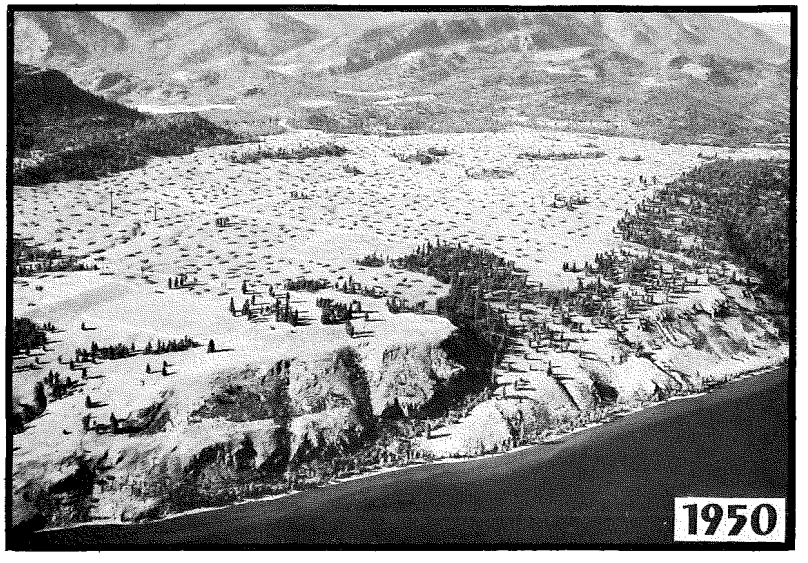
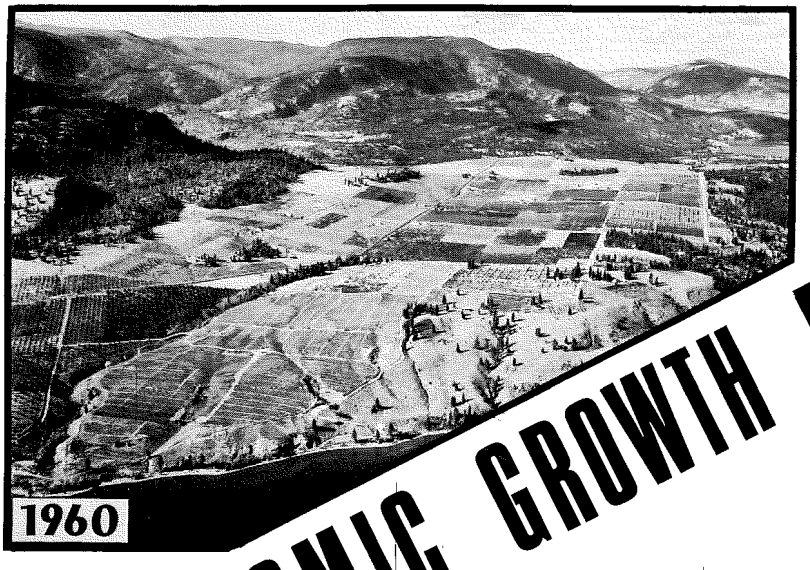
310-000000-00000-00000-0000-0000-BC27

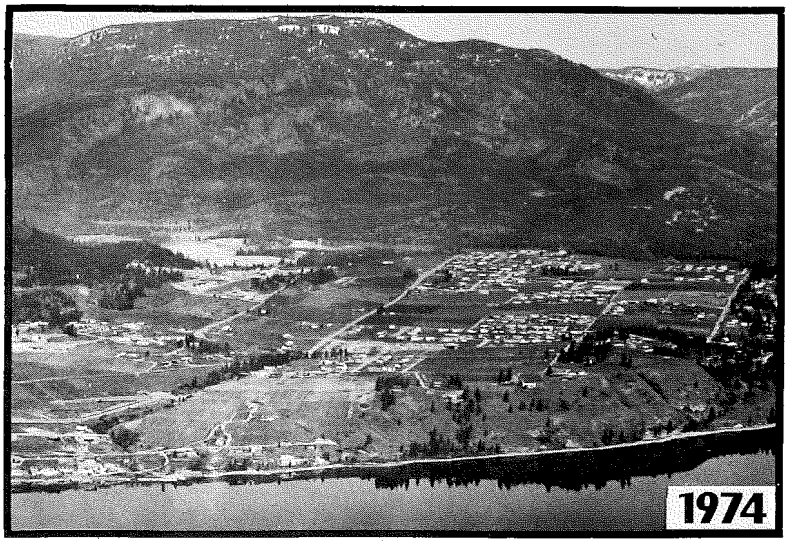
Conservation Section Library

CANADA-BRITISH OKANAGAN BASIN AGREEMENT





ECONOMIC GROWTH PROJECTIONS



"We came,
We saw,
We stayed."

MARCH 1974

TECHNICAL SUPPLEMENT X

FINAL PUBLICATIONS IN THIS SERIES

1. SUMMARY REPORT OF THE CONSULTATIVE BOARD
2. THE MAIN REPORT OF THE CONSULTATIVE BOARD
3. TECHNICAL SUPPLEMENTS TO THE MAIN REPORT

I	Water Quantity in the Okanagan Basin
II	Water Quantity Computer Models
III	Water Quantity Alternatives and Supporting Water Quantity Data
IV	Water Quality and Waste Loadings in the Okanagan Basin
V	The Limnology of the Major Okanagan Basin Lakes
VI	Review and Evaluation of Wastewater Treatment in the Okanagan Basin
VII	Value and Demand for Water in the Okanagan Basin
VIII	Water-Based Recreation in the Okanagan Basin
IX	Fisheries and Wildlife in the Okanagan Basin
X	Economic Growth Projections
XI	Public Involvement
XII	Planning, Administration and Institutional Considerations

Cover Photos by - Steve Cannings

- P.F.R.A., Regional Economic Expansion

'Aerial Views of Lakeview Heights Area on the West Side of Okanagan Lake near Westbank at three stages of development.'

Enquiries for copies of these publications should be directed to --

B.C. Water Resources Service,
Parliament Buildings,
VICTORIA, B.C.

CANADA-BRITISH COLUMBIA OKANAGAN BASIN AGREEMENT

TECHNICAL SUPPLEMENT X

TO THE

FINAL REPORT

ECONOMIC GROWTH PROJECTIONS

IN THE

OKANAGAN BASIN

PUBLISHED BY

OFFICE OF THE STUDY DIRECTOR

BOX 458, PENTICTON, B.C.

APRIL, 1974

THE CONSULTATIVE BOARD WISH TO ACKNOWLEDGE
THE CONTRIBUTION OF THE FOLLOWING PEOPLE IN
THE PREPARATION OF THIS TECHNICAL SUPPLEMENT

COMPILATION

P.J. Reynolds and G.E. Brown
Water Planning and Management
Inland Waters Directorate
Environment Canada

CONTRIBUTING AUTHORS

R.D. Bjonback, J. O'Riordan, L.K. Fielding
and D. Burpee, Water Planning and Management
I.W.D. Environment, Canada

Typist
K. Ricketts

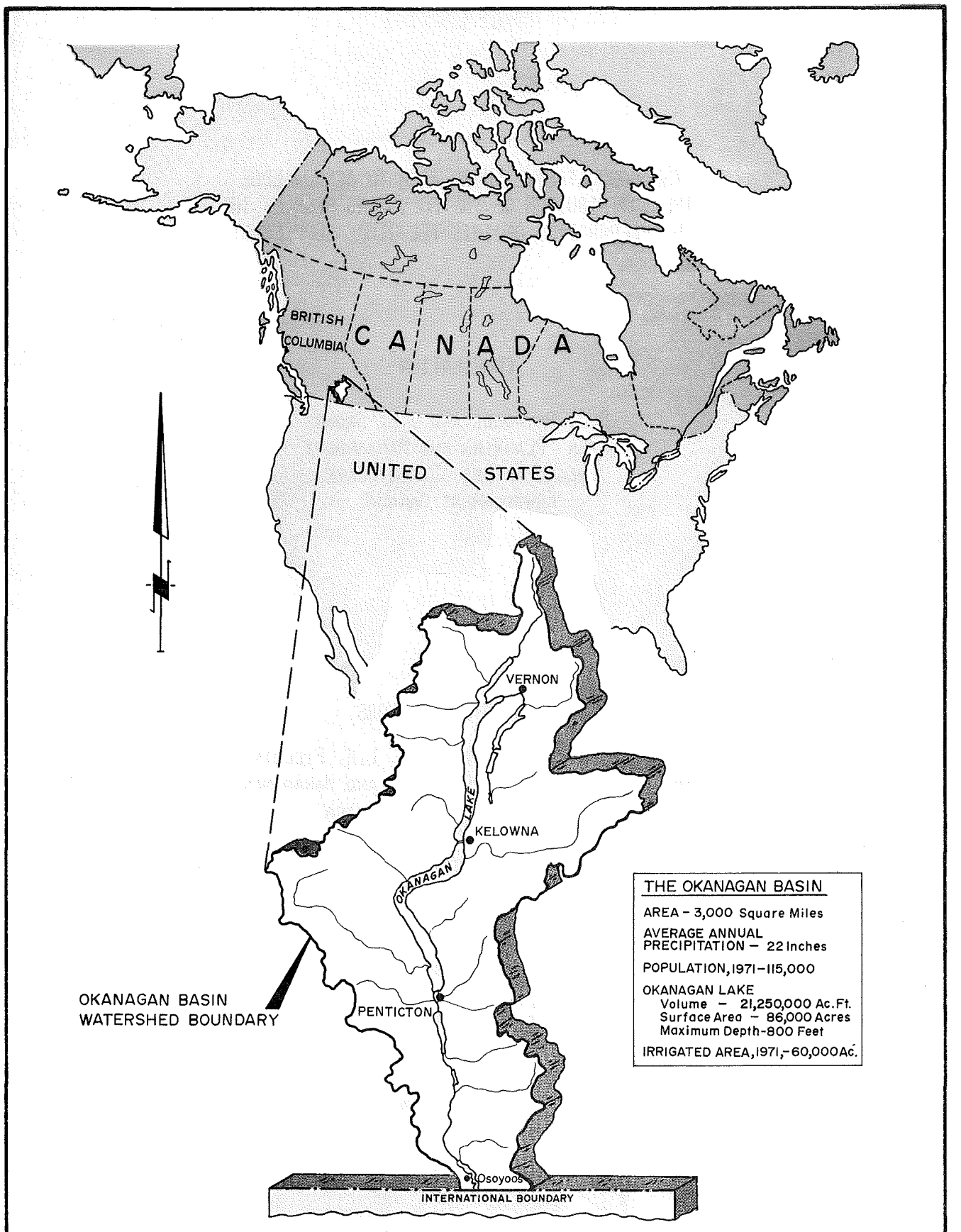
EDITORIAL REVIEW

BY

J. O'Riordan

M. Wiggins

A.M. Thomson



THE OKANAGAN BASIN
IN
BRITISH COLUMBIA – CANADA

Figure A

FOREWORD

This Technical Supplement describes and presents the results of economic growth studies carried out under the Okanagan Basin Agreement as part of the Socio-Economic Program. These studies provided the bases for projecting future consumptive and non-consumptive demands for water resources to the year 2020 and for establishing the effect of economic growth on water quality in the basin. Other Study publications are listed on the inside front cover of this report.

The material presented in this supplement supercedes that of all earlier preliminary reports or publications prepared under the Canada-British Columbia Okanagan Basin Agreement.

A. Murray Thomson
Study Director

TABLE OF CONTENTS

		PAGE
FOREWARD		iii
TABLE OF CONTENTS		v
LIST OF TABLES		viii
LIST OF FIGURES		x
CHAPTER 1	Introduction	1
	1.1 Role of Economic Growth Studies	1
	1.2 Objectives of Economic Growth Studies	1
	1.3 Scope and Nature of Economic Growth Studies	3
	1.3.1 Economic Growth Projections	4
	a) Projection I	4
	b) Projection II	4
	c) Projection III	4
	1.4 Approaches to Regional Economic Analysis	5
CHAPTER 2	Methodology	7
	2.1 Theory of Input-Output Analysis	7
	2.1.1 Economic Theory	7
	2.2 Construction of Model for Okanagan Basin	9
	2.2.1 Construction of Tables	10
	2.2.2 Usefulness of the Basic Tables	11
	2.3 Land Use Capability Analysis and Regional Growth Studies	11
	2.3.1 Projection I	12
	2.3.2 Projection II	12
	2.3.3 Projection III	12
	2.3.4 Tributary Basin Studies	14
CHAPTER 3	Historical and Present Economic Activities in the Okanagan	15
	3.1 Historical Development of the Okanagan	15
	3.2 Population	17
	3.3 Labour Force	19
	3.3.1 Employment	19
	a) Average Wage Rates	21
	3.3.2 Personal Income	21
	3.4 Agriculture	24
	3.4.1 Livestock	24
	3.4.2 Vegetables	26
	3.5 Forestry Resources	27
	3.5.1 Logging	28
	3.5.2 Sawmilling	28
	3.6 Mineral Resources	29
	3.6.1 Domain A - Copper (Molybdenum)	36
	a) Copper Mountain	36
	b) Brenda Lake	36
	c) Osprey Lake Batholith	36
	3.6.2 Domain B - Silver Lead - Zinc	36
	3.6.3 Domain C - Gold (Silver)	37

PAGE NO.

3.7 Manufacturing 37
3.8 Recreation and Tourism 37
3.8.1 Visitors 39
3.8.2 Visitor-Days 39
3.9 Transportation 42
3.9.1 Railroads 42
3.9.2 Air Services 42
3.10 Tertiary (Service) Industries 43
3.10.1 Census Data 1961-1966 & 1970 Trade & Service 43

CHAPTER 4 Assumptions of Economic Growth to 2020 45
4.1 Introduction 45
4.2 Basic Development of Assumption for Projections I,II, and III 46
4.2.1 Projection I - Continuation of Present Economic Policies 46
4.2.2 Projection II- High Economic Growth 46
4.2.3 Projection III-Low Economic Growth 47
4.3 Direct Demand Projections to 2020 49
4.3.1 Description of Final Demand Assumptions by Sector for Projection I 49
a) Tree Fruits & Grapes 49
b) Livestock 49
c) Dairying 50
d) Vegetables 50
e) Field Crops 50
f) Poultry, Eggs 50
g) Nursery 51
h) Logging 51
i) Mining 51
j) Meat & Dairy Products 51
k) Fruit & Vegetable Canners 52
l) Wineries, Soft Drinks, Distillers 53
m) Other Food and Beverage Industries 53
n) Sawmill & Planing Mills 54
o) Other Wood Products 55
p) Metal Fabricating and Transport Equipment Industries 55
q) Non-Metallic Mineral Products 56
r) Other Manufacturing Industries 57
s) Packing Houses 58
t) Wholesale Trade 59
u) Retail Trade 59
v) Hotel, Motel, Tourist Camps & Restaurants 61
w) Health, Education 61
x) Other Services 62
y) Transportation, Storage, & Communications 63
z) Finance, Insurance, Real Estate 63
aa) Construction 64
bb) Municipal Government 64
cc) Utilities 64
4.3.2 Forecast of Investment & Senior Government Expenditures 64
4.3.3 Final Demand Assumptions: High Economic Growth Projection I 65

PAGE NO.

