium | .18 | .30 | .19 | .19 | .20 |

Purchases in Pounds From Fishermen by Province and Species

May 1, 1970 to April 30, 1971

| | Alberta Pounds | Sask Pounds | Manitoba Pounds | Ontario Pounds | NWT Pounds | Total Pounds |
|-----------------------|-------------------|-------------------|--------------------|-------------------|------------------|-------------------|
| Whitefish | 1,574,426 | 5,220,294 | 3,786,748 | 1,530,078 | 3,007,532 | 15,119,078 |
| Pickereel | 122,461 | 2,187,347 | 2,293,687 | 1,102,120 | 85,251 | 5,790,866 |
| Saugers | — | — | 645,438 | 44,951 | — | 690,389 |
| Trout | 132,050 | 1,021,277 | 68,417 | 32,208 | 509,946 | 1,763,898 |
| Northern Pike | 424,717 | 1,692,480 | 2,510,909 | 530,956 | 158,202 | 5,317,264 |
| Tullibee | 377,248 | 142,617 | 29,894 | 91,784 | — | 641,543 |
| Sturgeon | — | 217 | 3,137 | 14,490 | — | 17,844 |
| Others | 155,857 | 68,580 | 3,942,118 | 169,979 | 73,992 | 4,410,526 |
| Total Province | 2,786,759 | 10,332,812 | 13,280,348 | 3,516,566 | 3,834,923 | 33,751,408 |

*Includes Rainbow Trout

Initial Payments to Fishermen by Province and Species

May 1, 1970 to April 30, 1971

| | Alta \$ | Sask \$ | Man \$ | Ont \$ | NWT \$ | Total \$ |
|-----------------------|-------------------|---------------------|---------------------|-------------------|---------------------|---------------------|
| Whitefish | 335,694.57 | 776,777.19 | 608,072.65 | 319,166.41 | 902,265.01 | 2,941,975.83 |
| Pickereel | 45,364.58 | 873,691.35 | 902,769.19 | 469,133.67 | 31,629.66 | 2,322,588.45 |
| Saugers | — | — | 232,972.58 | 14,392.11 | — | 247,364.69 |
| Trout | 26,539.42 | 206,654.18 | 21,635.20 | 10,185.95 | 134,832.28 | 399,847.03 |
| Northern Pike | 39,779.08 | 156,952.41 | 218,954.83 | 57,608.00 | 12,925.38 | 486,219.70 |
| Tullibee | 44,572.01 | 13,461.44 | 1,999.99 | 5,362.06 | — | 65,395.50 |
| Sturgeon | — | 286.46 | 4,620.64 | 18,568.65 | — | 23,475.75 |
| Others | 12,819.65 | 2,082.03 | 123,090.79 | 16,802.67 | 10,988.28 | 165,783.42 |
| Total Province | 504,769.31 | 2,029,905.06 | 2,114,115.87 | 911,219.52 | 1,092,640.61 | 6,652,650.37 |

*Includes Rainbow Trout

Average Price per Pound Paid to Fishermen for Loose Fish F.O.B. Receiving Depots of the Corporation or its Agents

May 1/69 to April 30/70 compared to May 1/70 to April 30/71

| | 1969/1970 | | 1970/1971 | | Increase (Decrease) |
|------------------|------------------|-------------------------|------------------|-----------------|---------------------|
| | Pounds Purchased | Initial & Final Payment | Pounds Purchased | Initial Payment | |
| Whitefish | 16,518,113 | 21.28¢ | 15,119,078 | 19.46¢ | (1.82) |
| Pickrel & Sauger | 8,313,605 | 32.97¢ | 6,481,255 | 39.65¢ | 6.68 |
| Trout | 1,978,578 | 28.94¢ | 1,763,898 | 22.67¢ | (6.27) |
| Northern Pike | 6,865,741 | 8.02¢ | 5,317,264 | 9.14¢ | 1.12 |
| Tullibee | 1,325,084 | 10.79¢ | 641,543 | 10.19¢ | (.60) |
| Sturgeon | 23,357 | 150.32¢ | 17,844 | 131.56¢ | (18.76) |
| Others | 3,297,701 | 3.71¢ | 4,410,526 | 3.76¢ | .05 |
| Total | 38,322,179 | 20.04¢ | 33,751,408 | 19.71¢ | (.33) |

Notes:

*The average price of whitefish is 1.82¢ per pound lower in 1970/71 than in 1969/70 due to closure of Lake Winnipeg and other heavy producing lakes which resulted in a loss to fishermen of the Selkirk Smoker and other high quality whitefish production, which normally brings the highest range of price and value of all whitefish produced.

*Average price for trout was down over the previous year due to a market price decline for the type and quality of product produced in this period.

*There was a very severe decline in volume of pickrel and sauger produced. This was attributable entirely to mercury pollution with resulting lake closure and product disposal.

Had pickrel production been maintained at previous year's level, the average price to fishermen in 1970/71 for all species would have been higher than in 1969/70 by approximately 3½%.

Annual Sales by Pounds, Species and Type

May 1/70 to April 30/71

| Pool | Fresh | Frozen | Filleted | Total Pounds |
|-------------------------|-------------------|------------------|------------------|-------------------|
| Whitefish | 5,410,844 | 3,761,153 | 2,737,884 | 11,909,881 |
| Pickeral & Sauger | 3,478,199 | 807,179 | 1,397,162 | 5,682,540 |
| Trout | 519,446 | 575,971 | 373,191 | 1,468,608 |
| Northern Pike | 589,222 | 983,804 | 2,453,151 | 4,026,177 |
| Tullibee | 217,522 | 405,514 | 40,220 | 663,256 |
| Sturgeon | — | 17,011 | — | 17,011 |
| Others | 1,350,386 | 502,149 | 1,246,508 | 3,099,043 |
| Grand Total | 11,565,619 | 7,052,781 | 8,248,116 | 26,866,516 |
| May 1/70 to Oct. 31/70 | 6,091,147 | 3,133,356 | 5,286,982 | 14,511,485 |
| Nov. 1/70 to Apr. 30/71 | 5,474,472 | 3,919,425 | 2,961,134 | 12,355,031 |
| Grand Total | 11,565,619 | 7,052,781 | 8,248,116 | 26,866,516 |

Annual Sales by Value, Species and Type

May 1/70 to April 30/71

| Pool | Fresh Value | Frozen Value | Filleted Value | Total Value |
|-------------------------|---------------------|---------------------|---------------------|----------------------|
| | \$ | \$ | \$ | \$ |
| Whitefish | 2,813,081.78 | 1,543,430.87 | 1,345,896.19 | 5,702,408.84 |
| Pickeral & Sauger | 2,275,510.44 | 505,963.13 | 1,634,604.80 | 4,416,078.37 |
| Trout | 278,755.94 | 276,336.94 | 244,005.55 | 799,098.43 |
| Northern Pike | 177,219.60 | 324,050.13 | 1,038,163.48 | 1,539,433.21 |
| Tullibee | 72,417.94 | 99,953.19 | 19,961.96 | 192,332.09 |
| Sturgeon | — | 30,572.77 | — | 30,572.77 |
| Others | 142,124.33 | 150,450.60 | 303,842.36 | 596,417.29 |
| Grand Total | 5,759,110.03 | 2,930,757.63 | 4,586,474.34 | 13,276,341.00 |
| May 1/70 to Oct. 31/70 | 3,033,759.38 | 1,337,103.50 | 3,085,368.04 | 7,456,230.92 |
| Nov. 1/70 to Apr. 30/71 | 2,725,350.65 | 1,593,654.13 | 1,501,106.30 | 5,820,111.08 |
| Grand Total | 5,759,110.03 | 2,930,757.63 | 4,586,474.34 | 13,276,341.00 |

Value of Catch Purchased from Fishermen by Species, Province and Season

| | Whitefish | Pickereel | Sauger | Trout | Northern Pike | Tullibee | Sturgeon | Other | Total |
|---------------------|---------------------|---------------------|-------------------|-------------------|-------------------|------------------|------------------|-------------------|---------------------|
| | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ | \$ |
| Alberta | | | | | | | | | |
| May 1—Oct. 31/70 | 173,806.70 | 38,677.06 | — | 16,900.44 | 24,706.97 | 23,161.51 | — | 8,258.31 | 285,510.99 |
| Nov. 1—Apr. 30/71 | 161,887.87 | 6,687.52 | — | 9,638.98 | 15,072.11 | 21,410.50 | — | 4,561.34 | 219,258.12 |
| Total | 335,694.57 | 45,364.58 | — | 26,539.42 | 39,779.08 | 44,572.01 | — | 12,819.65 | 504,769.31 |
| Saskatchewan | | | | | | | | | |
| May 1—Oct. 31/70 | 451,762.86 | 738,428.20 | — | 171,514.22 | 131,751.22 | 1,004.00 | 286.46 | 92.63 | 1,494,840.19 |
| Nov. 1—Apr. 30/71 | 325,014.33 | 135,263.15 | — | 35,139.36 | 25,201.19 | 12,457.44 | — | 1,989.40 | 535,064.87 |
| Total | 776,777.19 | 873,691.35 | — | 206,654.18 | 156,952.41 | 13,461.44 | 286.46 | 2,082.03 | 2,029,905.06 |
| Manitoba | | | | | | | | | |
| May 1—Oct. 31/70 | 471,582.91 | 593,616.24 | 13,791.96 | 14,651.53 | 71,444.96 | 826.84 | 4,620.64 | 45,385.49 | 1,215,920.57 |
| Nov. 1—Apr. 30/71 | 136,489.74 | 309,152.95 | 219,180.62 | 6,983.67 | 147,509.87 | 1,173.15 | — | 77,705.30 | 898,195.30 |
| Total | 608,072.65 | 902,769.19 | 232,972.58 | 21,635.20 | 218,954.83 | 1,999.99 | 4,620.64 | 123,090.79 | 2,114,115.87 |
| Ontario | | | | | | | | | |
| May 1—Oct. 31/70 | 234,800.06 | 412,221.15 | 12,001.27 | 6,486.27 | 42,138.21 | 5,117.93 | 18,191.65 | 15,406.89 | 746,363.43 |
| Nov. 1—Apr. 30/71 | 84,366.35 | 56,912.52 | 2,390.84 | 3,699.68 | 15,469.79 | 244.13 | 377.00 | 1,395.78 | 164,856.09 |
| Total | 319,166.41 | 469,133.67 | 14,392.11 | 10,185.95 | 57,608.00 | 5,362.06 | 18,568.65 | 16,802.76 | 911,219.52 |
| NWT | | | | | | | | | |
| May 1—Oct. 31/70 | 635,097.75 | 19,631.11 | — | 100,414.55 | 5,812.73 | — | — | 6,532.21 | 767,488.35 |
| Nov. 1—Apr. 30/71 | 267,167.26 | 11,998.55 | — | 34,417.73 | 7,112.65 | — | — | 4,456.07 | 325,152.26 |
| Total | 902,265.01 | 31,629.66 | — | 134,832.28 | 12,925.38 | — | — | 10,988.28 | 1,092,640.61 |
| Grand Total | | | | | | | | | |
| May 1—Oct. 31/70 | 1,967,050.28 | 1,802,573.76 | 25,793.23 | 309,967.61 | 275,854.09 | 30,110.28 | 23,098.75 | 75,675.53 | 4,510,123.53 |
| Nov. 1—Apr. 30/71 | 974,925.55 | 520,014.69 | 221,571.46 | 89,879.42 | 210,365.61 | 35,285.22 | 377.00 | 90,107.89 | 2,142,526.84 |
| Total | 2,941,975.83 | 2,322,588.45 | 247,364.69 | 399,847.03 | 486,219.70 | 65,395.50 | 23,475.75 | 165,783.42 | 6,652,650.37 |