4.3.4 Final Demand Assumptions: Low Economic Growth Projection II 65
4.3.5 Final Demand Tables 66
4.4 Projected Changes in Direct Production Coefficients 66

CHAPTER 5 Discussion of Projections to 2020 69
5.1 Introduction 69
5.2 Population 69
5.2.1 Population Growth 69
5.2.2 Population by Region 72
5.3 Economic Activity 74
5.3.1 Output 74
a) Output to 1980 74
b) Output - from 1980 to 2020 82
5.3.2 Employment 86
a) Employment to 1980 86
b) Employment Forecasts to Year 2020 94
5.3.3 Employment by Region 97
a) Employment by Region to 1980 97
b) Employment by Region from 1980 to 2020 97
5.3.4 Income 102
5.4 Land Use 106
5.4.1 Land Use Projections in Tributary Basins 110
5.5 Output Income & Employment Multipliers 112

CHAPTER 6 Summary & Discussion 117
6.1 Summary 117
6.2 Discussion 119
6.2.1 Advantages 119
6.2.2 Disadvantages 121

LIST OF REFERENCES 123

APPENDICES 127

APPENDIX A Survey Questionnaires and Covering Letter 129
APPENDIX B Final Demand Tables 143
APPENDIX C Interindustry Transaction Tables for 1970, 1980, 2000 and 2020 153
APPENDIX D Capability Analysis Matrix 163
APPENDIX E Land Capability Maps 169

LIST OF TABLES

TABLE NO.	TITLE	PAGE NO.
1.1	General Features Associated With Multiple Goals	3
2.1	Hypothetical Regional I/O Table Showing Transactions (in dollars) & Transactions Coefficients (in Parentheses)	8
3.1	Population 1921-1970, Okanagan - Similkameen Region	17
3.2	Age Group Distribution 1971	18
3.3	Estimates of Labour Force by Sector 1961 to 1970	20
3.4	Value of Production in Basic Industries 1970	22
3.5	Comparative Average Hourly Earnings	22
3.6	Declared Taxable Income, All Returns	23
3.7	Irrigated Crop Acreages By Region, Okanagan Basin 1971	24
3.8	Value of Agricultural Production In The Okanagan Valley 1970	25
3.9	1970 Tree Fruit & Grape Production for the Okanagan Valley	25
3.10	Number of Cattle & Calves, Other Than Milk Cows & Heifers, One Year & Over	26
3.11	Vegetable Production, Okanagan - Mainline - Grand Forks	26
3.12	Estimated Production & Employment in Logging	28
3.13	Saw & Planing Mills	29
3.14A	Employment by Sector, Okanagan Basin 1961 - 1970	28
3.14B	Value of Production & Income Earned in Agriculture, Manufacturing & Tourism in the Okanagan Basin for 1961, 1970	38
3.15	Number of Visitors to the Okanagan Basin in 1970	40
3.16	Number of Visitor-Days in the Okanagan Basin in 1970	40
3.17	Air Traffic at Penticton and Kelowna Airports Domestic Passenger Traffic	42
4.1	Derivation of the Weighted Average Per Capita Consumptions Growth And Long Run Income Elasticity of Demand	60
5.1	Population by Sub-Region Okanagan Basin 1961, 1966, 1971 and Projected 1980, 2000, and 2020	71
5.2	Share of Population by Region Okanagan Basin 1961, 1971, and Projected 1980, 2000, and 2020	73
5.3	Growth of Output by Major Economic Activity Okanagan Basin 1961, 1970 & Projected 1980, 2000 and 2020	75
5.4	Value of Output by Major Economic Activity Okanagan Basin 1961, 1970 and Projected 1980, 2000 & 2020	75
5.5	Value of Manufacturing Output, Okanagan Basin 1970 & Projected 1980, 2000, & 2020	77
5.6	Value of Output For Service Trades Okanagan Basin 1970 & Projected 1980, 2000 & 2020	78
5.7	Value of Agricultural Production 1970 & Projected 1980, 2000, and 2020	78

TABLE NO.	TITLE	PAGE NO.
5.8	Visitor-Days and Expenditures by Visitors by Sector in the Okanagan Basin 1970-2020	80
5.9	Employment by Major Economic Activity, Okanagan Basin 1961, 1970, and Projected 1980, 2000, and 2020	87
5.10	Share of Employment by Major Economic Activity, Okanagan Basin 1961, 1970 and Projected 1980, 2000 and 2020	87
5.11	Manufacturing Employment by Sector, Okanagan Basin 1970, and Projected 1980, 2000 and 2020	89
5.12	Service Employment by Sector, Okanagan Basin 1970 and Projected 1980, 2000 and 2020	91
5.13	Agricultural Employment by Sector, Okanagan Basin 1970 and Projected 1980, 2000 and 2020	93
5.14	Share of Employment by Major Economic Activities - Excluding Other Services, Okanagan Basin 1961, 1970 and Projected 1980, 2000 and 2020	97
5.15	Okanagan Basin, Employment by Major Economic Activity and Region 1970 and Projected 1980, 2000 and 2020	98
5.16A	Share of Employment by Major Economic Activity and Region, Share of total Employment by Major Economic Activity	103
5.16B	Share of Employment by Major Economic Activity and Region, Overall Share of Total Employment	104
5.17	Real Household Income by Source, Okanagan Basin 1970, and Projected 1980, 2000 and 2020	105
5.18	Total Area of Agricultural Capability Lands - Group 1 and 2 Okanagan Basin	108
5.19	Agricultural Land Use by Sub-Region, Okanagan Basin 1970, and Projected 1980, 2000 and 2020	109
5.20	Projections of Population Densities by Sub-Region 1970-2020	111
5.21	Population and Irrigated Land Projections for Eight Selected Tributary Streams to 2020	113
5.22	Output Multipliers by Industry Sector	114
5.23	Income Multipliers by Industry Sector	115
5.24	Employment Multipliers by Industry Sector	116
6.1	Examples of Range of Economic Growth that May Occur in the Okanagan Valley to the Year 2020	118
6.2	Population and Agricultural Statistics, 1970-2020	120

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE NO.
1.1a	Plan Showing Land Management Status	2
1.1b	Population Growth in the Census Subdivisions 3A, 3B, and 6B and in the Okanagan Basin	2
2.1	Economic Sub-Regions in the Okanagan Basin	13
3.1	Copper-Molybdenum, Domain A in Okanagan-Shuswap Region	30
3.2	Copper Production (1900-1969)	31
3.3	Silver-Lead-Zinc, Domain B in the Okanagan-Shuswap Region	32
3.4	Silver, Lead, Zinc Production (1900-1969)	33
3.5	Gold-Silver, Domain C in the Okanagan-Shuswap Region	34
3.6	Gold and Silver Production (1900-1969)	35
3.7	Public Recreation Sites Around the Main Valley Lakes	41
5.1	Population Okanagan Basin 1961, 1966, 1971 and Projected 1980, 2000 and 2020	70
5.2	Value of Output Agricultural Production	76
5.3	Value of Output Resource Based Manufacturing	76
5.4	Value of Output Non Resource Based Manufacturing	76
5.5	Value of Output Service Industries	76

CHAPTER 1

Introduction

1.1 ROLE OF ECONOMIC GROWTH STUDIES

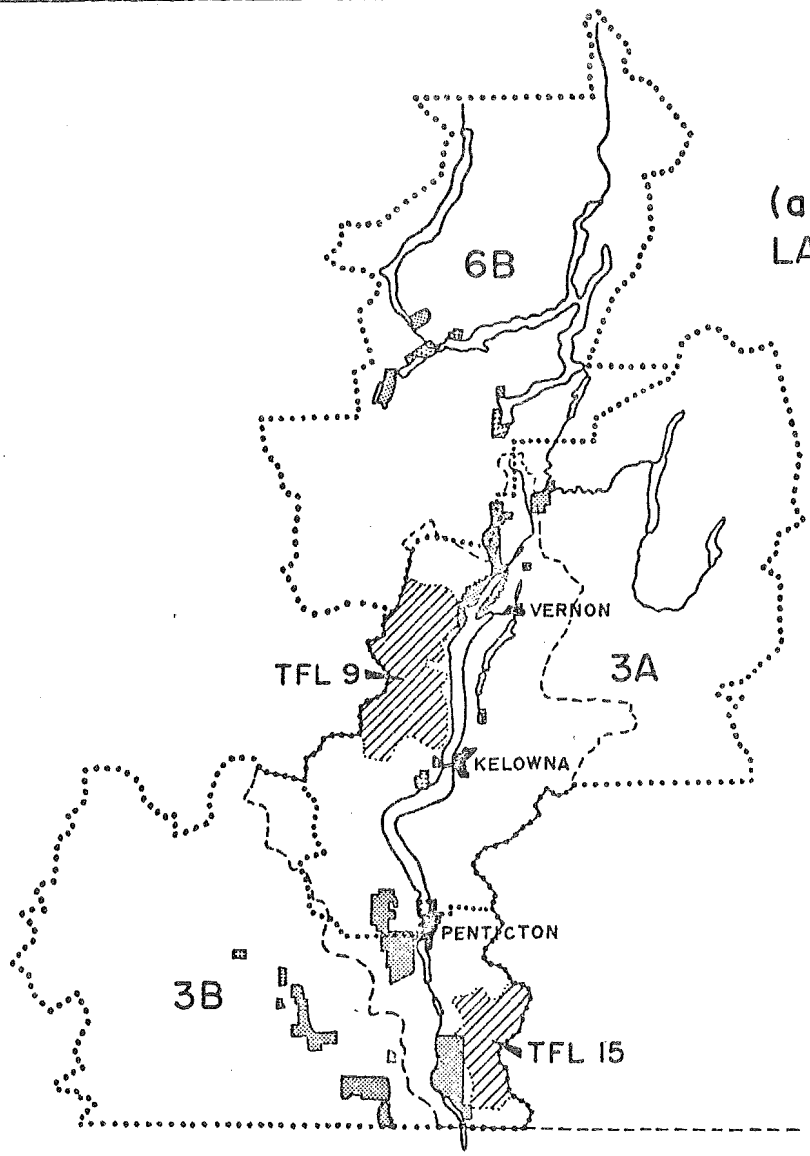
The main purpose of the Okanagan Basin Study was to prepare a comprehensive framework plan for managing water and related resources in the Okanagan to the year 2020. As the water resource in the Okanagan valley is a key factor in the economic, environmental and social well-being of the valley community, it is important that this plan be consistent to the pattern of future development in the basin. Consequently, projections of population, agricultural and industrial growth in the basin were prepared to enable calculations of future water and related resource demand (beach recreation, sport fishing, waste loadings), which in turn provided the basis for formulating alternative water management plans.

It must be emphasised from the start of this report that the economic projections developed for the Okanagan Study were undertaken solely to provide an information base for forecasting demands for the Okanagan water resource and to permit an assessment of the capability of the resource to supply these demands; these studies were never aimed at preparing regional economic plans for the Okanagan. Consequently, they lack much of the detail required in regional economic planning.

Forecasting economic growth particularly in small regions such as the Okanagan, well endowed with natural resources, has many uncertainties. This level of uncertainty increases rapidly with the length of the time horizon for planning. Because of the difficulties involved in projecting economic activity in any region over a 50 year period, especially in view of rapid changes in technology and in social values, a range of economic growth patterns were analysed. These economic projections were based on differing economic policy assumptions and because they provided a range of demands for water and related resources, they enabled sensitivity analyses to be undertaken on various water management alternatives.

1.2 OBJECTIVES OF ECONOMIC GROWTH STUDY

The aim of the economic growth study of the Okanagan Basin was to provide a basis for water resource planning from 1970 to 2020. As can be seen from Figure 1.1 the geographic boundaries of the Okanagan Basin were to be drawn wide enough to encompass significant economic and physical impacts of water resource development, including parts of neighbouring watersheds - Shuswap and the Similkameen. The economic growth study was intended to illuminate the complex process of comprehensive planning, within a multiple goal context, in order that the consequences of alternative plans for water and related resources management could be evaluated within a suitably broad frame of reference.



(a) PLAN SHOWING LAND MANAGEMENT STATUS

-Legend-

Census Subdivisions

Okanagan Basin

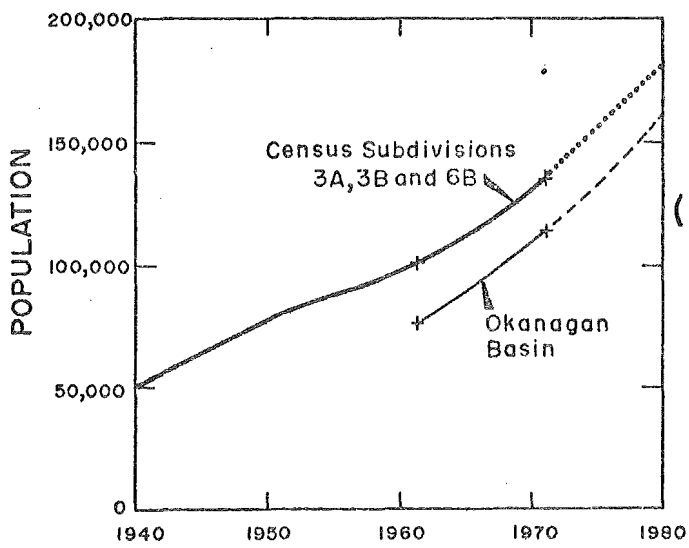
Indian Reserves

Cities

Tree Farm Licence

N

10 0 10 20 30mi.



(b) POPULATION GROWTH in the CENSUS SUBDIVISIONS 3A, 3B, and 6B and in the OKANAGAN BASIN.

Figure 1.1

Three major goals of economic development, social betterment and environmental quality have been defined for the Okanagan Basin Study. The economic objective has been enunciated as aiming to increase economic development, as measured by the economic value of income, goods and services accruing to the residents of the Basin and surrounding area. The social betterment goal aims at a more equal distribution of income and opportunity between regions in the valley, while the environmental goal strives to improve the quality of the natural environment. As these goals conflict, balanced rather than maximized achievement is to be achieved.

In theory, achieving a desirable balance between these multiple goals involves a broad study of a wide range of social and economic plans for the management of natural and human resources. Within the context of the Okanagan Basin Agreement, water and water-related resources, namely, fisheries, wildlife, water-based recreation and shoreline use, were the primary areas of study. However, a broader set of criteria (or human values) associated with these multiple study goals were implicitly considered in the development of a framework plan, as shown in Table 1.1 below.

TABLE 1.1

GENERAL FEATURES ASSOCIATED WITH MULTIPLE GOALS

GOAL	ECONOMIC DEVELOPMENT	ENVIRONMENTAL QUALITY	SOCIAL BETTERMENT
General	- regional income	- air and water quality	- population density
Features	- total employment	- fisheries production - aesthetics	- job security - health
(criteria)	- per capita income	- wildlife and other ecological systems - quietness - wilderness areas - recreation opportunities	- education - cultural amenities - urban conditions - communications - income distribution

Development of alternative growth plans for the Okanagan involved placing differing emphasis on the three major goals detailed in Table 1.1. While the detailed assumptions associated with each of these projections are discussed later in this report, it is sufficient to note here that one projection placed most emphasis on economic growth, another on environmental quality, while the third assumed a more even weighting of all three goals.

1.3 SCOPE AND NATURE OF ECONOMIC GROWTH STUDIES

The economic growth studies provided projected economic demands over a 50 year period from 1970 to 2020. It was recognized that the Okanagan economy had

gained a certain momentum as a result of the Federal Governments economic incentives program during the late 1960's and it was considered that this momentum would continue till about 1980. Therefore, the economic growth projections were broken into two phases. The first phase covered the 10 year period 1970-1980, involved a single projection of economic growth, based on trends which developed in the late 1960's. The second phase, considered to be less accurate, covered the period 1980 to 2020, for which three alternative growth patterns were developed. Generally speaking economic and population data were distributed over four sub-regions within the Okanagan on the basis of existing patterns, though modifications were expected to occur due to variation in economic advantages between regions.

Although the post 1980 projections were based on a range of economic growth criteria, similar assumptions concerning labour productivity and economic linkages between primary and support acitivity sectors were used in all alternative projections. However, over the 40 year time-span, labour, wages per unit of product and total export industry relationships were assumed to change, partly on the basis of best available information and partly from subjective analyses.

1.3.1 Economic Growth Projections

In the post 1980 phase, three economic growth projections for the Okanagan were prepared by varying the emphasis on the economic and environmental goals associated with the Study. Specifically, the following assumptions were used to generate the different projections.

a) Projection I

Continuation of existing economic policies in the Okanagan. The high rate of economic growth experienced in the valley over the past 10 years was assumed to continue to 1980 and then gradually decline over the next 40 years to 2020. In accordance with present provincial government policy, agricultural lands will be protected from sub-division for residential and industrial purposes, although some limited development in the form of land banks can be anticipated adjacent to the major urban centres. The projection placed relatively equal weights on economic, environmental and social goals.

b) Projection II

An increase in the rate of economic growth compared to Projection I stimulated by the assumption of further government support for industrial development. Land use policy is similar to that assumed in Projection I, except that greater rates of population and industrial growth will result in increased transfers in landuse from agriculture to residential and industrial development. This projection placed major emphasis on economic goals.

c) Projection III

A decrease in the rate of economic growth compared with Projection I through controls on industrial development. These controls would apply to any economic activity creating employment through the export of goods and services to regions outside the Okanagan. Thus, after 1980 the valley will grow only in response to

internal demands from the increasing population base rather than expansion of the economic base to support growth outside the basin. As the main emphasis in this projection was on maintaining a high level of environmental quality, agricultural lands were assumed to be protected from sub-division and additional agricultural development was encouraged.

1.4 APPROACHES TO REGIONAL ECONOMIC ANALYSIS

The method of regional economic analysis pursued and the relevant variables used in an analytical study are dictated by basin water resources planning objectives, kinds of data obtainable, and financial resources available.

The main methods of regional analysis include export base, input-output, net shift and proportionate share, or a model which combines several methods with varying degrees of sophistication. Each can be used for analysis of present and projected future economic conditions, with varying levels of reliability. Each method depends on some measure of economic activity over a discrete time period, such as employment or output changes measured in constant dollars or production units, etc.

The Export Base method as a first cut approach segregates the regional economy into two classes of industrial activity, namely export firms that sell their products outside the Okanagan and local industry. Its advantages are the need for less data, and it is less costly than other methods. Also, it studies the growth of the region within the context of growth of other regions. The technique also has important limitations, because although it provides useful estimates of effects of changes in economic structure, the relationship between the growth rate of a given industry and its multiplier effect are difficult to quantify. This method was used at the beginning of the study to obtain a basic understanding of the Okanagan economy and to prepare the data base for the more complex approach known, as input-output analysis.

Input-output or inter-industry analysis concentrates on dependences between economic sectors, involving trading patterns within the region and outside the region. A matrix is established for a finite number of production activities, showing the economic inter-relationships between them. The input-output method can be expensive because of extensive data requirements, but it is very useful in showing economic linkages, appraising the effects of changes in production process, and in estimating area multipliers.

Net shift, proportional shift and regional share, and net relative change, analyses use techniques of varying complexity. All view the region as a segment of a larger whole, measuring the impact of geographic shifts over time in the size of economic or demographic variables. Projections can be made into the future. While the methods have some very useful applications in planning, the techniques have certain drawbacks. An accurate delineation of

economic (not river basin) regions is essential, because otherwise economic linkages are broken (especially in the proportionate share method) and growth factors are then left out. Projections into the future also assume past trends reflect causative factors of coming activity.

A combination of methods, input-output to determine product flows, plus export base, and some element of historic shift and share, can be incorporated into one, complex regional model.

In the economic growth study completed for the Canada-British Columbia Okanagan Basin Agreement (1973) economic growth projections were based on three approaches. First, an economic base study was undertaken to make preliminary projections of economic growth for the Okanagan and ajoining Shuswap region; second an input-output model which analysed relationships between twenty-nine agricultural, industrial and service sectors was developed to prepare alternative growth projections to 2020. Third, for selected tributary sub-basins, economic projections were based on land capability analysis.

Major emphasis was placed on the input-output approach as this model was the only one that allowed sensitivity analysis to be undertaken successfully so that changes in economic growth assumptions could be incorporated into the planning studies.

The disadvantages of this approach for undertaking long-term economic projections in a small economic region such as the Okanagan were fully realised at the outset of the Study. However, the entire Okanagan Basin Study was both a planning study to prepare plans for managing water and related resources in the valley, and an experiment in developing methods in comprehensive basin planning. Innovative approaches were devised in many sectors of the study, notably in public involvement and evaluation techniques, so it was agreed that the input-output technique should be tested in this study. In the final chapter of this report, some attempt will be made to assess the advantages of the approach in a basin planning study and to ponder on lessons learnt.