S.4.*

REFERENCES

MARKETING REFERENCES

Manitoba Facts 1969
Provincial Government of Manitoba Publication

Fisheries Research Board of Canada
Manuscript Report Series Biological No. 871
History of Commercial Fishing in Inland Canada
Authorship - W. A. Kennedy

The Whitefish Fishery
Natural Resources Management
Authorship - David Tomasson - 1971

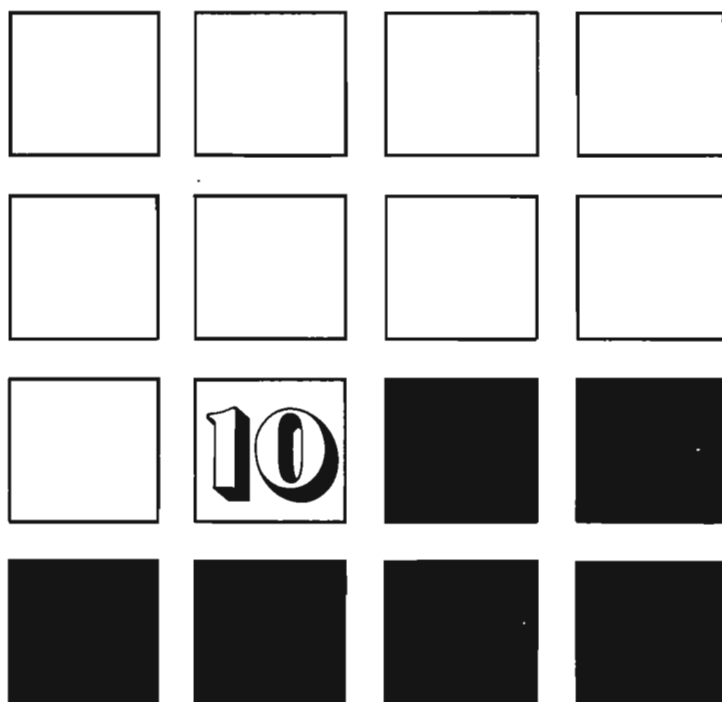
Economic Aspects of the Great Lakes Fisheries of Ontario
Bulletin No. 149
Economic Services, Department of Fisheries of Canada, Ottawa
Authorship - Harold C. Frick - 1965

Quick Facts About the Freshwater Fish Marketing Corporation -
1971

Annual Report
Freshwater Fish Marketing Corporation 1971-72

McIvor Commission Report -
1967

ECONOMIC TRENDS IN MANITOBA FISHERIES



Department of the Environment
Industrial Development Branch
Exploratory Fishing Division
Chief, J. Rycroft

1972 MANITOBA
ROUGHFISH HARVESTING
PROJECT—1354—72

Co-Authors
Andrew and Ian B. Duthie

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UNIT 10

ECONOMIC TRENDS IN MANITOBA FISHERIES

Unit Introduction

This Unit deals with production and trends in the fisheries for the past 30 years.

Some interesting conclusions can be drawn from the graphical presentations and, when sociological factors are also considered, the trends confirm that the Manitoba Fisheries are in a state of decline.

S.1.*

CONCLUSIONS

SECTION 1

CONCLUSIONS

General

The trends in commercial fisheries in Manitoba indicate that the industry is in a state of decline.

Specifics

1. Production in most species has been dropping steadily since 1952.
2. A policy of attrition seems to be in effect; this has resulted in a steady decline in the number of licensed operators. Little encouragement is given to young people to enter the industry.
3. Over 70% of the fishermen earn less than \$2,000 per annum from fishing and many are leaving the industry.
4. Research and service costs appear to be increasing and to outweigh the revenues derived from commercial fishing.

S.2.*

ROUGH FISH BACKGROUND INFORMATION

SECTION 2

ROUGH FISH BACKGROUND INFORMATION

a) Historical

The following documents serve to give a brief history of rough fish operations in Manitoba in recent years.

ROUGH FISH HARVESTING AND DEVELOPMENT

Provincial Annual Report 1964-65

New interest is developing in such low value species as muskellunge (burbot) and carp. They are being utilized in the animal food market. Introduction of more efficient kinds of fishing gear by the Fisheries Branch in its gear research program has encouraged greater utilization of these low value species. Over one half million pounds of carp were caught in the Clandeboye Bay Area of Lake Manitoba alone in this program.

GEAR RESEARCH

The Branch is continuing its program of gear research aimed towards developing new and improved fishing techniques. Trap nets, trawling gear and seines have been used in demonstrations to fishermen. Gear of this type is comparatively new to Manitoba and considerable experimentation and modification is required to adapt it to the specialized fishing in Manitoba waters. The objective of this program is to develop fishing methods which will increase the efficiency and lower the present high cost of production in this industry.

ROUGH FISH HARVESTING AND DEVELOPMENT

Provincial Annual Report 1965-66

More "Coarse Fish", such as suckers, maria and carp were produced and there was an improved market for these species. About 65% was produced and sold to American markets and the remainder was used mainly for animal food and fish meal. Carp fillets were in demand for the famed "Gefilte fish" trade, and over 3/4 million lbs. of carp was taken in the Lake Manitoba area alone. This new fishery will bring added income to fishermen as the market becomes established. The Fisheries Branch introduced a beach drag seine which provide highly efficient and economical for catching carp.

The Program of Gear Research was continued by a specialized crew whose investigations were aimed at improving fishing techniques. A trawling technician assigned by the Federal Industrial Development Service, has continued to demonstrate and instruct both fishermen and our trawler crew in trawling methods. With the trawler, it may be possible to remove large quantities of the low value species of fish at a minimum cost. The purpose of this program is to develop a new fishery for commercial fishermen and to give them additional income.

ROUGH FISH HARVESTING AND DEVELOPMENT

Provincial Annual Report 1966-67

The production of "Coarse Fish" - suckers, carp and maria - for block fillets and animal food was 520,500 lbs. less than last year. About 70% was processed and sold to the American Export Trade with the remainder going for fish meal and mink food. About 1 1/2 million lbs. of carp was produced from Lake Manitoba during the May and June special beach seine net operation, which resulted in additional income of about \$35,000 to participating fishermen. Two ice houses and packing sheds were built by the Branch in the Clandeboye Channel area on Lake Manitoba to provide facilities on an experimental basis for increased carp removal and quality improvement for the coming season.

The Lake Winnipeg Gear Research Project continued to develop specialized fishing techniques for removal of "Coarse Fish" in large quantities. The Federal Industrial Development Service supplied a fully experienced gear technician to supervise the handling of trawl nets and to instruct the trawler crew and fishermen in trawling methods. This program is directed towards the development of a new fishery to enable commercial fishermen to derive additional income from low value species of fish.

ROUGH FISH HARVESTING AND DEVELOPMENT

Provincial Annual Report 1968-69

The utilization of Rough Fish, (suckers, carp, maria and tullibee) for both the block fillet trade and animal food markets, showed a definite improvement. In spite of an increased catch of about 2,000,000 lbs., market demand was in excess of the available supply. A production of 613,000 lbs. of carp was taken by 14 fishermen in the Lake Manitoba area, slightly below the 1967-8 year. The additional income to these fishermen was about \$15,341.00 for the period of June and July. However, in the long term, development of new products is of paramount importance to allow for further expansion of this fishery for rough fish.

SECTION 2

ROUGH FISH BACKGROUND INFORMATION

b) Biological

The following section gives a definition of the term "rough fish" and an account of the several important Manitoba species.

1) Definition

The definition of rough fish is essentially a regulatory matter and is based largely on economic value. The following text gives the definition as it applies to Manitoba.

MANITOBA FISHERY REGULATIONS

(Made under Section 34 of the Federal Fisheries Act)

Note: The following is a consolidation of the Manitoba Fishery Regulations which has been compiled from the various Orders in Council establishing and amending the regulations up to and including the 1964 amendment.

INTERPRETATION

1. (1) In these regulations,
 - (c) "course fish" or rough fish" means,
 - i) bullhead, catfish or any member of the family Ameiuridae;
 - ii) burbot or ling (*Lota lota maculosa*, Le Sueur);
 - iii) carp (*Cyprinus carpio*, Linnaeus), or any member of the family Cyprinidae; and
 - iv) mullet, sucker or any member of the family Catostomidae;

II) Burbot

Lota lota (= *Lota lota maculosa*)

Other names: maria, ling



Description

The Burbot is the sole representative of the codfish family in fresh water. It is light to dark brown in colour, overlaid with blotches and spots of a darker brown or black, depending upon the water in which it lives. The dorsal, caudal and anal fins are mottled.

It has an elongated eel-like body that is rather rounded at the front half and compressed at the rear half. It has two dorsal fins, the second extending from the middle of the back to the tail. The anal fin is also long, extending from the tail almost to the middle of the belly.

There is a single barbel at the tip of the chin and a small barbel near each nostril. The body appears scaleless. In fact, there are scales, but they are microscopic and do not impart a 'rough feel' to the body. The average weight is from three to five pounds.

Habits:

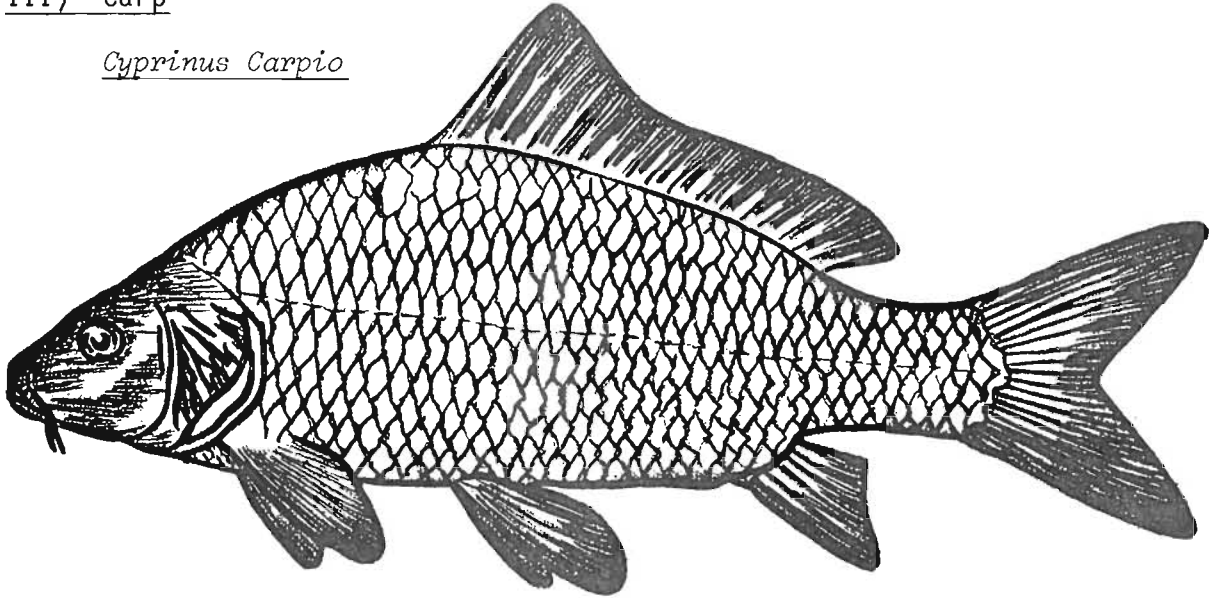
The Burbot feeds on a variety of animal organisms, such as small fish, insect larvae, crustaceans, fish eggs, etc. It generally lives in deep water where there is access to cold water. It spawns in midwinter and after spawning moves into the mouths of large rivers and shallow bays under the ice. During this migration it feeds extensively.