As the input-output approach is rather complex, the major concepts underlying the techniques are discussed in some detail in the following chapter.

CHAPTER 2

Methodology

2.1 THEORY OF INPUT-OUTPUT ANALYSIS

2.1.1 Economic Theory

The theoretical basis of the Okanagan basin economic model was the Leontief input-output model, (also known as intersectoral or interindustry model), which is concerned with an analysis of the flows of economic inputs or outputs between industries within the study area studied and between industries within and outside the area.

The method of analyzing interindustry flows of an area uses a system of regional accounts known as input-output (I/O) tables. These tables are based on the concept that any given type of economic activity bears a measurable relationship to other sectors in the economy and that these relationships can be solved mathematically. The table is arranged as a matrix which shows by rows how much output of each industry (represented by that row) goes to itself and to other column industries as intermediate product (input) and to final demand, i.e., to consumption, investment or export[1]. If all of the output is used as input, there is no final demand column. In such an open system, the sum of intermediate plus final output gives the total output of the region. Reading down each column of the matrix tells how much of each sector's input is required by the industry (represented by that column) to produce its current volume of output. An example is given in Table 2.1.

Let the numbers outside partenthesis represent dollar values of output. Transactions (intersectoral flows) can be appraised as follows. By reading across row B, we find that the value of total outputs from sector B is $24 , of which $6 of output is used by that sector and sectors A($4) and C($4) as inputs (intermediate outputs) in their production processes. The total input requirements for sector B column is $12 in this open system. To close the system an additional row entitled "primary inputs" would be added in which the values shown in the row "total inputs" would appear and the values in the"total input" row would then be equal to those of the "grand total" column, with the values in the "final demand" column added in to represent the additional inputs required to close the system of flows.

So far, only the flows of inputs and outputs have been considered. The flows show the contribution of each sector to regional ouptu and the relationships between the sectors with respect to their dependency on each other for input requirements. Therefore, I/O analyses are quite helpful in explaining the economic processes underlying the economic structure of the region. If each

---

[1] Export in the context of this study relates to flows of goods and services outside the Okanagan Valley.

TABLE 2.1

HYPOTHETICAL REGIONAL I/O TABLE SHOWING TRANSACTIONS (IN DOLLARS) AND TRANSACTIONS COEFFICIENTS (IN PARENTHESES)[a]

Sector Producing[e]	Sector Buying[b]	Intermediate Transactions by Sectors (inputs)[B]			Used as Input[d]	Final Demand[e]	Grand Total[f]
		A	B	C			
Outputs[c]							
	A	1(0.083)	3(0.125)	2(0.111)	6	6	12
	B	4(0.333)	6(0.250)	4(0.222)	14	10	24
	C	2(0.167)	3(0.125)	5(0.278)	10	8	18
Total Inputs		7	12	11	30	24	54

NOTES:

a See Discussion in text for explanation of the "transactions" and "transaction coefficients".

b Read down columns to determine outputs purchased (as inputs) from row sectors.

c Read along rows to determine output sold to other sectors and as final demand

d Sum of row values in 3 x 3 transactions matrix.

e Output not sold to sectors shown in the transactions matrix; consumption, export, inventory, etc.

f Total of input and final demand columns.

element of a column within the transactions matrix (the 3 x 3 matrix formed by the sector designations) is divided by the grand total of the corresponding row, a table of input (or transaction or interdependence) coefficients is obtained (see numbers in parentheses). These coefficients represent the value of input necessary from each sector to produce one dollar of total output for the column sector. For example, it takes 8.3 cents worth of A's output in combination with the 33.3 cents of B's output and 16.7 cents of C's output to produce one dollar of A's total output. Thus, the effects of input constraints or changing technology (which would be reflected by changes in the transaction coefficients) can be made more explicit.

Defining income coefficients for each sector and coupling these with water use and waste loading coefficients results in an estimate of total income created

by water in different uses as well as forecasts of water use and waste loading. The I/O tables are also useful for examining alternative production targets in various sectors of the economy.

2.2 CONSTRUCTION OF MODEL FOR OKANAGAN BASIN

The basic Okanagan input-output model is composed of three tables. These are (a) the flow or transactions table; (b) the table of technical coefficients; and (c) the interdependency or direct and indirect requirements matrix. Steps used in the construction are as follows:

(a) Define the sectors of the regional economy (in this case 29 sectors).

1) tree fruits and grapes
2) livestock
3) dairying
4) vegetables
5) field crops
6) poultry and eggs
7) nurseries
8) mining
9) logging
10) meat and dairy products
11) fruit and vegetable canning
12) wineries, soft drinks and distilleries
13) other food and beverage industries
14) sawmills and planing mills
15) other wood products
16) metal fabricating and transport equipment industries
17) non-metallic mineral products
18) other manufacturing
19) packing houses
20) wholesale trade
21) retail trade
22) tourist services
23) education and health services
24) other service trades (amusement, personal, business, repair and miscellaneous services)
25) transport, storage, communication
26) finance, insurance, real estate
27) construction
28) local government
29) utilities

(b) Develop the input-output model for the Okanagan utilizing this sectoral classification and present the model in the form of three types of tables:

1) Flow or Transactions Table - shows the dollar value of transactions among all sectors in the regional economy. Purchases by regional sectors (#1-29 above), consumers within the region and other regions (exports), investment and non-local government expenditures are presented on the horizontal axis. Destination of sales of regional sectors, imports, and local labour and capital services are outlined on the vertical axis. Data used in the model is based on the year 1970.

2) Technical Coefficients Table - expresses the value of inputs per dollar of output for each economic sector, by sector of origin as of 1970.

3) Table of Direct and Indirect Requirements (Interdependency Matrix) - The direct production coefficients are transformed by matrix inversion to show the direct and indirect value of goods necessary to increase output in each sector by one dollar. For example, if there is an increase in demand for the products of sector 13, it would be seen from the Technical Coefficients Table that there will be direct increases in purchases from sectors 15 and 17. But in addition, when sector 15 sells more of its output to sector 13, sector 15's demand for the products of sectors which provide its inputs also increases. A third round of expansion occurs as the sectors which supply sector 15 are required to expand. Repeating the calculations for successive rounds and then adding up all the figures would provide an estimate of the total requirements, direct and indirect, resulting from the original increase in demand for the products of sector 13.

2.2.1 Construction of the Tables

The flow or transactions table contains all the basic data. The total value of each sector's output and its distribution was obtained from a number of questionnaire surveys, studies and published sources. Basic information was obtained from an economic base study of the basin and adjacent areas (B.C. Department of Trade and Commerce, 1971)[2]. This report covered an assessment of the resources, manufacturing, recreation and tourism sectors of the economy. Preliminary projections of regional population, employment growth and output by industrial grouping as well as regional income up to the year 2020 were also included.

The data base developed in this economic base study was not detailed enough to allow the contruction of a transaction table for the input-output model. Consequently, more detailed data on each of the 29 sectors noted earlier had to be obtained from direct questionnaire surveys of a sample of business firms in the valley. Random samples were selected from the directory of firms in each sector and the separate questionnaires administered for each major sector; i.e. agriculture, manufacturing industry, service industries, etc. Copies of the questionnaires are contained in Appendix A.

Data derived from these questionnaires were used both to generate the basic transaction tables and to provide a basis for making economic growth projections. Economic consultants prepared estimates of final demands in each sector of the tourist, manufacturing and primary production industries using questionnaire data plus their best knowledge of growth opportunities in each of these industries. These projections enabled transaction tables to be constructed for the years 1980,2000 and 2020, as is explained in Chapter 4.

---

[2] B.C. Department of Trade and Commerce - 'An Economic Study of the Okanagan-Shuswap Region' April 1971

To provide information required on the vital agricultural industry in the Okanagan Basin, an inventory of present agricultural resources and production, together with an appraisal of potential development was prepared by the British Columbia Department of Agriculture (1970)[3]. Output from this study included classification of arable and non-arable acreages and an assessment of potential use by sub-area in the Okanagan, Similkameen and Shuswap areas. Also included were projections of output and value of production for 1980 and 2020 by kind of animal, crop, tree fruit and vegetables. Markets and comparative factors were not discussed in detail though were used to develop the agricultural projections.

2.2.2 Usefulness of the Basic Tables

The flow table is rarely of any analytical value. It is purely descriptive in that it simply depicts the value of flows in the economy in a given year, i.e. 1970.

The matrix of technical coefficients is somewhat more useful in that the direct purchases from each sector by each sector, per dollar of the purchasing sector's output are displayed.

The interdependency matrix (and its transformation) is really the only analytical tool involved. This matrix generates estimates on both the direct and indirect output requirements generated by a change in final demand. Thus, projections of changes in output levels may be made which are dependent on changes in final demand or other output levels. For further discussion of the projection methodology refer to Sections 4 and 5 later in this report.

2.3 LAND USE CAPABILITY ANALYSIS AND REGIONAL GROWTH STUDIES

The agricultural potential of land in the Okanagan Basin and its estimated future use for farming or urban development was analyzed by the B.C. Water Resources Service (1972).[4] Land capability studies were undertaken to insure that future projections of economic activity, especially population totals and agricultural acreages, could indeed be supported by the available land resources in the Okanagan. The economic projections were originally developed independently of the physical capability of the Okanagan to support such growth. Because of the nature of the input-output model, growth forecasts are dependent solely on the comparative advantages of the Okanagan to trade with outside regions plus internal factors that enable growth in the basic industries. This industrial growth in turn promotes the development of service industries (local), all of which increase employment and population. To make these population projections realistic, however, there must be an assessment of the capability of the land resource to support urban development as well as projected agricultural requirements.

---

[3] Agricultural Resources Production and Potential, B.C. Department of Agriculture, 1970

[4] B.C. Water Resources Service 1972 "Preliminary Report" Value and Demand for Consumptive Use of Water in the Okanagan Basin, Task 209, Okanagan Basin Study 1972.

Assessment of land capability in the Okanagan Valley involved three stages. First, present landuse was mapped with particular attention given to land requirements for urban and rural populations. Census of Canada 1971 data on total population for urban centres and enumeration areas were utilized. Agricultural areas (present landuse only) were identified from Canada Land Inventory maps.

The second step involved assessing the agricultural land capability in the Okanagan from recent unpublished Canada Land Inventory maps. As it was assumed that irrigated crops (tree fruits, grapes, vegetables and pasture) could only be developed on high and medium agricultural capability lands (Class 1-4 inclusive), these areas were distinguished from the poorer agricultural areas (Classes 5-7 inclusive). Irrigated crops were considered important in this study because they consume over 80% of all water consumption in the Valley. Maps and accompanying descriptions are shown in Appendix E.

The third step involved integrating the results of the first two steps with economic growth forecasts and making land-use projections to the years 1980, 2000 and 2020. Population projections were broken down into urban areas and rural areas for the four selected sub-regions of the basin, according to assumptions developed by the economic input-output model. These regions are shown in Figure 2.1, with centres at Vernon, Kelowna, Penticton and Oliver-Osoyoos respectively. Essentially, the population and agricultural projections developed from the economic model were distributed within these regions according to the known land capability. In most cases, the sub-regions could support these economic projections. In other words, the land resource did not act as a constraint.

Present and future urban and rural population densities were calculated for each of the three economic projections. The following assumptions were derived so economic and population growth could be integrated with land capability:

2.3.1 Projection I

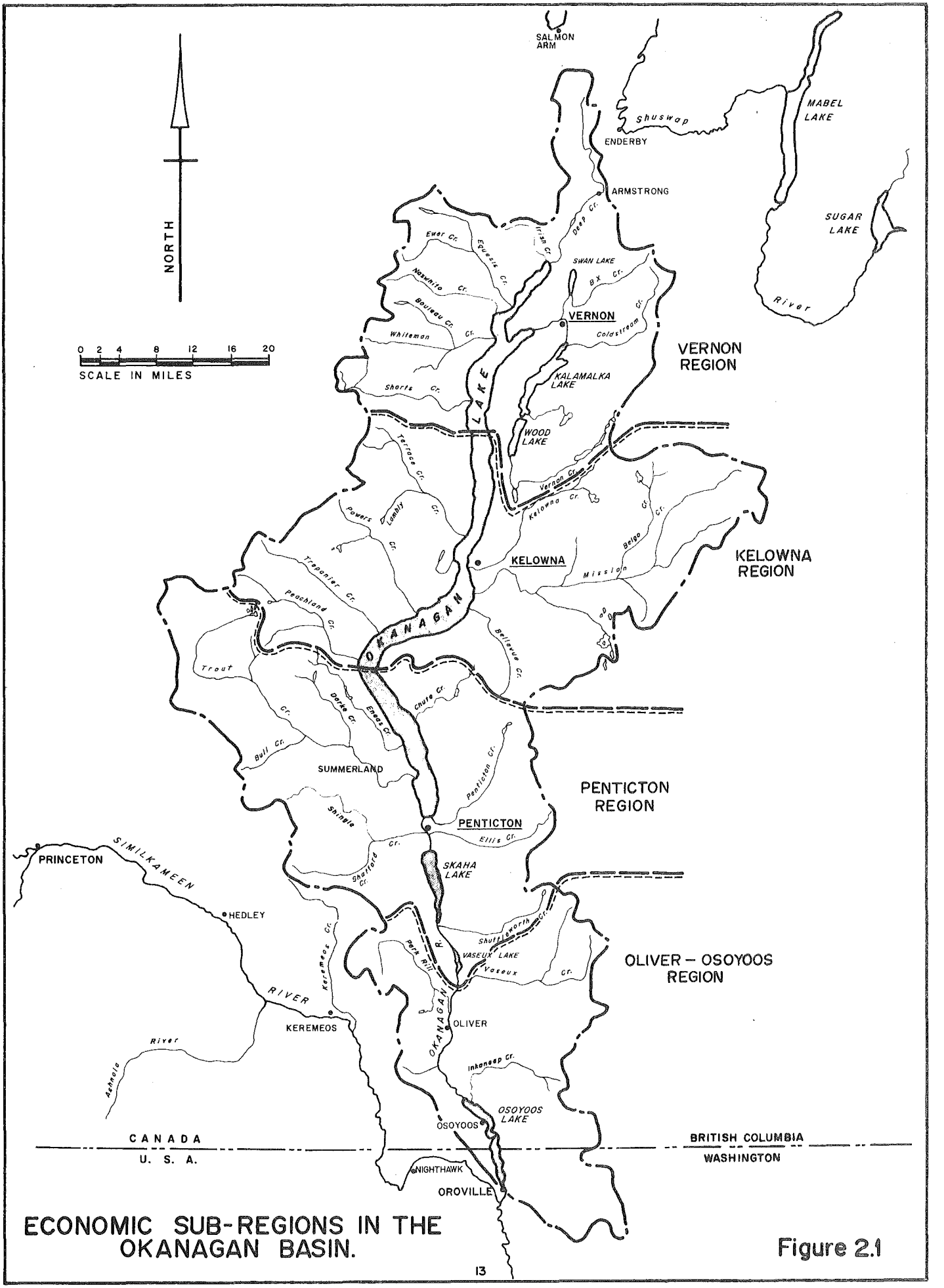
Continuation of existing controls on subdivision of prime agricultural land, with some losses to land banks close to or within urban areas; development of replacement agricultural acreages; moderate urban growth with distinct transition zones between rural areas.

2.3.2 Projection II

Agricultural land unprotected and decreasing under industrial and urban presures exerted; urban sprawl with broad transition zones.

2.3.3 Projection III

Agricultural lands protected with incentives to agriculture; agricultural acreage increases including on Indian reserves; controls on industrial development and limited urban growth with minimum sprawl.



ECONOMIC SUB-REGIONS IN THE OKANAGAN BASIN.

Figure 2.1

A Capability Analysis Matrix (See Appendix D) was developed for each projection. There were 15 variables per matrix, and one matrix for each of the four sub-regions. These variables included:

- 5 population measures - urban rural and total population counts, and urban and rural population densities;
- urban areas, i.e. residential, industrial and commercial development;
- 2 agricultural acreage measures - total capability, irrigated acreage (based on ratio of 1970 irrigated land to 1970 agricultural land in each sub-region).

Finally, the three projections were mapped for the horizon year 2020 for the whole basin, (See Appendix E).

2.3.4 Tributary basin Studies

More detailed land capability studies were undertaken on selected tributary watersheds to Okanagan Lake, as these tributary basins were too small for full regional economic studies. Projections of population and agricultural development were entirely based on land capability. The main purpose of these studies was to assess whether eight of the most heavily utilized tributary watersheds could continue to meet projected water requirements. The selected tributary basins were Trout Creek, Peachland Creek, Powers Creek, Equesis Creek, Vernon Creek, Kelowna Creek, Mission Creek and Penticton Creek.

Growth projections in these tributary basins were closely related to water quantity studies. A computer model was developed to estimate available water supplies for consumptive use (for agricultural and domestic purposes) at the major diversion points on each tributary. This model was adapted to match supply and demand at each of these selected points under dry, average and wet runoff conditions for 1970, 1980 and 2020 levels of economic development. In some creeks, minimum flows were also included to satisfy non-consumptive uses for fisheries, wildlife and aesthetic resources.

To test the sensitivity of water supplies in each basin to a range of future water demands, three projections of agricultural and population development were assumed. The first projection involved the maximum possible water requirements based on a high population projection for the triburary basin, assumed to be located on non-agricultural lands, plus a maximum development of Class 1-4 agricultural lands for irrigation. The second projection assumed minimum water demands, being based on a low population growth rate and a reduction of existing agricultural lands, due to sub-division. The third projection represented the arithmetic mean between these two extreme projections. (See Appendix E for details).