Value:

In Manitoba the Burbot has been utilized to some extent for fish meal. It is also used for mink food, but due to the fact that the bottom fell out of the mink ranching business in recent years, only a limited market now exists. However, increasing interest is being shown regarding utilization of Burbot as a food source. The market price for this species would be around \$4.00 per ton for fishmeal.

III) Carp

Cyprinus Carpio



Description:

The body of the Carp is robust and compressed, olive greenish on the back, fading to a shade of yellow on the lower and upper side. It is generally covered with large scales.

Varieties of Carp occur that may have no scales at all; others are only partly covered by scales. The latter type has been found in Manitoba along with the fully scaled variety. The head of the Carp is short and the snout is somewhat rounded. Two fleshy barbels grow from each side of the upper jaw. Carp probably grow upwards to 30 pounds in Manitoba; the average size of fish caught ranges between five and eight pounds.

Habits:

The Carp is quite a recent introduction to Manitoba. It is suspected that Carp gained entrance to the major lakes of the province from the United States via the Red River. The species has since been scattered through the large lakes and rivers of south central and southwest Manitoba. The Carp flourish in quiet warm waters and it is believed that they have moved as far north as conditions permit.

The most notable Carp grounds in Manitoba are the Netley Marsh, Willow Creek and the west side of Hecla Island at the south end of Lake Winnipeg and the Delta Marsh at the south end of Lake Manitoba. Carp spawn during June and July in shallow, weedy locations. The fry remain in the marshy areas throughout the summer until they are about three inches long.

Carp feed primarily on plant life, rooting up the bottom to get at the roots of aquatic plants. When a number of Carp are at work in this fashion it is often charged that they despoil the habitat for use by water fowl and other fish.

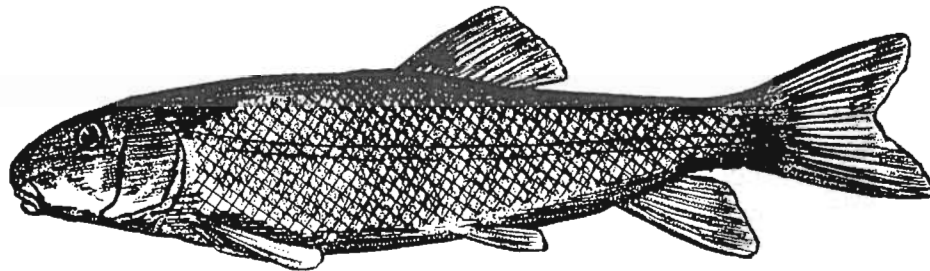
Value:

There is little or no market existing for carp from the Manitoba fisheries at the present time, but the latest market probes are beginning to show some promise. The value of Carp to the fisherman is currently 6¢ per lb. at the FOB Transcona Processing Plant at Winnipeg and the fishmeal price is 1/4¢ per lb. delivered to the Clandeboyne Reduction Plant.

IV) Suckers (Mullets)

There are seven or eight different kinds of suckers in Manitoba. Some are rare and are known to occur in only a few places in the province. The most common species and the ones frequently seen or caught are:

White sucker - *Catostomus commersoni*
and Longnose sucker - *Catostomus catostomus*.



THE WHITE SUCKER (COMMON SUCKER)

Description:

The sucker has a long, cylindrical body with a sucking type mouth and coarse lips. The anal fins are located well back near the end of the body and there are numerous relatively small scales.

The Longnose sucker is distinguished by its elongated snout.

The colour of suckers changes from dark brown to silvery depending on the waters from which the fish are taken and the time of year. Spawning fish tend to be dark coloured; during the spawning season males may have flashes of red on the sides and fins. The general size of suckers caught is about 1 1/2 to 4 pounds.

Habits:

The White sucker occurs throughout the province in practically every body of water which is capable of sustaining fish. It can withstand a great variety of environmental conditions. The Longnose sucker (northern sucker, sturgeon sucker) prefers cooler waters.

These fish spawn in the early spring and lay their eggs along the shores of lakes and in streams where there are water currents. White suckers in particular ascend streams to spawn in gravelly and stoney areas and can be seen "running" in small streams during late April and early May.

Suckers feed on the various organic materials found on the bottom of lakes and streams in which the fish live.

Value:

The flesh of suckers is of good edible quality but contains numerous small bones. The commercial product is frequently termed "mullet". Much experimentation has been carried out to harvest this species and the market which now exists in the United States for sucker is gradually improving as they are becoming more accepted as a food product. Experimentation is being carried out to create new fried products from the flesh of the mullet. The present price paid to the fisherman for mullet is 6 1/2¢ per lb. headless dressed, FOB Transcona Processing Plant, Winnipeg.

S.3.*

MULLET PRODUCTION TRENDS

SECTION 3

MULLET PRODUCTION TRENDS

a) Total Mullet Production - Manitoba
- 1931-70

i) Summary:

Mullet production fluctuated between 1931 and 1955, peaking in 1943 to over 5 million pounds, and dropping from that figure to a million and a half pounds in 1953.

From 1953 on, one or two factors contributed to an impressive increase in mullet production:

- a. Improvement in the Gefilte fish marketing situation;
- b. Expansion of local mink ranching business due to improved marketing situation.

During 1964 and 1965, the bottom fell out of the mink ranching business, which at that time consumed 40% of the Manitoba rough fish production.

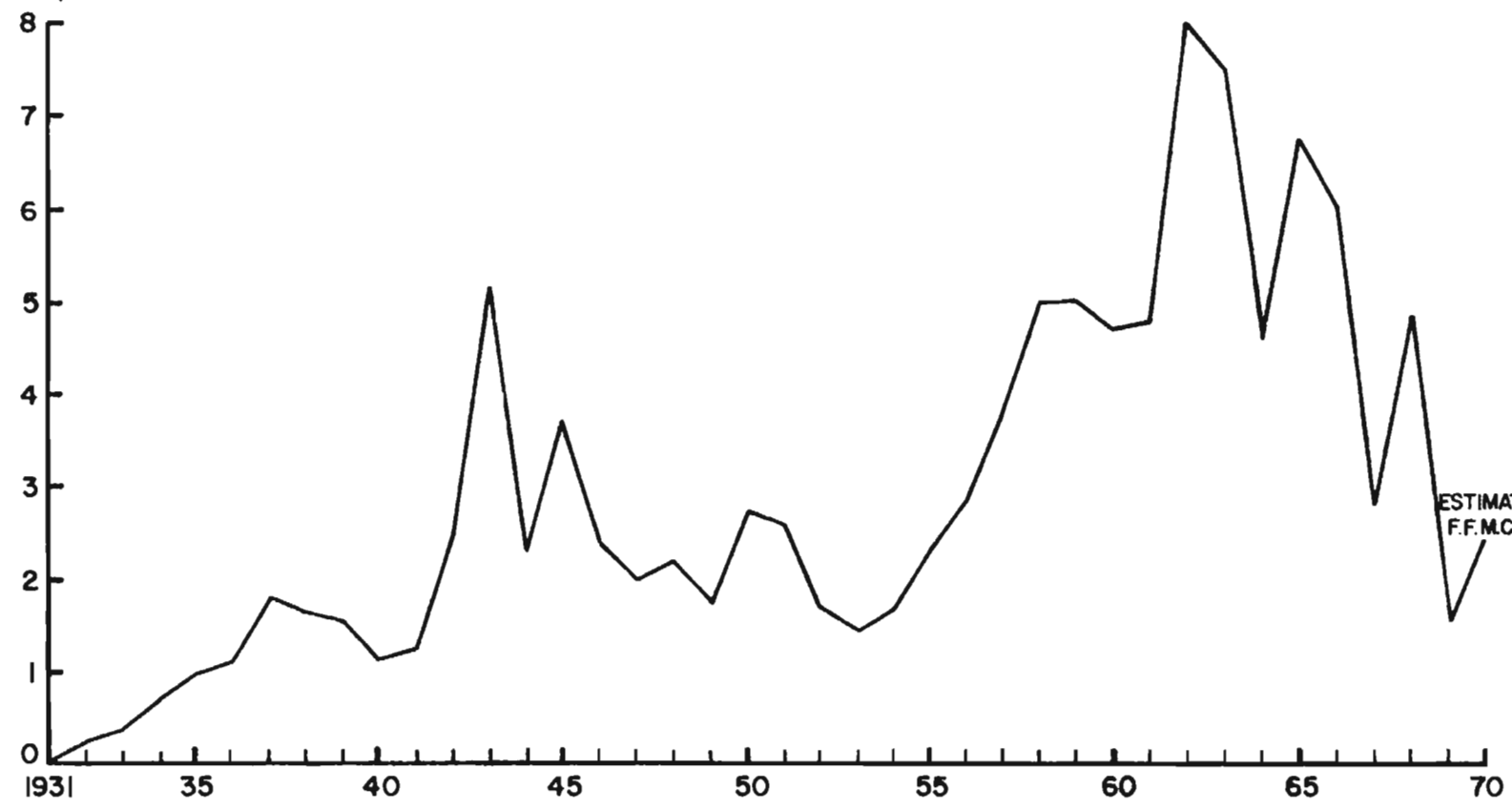
In the same period there was a market decline in the shipment of rough fish to the United States. The combined effects of these changes were such that by 1970 the total production of mullet had dropped to around two million pounds from a high of eight million pounds in 1963.

It is very doubtful that the drop in production is attributable to declining stocks. In fact the pattern seems to follow the decline in licensed operators and would appear to be caused by the loss of markets since the product price is inflexible. There are hundreds of creeks and inlets where mullet spawn and it is most unlikely that exploitation in limited areas could seriously affect the mullet population.

TOTAL MULLET PRODUCTION - MANITOBA - 1931 - 1970

SECTION - 3-A-II

PRODUCTION
MILLION/LBS.



ESTIMATED
F.F.M.C.

REF: PROVINCE OF MANITOBA STATISTICAL RECORDS . (APPROX.)