CHAPTER 3

Historical and Present Economic Activities in the Okanagan

3.1 HISTORICAL DEVELOPMENT OF THE OKANAGAN

The first economic activity in the Okanagan, as in much of British Columbia, resulted from the fur trade but benefits were minimal; no permanent posts were established because trapping was poor in the area. In 1811 David Stuart, working for an American firm called the Pacific Fur Company, is believed to have been the first Caucasian to see Okanagan Lake. Ten years later the Hudson's Bay Company established its Pacific headquarters on the lower Columbia River and developed a fur brigade trail which ran through the region from present-day Osoyoos to Vernon and thence to Fort Kamloops and points north. The trail was used until 1846 when the International boundary was established at its present position and a new trail was developed between Fort Kamloops and Fort Langley on the lower Fraser River.

The Fraser River gold rush of 1857-58 marked the beginning of settlement as ranches were established in areas such as the Thompson Valley, Vernon and Kelowna, to meet the needs of miners headed for the Cariboo via the Columbia and Okanagan Rivers. The discovery of placer gold on the Similkameen River in 1859 and in the Boundary country and the Kootenays in the following years provided additional markets, furthered settlement and opened up transportation routes.

The gold rush period was virtually over by the 1880's but extensive exploration began to turn up promising lode deposits, particularly in the Kootenays. During the same period railroad construction activity provided a large market for beef and farm produce. Completion of the Canadian Pacific Railway in 1885 meant that markets much further afield could now be supplied and the northern part of the region experienced a heavy influx of settlers. In 1886 regular steamer service began on Okanagan Lake as farmers moved southward into what had been for many years the exclusive domain of cattle ranchers. By 1891 a rail line from Sicamous to Okanagan Landing (near Vernon) had been completed to link up with the lake steamers. The lake boats continued in operation until 1935 when road improvements eliminated the need for such service; however, rail barges are still in use meeting the freight transport requirements of lakeside communities.

The advent of reliable, fast, low-cost rail transportation marked the turning point of agriculture in the Okanagan. Beef and grains were the main crops until commercial fruit production was introduced by Lord Aberdeen at Kelowna and Coldstream in 1892. Large estates were subdivided and community irrigation works were undertaken. Despite periods of low prices and damage

due to heavy frost on occasion, agriculture diversified and expanded to the point where it was the leading economic activity for half a century.

Local markets for farm produce received a boost shortly after the turn of the century as Copper Mountain, Hedley and a number of smaller mining camps became established. Coal mines were brought into production at Princeton and Tulameen to meet a rapidly-growing demand for fuel; some continued in operation until the early 1960's when they were finally phased out as markets disappeared. The gold mine at Hedley closed in 1955 and Copper Mountain ceased production in 1957.

As the economy of the area broadened and the population increased, transportation facilities were improved. In 1907 a rail line from Oroville (U.S.A.) reached Keremeos but it was not until 1915 that Kettle Valley Railway (C.P.R.) was built through Princeton and Penticton, giving the area its second east-west rail connection. A branch line was extended to Oliver in 1923 and Osoyoos in 1944. In 1925, the C.N.R. completed a line from Kamloops to Kelowna. Major road construction projects were also undertaken, with the section of the Trans-Canada Highway in 1962 being most important to the area. These highways permitted rapid shipment of perishables, reduced shipping costs and, perhaps more important, resulted in a tremendous influx of tourists.

The forest industries were primarily geared to the local market for shipping containers for fruit and vegetables, rail ties, mine props and construction materials until the Second World War. Increased demand then resulted in a major expansion of sawmilling. Initially, mills could be found in almost every settlement although more recently centralization has occurred along with additions to the product mix.

In 1957, natural gas first became available to homes and industries along the main pipeline and by 1970 service had been extended throughout most of the area. Financial assistance available under the Area Development Incentives Act prompted a number of new manufacturing firms to establish in the region and local businesses to expand during the latter half of the 1960's. Concurrently, many irrigation and improvement districts received ARDA assistance in rehabilitating community irrigation systems. The mining industry once again became a significant factor in the economy with the production commencing at the Silver Horn property of Utica Mines in 1965, the Brenda Mine in early 1970, and the Trent Resources Mine in mid-1970. Also in 1970, the Princeton area was buoyed by the start of work on the Ingerbelle copper mine adjacent to the famous Copper Mountain property. Major advances have also been made by the forest industries in the past few years, commencing with the creation of a chip market at Kamloops in 1965. The shift to close utilization of the timber resource led to the establishment of a number of new sawmills, the regions's third plywood plant, and other forest products manufacturing facilities in the latter half of the 1960's.

In summary, the economy of the Okanagan has shifted from a heavy emphasis on primary resource industries (agriculture, forestry and mining) predominating to the mid-1960's to a more diversified economy based on manufacturing and service industries. Much improved road networks into the Okanagan from Alberta as well as the Lower Mainland has not only contributed to this development of market oriented industry, but also permitted the rapid expansion of tourism, now one of the major service trades in the basin.

3.2 POPULATION

The population of the Okanagan Basin in 1966 was 87,179, slightly more than four percent of the total number of persons in the Province. The population rose by 11,345 between 1961 and 1966, representing an increase of 13.1 percent. This was somewhat below the 15 percent average increase recorded by British Columbia as a whole during the first half of the 1960's. However, since 1966 growth in the area has been well above the Provincial average, largely because of rapid industrial expansion resulting from the Federal industrial incentives program, the many ARDA projects undertaken in the area, opening of the Brenda mine, and an expanding tourist industry. The 1971 population in the Okanagan basin was approximately 114,500 (about 5.2 percent of the Provincial total) representing an annual growth rate of 6%.

Population data on a Census Subdivision basis are available back to 1921. The following table 3.1 illustrates the growth pattern in each of the two subdivisions making up the region and compares these with the Provincial average.

TABLE 3.1

POPULATION 1921-1970, OKANAGAN[1] - SIMILKAMEEN REGION

(Including Indians on Reserves)

	CENSUS SUBDIVISION 3A		CENSUS SUBDIVISION 3B		
YEAR	NUMBER	ANNUAL PERCENTAGE CHANGE	NUMBER	ANNUAL PERCENTAGE CHANGE	ANNUAL BRITISH COLUMBIA PERCENTAGE CHANGE
1921	21,982		7,743		
1931	24,662	+1.16%	11,059	+3.63%	+2.84%
1941	30,306	+2.08%	15,840	+3.66%	+1.65%
1951	46,445	+4,36%	24,163	+1.57%	+3.71%
1956	51,316	+2.01%	26,123	+1.28%	+3.10%
1961	58,692	+2.72%	27,843	+1.28%	+2.83%
1970[3] (est)	81,000	+4.40%	34,000	+3.44%	+3.33%

[1] See Appendix A. Economic Study Okanagan, April, 1971

[2] Includes part of Similkameen sub-basin

[3] Changes in Census sub-division 1971 - Regional District basis

Inward migration has played a significant role in population growth, accounting for over 50% of the total increase in the two census sub-divisions 3A and 3B, between 1951 and 1970. Natural births accounted for the balance. Indeed, net in-migration into census subdivision 3A (North and Central Okanagan) which has witnessed the largest population growth, has accounted for almost 70% of the total increase in that subdivision. The reasons for the high proportion of net in-migration in population growth include the increased availability of jobs during the 1960's and the relatively low regional birth rate, due to the high proportion of older people in the population structure.

The high proportion of older people in the Okanagan compared to the Province as a whole is illustrated in Table 3.2 and is probably a reflection of the region's populatity as a retirement centre. Table 3.2 also indicates that there are fewer persons in the 15-34 age groups, a common feature of smaller economic regions where job opportunities have been limited in the past and the young people migrate to the large urban centres. This trend may now be changing as a result of the greater opportunities for employment in the basin due to the Incentives Program.

TABLE 3.2

AGE GROUP DISTRIBUTION 1971

AGE (Years)	OKANAGAN-SIMILKAMEEN Census Divisions	BRITISH COLUMBIA
0-14	27.7%	28.2%
15-34	26.3%	31.0%
35-54	22.6%	22.8%
55-over	23.4%	18.0%

Population growth has not occurred at equal rates in all regions of the Okanagan Basin. The Central Okanagan region, extending from Peachland to Winfield and including Kelowna has experienced the fastest rate of growth over the past decade, its population increasing by over 83% to reach 46,700 in 1971. Much of this rapid growth has been due to the concomitant increase in job opportunities in manufacturing and service industries.

Population in other regions of the basin has grown at less than half the pace of that experienced in the Kelowna region over the past decade. The Oliver-Osoyoos regional population increased by 28% to 8700 in 1971 due primarily to tourist industry development and an influx of retired persons. The Penticton and Vernon regional populations grew by 32% and 40% respectively due to expansion of tourism, manufacturing and associated retail and service trades.

3.3 LABOUR FORCE

Very little data on the labour force are available apart from statistics from the 1961 Census pertaining to employment by occupation and industry. Even these are of limited value for establishing benchmarks, since they are not available for areas smaller than Census Divisions. In addition, of course, major changes in the local economy during the past decade make the 1961 data of limited use in projecting the possible structure of the future labour force.

The availability of labour with specific skills in any given location usually does not constitute a problem because of the mobility of the Canadian labour force in general and the British Columbia labour force in particular. This is particularly true in the study region where firms report a steady flow of job applications from people wishing to move to the area. There was a strong inward migration during the 1960's as more jobs became available. It is therefore suggested that the past and present composition of the local labour force (in terms of occupational skills) has little or no bearing on the potential labour supply for any new industry.

As full utilization of local natural resources is realized over time, the labour requirements of the primary sector will eventually reach a peak, beyond which point technological advances will probably lead to an actual decline in employment. Because of the rising importance of other sectors of the economy, a steady decline in the proportion of the labour force engaged in the primary sector appears inevitable.

Under the assumptions of projections I, II and III most of the new jobs which will be created in the future will be in the tertiary or service-producing sector. The key growth industries, including health, education, business services, personal services and public adminstration, are included in this field The secondary sector, which includes manufacturing and construction, is expected to show little change in its relative position as a source of employment. The following table 3.3 illustrates estimates of labour force distribution for the years 1961 and 1970. Note that the distribution includes all persons in the labour force, whether unemployed or employed only on a part-time basis, which means that the data are not fully comparable with employment figures provided elsewhere in this study.

3.3.1 Employment

The growth of population can be directly related to the growth of employment in the Okanagan. Generally speaking, regions such as the Okanagan Basin experience economic growth because they are able to produce goods which can be exported to other regions in British Columbia or elsewhere. Until the mid-1960's, the Okanagan economy relied upon the production and export of primary resource products in agriculture, forestry and mining, most of which were sold to the

TABLE 3.3

ESTIMATES OF LABOUR FORCE BY SECTOR - 1961 TO 1970

(Okanagan Basin)

SECTOR	EMPLOYMENT		SHARE OF TOTAL EMPLOYMENT	
	1961[1]	1970	1961	1970
Agriculture	2,930	2,650	15.7%	9.3%
Mining	40	360	0.2	1.3
Logging	500	300	2.7	1.0
Manufacturing - Resource based	1,650	2,010	8.9	7.1
Non-resource based	720	2,160	3.9	7.6
Services - tourism	640	1,230	3.4	4.3
Services - retail	12,130	19,760	65.2	69.4
TOTAL	18,610	28,470	100.0	100.0

SOURCES:[1] Estimates developed from Statistics Canada, Census of Manufacturing, Agriculture, Merchandising and Labour Force, 1961.

rest of the province and Canada. These primary economic activities created a demand for a wide range of goods and services, such as education, health care, retail shopping, and finance. These service trades themselves employed people who, with their families and dependents, created more demands for services.

The money earned through the export of primary resources is re-invested in these primary economic activities creating more jobs both in the industries themselves, and in the service or support industries that supply materials for production. For example, increased exports of tree fruits required a greater demand for packing cartons which in turn required greater production in the logging industry resulting in a spiraling growth.

As a result of the introduction of the Federal Government's Industrial Incentive Program, the primary resource based activities have been superceded by non-resource-based manufacturing as the major growth-creating industry. These non-resource-based industries which include the manufacture of mobile homes, boats, tractors, glass, chemicals, etc., are not dependent upon the primary resource base in the Okanagan, nor are they directly dependent upon the proximity of markets. Rather, they are sometimes referred to as 'footloose' industries because they can locate in any region where there are good transportation links with the supply of raw materials and the markets. The offer of financial incentives to locate in the Okanagan was a deciding factor for many

firms which were affected by the high economic and environmental costs of locating in major urban centres in British Columbia or elsewhere.

The rapidly increasing importance of non-resource-based manufacturing is further illustrated in Table 3.4, which presents the value of total production and actual income that remains in the Okanagan generated by the major basic industries - agriculture, manufacturing and tourism. The value of production in non-resource-based manufacturing has increased about seven times during the past decade, making it the leading industry in the growth-inducing sector of the economy. Despite the reduction in actual employment in the agricultural sector, the value of its production increased by about 26% between 1961 and 1970, while the value of services and expenditures by tourists more than doubled over the same period.

a) Average Wage Rates

Whereas average wage rates in many of the relatively small resource-oriented communities in British Columbia are higher than the Provincial average in order to attract and retain skilled employees, those in the Okanagan are generally below the Provincial average. This is largely a reflection of the area's ability to attract potential employees in excess of current requirements. Table 3.5 shows the pattern of wages actually paid in three of the largest employment groups over the years 1967 through 1970.

Although it would appear that the gap between the regional and Provincial average wage rates is diminishing, the rate of change is so slow as to be barely discernible. Average Provincial rates will likely be attained by key industries in the near future, but other wages are likely to remain somewhat below Provincial averages. This wage differential has not yet been an appreciable factor in attracting new industry to the region because additional transportation and other costs generally have exceeded potential labour cost savings. However, this differential could be an important advantage in attracting new businesses in the future, particularly service industries such as financial offices which need not consider the cost of moving goods. Additionally, as the Southern Interior market grows, new industries established to serve the regional market may find the lower wage levels an advantage in expanding beyond regional boundaries.

3.3.2 Personal Income

Reliable data on sources of personal income are available only for a few of the Province's largest municipalities and for Census Divisions. However, since 1967, special small-area tabulations have been prepared which permit reasonable estimates of total income on a regional basis.

TABLE 3.4

VALUE OF PRODUCTION IN BASIC INDUSTRIES - 1970
(Okanagan Basin)

SECTOR	Value of Production		Value of Income[1]	
	1961	1970	1961	1970
	($1,000 constant 1970 dollars)		($1,000 constant 1970 dollars)	
Agriculture	31,970	40,300	9,930	11,680
Manufacturing Resource Based	32,940	49,710	10,830	12,160
Non-resource Based	11,290	77,860	5,790	15,610
Tourism	5,530	11,240	2,580	5,160
Other (Service and Retail)	N.A.	319,460	N.A.	153,090
TOTAL	------	498,570	------	197,700

[1] Income includes wages, salaries, rents, and other income that remains in the Okanagan Basin.

SOURCE: Estimated from Questionnaire Survey undertaken by Socio-Economic Task Force, 1971-72.

TABLE 3.5

COMPARATIVE AVERAGE HOURLY EARNINGS

	MANUFACTURING		CONSTRUCTION		COMMUNITY, BUSINESS AND PERSONAL SERVICES	
	Okanagan	British Columbia	Okanagan	British Columbia	Okanagan	British Columbia
October 1967	$2.35	$3.10	$3.59	$4.47	$1.41	$1.78
January 1968	2.45	3.15	3.65	4.11	1.49	1.77
April 1968	2.50	3.20	3.63	4.28	4.50	1.82
July 1968	2.59	3.19	3.88	4.38	1.49	1.89
October 1968	2.72	3.27	3.94	4.45	1.49	1.92
January 1969	2.76	3.38	4.07	4.49	1.62	1.92
April 1969	2.57	3.41	3.97	4.70	1.62	1.92
July 1969	2.81	3.46	4.13	4.99	1.64	1.97
October 1969	2.94	3.56	4.20	5.34	1.69	2.03
January 1970	3.13	3.62	4.67	5.29	1.72	2.10
April 1970	3.07	3.67	4.47	5.42	1.61	1.98
July 1970	3.17	3.64	4.61	5.50	1.84	2.14

SOURCE: Economic Base Study, p.38, April 1971.

Of particular significance is the relative importance of investments as a source of income within the region. In 1968 residents of the Kelowna area reported investment income amounting to 11.1 percent of total taxable income, and in the Penticton area the figure was 9.1 percent. Only 6.1 percent of all Provincial taxable income was received from investment sources in 1968. These statistics are a reflection of the region's ability to attract retired persons of considerable means.

Taxation statistics also confirm the high degree of seasonality that is characteristic of local employment. The relationship between taxable and non-taxable returns is believed to be largely a function of the proportion of the tourist services. Non-taxable returns filed in the region in 1969 amounted to 20.4 percent of all returns filed, compared with 14.4 percent for the Province as a whole. The seasonal nature of many occupations, lower average wage rates, and the high proportion of retired persons in the region combine to produce an average income considerably below the Provincial average. Between 1967 and 1969 the average Provincial income reported for taxation purposes rose 11.9 percent whereas an increase of 15.2 percent was recorded in the Okanagan. As Table 3.6 clearly illustrates, although the gap has closed slightly, the local level of income remains well below the Provincial average.

TABLE 3.6

DECLARED TAXABLE INCOME, ALL RETURNS

YEAR	OKANAGAN[1]		BRITISH COLUMBIA	
	Returns Filed	Average Income	Returns Filed	Average Income
1967	46,090	$4,054	834,890	$4,971
1968	50,616	4,335	878,131	5,240
1969	55,859	4,669	945,986	5,561

[1] Okanagan-Shuswap Region area data are integrated in the Table.

In British Columbia in 1968, income reported for taxation purposes accounted for 81 percent of total personal income. The remaining 19 percent was made up primarily of transfer payments(family allowance, social assistance, etc.), military pay, and undeclared income of persons earning less than their basic exemption. Assuming that the relationship holds true for the region, total personal income in the Okanagan was estimated $340 million in 1970 compared with $234 million in 1967.

3.4 AGRICULTURE

Table 3.7 which shows the distribution of irrigated acreage by crop type and region, indicates that the Okanagan Valley is one of the most intensively farmed regions in the Province. Mixed farming, based on dairying and irrigated pasture predominates in the North Okanagan, particularly in the Spallumcheen Valley, while tree fruits and other horticultural crops are grown intensively in the regions to the South. The region produces over 90% of all tree fruits grown in British Columbia and about 10% of provincial vegetable production.

TABLE 3.7

IRRIGATED CROP ACREAGES BY REGION, OKANAGAN BASIN 1971

(acres)

REGION	TREE FRUITS	GRAPES	NURSERY CROPS	VEGETABLES	FIELD CROPS	FORAGE CROPS AND PASTURES	TOTAL
Vernon	2,939	129	84	485	344	11,652	15,633
Kelowna	14,259	1,273	441	289	-	5,885	22,147
Penticton	8,905	109	10	20	-	2,290	11,334
Oliver-Osoyoos	5,716	791	165	412	-	3,872	10,956
Basin Total	31,819	2,302	700	1,206	344	23,699	60,070

SOURCE: B.C. Tree Fruits Ltd., Statistics Canada, Canada Land Inventory Land Use Maps.

Agriculture is one of the major sectors of the Okanagan economy in terms of value of output. Table 3.8 presents the value of production of the major agricultural crops and indicates the dominant position of the tree fruit industry. Apples represent over half of the gross value of tree fruits to the farmer followed by cherries (13%), pears (11%), and peaches (9%) (Table 3.9). Grape production varies considerably from year to year due to winter kills during severe frosts, but in 1970 was valued at about $1.5 million or about 8% of the value of tree fruits. Grapes have only recently gained some importance in the Okanagan agricultural economy. Because of increasing trends in per capita wine consumption in the Province and the suitability of the Okanagan for grape production, this product has considerable growth potential in the basin.

3.4.1 Livestock

Production of beef cattle is a very important part of the agricultural economy, the value of livestock production being the second most important category of agricultural production. There are over 850,000 acres of grazing lands within the watershed, much of this in the lower forested areas, while irrigated pasture lands could significantly increase the potential for livestock production.

TABLE 3.8

VALUE OF AGRICULTURAL PRODUCTION[1]
IN THE OKANAGAN VALLEY - 1970

Crop Type	Value of Crop	Percentage
Tree Fruits and Grapes	$31,974,200	79.3
Livestock	2,749,900	6.8
Dairying	1,535,500	3.8
Vegetables	1,241,300	3.1
Field Crops	482,200	1.2
Poultry and Eggs	1,304,000	3.2
Nursery Crops	1,021,000	2.6
TOTAL	$40,308,000	100.0

[1] Values include packing-house charges for handling, processing and transportation

SOURCE: Statistics Canada, Agricultural Census.

TABLE 3.9

1970 TREE FRUIT AND GRAPE PRODUCTION
FOR THE OKANAGAN VALLEY

Fruit	Total Production (pounds)	Total Value[1] (dollars)
Apples	257,700,000	10,690,000
Crabapples	530,000	30,000
Pears	33,300,000	2,180,000
Plums	160,000	18,000
Prunes	7,490,000	570,000
Cherries	12,780,000	2,510,000
Peaches	18,170,000	1,670,000
Apricots	5,500,000	350,000
Grapes	17,330,000	1,500,000
TOTAL	352,960,000	19,518,000

[1] Figures represent gross values to farmers and do not include packing house charges.

SOURCE: B. C. Department of Agriculture Report on the Okanagan Similkameen District.

Table 3.10 indicates that the total number of cattle is increasing in the region, a trend that is expected to continue as population and per capita consumption of beef increase.

TABLE 3.10

NUMBER OF CATTLE AND CALVES, OTHER THAN MILK COWS AND HEIFERS, ONE YEAR AND OVER

Census Sub-Division	1961	1966	1971
3A	25,444	28,332	30,450
3B	16,315	20,741	20,896
TOTAL	41,759	49,073	51,346

SOURCES: Statistics Canada, Agricultural Census Data, 1961-1971

3.4.2 Vegetables

Vegetable production in the Okanagan Basin is an important agricultural activity, contributing between two and three million dollars annually to local farm cash receipts. It is a difficult sector to analyze because of the wide number of vegetable crops and varieties grown, but some generalizations can be made. Total annual acreage in vegetables in the region fluctuates but has

TABLE 3.11

VEGETABLE PRODUCTION, OKANAGAN - MAINLINE - GRAND FORKS[1]

YEAR	VEGETABLES			POTATOES		
	Acres	Total Returns	Returns per acre	Acres	Total Returns	Returns per acre
1960	2,692	$1,235,876	$459	2,265	$ 786,579	$347
1961	2,585	1,584,871	613	2,448	839,002	343
1962	2,651	1,370,493	517	1,995	712,427	357
1963	2,632	2,232,473	848	1,922	754,233	392
1964	2,641	1,808,364	685	1,922	1,837,822	956
1965	2,980	2,339,840	785	2,545	1,613,585	634
1966	2,500	2,275,262	910	1,865	851,982	457
1967	2,699	2,194,858	813	1,935	1,012,840	523
1968	2,908	1,607,717	553	1,875	1,152,00	614
1969	2,795	1,708,075	611	1,870	1,164,760	623
1970	2,502	N.A.	N.A.	1,760	N.A.	N.A.

SOURCE: Economic Base Study, p.60, April 1971

[1] Area based on the larger economic unit including Shuswap, Similkameen and Kettle Valleys.

generally averaged around 2,000 acres plus an additional 1,500 acres in potatoes since 1960. The amount of land devoted to any one vegetable crop varies according to prices obtained in the previous season and growers' expectations of the coming one. The bulk of the land in potatoes and vegetables is located in the Armstrong-Spallumcheen area with secondary pockets around Kelowna, Oliver, Osoyoos and Keremeos, although Table 3.11 illustrates the variations in both acreage and farm returns. Figures in the Table are not comparable with those from the Census as they include the Kamloops and Grand Forks areas as well.

3.5 FORESTRY RESOURCES

The forest industries have been a factor in the Okanagan economy since the 1880's when tie mills were set up to supply the C.P.R. rail line then under construction. As the population grew and the economic base broadened, small mills were established for the production of construction lumber, sash and doors, box shook and tree props. The mining industry also provided a market for mine timbers in the south-western corner of the region. For the most part, forest industries production was based on local markets until World War II.

In 1970 the logging, lumber and plywood sectors of the forest industries directly employed and estimated 3,830 persons in production, administrative, supervisory and office positions (compared with 4,250 in 1969) and paid out some $24 million in wages and salaries.

Productive forests cover over 1.3 million acres or 68% of the Okanagan watershed. Spruce and balsam comprise half the net volume of mature timber, with lodgepole pine, Douglas fir, cedar and hemlock constituting the balance.

The potential allowable annual timber harvest from the Okanagan Public Sustained Yield Unit (P.S.Y.U.) in 1970 was 25.4 million cubic feet, but actual harvest was only 10.8 million cubic feet, or 43% of potential. However, as timber harvesting methods become more efficient, it is expected that annual cuts will remove a greater proportion of the potential allowable annual harvest.

Almost the complete timber harvest is processed in saw and plywood mills, more than half in the 30 saw and planing mills and two major plywood mills. In response to rising labour and other costs, there has been a restructuring of the wood processing sector towards large and more efficient production units, with a parallel decline in the number of small 'bush' mills. In addition, there has been some recent diversification in wood processing with the opening of a $4.5 million corrugated container plant in Kelowna in 1970. This industry serves the local fruit and vegetable packers as well as the distillery at Winfield and various local wineries.

3.5.1 Logging

Logging employment has been declining up to 1969 when an increase resulted from the very favourable demand and prices then in effect. Total employment slipped back in 1970 because of a weak lumber market and because of industrial disputes, but the number of new facilities to be brought into production in 1971 should result in a large increase in this and following years. (See Table 3.12).

TABLE 3.12

ESTIMATED PRODUCTION AND EMPLOYMENT IN LOGGING
(Okanagan-Shuswap Region)

	1967	1968	1969	1970
Logging employment (number)	1,415	1,346	1,606	1,149
Logging employment (man-months)	10,184	10,051	13,573	9,111
Average employment period (months)	7.2	7.5	8.5	7.9
Log production (M cubic feet)	73,106	73,076	91,780	87,751
Log production per man (M cubic feet)	51.7	54.3	57.1	76.4

SOURCE: Economic Base Study, April 1971

The above table has been compiled on the basis of ranger districts for which comparable data are not available for earlier years, but two trends are clearly evident. The average employee is producing more and, until the 1970 market slump, he had been working progressively longer each year.

Minor products constitute a small but important segment of the logging sector. In 1970 the Forest Service reported production of approximately 840,000 lineal feet of poles and piling, 62,000 Christmas trees and 380,000 cubic feet of minor products originated in the region's P.S.Y.U.'s.

3.5.2 Sawmilling

There were 40 stationary saw and planer mills and approximately 108 portable mills in the region in 1969 although many of the small units operated only during part of the year. Twenty mills operated barkers and 18 of those had chappers in 1970. An estimated 2,410 men were employed for a total of 26,070 man-months in 1970, the latter figure being 40 percent higher than in 1967. Total productive capacity has been trending upward and the large facilities have accounted for an increasing share of total output, as shown in the following table.

TABLE 3.13

SAW AND PLANING MILLS

Okanagan-Shuswap Region

Estimated Daily Capacity (Mfbm per 8 hr. Shift)	Number of Mills				Total Daily Capacity (Mfbm per Shift)			
	1965	1967	1969	1970	1965	1967	1969	1970
0 - 20	123	123	145	118	636	639	899	611
21 - 50	27	21	21	19	955	815	700	635
51 - 100	7	7	8	8	485	458	620	545
100 and over	1	3	3	3	130	410	415	492
TOTALS	158	154	177	148	2,206	2,322	2,634	2,283

SOURCE: Economic Base Study, April 1971

Mfbm = Thousands of board feet

3.6 MINERAL RESOURCES

The Okanagan Basin lies within a larger region of SouthernBritish Columbia which has high mineral potential.

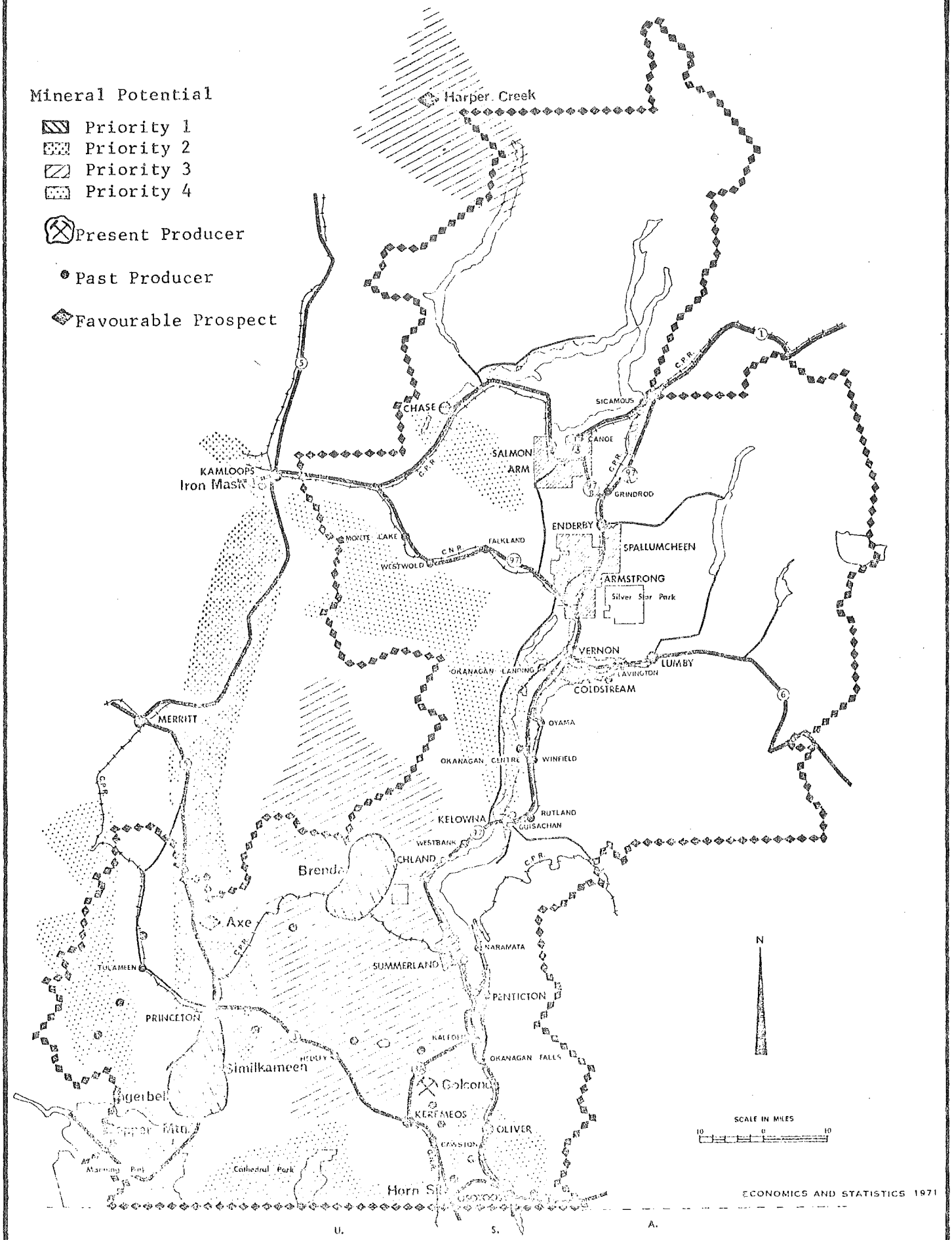
Mineral occurrences in the Okanagan-Shuswap region can be divided in general into separate domains characterized by the major metallic elements present:

1. Domain A - Copper (Molybdenum) (Figure 3.1)
2. Domain B - Silver - Lead - Zinc (Figure 3.3)
3. Domain C - Gold - (Silver) (Figure 3.5)

These metal combinations are common world-wide associations, and are applicable to this area with very few exceptions. These exceptions are deposits which can be classified in more than one domain.

In Domain A, copper is far more abundant than molybdenum, but exceptions and the absence of one or the other are entirely possible in the future. In Domain B, there is no order implied, and in exceptional cases, all single and double element combinations are possible. In Domain C, silver generally exceeds gold in abundance (but not in value) and in no case will gold be absent.

The maps for each domain show boundaries along with the locations of present producers, major prospects and all known deposits where ore was shipped or treated in the past (Figures 3.1,3.3,3.5). The accompanying figures (Fig. 3.2, 3.4 and 3.6) show metal production in the study region from 1900-1969 compiled by decade from information in "The Production of Lode Mines" prepared by the Economics and Statistics Branch. Total silver production has been split due to the presence of this element in two domains.

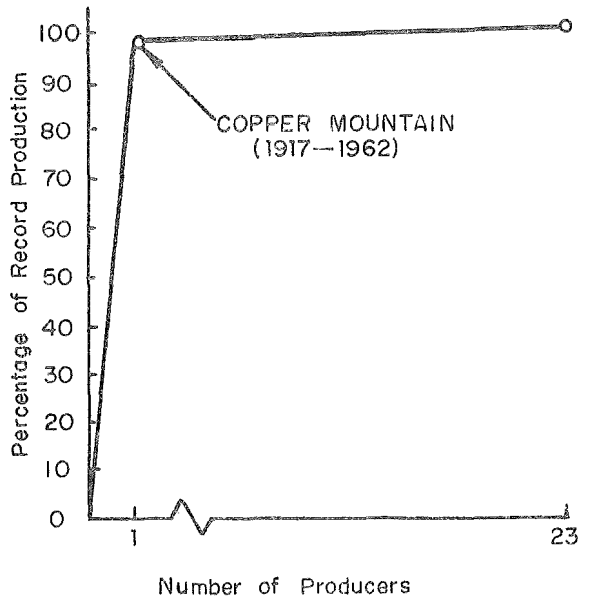


COPPER-MOLYBDENUM, DOMAIN A in the OKANAGAN-SHUSWAP REGION.