B) Total Mullet Production - Lake Winnipeg

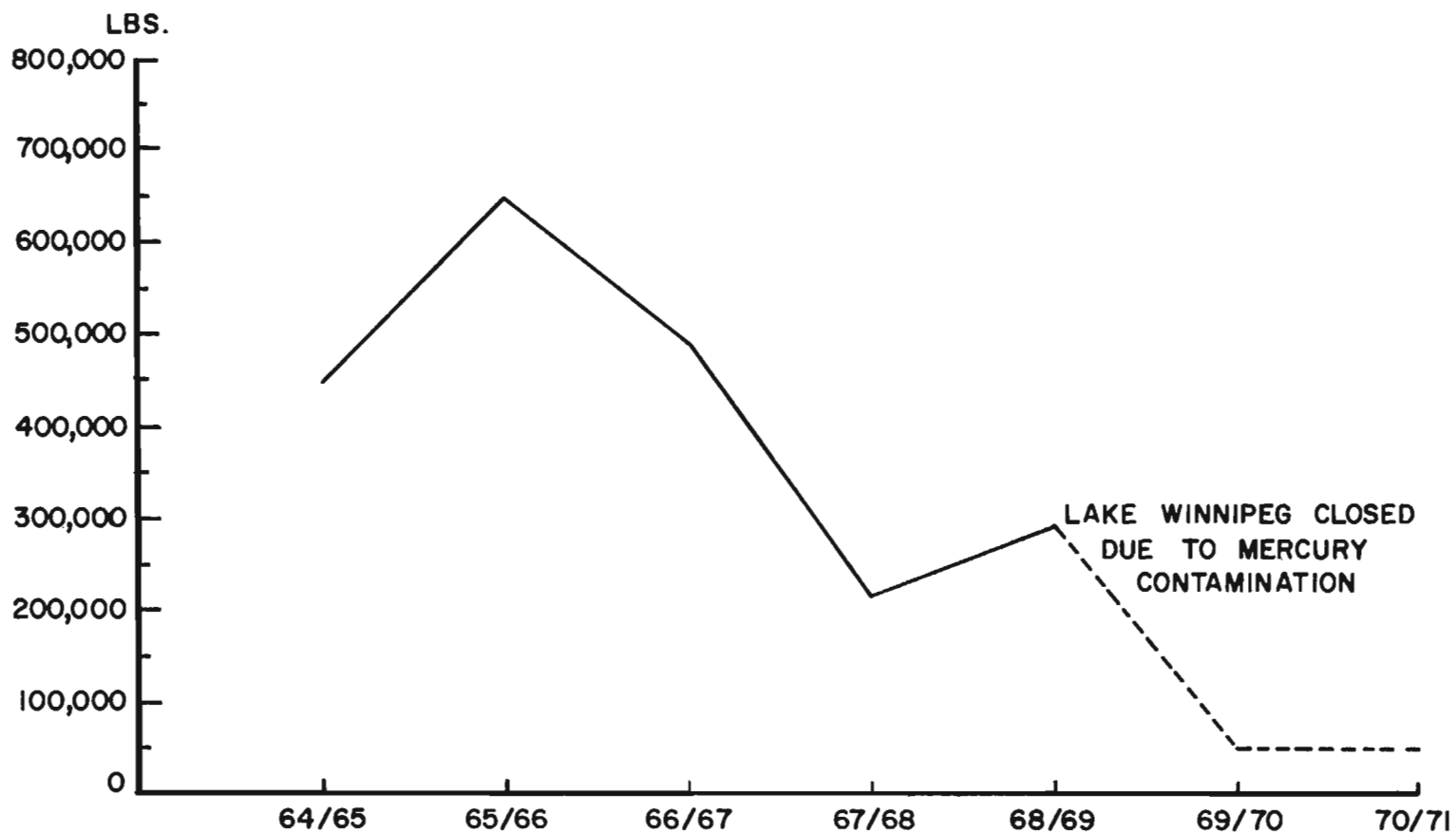
- 1964-71

i) Summary:

Lake Winnipeg is not well known as a rough fish lake, but rough fish do abound there. There are certain areas in north Lake Winnipeg where fishermen will not set gill nets due to the heavy concentrations of mullet. Also, the heavy spawning runs which affect the creeks and rivers of Lake Winnipeg are well known to the local people. The peak production period for the lake was in the 1966-67 season when 750,000 lbs were landed, but after the collapse of the mink ranching business, many fishermen stopped fishing for rough fish. Also when the lake was closed due to mercury pollution, negligible fishing took place for mullet.

TOTAL MULLET PRODUCTION — LAKE WINNIPEG — 1964 - 1971

SECTION 3 - B - 11



REF : PROVINCE OF MANITOBA STATISTICAL RECORDS. (APPROX.)

c) Total Mullet Production - Lake Manitoba
- 1964-72

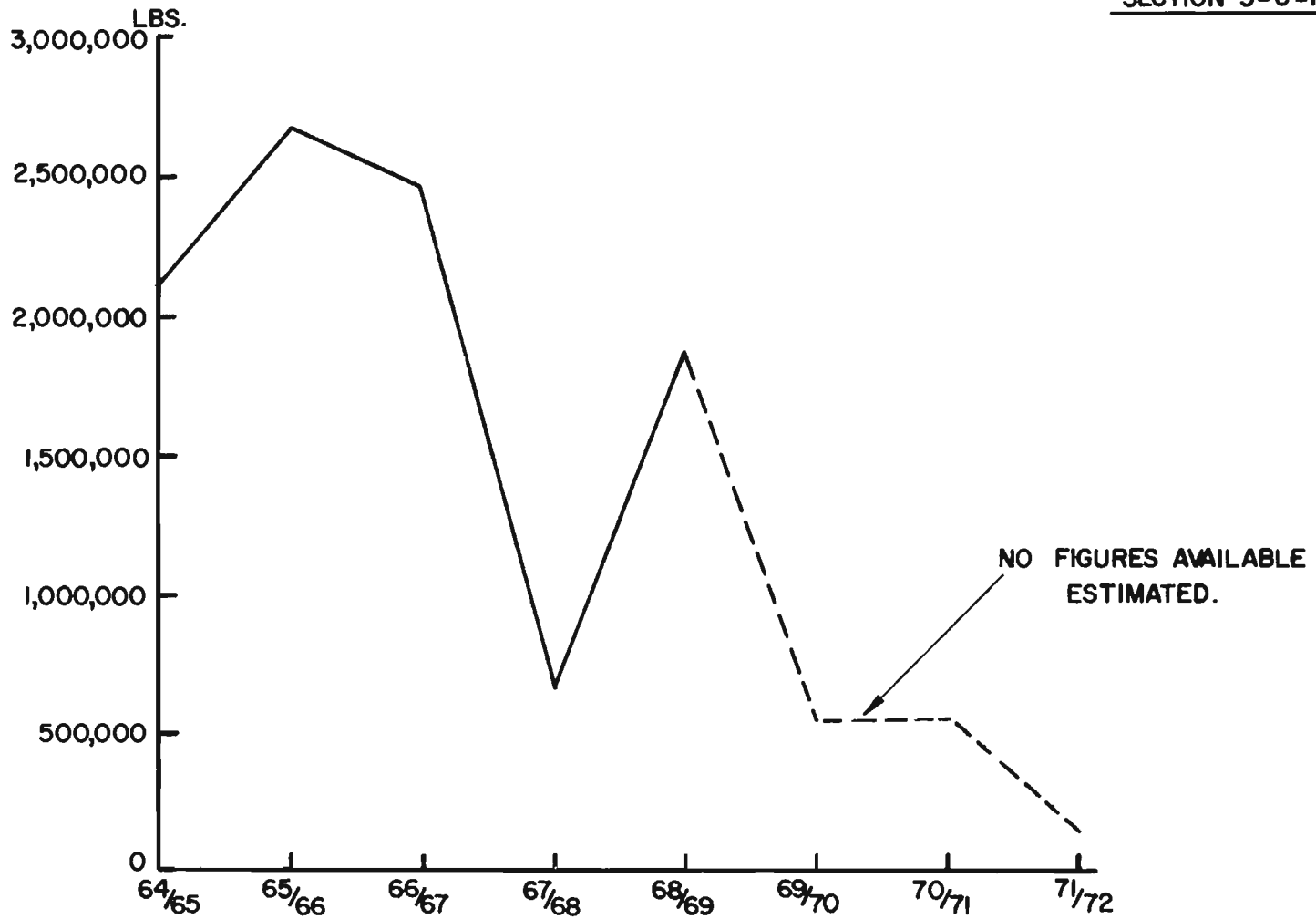
i) Summary:

Lake Manitoba is known to have a large mullet population which has been exploited to some extent.

The introduction of trap nets to Lake Manitoba and the support given the fishermen by the provincial government encouraged the fishing of mullet. However, the experimental rough fish removal programs were withdrawn after 1966 and, as the mink business had declined sharply, fishermen lost interest in catching mullet.

TOTAL MULLET PRODUCTION - LAKE MANITOBA - 1961 - 1970

SECTION 3-C-II



REF: PROVINCE OF MANITOBA STATISTICAL RECORDS. (APPROX.)

d) Total Mullet Production - Lake Winnipegosis
- 1964-72

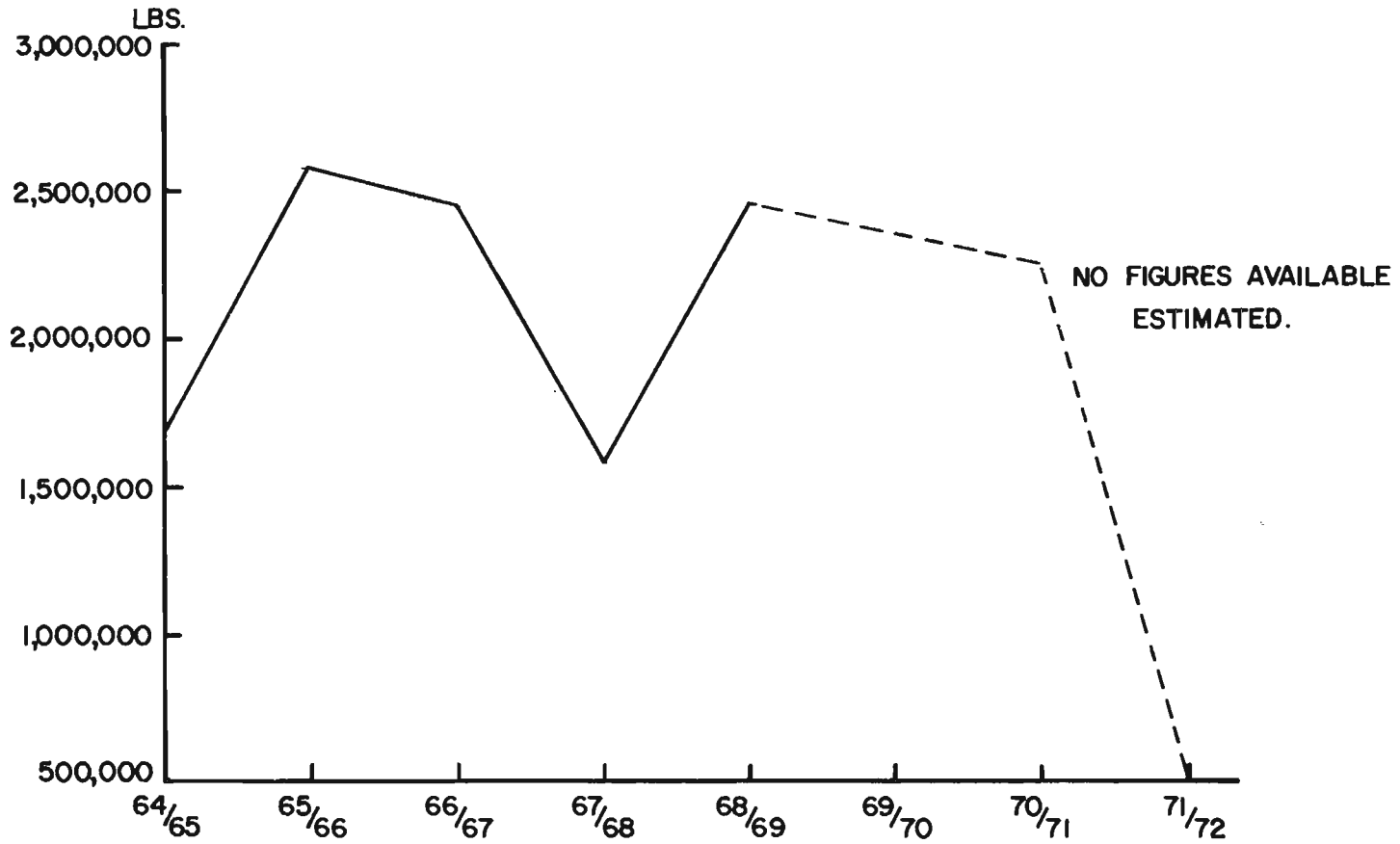
i) Summary:

Lake Winnipegosis has shown great promise as a mullet-producing lake and in 1965-66 was topping the two and a half million pound mark. The two main producing areas were Duck Bay and Mossey River. However, after the collapse of the mink ranching business, the only outlets for mullet were in the American market or among fishmeal producers. The prices were not attractive to the fishermen and less fishermen participated in the harvesting of mullet.

Currently about a million and a half pounds are being produced from Lake Winnipegosis, but the Lake has much greater potential.

TOTAL MULLET PRODUCTION - LAKE WINNIPEGOSIS - 1964 - 1972

SECTION - 3-D-II



REF.: PROVINCE OF MANITOBA STATISTICAL RECORDS. (APPROX.)

S.4.*

CARP PRODUCTION TRENDS

a) Total Carp Production - Manitoba
- 1931-70

i) Summary:

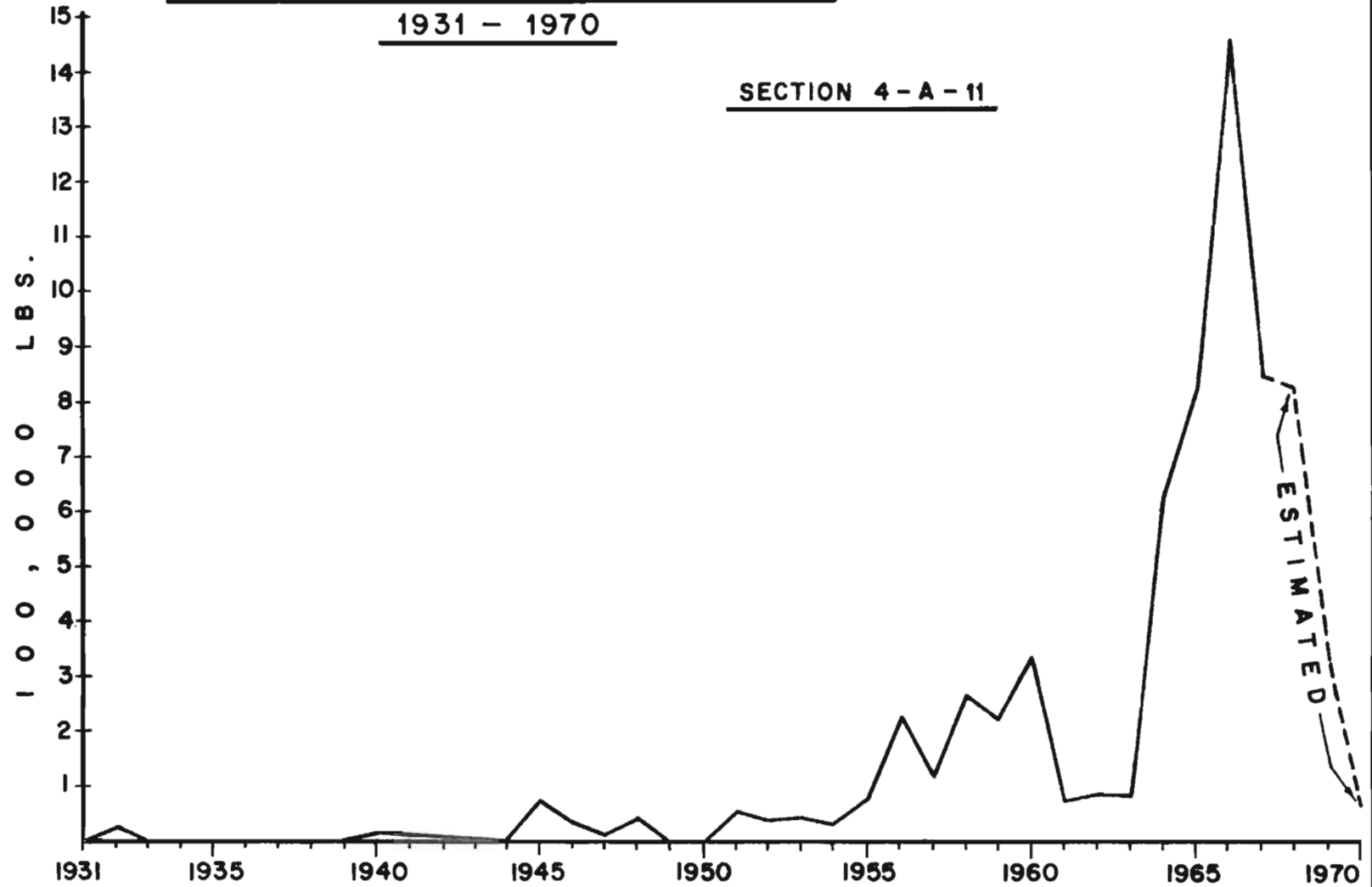
From 1931 to 1958 a very limited amount of Carp was harvested in Manitoba.

But from 1958, the growth of mink ranching and increasing demand from the United States for Carp filets resulted in a rapidly increasing production until around 1966; at this time, as has been pointed out previously, there was a substantial loss of markets.

Currently a very limited market exists for Carp.

TOTAL CARP PRODUCTION - MANITOBA -
1931 - 1970

SECTION 4 - A - 11



REF: PROVINCE OF MANITOBA STATISTICAL RECORDS. (APPROX.)

b) Total Carp Production - Lake Winnipeg
- 1964-71

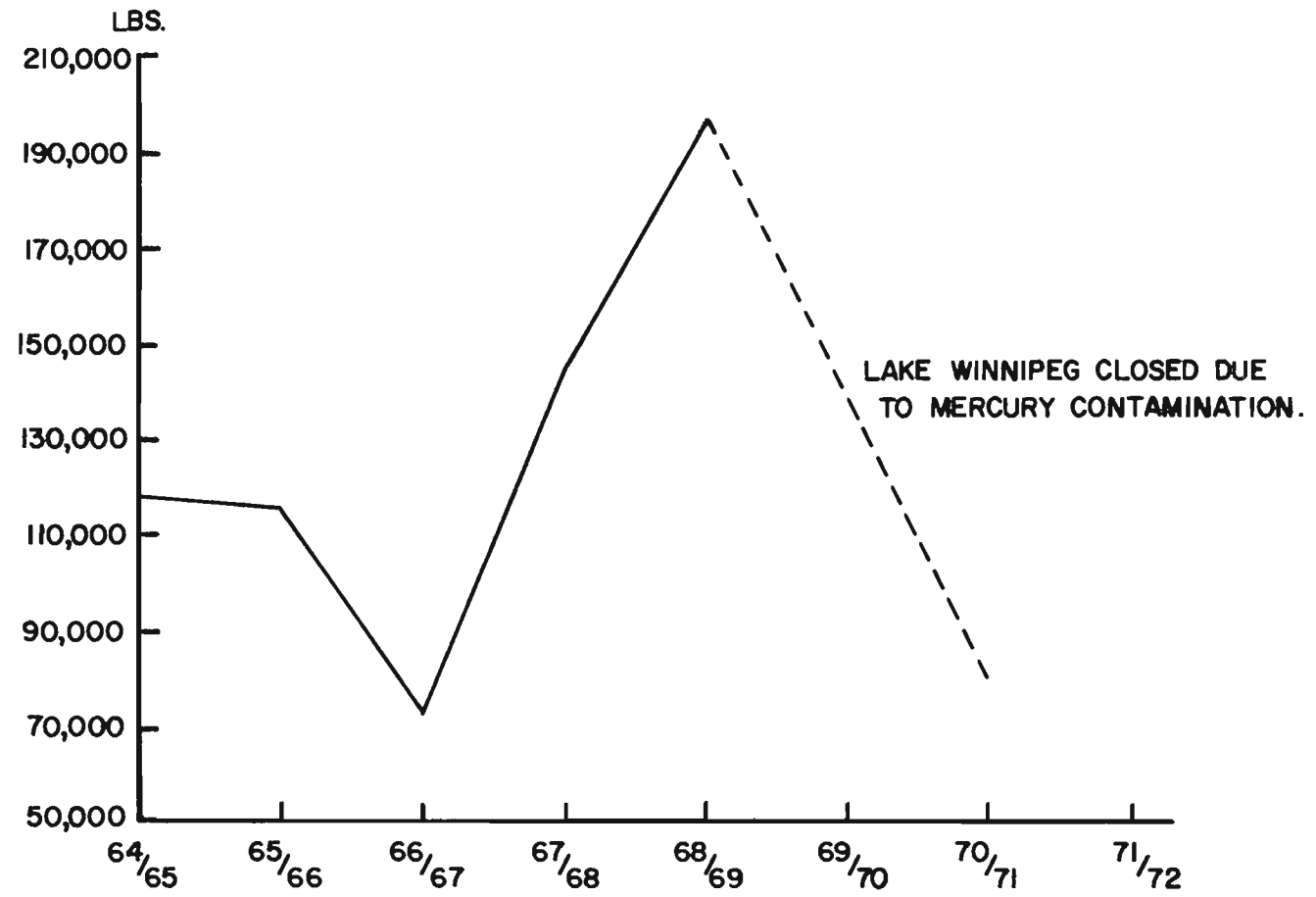
i) Summary:

Carp has never been exploited seriously in Lake Winnipeg. However, production took a dramatic upswing in 1968-69 and then fell off when the Freshwater Fish Marketing Corporation took over.

The fishermen seem willing to harvest carp under a subsidized program, but the prices are so low at the moment that it is unlikely that they would fish for carp without support.

TOTAL CARP PRODUCTION - LAKE WINNIPEG - 1964 - 1971

SECTION - 4 - B - II



REF PROVINCE OF MANITOBA STATISTICAL RECORDS. (APPROX.)

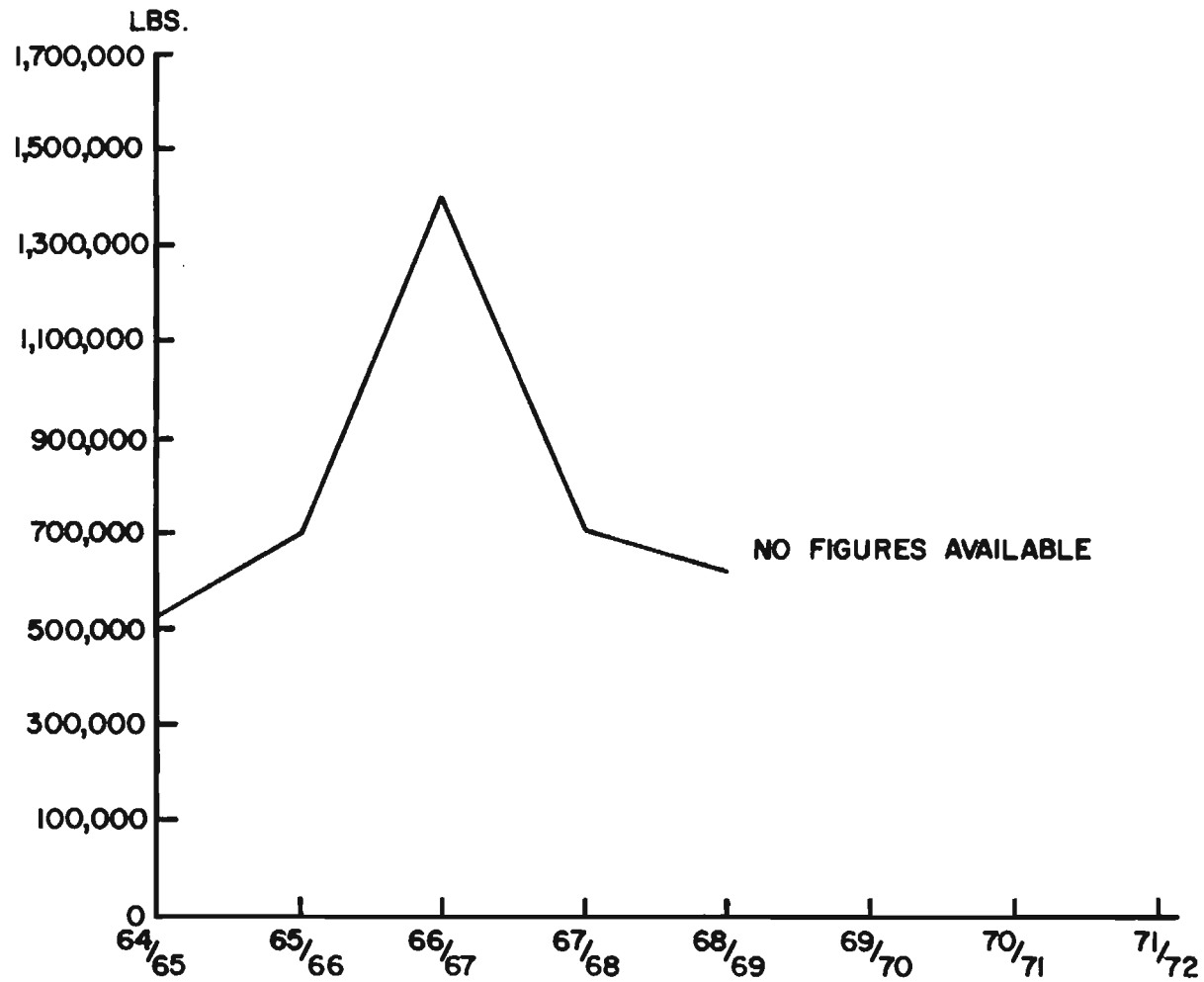
c) Total Carp Production - Lake Manitoba
- 1964-71

i) Summary:

Carp was never seriously exploited on Lake Manitoba due to lack of markets and low returns. However, the mink ranching business and gradual improvements in United States markets, plus support from the provincial government, encouraged fishermen to exploit Carp to the point where by 1966 about a million and a half pounds were being taken annually. Withdrawal of government support, failure of the mink business and low returns have almost wiped out this fishery.