Figure 3.1

RANKING OF PRODUCERS (1900-1969)

COPPER

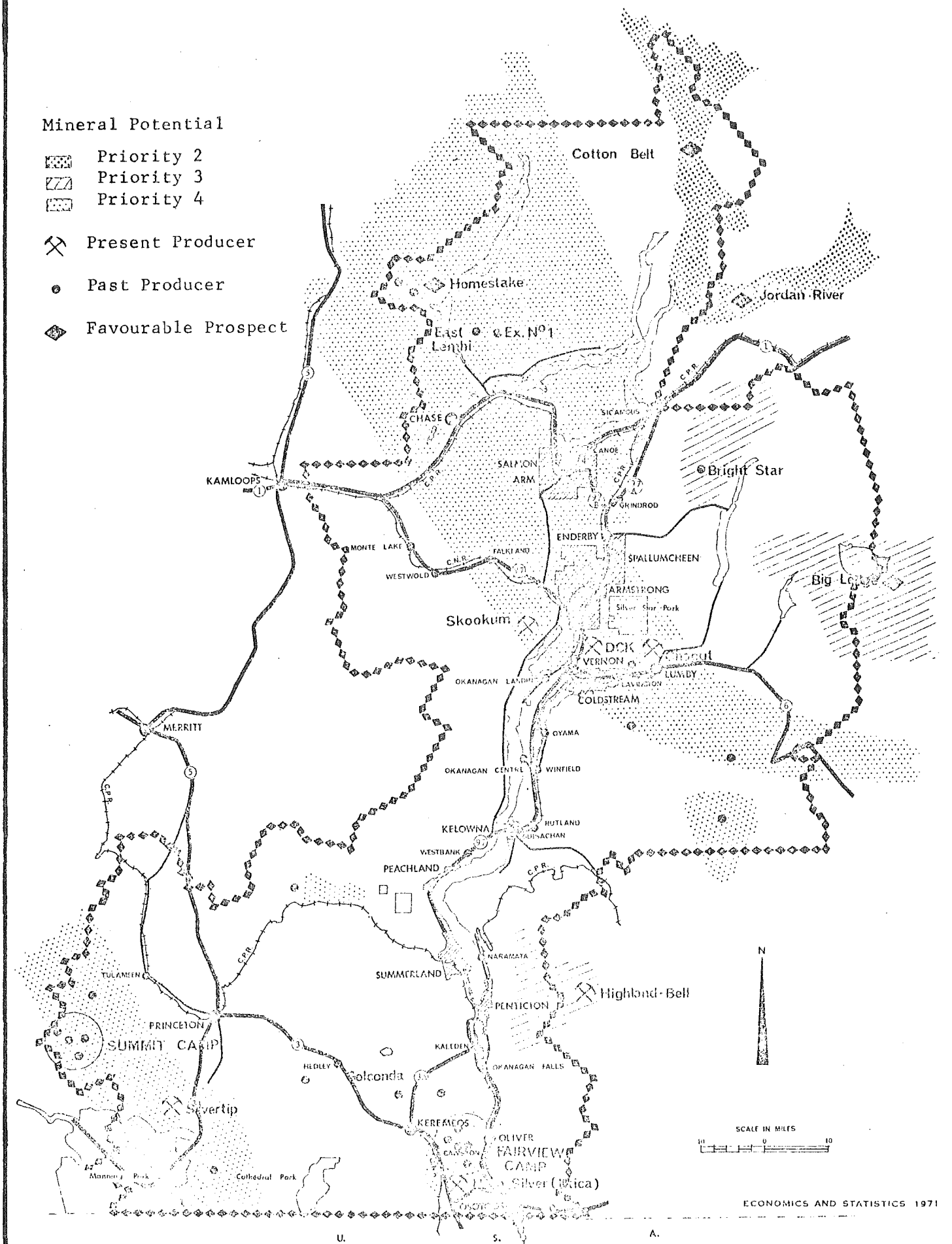


YEAR	PRODUCTION (lbs.)
1900 - 1909	3,644
1910 - 1919	87,292
1920 - 1929	84,220,566
1930 - 1939	90,703,344
1940 - 1949	266,947,952
1950 - 1959	175,572,657
1960 - 1969	98,520

Molybdenum production (from Goleonda Mine only): 1918 - 1930, 1771 lb. MoS_2 1960, 5414 lb. Mo.

COPPER PRODUCTION (1900-1969)

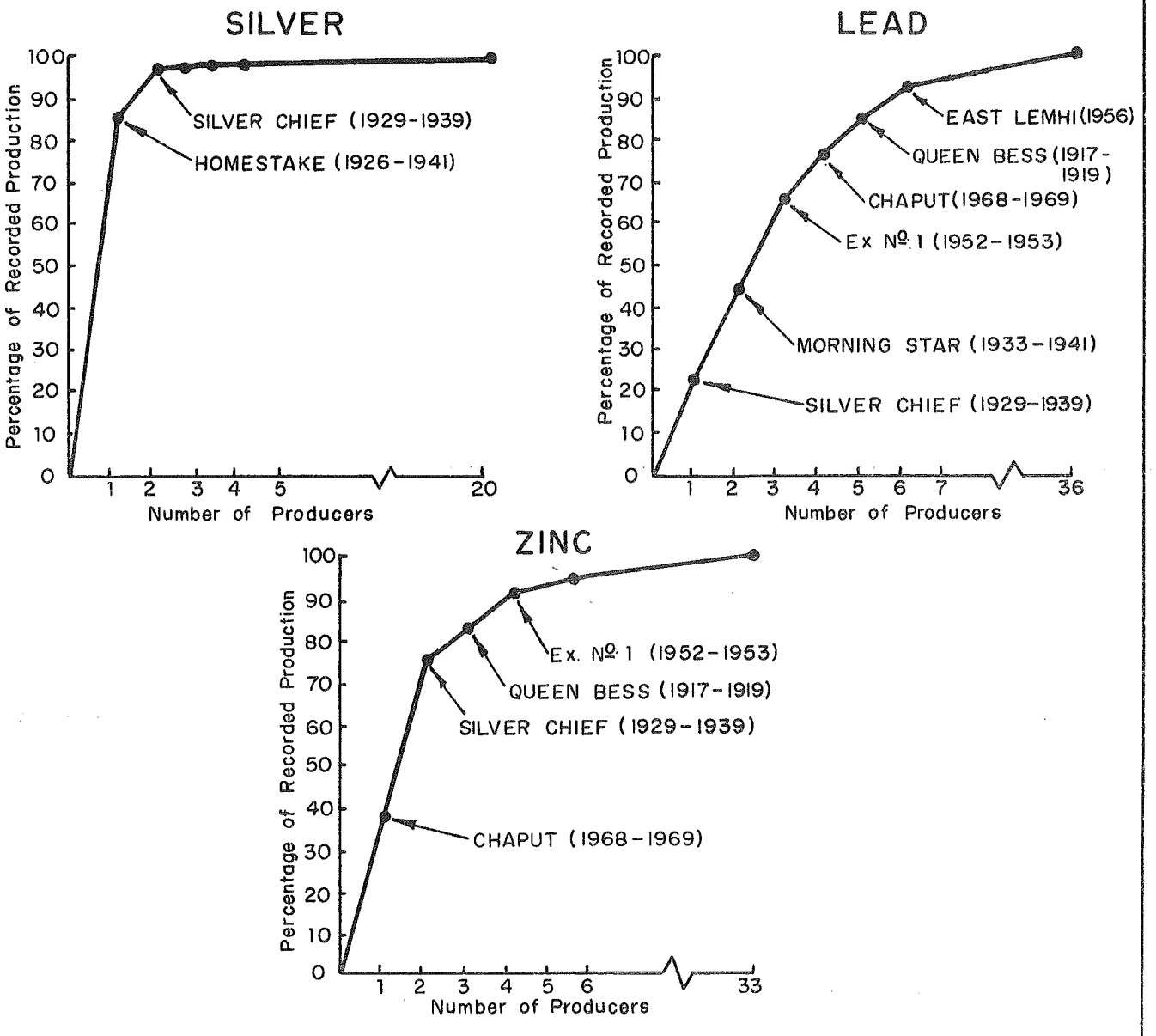
Figure 3.2



SILVER-LEAD-ZINC, DOMAIN B in the OKANAGAN-SHUSWAP REGION

Figure 3.3

RANKING OF PRODUCERS (1900-1969)

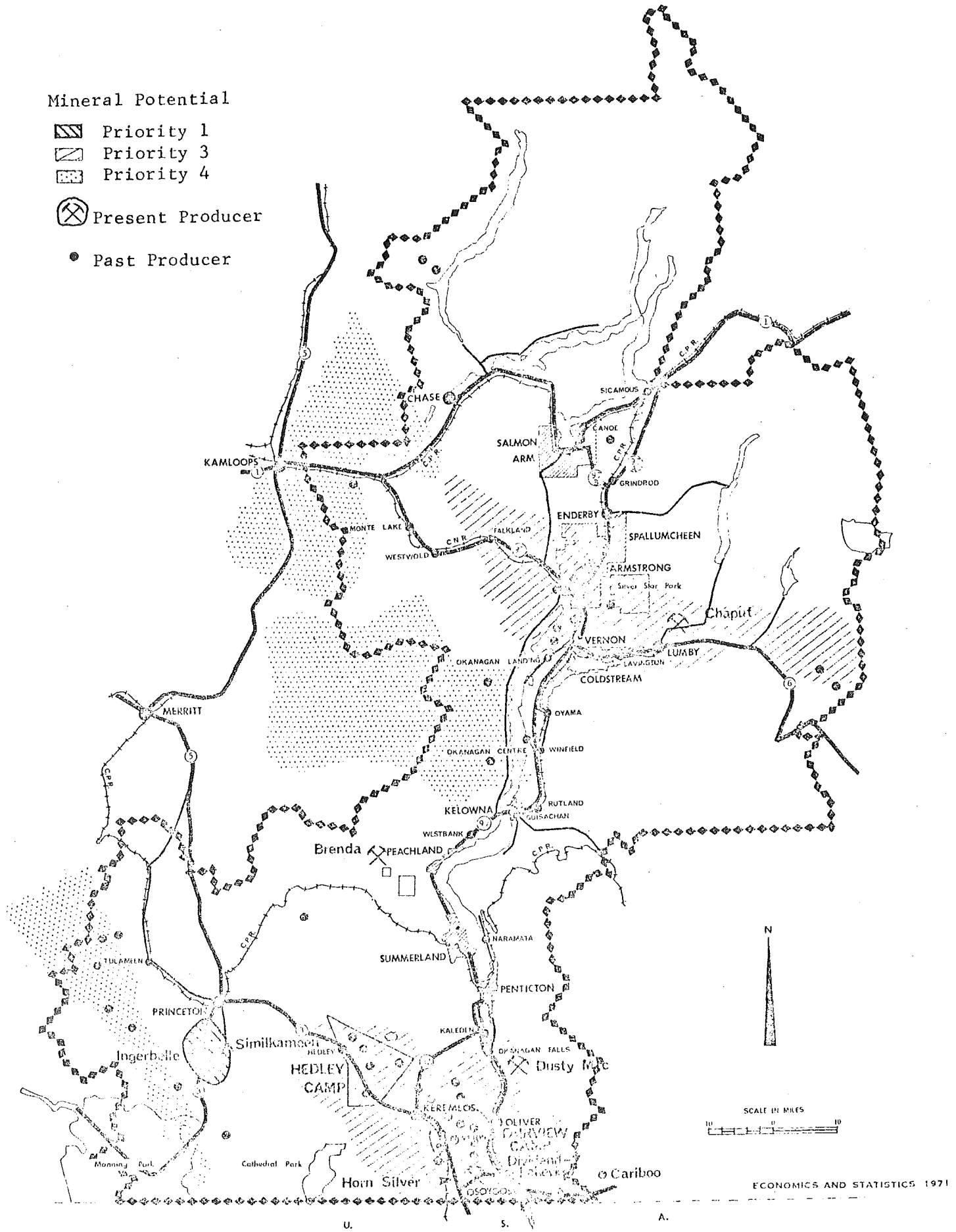


YEAR	SILVER* PRODUCTION	LEAD PRODUCTION	ZINC PRODUCTION
1900 - 1909	-	7,445 lbs.	-
1910 - 1919	1,679 oz.	30,399	27,564 lbs.
1920 - 1929	236,279	277,588	425,275
1930 - 1939	84,966	630,941	125,175
1940 - 1949	1,393	4,504	8,856
1950 - 1959	6,592	190,738	37,269
1960 - 1969	723	550,611	550,439

*Other silver production is recorded in Domain C.

SILVER, LEAD, ZINC PRODUCTION (1900-1969)

Figure 3.4

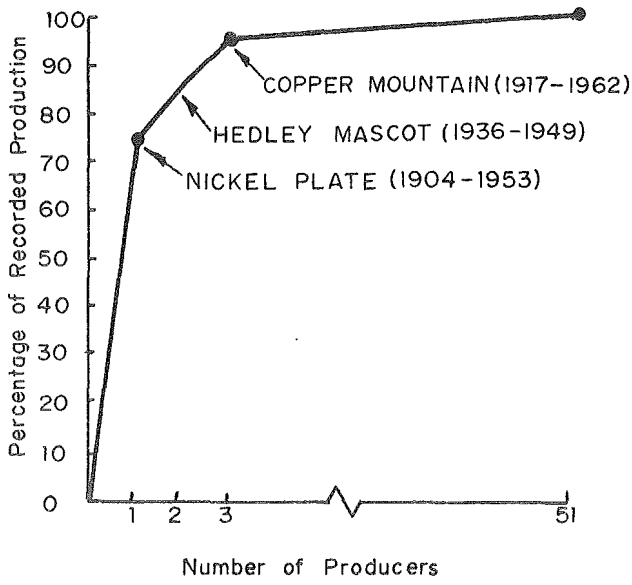


GOLD - SILVER, DOMAIN C in the OKANAGAN - SHUSWAP REGION.

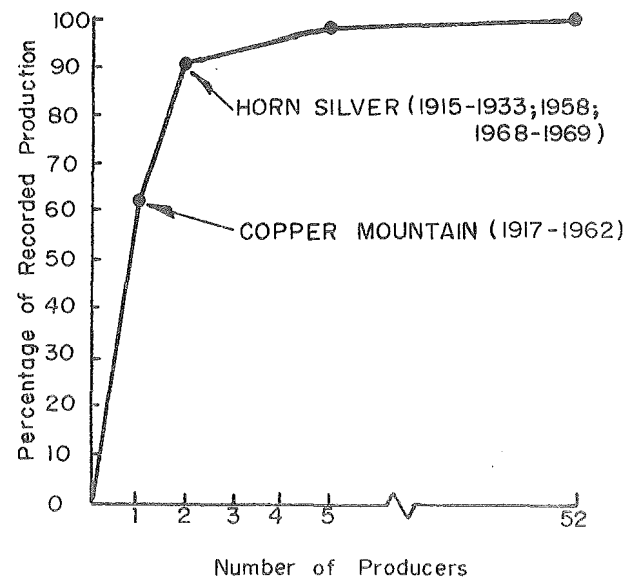
Figure 3.5

RANKING OF PRODUCERS (1900-1969)

GOLD



SILVER



YEAR	GOLD PRODUCTION	SILVER* PRODUCTION
1900 - 1909	114,698 oz.	23,527
1910 - 1919	347,400	127,078
1920 - 1929	164,395	775,444
1930 - 1939	283,617	866,014
1940 - 1949	561,980	1,963,976
1950 - 1959	327,762	1,258,728
1960 - 1969	7,600	2,105,404

* Other Silver production is recorded in Domain B.

GOLD and SILVER PRODUCTION (1900-1969)

Figure 3.6

The number of producers are plotted against the percentage of total recorded production of metals in each domain. The significant feature illustrated by these graphs is that in all cases, over 90 percent of all production of a given metal has come from a very small percentage of the total number of producers.

3.6.1 Domain A - Copper (Molybdenum)

a) Copper Mountain

From 1917 to 1962, the Copper Mountain Mine treated nearly 35 million tons of ore with values in copper and accessory gold and silver, producing a gross value at present prices of roughly $330,000,000. Of the 33 localities from which copper was shipped or treated in the past, Copper Mountain accounted for over 99 percent of all production. The Ingerbelle property has established the presence of an estimated 76 million tons of ore grading 9.53 percent copper with important accessory values in gold and silver. A daily production rate of 15,000 tons gives this complex a life of not less than 14 years, and a gross value at present metal prices of approximately $430,000,000.

b) Brenda Lake

Copper and molybdenum mineralization in this area was located in 1954, but the low grade of the occurrences negated detailed study until the mid-60's. This renewed examination led to the opening of Brenda Mine in March, 1970. This mine has an estimated 177 million tons of 0.15 percent copper and 0.049 percent molybdenum. At a daily production rate of 24,000 tons, mine life will be not less than 20 years, with a gross value (at 1970 prices) of approximately $790,000,000. The current labour force is about 390. Concentrates are shipped by truck to railhead at Kelowna for movement to Vancouver by C.N.R. All of the copper concentrate and some of the molybdenum is shipped to Japan. Minor amounts of gold and silver are also recovered.

c) Osprey Lake Batholith

Golconda Mine (Trent Resources Ltd) is a minor past producer of copper and the only past producer of molybdenum within the study area. Production was resumed in 1970 at a rate of 150 tons per day and employing about 45 persons.

3.6.2 Domain B - Silver Lead - Zinc

Much of the activity under this category is confined to small-scale operations (Figure 3.3). Development activity is increasing due to increased prices on world markets. Poor metal recovery, inaccessibility and erratic grades has prevented mining of potential larger reserves. Major properties that continue to provide interesting prospects are: Jordan River, Bottonbelt and Ruddock Creek. The Highland Bell Mine has been the main producer of silver, lead and zinc just beyond the Okanagan Basin boundary. More development is expected at the DCK property near Vernon. Chaput, Horn Silver (Utica) and Shookum remain the most important producers in the area (Figure 3.3).

3.6.3 Domain C - Gold (Silver)

The Hedley camp has been actively explored since 1894, with the Nickel Plate Mine and the adjoining Hedley Mascot Mine being the major gold producers and significant silver producers over the period 1904-1958.

Fairview Camp is also one of the older mining camps of the Province, with prospecting and production dating back prior to 1900. Of the dozen or more minor producers recorded, only Morning Star and Stemwinder accounted for significant amounts of precious metals over the period 1898-1949.

Horn Silver (Utica) has been a significant past producer of silver (with minor gold), but it may also be classified as a silver-(lead-zinc)deposit. The mine closed down in the first quarter of 1970 because of low silver prices. Employment in 1969 averaged 89 and mill capacity was rated at 300 tons per day.

3.7 MANUFACTURING

Significant changes in the structure of the Okanagan economy have occurred since 1961. As mentioned earlier the economy has moved rapidly from being dominated by resource-based industries (agriculture, manufacturing , logging and mining) to a non-resource-based manufacturing, tourist and service-based economy. For example, between 1961 and 1970 growth of resource-based manufacturing output has averaged 3 1/2 % annually whereas non-resource-based manufacturing has achieved an annual rate of 22%. Income in the same period has risen by about 20% for resource-based and almost trebled in the case of non-resource based manufacturing (See Table 3.14A). The rate of population growth is directly related to growth of employment opportunities within the region. Total employment in the basin grew by 9,860 jobs (53%) between 1961 and 1970 (Table 3.14B). A large proportion of this increase can be attributed to the Federal Government's Regional Incentives Program. Most of the 1,800 jobs created in the manufacturing sector, particularly non-resource-based manufacturing (trucks, glass, mobile homes) are due to the location of new plants or the expansion of existing plants induced by this program. The opening of the Brenda Mine near Peachland contributed a growth of 300 jobs in the mining sector.