TOTAL CARP PRODUCTION - LAKE MANITOBA - 1964 - 1971

SECTION - 4 - C - II



REF. : PROVINCE OF MANITOBA STATISTICAL RECORDS. (APPROX.)

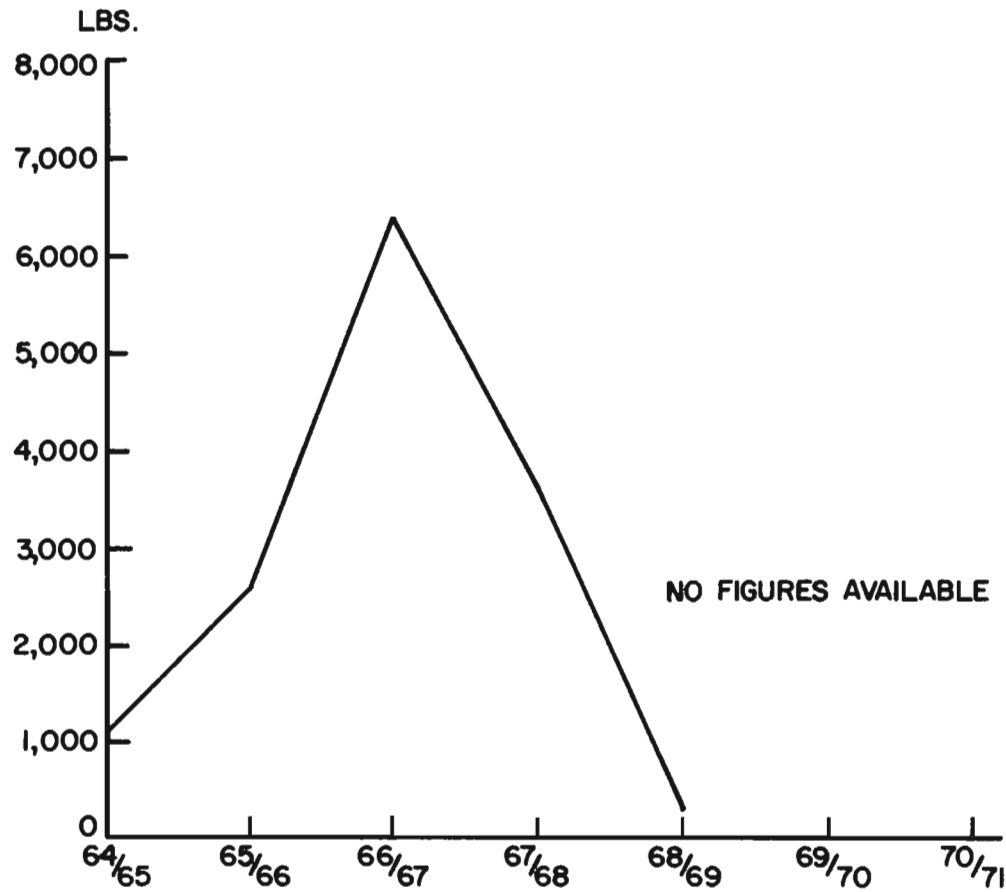
d) Total Carp Production - Lake Winnipegosis
- 1964-71

i) Summary:

Lake Winnipegosis does not sustain a large population of Carp. The highest figure recorded was in 1966, when 6 1/2 thousand pounds were taken out. The fishermen have little incentive to harvest this species due to uneconomic returns and lack of outlets.

TOTAL CARP PRODUCTION - LAKE WINNIPEGOSIS - 1964 - 1971

SECTION - 4 - D - II



REF.: PROVINCE OF MANITOBA STATISTICAL RECORDS. (APPROX.)

S.5.*

GENERAL TRENDS - MANITOBA

SECTION 5

GENERAL TRENDS - MANITOBA

a) Overall Production - Manitoba
- 1931-70

i) Summary:

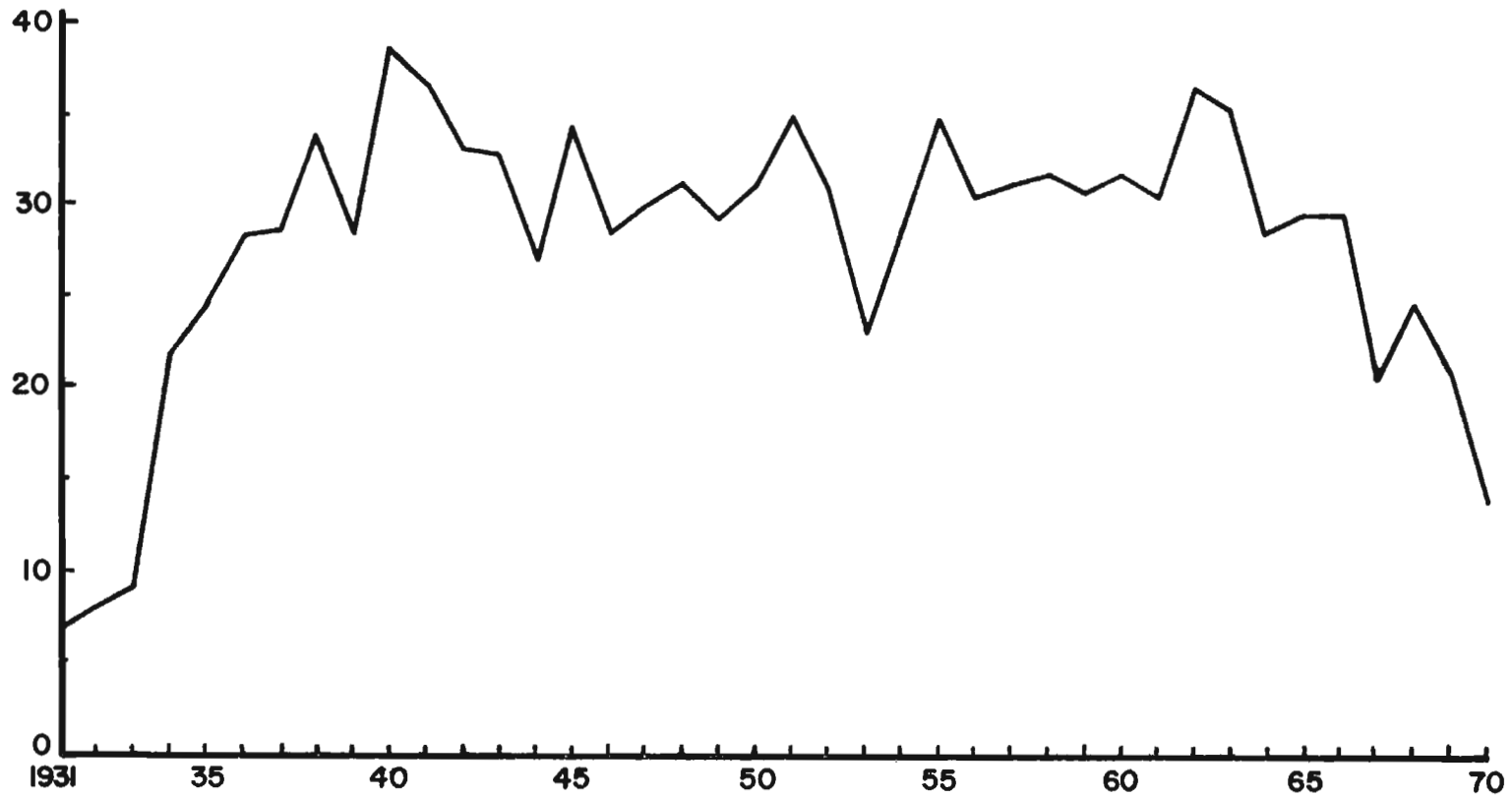
From 1931 to 1942 the overall production in Manitoba rose from 8 million pounds to 38 million pounds. From 1942 to 1964 the total production remained fairly constant. But after 1964 and up to 1969 the production dropped fairly quickly from 35 million pounds to approximately 18 million pounds - a drop of roughly 50%.

The number of fishermen engaged in the fishery has changed in the same way as total production; this can be seen by comparing Section 5a)ii with Section 5b)ii. Restrictive annual quotas have contributed to the decline.

OVERALL PRODUCTION -- MANITOBA -- 1931-1970

SECTION 5 - A - 11

PRODUCTION
MILLION LBS.