Development of new methods of log harvesting, centralization of sawmills, and improved methods of production, fruit and vegetable canning, have increased labour productivity at an average rate of 7% annually in comparison with agricultural labour which has only averaged 1.9% per year.

3.8 RECREATION AND TOURISM

The economic impact of tourism on the region is difficult to determine. Part of this difficulty stems from the fact that changes in statistical classifications and definitions make it impossible to trace out details of long-run

TABLE 3.14A

EMPLOYMENT BY SECTOR, OKANAGAN BASIN - 1961 - 1970

SECTOR	EMPLOYMENT - NUMBER OF JOBS			SHARE OF TOTAL EMPLOYMENT BY SECTOR %	
	ESTIMATE 1961[1]	ESTIMATE 1970[2]	CHANGE OF EMPLOYMENT 1961-1970	1961	1970
Agriculture	2,930	2,650	- 280	15.7%	9.3%
Mining	40	360	320	.2	1.3
Logging	500	300	- 200	2.7	1.0
Manufacturing					
- Resource Based	1,650	2,010	360	8.9 12.8	7.1 14.7
- Non-Resource Based	720	2,160	1,440	3.9	7.6
Retail and - Tourism	640	1,230	590	3.4	4.3
Service Trades - Resident	4,330	7,250	2,920	23.3	25.5

SOURCES: [1] Estimates developed by Socio-Economic Division, Environment Canada from Statistics Canada, Census of Manufacturing, Agriculture, Merchandising and Labour Force, 1961.

[2] Estimated from questionnaire Survey, Task 205-206, Economic Growth Study, Canada-British Columbia Okanagan Basin Agreement.

TABLE 3.14B

VALUE OF PRODUCTION AND INCOME EARNED IN AGRICULTURE, MANUFACTURING AND TOURISM IN THE OKANAGAN BASIN FOR 1961, 1970

	VALUE OF PRODUCTION, Value of Production[1] (in Thousands of Constant 1970 Dollars)	
	1961	1970
Agriculture	31,971.	42,006.
Manufacturing		
Resource-Based	32,937.	49,714.
Non-Resource-Based	11,291.	77,864.
Tourism	5,526.	11,235.
Other	no records available	319,462.
	Income[2]	
	1961	1970
Agriculture	9,925.	11,679.
Manufacturing		
Resource-Based	10,827.	12,158.
Non-Resource-Based	5,791.	15,607.
Tourism	2,581.	5,162.
Other	no records available	153,088.

[1] Value of production is defined as total receipts received by service trades from, and the mark-up on retail goods sold to tourists, business travellers, and non-resident convention delegates.

[2] Defined as income accrued to Okanagan Basin residents; includes wages and salaries, business and farm operators' profits, rents paid for land, buildings and equipment, land taxes, and interest.

SOURCE: Refer to Table 3.6A.

changes in trade and services with certainty. As a consequence, very little information exists on either the gross sales of the various segments of the industry or its contribution to the economy in terms of employment and wages. However, an estimate has been built up on the basis of accommodation available, average occupancy rates, average rental charges and the relationship between tourist expenditures on lodgings and their total outlays. It is estimated that more than 800,000 visitors to the region in 1970 spent approximately $17 million, of which accommodations accounted for $11 - $12 million. More detailed discussion on summer tourism is contained in Technical Supplement VIII.

3.8.1 Visitors

The total number of visitors (defined as people who reside outside the Okanagan) to the Okanagan in 1970 is presented in Table 3.15. Recent development of high quality convention and skiing facilities has begun to provide a more balanced year round flow of visitors.

3.8.2 Visitor-Days

A survey of summer holiday visitors indicated that an average group consists of 4.5 persons and stays for 6.4 days in the Okanagan. Based on these data, summer holiday visitors spent over 3.1 million visitor-days in the basin in 1970 while business, convention and winter holiday visitors spent an additional 600,000 visitor-days for a total of 3.7 million visitor-days in 1970 (Table 3.16).

The major reasons underlying the popularity of the Okanagan as a tourist centre are the climate and good access. The region acquires over 2000 hours of sunshine annually, the sun shining for over 70% of the potential daylight hours during the summer. Rainfall is almost negligible during July and August, averaging about 12 inches annually in the valley bottoms. The warm summer temperatures which run around 100°F on occasion, also warm the main lake water temperatures to over 70°F in July and August.

The tourist industry, as we know it, has been made possible by the development of modern public transportation facilities. Three major Provincial Highways, as well as a network of well-serviced local roads, provide easy access to the region's entire recreation complex. With the completion of the Rogers Pass Section of the Trans-Canada Highway in 1962, the region has benefitted from an increase in the tourist population. The distribution of Rogers Pass traffic flow on an annual basis is of particular importance to the seasonal balance of the tourist economy. Between 1965 and 1970 traffic over the Rogers Pass in the peak months of June, July and August increased 20 percent while off-season traffic increased by 32 percent. The relatively greater rate of growth in off-season travel is a reflection of changing tourist demand.

TABLE 3.15

NUMBER OF VISITORS TO THE OKANAGAN BASIN IN 1970

TYPE OF VISITOR	SUMMER[1]	OFF-SEASON	TOTAL
Holiday	485,400	71,800	557,200
Business	39,000	78,000	117,000
Convention	7,800	24,200	32,000
Sub-Total	532,200	174,000	706,200
Day Trips	116,800	38,200	155,000
TOTALS	649,000	212,200	861,200

[1] June to September inclusive.

SOURCE: Department of the Environment, Socio-Economic Division. Tourist Survey.

TABLE 3.16

NUMBER OF VISITOR-DAYS IN THE OKANAGAN BASIN IN 1970

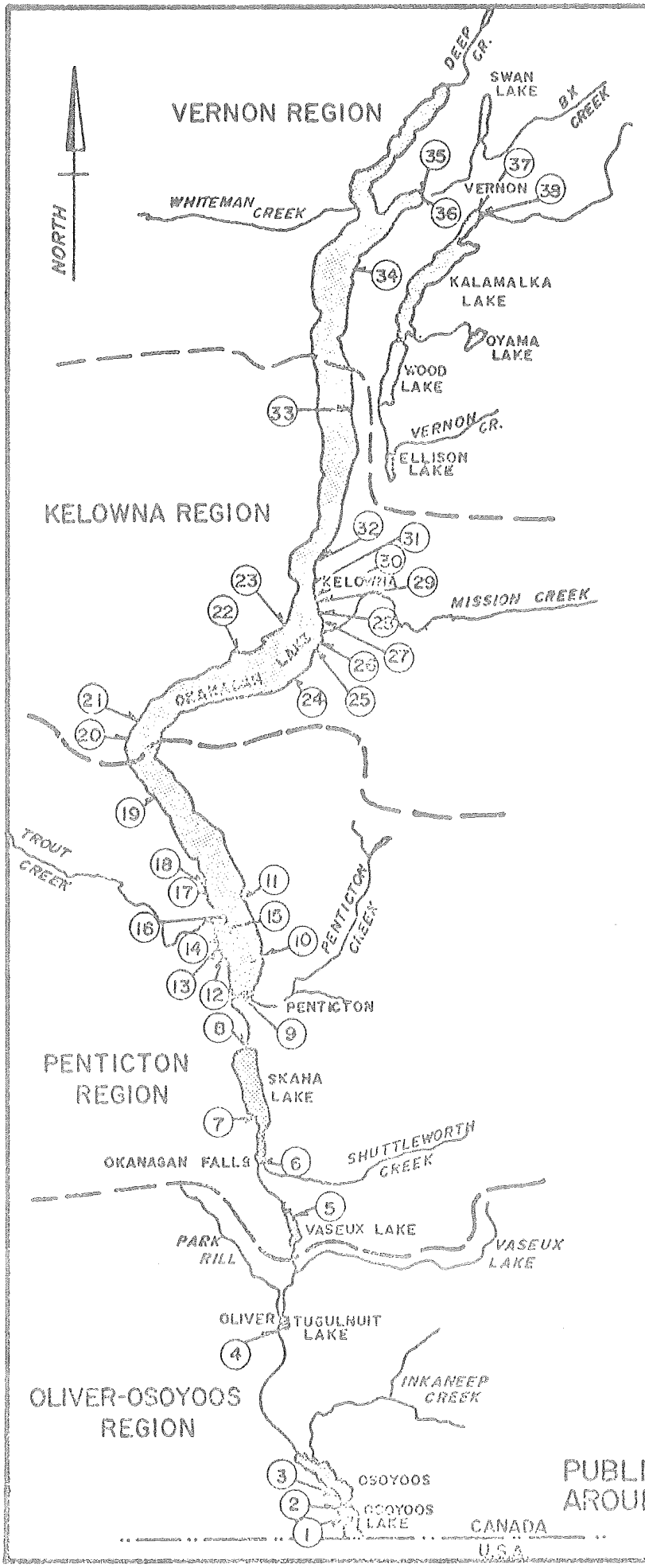
TYPE OF VISITOR	SUMMER	OFF-SEASON	TOTAL
Holiday	3,111,400	229,800	3,341,200
Business	78,000	156,000	234,000
Convention	32,400	120,000	152,400
TOTALS	3,221,800	505,800	3,727,600

SOURCE: Department of the Environment, Socio-Economic Division. Tourist Survey.

Next to transportation, accommodation is the most important requirement of the tourist industry. To a large extent, changes in the pattern of travel determine the type of accommodation offered.

The study region caters to visitors from all parts of British Columbia and the adjacent provinces and states. More out-of-Province travellers have been using the Provincial Parks (Figure 3.7). Whereas British Columbians accounted for 75.7 percent of all camper-nights recorded in 1961, by 1970 the proportion had fallen to 61.6 percent.

Growth in the region's approved tourist accommodation has undergone significant modifications over the past decade. While 17 percent of the total provincial units of private tourist accommodation were located in the study region in 1967, the figure had grown to 22 percent by 1970. Currently there are approximately 6,912 units of approved accommodation available in the region.



VERNON REGION

PROVINCIAL
34 Ellison Park
MUNICIPAL
35 Kin Beach
36 Kin Beach (Indian Reserve Section leased by municipality)
37 Kalamalka Beach
38 Small Park

KELOWNA REGION

PROVINCIAL
20 Antlers Beach Park
22 West Bank Park
23 Kalamoir Park
MUNICIPAL
21 Peachland Park
24 Beau Se Jour
25 Small Park
26 Small Park
27 Rotary Park
28 Gyro Park
29 Warlaw Park
30 Strathcona Park
31 Kelowna City Park
32 Sutherland Park
33 Okanagan Centre

PENTICTON REGION

PROVINCIAL
5 Vaseux Prov. Park
6 Christie Memorial Park
11 Manitou Park
12 Kickinee Picnic Ground
13 Soorimpt Picnic Ground
14 Pyramid Picnic Ground
15 Sun-Oka Beach Park
19 Okanagan Lake Prov.Park
MUNICIPAL
7 Kaleden Community Park
8 Skaha Lake Park
9 Okanagan Beach
10 Third Beach
16 Powell Beach
17 Rotary Beach Summerland
18 Kin Beach Summerland

OLIVER-OSOYOOS REGION

PROVINCIAL
1 Haynes Point Prov.Park
MUNICIPAL
2 Community Park (south of Causeway)
3 Osoyoos Community
4 Tugulnuit Park

PUBLIC RECREATION SITES AROUND THE MAIN VALLEY LAKES. Figure 3.7

3.9 TRANSPORTATION

3.9.1 Railroads

The main line of the Canadian Pacific Railway cuts across the northern part of the region, parallel to the Trans-Canada Highway, while the C.P.R. Kettle Valley line bisects the southern part. The two east-west routes used to be linked through the Okanagan Valley by a branch line between Sicamous and Kelowna, rail-barge service on Okanagan Lake, and a second C.P.R. branch from Penticton to Osoyoos. A Canadian National Railways branch line extends eastward from Kamloops to Armstrong, thence south on a joint basis with the C.P.R. to Kelowna where it used to connect with a lake barge service. All barge traffic was ended in the summer of 1972 as more efficient transportation was available by land. A branch between Vernon and Lumby is also shared by the two companies. Keremeos and Cawston are served by the Great Northern Railway.

Logs, lumber and agriculture products have traditionally accounted for the bulk of rail traffic generated within the region. However, with Brenda mines now in production and development underway at the Ingerbelle property, mineral products should represent a larger proportion in the future.

3.9.2 Air Services

The region's two major airports are located at Penticton and Kelowna, the former operated by the Department of Transport and the latter, by the City of Kelowna. Other licensed airfields are situated at Vernon and Princeton while small unlicensed fields are to be found at Salmon Arm, Sicamous, Armstrong, Anglemont, Oliver and Towers Ranch on the Hope-Princeton Highway. Unlicensed water bases are located at Kelowna, Penticton, and Winfield while Kelowna has the only licensed heliport in the area. Comparison of domestic passenger traffic statistics at Penticton and Kelowna airports are shown below:

TABLE 3.17

AIR TRAFFIC AT PENTICTON AND KELOWNA AIRPORTS
DOMESTIC PASSENGER TRAFFIC

Year	PENTICTON			KELOWNA		
	Outbound	Inbound	Total	Outbound	Inbound	Total
1960	9,610	8,700	18,310	2,365	2,270	4,635
1962	8,785	8,085	16,870	3,960	4,065	8,025
1964	10,445	11,035	21,480	5,975	5,940	11,915
1966	10,100	9,925	20,025	13,480	12,800	26,280
1968	12,945	12,140	25,085	21,185	22,400	43,585
1969	13,155	12,890	26,045	27,360	26,555	53,915

SOURCE: DBS Cat. No. 51-204, Origin and Destination Statistics, Air Transport Board.

3.10 TERTIARY (SERVICE) INDUSTRIES

The tertiary industries are generally broken down into five basic groups: transportation, communications and utilities; trade; finance, insurance and real estate; community, business and personal services; public administration. Of these five groups, a limited amount of data are available from the Census on only two: trade; and community, business and personal services. Statistics on the retail portion of the former group are reasonably complete but statistics on the latter do not include services relating to education, health and welfare, as well as most professions. Census data on the community, business and personal services group are broken down into: amusement and recreation services; business services; selected personal services; repair services; hotels, tourist camps and restaurants; and miscellaneous services.

3.10.1 Census Data 1961 - 1966 and 1970 Trade and Services

Kelowna, Penticton and Vernon are the principal trade and service centres, together accounting for 65 percent of retail sales and 63 percent of service receipts in the region in 1966. Actual trading areas are difficult to define, because of the relatively short distances between these three communities and the smaller centres scattered throughout the Southern Interior. In addition the proportion of trading area population within municipal boundaries varies considerably. As a result, comparisons of per capita sales over time provide a more reliable indication of economic growth although these statistics also have limitations since a decline in population produces the same result as an increase in total sales.

In the region of study, total retail sales in 1966 were estimated at $132.2 million. Retail trade provided employment for 692 working proprietors and 3,564 paid employees who received $12,629,700 in wages and salaries in 1966. Retail sales in 1970 are estimated at $185 million and total employment (working proprietors plus paid employees) at 5,025 on a full- time basis.

For the region as a whole, community, business and personal services realized over $23 million in gross receipts in 1966. As of 1966 there were 685 working proprietors and 2,037 paid employees who received $5,732,500 in wages and salaries during the year. Total regional service trade receipts in 1970 are estimated at $31 million and total year-round employment at 3,270.

The distribution of retail goods sales to visitors in 1970 was:

Food	$3,392,000	50.3%
Automotive	1,715,000	25.4%
Other Shopping	1,640,000	24.3%
TOTAL	$6,747,000	100.0%

The Okanagan Basin retail outlets surveyed showed wages and salaries expenditures at 10.42% of gross receipts. Operating data from the 1961 and 1966 Census of Canada for British Columbia Census Division Three follows:

	1961	1966
Gross Receipts	$96,646,000	$132,238,600
Salaries & Wages - $	8,315,300	12,629,700
Salaries & Wages - % of receipts	8.6%	9.6%

The numbers of personnel per $1,000,000 of receipts in 1966 and the estimates for 1970 follow for Census Division Three.

	1961	1970
Retail Goods	31.2	26.9
Retail Services	115.6	99.3

SOURCE: Joseph B.Ward & Associates "Final Demands and Input Requirements to 2020 - The Tourist Industry in the Okanagan Basin", July, 1972.

CHAPTER 4

Assumptions of Economic Growth to 2020

4.1 INTRODUCTION

Economic growth projections were made for the years 1980, 2000, and 2020. For each of the prescribed years, direct demands for outputs in each of the 29 sectors were estimated using the best economic forecasts available. Additional indirect demands associated with each sector were then determined by tracing the impacts of these direct demands on related sectors by means of the inter-industry economic model. The outputs of the model were specified in constant 1970 dollars of total (direct plus indirect) demands, which could be translated into production units (pounds of tree fruits, numbers of trailers). An estimate of the total labour force was made by using productivity statistics related to production units per employee, and also taking into account trends in these statistics over time.

Many assumptions had to be used in the development of these economic projections. The most significant ones involved changes in labour productivity in each sector and changes in the economic linkages between sectors. Obviously, the relative accuracy of these assumptions decreases rapidly as the length of the planning horizon increases and it should be noted that the economic projections developed can only be assumed to be relatively accurate to the year 1980. Rapidly changing patterns in working hours, leisure demands, industrial and transportation technology can be expected over the next 50 years making projections of economic growth, especially in small regions such as the Okanagan Basin, little more than educated guesses.

Some of these difficulties are overcome somewhat by choosing upper and lower limits on economic growth. If the separation between these limits is sufficiently great, the real growth over the forecast period is likely to fall between them. By careful choice of these limits, the projections, although individually subject to error, provide the planner with an indication of the sensitivity of various levels of economic growth on future water requirements and therefore on the types of water management measures necessary.