REF : PROVINCE OF MANITOBA STATISTICAL RECORDS. (APPROX.)

b) Variations in the Number of Fishermen
Engaged in the Fishery - Manitoba
- 1931-70

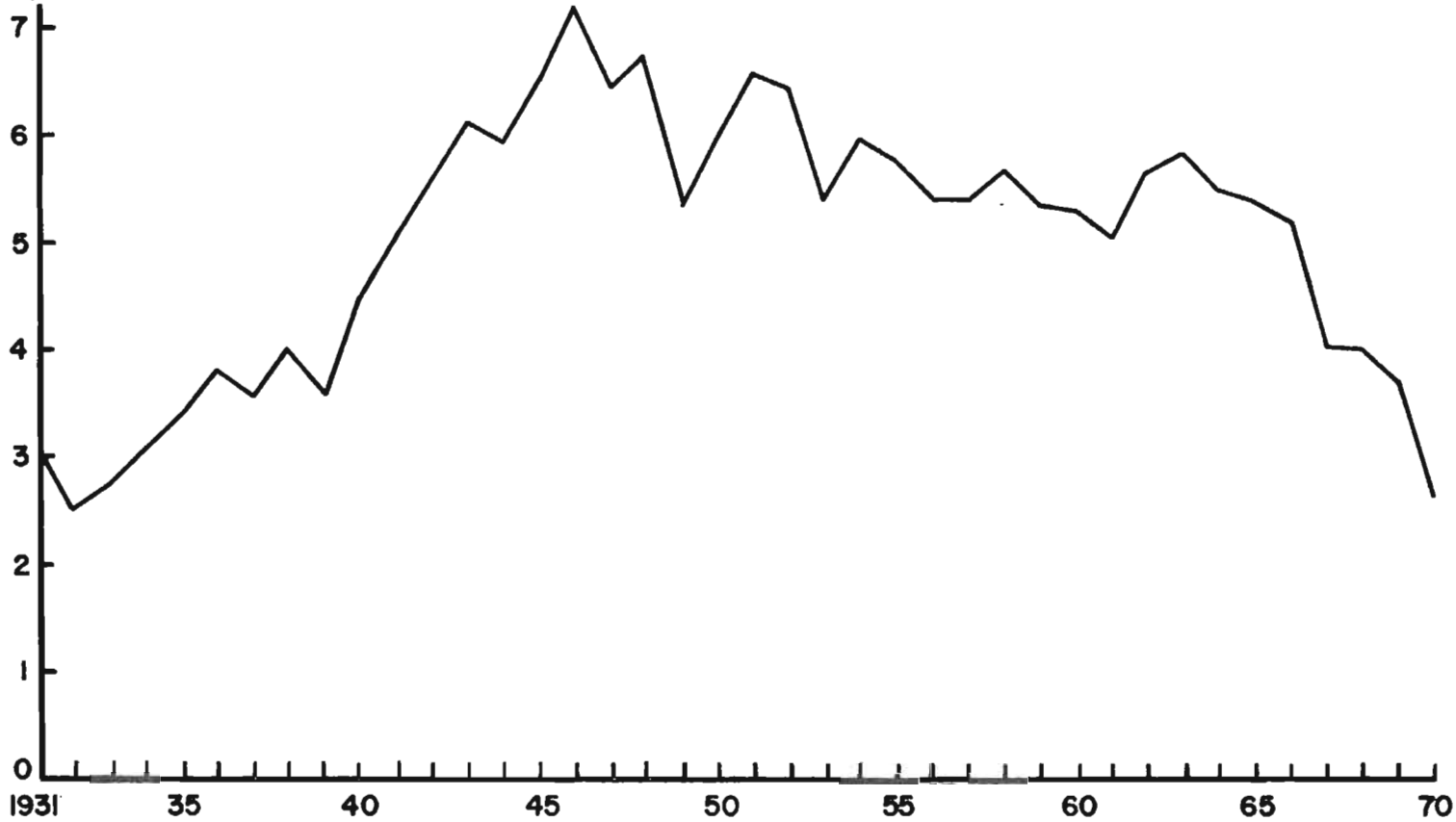
i) Summary:

The number of fishermen engaged in the fishery peaked at 7,200 men in 1947 and then remained fairly steady until 1964, when the figure declined rapidly to 2,400. Licences which belonged to deceased fishermen were not being renewed. The average ages of fishermen were increasing annually with limited entry of young people into the industry.

VARIATIONS IN FISHERMEN ENGAGED IN THE FISHERY — MANITOBA
1931 — 1970

SECTION 5 - B - 11

NUMBER OF
FISHERMEN
x 1,000



REF : PROVINCE OF MANITOBA STATISTICAL RECORDS (APPROX.)

c) Overall Production - Lake Winnipeg
- 1931-70

i) Summary:

Production on Lake Winnipeg, which ran at 5 million pounds in 1931, rose gradually to a peak of approximately 18 million pounds in 1955. From 1955 to 1969 the production dropped 60% from 18 million pounds to 6 million pounds. It is significant that the number of fishermen engaged in the fishery from 1954 to 1969 dropped from 4,000 fishermen to 1,500 fishermen.

OVERALL PRODUCTION - LAKE WINNIPEG - 1931 - 1970

SECTION - 5 - C - II

PRODUCTION
MILLION / LBS.



REF.: PROVINCE OF MANITOBA STATISTICAL RECORDS. (APPROX.)

d) Variations in the Number of Fishermen
Engaged in the Fishery - Lake Winnipeg
- 1931-70

i) Summary:

The number of fishermen engaged in the fishery rose gradually from a low of 800 in 1931 to a peak of 4,000 men in 1954. From 1954 to 1969 the number of fishermen engaged dropped rapidly from 4,000 men to 1,500 men, a change which relates significantly to the decline in production. Fishermen were not replaced when they retired or left the industry. It is interesting to note that 70% of licensed Manitoba fishermen receive less than \$2,000.00 per annum from fishing.

VARIATIONS IN FISHERMEN ENGAGED IN THE FISHERY

- LAKE WINNIPEG - 1931 - 1970

SECTION 5 - D - II



e) Overall Production - Lake Winnipegosis
- 1947-71

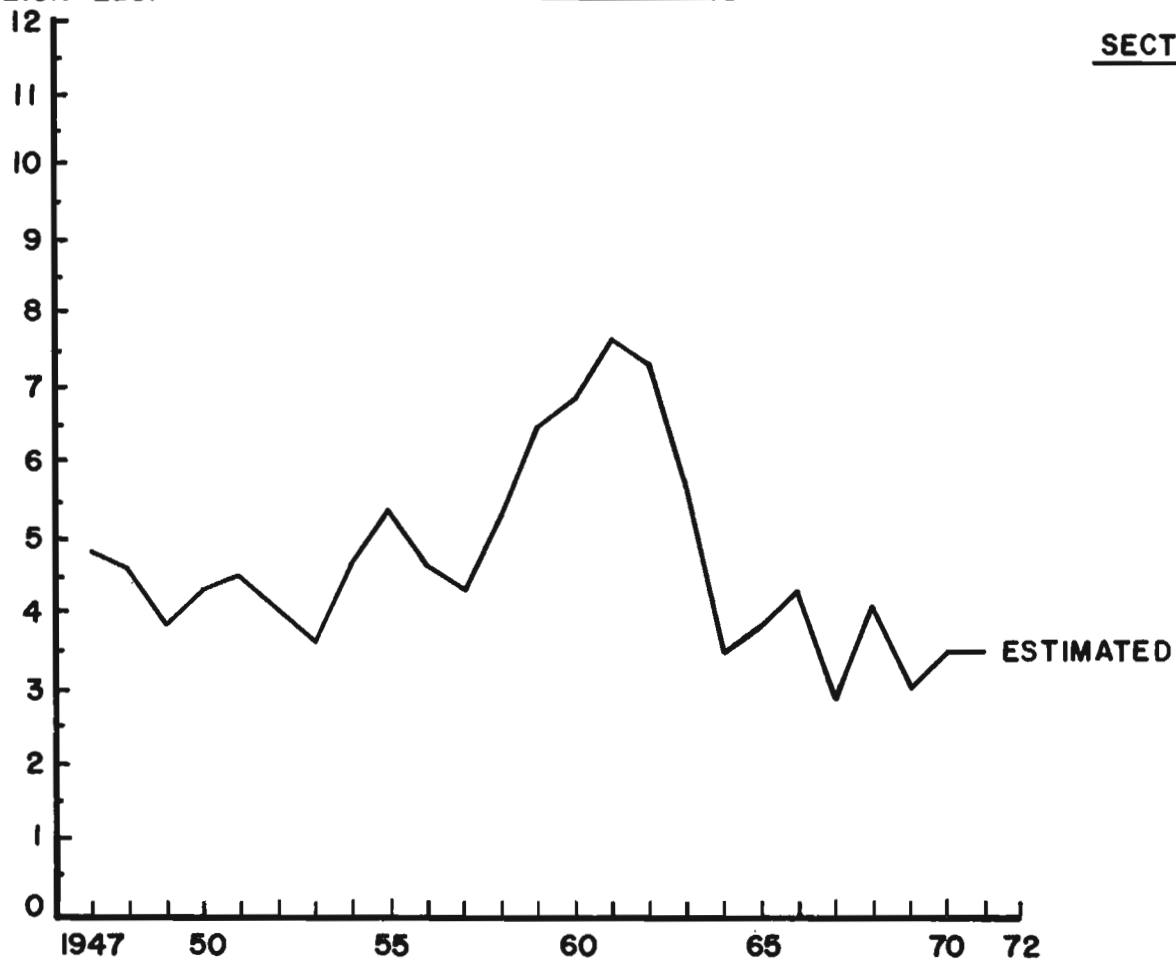
i) Summary:

Lake Winnipegosis sustained a fairly healthy fishery from 1947 to 1960. Between 1958 and 1964 a dramatic rise resulted from five million pounds to eight million pounds. Production dropped after 1964 from eight million to three million pounds. The presence of large quantities of rough fish seems to have contributed to the decline of low volume, high priced species. Also, the decline in the number of fishermen engaged in the fishery from 600 to 150 seems to correlate closely with the decline in production. Low prices and regulations are also factors which have affected this fishery.

OVERALL PRODUCTION - LAKE WINNIPEGOSIS
1947 - 1971

SECTION 5 - E - 11

PRODUCTION
MILLION LBS.



REF : PROVINCE OF MANITOBA STATISTICAL RECORDS. (APPROX.)

f) Variations in the number of Fishermen
engaged in the Fishery - Lake Winnipegosis
- 1947-71

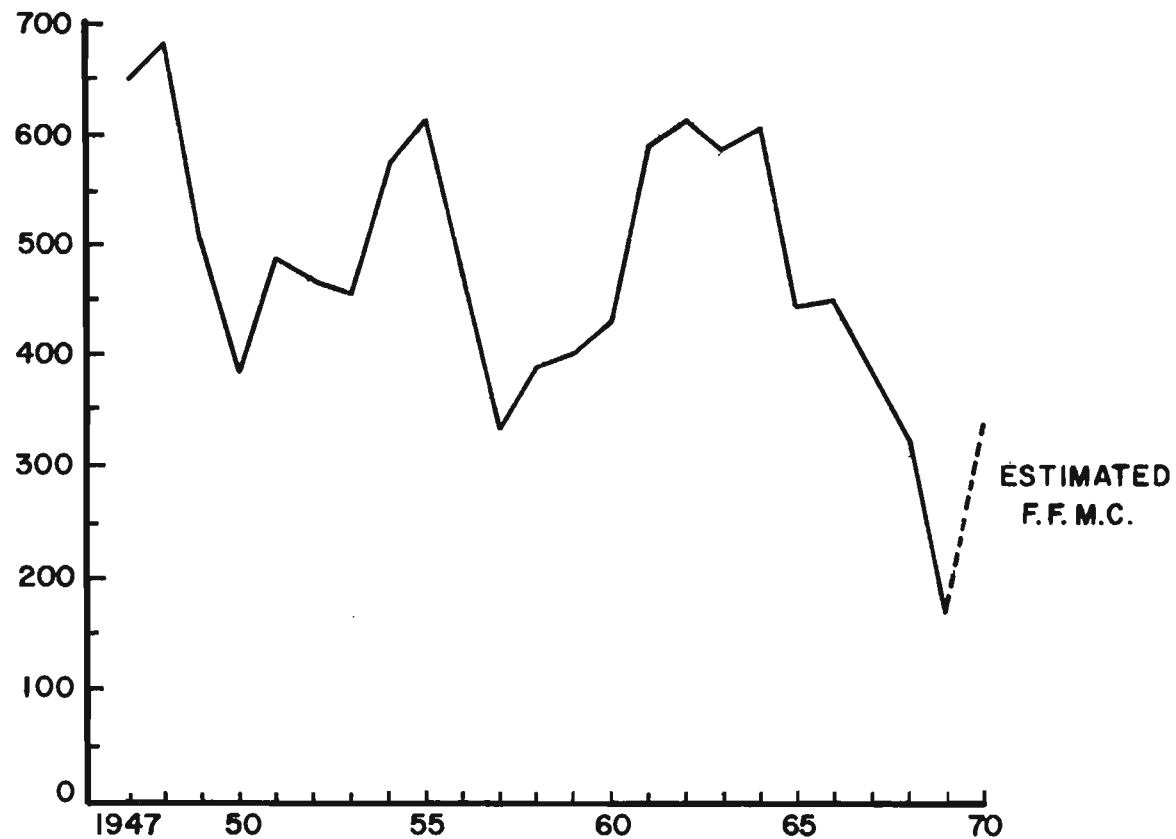
i) Summary:

The number of fishermen engaged in the fishery has fluctuated wildly. There were 680 fishermen in 1947, 350 in 1954 and 600 in 1966. From 1966 to 1969, the number of licensed fishermen dropped to 150, reflecting a grave decline. Unless some radical decision is made regarding rough fish this fishery would appear to be in jeopardy.

VARIATIONS IN FISHERMEN ENGAGED IN THE FISHERY
LAKE WINNIPEGOSIS - 1947-1970

SECTION 5 - F - 11

NUMBER OF
FISHERMEN



ESTIMATED
F.F.M.C.

REF : PROVINCE OF MANITOBA STATISTICAL REPORTS. (APPROX.)

g) Value to Fishermen/Value to Market
- Manitoba
- 1962-71

i) Summary:

The value to fishermen compared to the value to market has run around the 60% mark until 1970, when we have estimates from the Freshwater Fish Marketing Corporation of 52%. However, the statistical records available were calculated annually on a fixed percentage prior to 1969. The 52% figure is derived from EAS Publication, July, 1972.

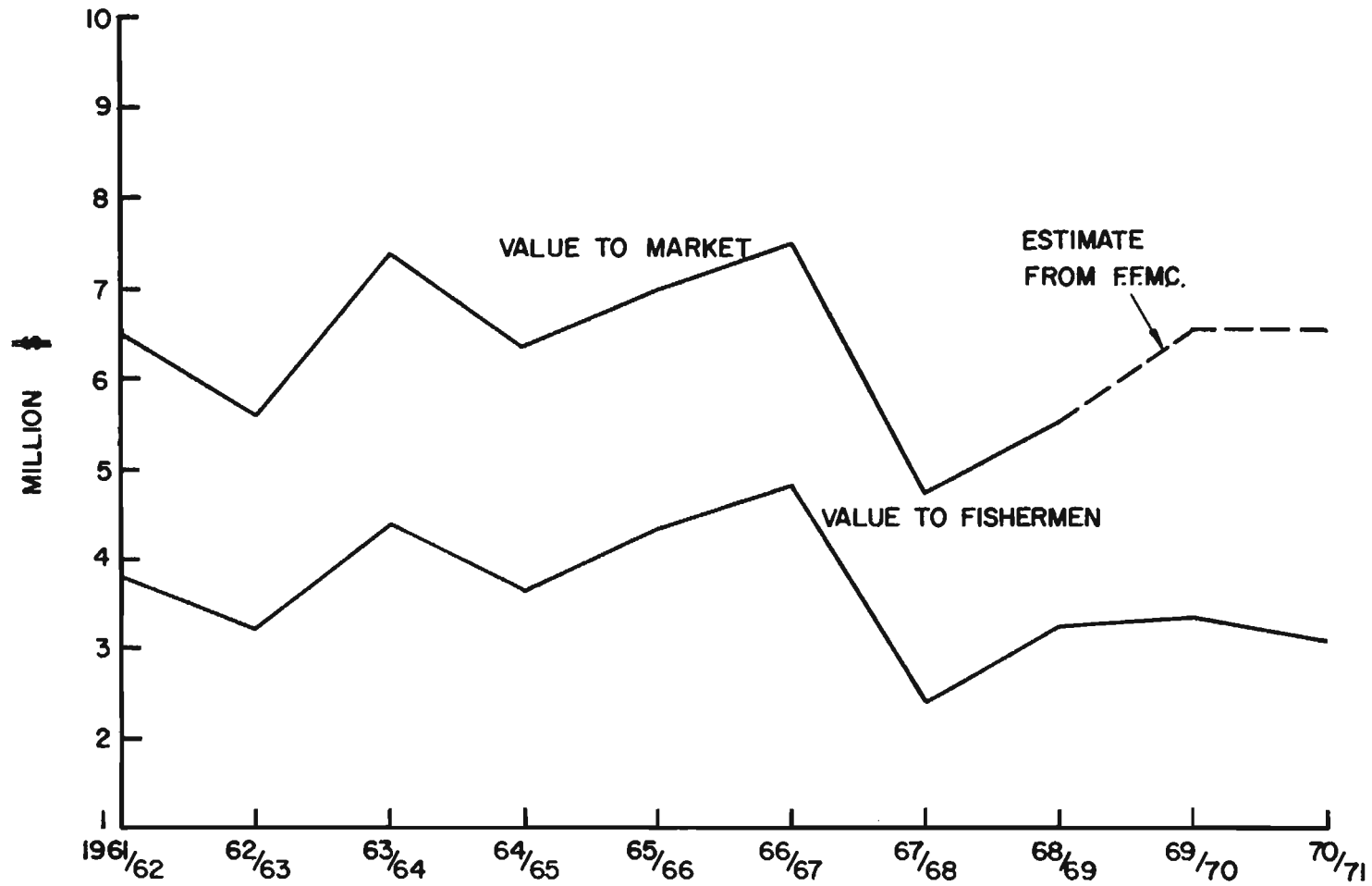
The value of the Manitoba fishery, however, was holding at about the 7 million dollar mark in 1966; it has since dropped to 5 1/2 million dollars.

The average income of the fishermen from the fishery has increased as follows:

| <u>Year</u> | <u>Average Income</u> |
|-------------|-----------------------|
| 1961 | \$760.00 |
| 1966 | \$769.00 |
| 1969 | \$1290.00 |

VALUE TO FISHERMEN / VALUE TO MARKET - MANITOBA - 1962 - 1971

SECTION - 5 - G - II



REF : PROVINCE OF MANITOBA STATISTICAL RECORDS. (APPROX.)

h) Production - Catch/Unit of Effort - Manitoba
- 1962-70

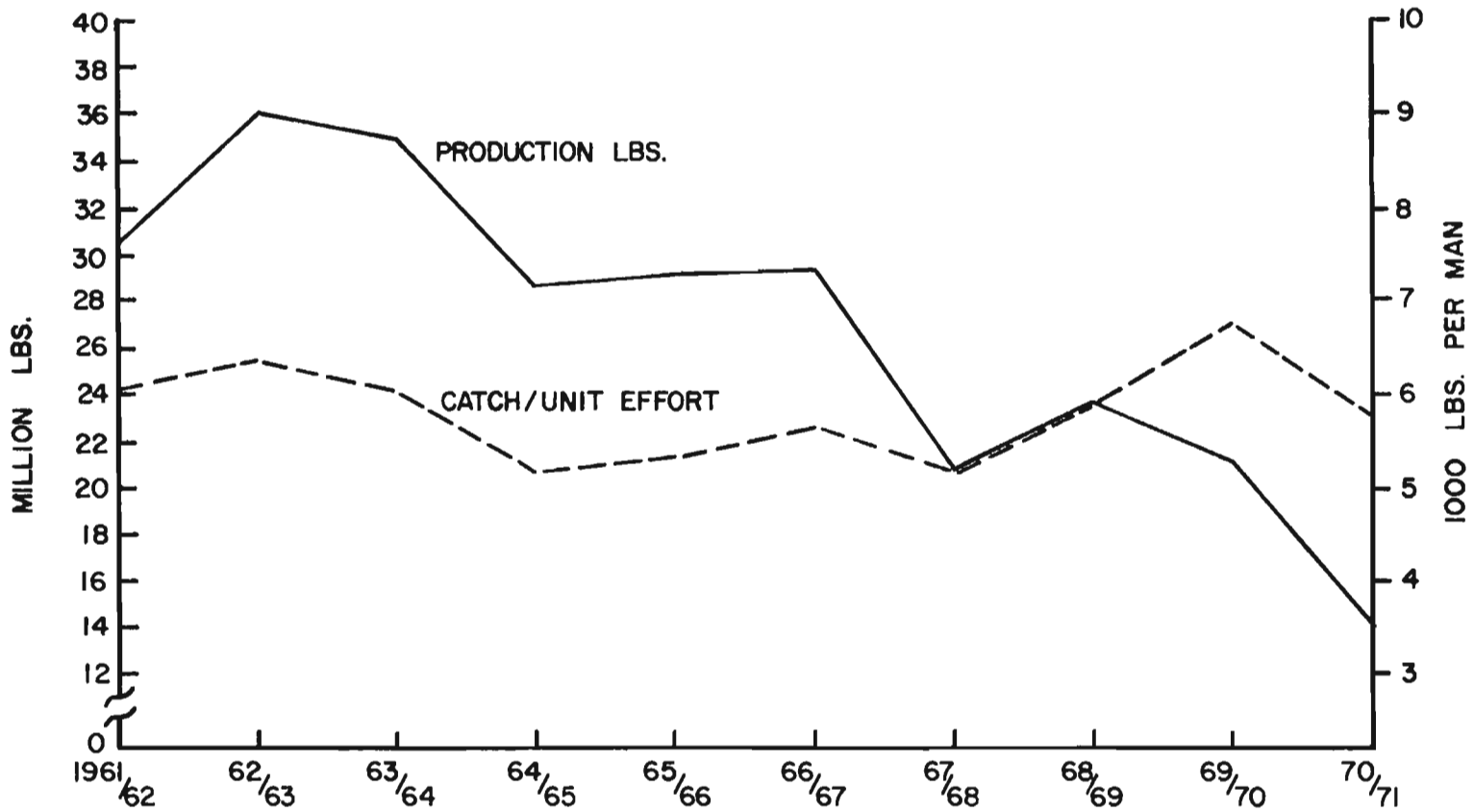
i) Summary:

This is a very rough index to measure productivity but it will give some indication of the trends. As the production declined and the number of operators declined, an increase in the catch per unit effort occurred. However, the restrictions on new licences and the species quotas have been such that although productivity increased production figures have rapidly decreased.

It may be difficult to reverse this trend but concentration on developing new products from under-exploited and unexploited species can contribute to strengthening the situation.

PRODUCTION - CATCH / UNIT OF EFFORT - MANITOBA - 1962 - 1970

SECTION - 5 - H - II



REF : PROVINCE OF MANITOBA STATISTICAL RECORDS. (APPROX.)

S.6.*

REFERENCES

SECTION 6

REFERENCES

1. The Fishes of Manitoba, Manitoba Department of Mines and Natural Resources, Winnipeg - David Hinks - 1943.
2. The Fishes of Manitoba (Supplement - 1957) Manitoba Department of Mines and Natural Resources, Winnipeg - J.J. Keleher and B. Kooyman.
3. Carp in Canada, Fisheries Research Board of Canada, Ottawa F.R.B. Bulletin #165 - H.R. McCrimmon - 1968.
4. Freshwater Fishes of Northwestern Canada and Alaska, Fisheries Research Board of Canada, Ottawa - F.R.B. Bulletin #173 - J.D. McPhail and C.C. Lindsay.
5. Fishing - Bulletin for Commercial Fishermen, Manitoba Department of Mines and Natural Resources, Winnipeg.
6. Fisheries Adjustment Study, Manitoba Department of Mines, Resources and Environmental Management, Winnipeg - R.E. England and R. Peters - 1971.
7. Fishes of the Great Lakes Region - Cranbrook Institute of Science, Michigan, Bulletin #26 - C.L. Hubbs and K.F. Lagler - 1958.
8. Provincial Annual Reports - 1964 to 1969 - Manitoba.
9. Manitoba Fisheries Regulations - ref (Section 34 of Federal Fisheries Act).
10. Manitoba Provincial Statistics - 1931-1970.
11. Environmental Analysis Service, Economics Branch, Central Region, Fisheries Service.