The purpose of this chapter is to discuss the general and specific projections which were made in projecting the I/O model to the years 1980, 2000 and 2020. Section 4.2 identifies the projections as defined in an earlier chapter of this report and gives a general broad brush description of the specific assumptions made in projecting the model.

4.2 BASIC DEVELOPMENT OF ASSUMPTION FOR PROJECTIONS I, II and III

4.2.1 Projection I - Continuation of Present Economic Policies

Forecast population growth in the Okanagan for Projection I was based upon population projections for the province as a whole, prepared by the Provincial government. Up to 1980, the economic momentum generated in the latter part of the 1960's was expected to enable the Okanagan to grow at a somewhat faster pace than the province in general. After 1980, the Okanagan economy should be well diversified and the region may be expected to grow at provincial rates. Population totals were distributed into the four economic subregions according to recent growth trends, but were adjusted as necessary to account for land capability, transportation routes and other factors (see section 2.3).

Forecasts of direct demands in manufacturing and tourist-recreation service sectors of the Okanagan economy were developed. These projections were based to some extent on past trends, particularly since the Federal government's Industrial Incentive Program was introduced in the mid- 1960's, but also took into account potential growth opportunities in the non-resource-based manufacturing sector which sells to markets outside the basin. In the mining and logging sectors, limited resource potential acted as constraint, maximum economic growth being forecast within the 50-year planning horizon. Projections of employment were obtained from forecasts of labour productivity applied to the output of each economic sector as calculated by the input-output computer model.

Projections of demands for agricultural products were more difficult to assess because of non-economic factors that affect the development of this sector. Provincial government legislation does not allow the transfer of designated agricultural land to non-agricultural purposes except with approval from the British Columbia Land Commission. Under this policy, small declines of tree fruit acreage around the larger urban areas are forecast. However, increased production per acre is expected to more than overcome this loss of acreage, and increased production could be absorbed by continued demand from Western Canadian markets. The development of grapes, vegetables, and forage crops, especially in the North Okanagan, is expected to compensate losses in tree fruits, resulting in little change in irrigated acreage in agriculture to 2020.

4.2.2 Projection II - High Economic Growth

Higher rates of economic growth for the Okanagan than those anticipated for Projection I were assumed by stimulation of additional investment in the manufacturing sector through a renewed industrial incentives program hypothesized to be in effect between 1980 and 1990. This would create growth in the economy through both direct expansion in the manufacturing sector, and indirect economic effects of this expansion on other sectors of the economy.

Direct demands in the resource and non-resource-based manufacturing sectors were increased relative to those in Projection I for each of the designated years (2000 and 2020), approximately in the same proportion as the documented impacts on these sectors resulting from the actual incentives program of the late 1960's. Impacts of this increased growth rate on related sectors of the economy were analyzed by the I/O model, and using the same productivity per worker ratios as employed in Projection I, total employment was estimated. These totals were broken down into the four sub-regions according to the distribution trends used in Projection I, with appropriate adjustment for differential employment growth ratios and land resource constraints.

Land use policy is similar to that for Projection I, except that greater population and industrial growth should produce somewhat greater pressure for the creation of larger tracts under residential and industrial reserves, particularly within or adjacent to the large urban centres.

As a result, there was a projected declinein irrigated acreage in the Okanagan, especially near the urban centres around Okanagan Lake, where most of the increased population is expected to be located. This decline was calculated on the basis of an average density of 10 persons per acre. There was no significant difference in the irrigated acreage totals for the North and South Okanagan regions, as increased population pressures in these areas do not appear to be sufficient to offset increased agricultural activities.

4.2.3 Projection III - Low Economic Growth

The basic assumption underlying the development of Projection III is that a lower rate of economic development and associated population growth will enable a higher natural environmental quality to be maintained. This perception was apparent from the public briefs submitted to meetings held by the Okanagan Basin Water Board and from an analysis of a questionnaire survey of a sample of residents. In accordance with the philosophy of the public involvement the task forces placed emphsis on environmental protection and preserving the quality of life in the valley with economic growth occurring only within this framework. Task force members agreed that a relative slowing down in the rate of economic growth over the next 20 years or so would not only provide a better opportunity for planning growth within the environmental framework, but also allow the option of increasing the rate of growth at some future date should economic hardships result. This approach would be less easily achieved if the rapid rate of growth forecast in Projections I and II were to occur. For more information on the public involvement program, see Technical Supplement XI.

To provide a reasonable range in economic growth rates between Projections, it was felt that population growth should be as low as was realistically possible considering the existing growth potential of the region and its attraction as a retirement centre. In addition, due to the present momentum in the Okanagan economy, it was assumed that significantly slower rates of economic growth would not occur until after 1980.

Between 1951 and 1961, before the stimulation of the Okanagan economy through industrial incentives, population growth in the valley averaged about 1.5% per annum, or about 12% lower than the provincial average. The Okanagan valley is not an economic island, but is closely interlinked with other regions of the province and as the provincial economy and population grows, it is inevitable that the Okanagan, through these economic links, will also grow. No realistic economic policy can prevent such growth. Thus, it was assumed that population growth in the Okanagan between 1980 and 2020 would grow at a constant rate based on that which prevailed between 1951-1961 in the province, averaging about 1.3% per annum over the 40-year period. Sub-regional population totals were then obtained using similar distribution patterns as those used in Projection I.

The procedure for assessing the economic consequences of a slower rate of population growth throughout the Okanagan economy was the reverse of that used in Projections I and II. Using target levels of population for 2000 and 2020 based on proportional increases tied to projected provincial growth rates, the size of the labour force was determined by using population to labour force ratios employed in Projection I. Total employment in agriculture, tourist and service sectors were related to householders expenditures and were calculated using the I/O model and forecasts of total demands in these sectors. These labour totals were then subtracted from the total labour force to determine employment in the manufacturing and other service sectors. Direct demands for goods in the manufacturing and service sectors, which promoted most growth after 1980 under Projection I, were revised downwards, so that total employment in both the manufacturing sector and the support industries as calculated from the model would be consistent with the required employment levels. As these reductions in final demands for manufactured goods would, in turn, affect demands for related goods and services provided by other sectors of the economy, the procedure described above had to be repeated a number of times until the outputs of the economic model were consistent with labour force and target populations for the years 2000 and 2020. Because of a possible under-estimation in the rates of increased productivity per worker in some sectors, total employment, and hence population, may be over-estimated in this projection.

Forecasts of tourism were revised downwards compared with Projections I and II to remain consistent with lower resident population totals and the concept of a slowing down of the pace of economic growth. This applied to all types of tourist activity; commercial holiday visitors staying at hotels, motels and campsites; holiday visitors staying with friends and relatives (due to lower resident population) and business and convention visitors due to lower levels of business activity.

To provide contrasts with other projections, irrigated acreage was forecast to increase over existing levels. In view of the fact that public involvement task forces and residents appear to place considerable emphasis on the value of irrigated agriculture in maintaining the high environmental quality of the region, it was assumed that not only would agriculture lands continue to be protected from residential or industrial sub-divisions, but that senior governments would promote economic incentives designed to encourage farmers to remain on and develop the land. Thus, though there would be some loss of agricultural acreage in areas already zoned for sub-division, these would be more than offset by gains in other regions. Indeed, it was initially assumed that all remaining available medium and high quality irrigable land in the basin would be developed for agricultural purposes, though in many areas such developments may not be economically justified.

4.3 DIRECT DEMAND PROJECTIONS TO 2020

4.3.1 Description of Final Demand Assumptions by Sector for Projection I

a) Tree Fruits & Grapes

Total output rather than final demand was projected for tree fruits. The British Columbia Department of Industrial Development, Trade and Commerce, estimated that growth of tree fruit production would be limited over the long run to the Western Canadian market. There appeared to be no problems in increasing production. For example, apple production could double by 2020 even in the event of a 50% reduction in acreage from urban expansion due to an anticipated four-fold increase in production per acre. Soft fruits were projected on the basis of a 5% per decade increase in productivity and a small increase in acreage. The output projection utilized in Projection I, is a product of the land available for tree fruits calculated from the agricultural land capability analysis and the productivity gains outlined above. These output levels were converted to value terms and imposed upon the model.

Household and Tourist demand was estimated by extrapolating past per capita consumption trends. Exports were calculated as the residual after valley consumption had been satisfied and thus was the tool by which total output was adjusted to the constraints of land use.

Grape production was also projected on an output basis. Future demand was estimated from the projection of British Columbia winery production utilized in Sector 12. Acreage projections were calculated by multiplying production by estimated production per acre statistics from the B.C. Department of Agriculture study.

b) Livestock

Projections of total production were provided by the British Columbia Department of Agriculture for all varieties of livestock in the study area, and were primarily based on grazing resources available. These projections were converted to livestock values in constant dollars. Investment was estimated as a constant proportion to total output re-sold in the Valley as breeding stock.

Hand calculations of interindustry demand for livestock by Sector 10, meat and dairy products, were made and added to investment demand; exports remained as the residual to accommodate the production forecast.

The assumptions of Projection III indicated an increase in acreage under forage crop production of 20% and 27% by 2000 and 2020 respectively. It was assumed livestock production would be encouraged by a similar amount.

c) Dairying

This sector is largely solved by the model through forward linkages to the manufacturing sector through sector 10 - 'Meat and Dairy Products'. Investment and exports consisted of breeding stock sold within and outside the study area respectively and were projected as a constant proportion of total output.

d) Vegetables

Total production figures for 1970 were obtained from the Interior Vegetable Marketing Agency and output projections were obtained from the British Columbia Department of Agriculture report. Tourist and Household Demand was estimated by extrapolating past per capita expenditure trends. After a hand calculation of interindustry requirements, exports were adjusted to satisfy the output projection.

e) Field Crops

The output of the field crops sector includes forage crops grown by livestock and dairy sectors but sold to other operators in the same sector as gleaned from the questionnaire survey and construction of the interindustry table for 1970, plus an estimate of basin grain production from the British Columbia Department of Agriculture report. The questionnaire survey also indicated forage crops were not exported out of the valley and as a result, grain exports remained as the only final demand category. The British Columbia Department of Agriculture projections of grain output to 2020 were used and hand calculations of interindustry demand for grain (primarily to feed mils of Sector 13) were subtracted from this figure to estimate exports

f) Poultry, Eggs

Total output for 1970 was obtained from the British Columbia Department of Agriculture Report. Distribution of this output to intermediate and final demand sectors was estimated from the questionnaire survey; service and retail sectors purchases were checked against the sales vector for this sector.

Growth in total output and final demand sectors was estimated from past trends in national sales per capita. Per capita consumption of poultry is expected to rise and then level off after 1990 while sales per capita of eggs has been declining, however, the latter was assumed constant in the model.

g) Nursery

Output for 1970 was defined by the B.C. Department of Agriculture report. The forecast of total output was obtained from the same report and was based on the total number of acres expected to be developed by 2020. Most of the output is absorbed by investment and household demand within the valley. Exports were adjusted to accommodate the projection.

h) Logging

The estimate of total output for 1970 was obtained from the questionnaire survey of logging enterprises and total employment statistics for the Okanagan Ranger Districts from the British Columbia Forest Service Report, Kamloops Forest District. A list of firms with greater than twenty employees from the Canada Deparment of Labour average weekly wages, salaries and hours of work survey provided an effective method of calculating output by dividing the sector into small contractors and larger operators.

Output per employee values were calculated for the firms sampled (about 70%) with more than twenty employees. Inputing average employment per firm from the sample to the remaining establishments yielded total employment and output for this group. Subtracting the employment of the large enterprises from total logging employment provided an estimate of the employment by small contractors. An estimate of the output per employee calculated from the random sample of small enterprises was then multiplied by the employment estimate to obtain output for this group.

Output from the logging industry is almost entirely absorbed by sawmill (Sector 14) and plywood (Sector 15) operations in the basin. However, a ceiling of 2.36 times 1970 output was imposed upon expansion of this sector to take into account the maximum potential allowable annual cut available in the basin provided by the B.C. Forest Service. Communications with the Okanagan Ranger Districts provided an estimate of annual allowable cuts for the remaining forest lands (Tree Farm Licences and private lands) in the basin.

i) Mining

Estimates of total sales and distribution to the final demand sectors were again obtained from the questionnaire surveys. The small gravel pit operators were surveyed but constitute only a small proportion of total sales by the sector. The remaining information was supplied by Brenda Mine which dominates the mining industry in the Basin.

j) Meat and Dairy Products

Total sales for 1970 were estimated from the questionnaire surveys. Distribution of the output to the final demand sectors was obtained from the sales side

of the questionnaire for the sector supplemented by the input side of the retail and service trades questionnaires.

Export projections for meat products were prepared by J.B. Ward and Associates[1]. Since the bulk of livestock in Western Canada are fed and slaughtered in the Prairie Provinces and the factors of freight and feeding costs indicated that this practice would continue, it was concluded that Okanagan plants would not increase in importance in terms of supplying the B.C. market. During the last decade, B.C. meat production increased on the average about 5.3% per year and this increase was forecast to continue through to 2020.

In 1970, about 58% of the Okanagan's milk products output was shipped to areas outside the region but within British Columbia - the Kootenays, southern Cariboo, Kamloops, Princeton, and, more recently, the Fraser Valley. In concurrence with the B.C. Department of Industrial development, Trade and Commerce forecast[1], the Ward and Associates report anticipated a bright future for the industry in the Okanagan since pressure in the B.C. Lower Mainland to take land out of dairying for other uses would likely stimulate the import of dairy products from other parts of B.C. The North Okanagan should share in this expansion as access to the Lower Mainland, climate and land availability are favourable vis a vis other regions. Translated into production terms, dairy products exports should increase at a minimum annual growth rate of 6% per year calculated on the 1970 base to 2020.

Household consumption and tourist demand for meat and dairy products were projected at rates estimated for the rest of Canada from Economic Council of Canada Statistics. After 1990 per captia consumption for these products was assumed constant. Government expenditure (Vernon Camp, Canadian Forces) was projected in proportion to projected British Columbia population growth[2].

k) Fruit and Vegetable Canners

Almost all the output from this sector is exported and, as a result, export projections largely determine output projections. The Ward and Associates report based the projection of exports from the Okanagan upon an output forecast for the British Columbia industry as a whole. On a per capita basis in the province, the value of shipments in constant 1970 dollars increased by

---

1 J.B. Ward and Associates "Final Demands and Input Requirements to 2020; Mining, Forestry and Manufacturing Activities in the Okanagan Basin 1972".

2 Economic Base Study of the Okanagan-Shuswap Region, p.52-57

3 B.C. Department of Industrial Development, Trade and Commerce, ibid p.34

five dollars during the 1960's. Growth in per capita consumption of fruit and vegetables is expected to continue due to high standards of nutrition, a trend towards a wider range of fruits and vegetables being incorporated into diets, and an increase in the level of processing. A similar increase was forecast to 1980, declining to an increase of one dollar during the final decade to 2020. Loss of agricultural land to urban uses in the Fraser Valley is expected to allow the Okanagan-based industry to increase its share of provincial production from about 21% in 1970 to 25% by 1980. This share is forecast to be maintained to 2020.

Household and tourist consumption was estimated to follow the Canadian 1961 to 1971 trend in per capita "apparent disappearance" of canned fruit of 5 ¼% per year to 1980. Since this rate of increase was deemed to be high over the long run, a rate of one-half this level was assumed to the year 2000 and constant thereafter.

l) Wineries, Soft Drinks, Distillers

Export projections to 1980, 2000 and 2020 for all three subsectors were obtained from the J.B. Ward and Associates report. The projections of output from Okanagan wineries, 1970 to 1980, was based on the national growth rate of 8.6% experienced by the industry from 1961 to 1968. Two-thirds of the output is expected to be for provincial consumption which will amount to a per capita consumption of $2.80. The long run projections to 2000 and 2020 are "based on the maintenance of this consumption level with sales to other parts of Canada maintaining their share of production at one-third".

Construction of the Okanagan distillery at Winfield was initiated during 1970 and production commenced during 1971. The Ward Associates report estimated that production (all export) should double between 1972 and 1982, consistent with the high growth rate (about 9.25% per year), achieved by the Canadain distillery industry between 1961 and 1968. After this date no further expansion was foreseen as increased production will likely take place in other regions of the province.

The Ward and Associates report noted that in Canada the per capita consumption of soft drinks, expressed in constant 1968 dollars, increased 20% over the previous decade. This rate of increase in per capita consumption is expected to continue to 1980, then decline at 5% per decade, for the projections to 2000 and 2020. These rates were therefore utilized for household and tourist final demand projections. Exports are expected to maintain the present 14 % of total output.

m) Other Food and Beverage Industries

Total sales and distribution were ascertained from the questionnaire survey for 1970. Tourist demand, which is basically for bread, from this sector was

estimated by multiplying the coefficient of bread consumption of the total food budget by total food expenditure by tourists in the Okanagan basin.

Projections of final demand for the bakery products and feed industry subsectors were available from the J.B. Ward and Associates report. The bakery industry in British Columbia increased its production from $31 million in 1961 to over $40 million in 1968. However, when expressed in constant 1968 dollars on a per capita basis this represents a decline from $23.00 to $20.00. Canada as a whole also shows a decline of approximately $1.00 per capita per decade expressed in constant 1970 dollars over the period from 1946 to 1971. Household and tourist consumption of bakery products in the Okanagan are expected to maintain this trend to 2020. Exports are expected to increase in the same proportion as total sales. Feed industry exports were projected to 2020 on the basis of maintaining the provincial growth rate of 2% per year experienced over the period 1961 to 1968.

The growth rate of the miscellaneous food and beverages industries sub-sector, which was not included in the Ward and Associates report, was estimated in both cases by dividing the 1971 index number of real product for the other food and beverage industries by the index number for the 1971 Canadian population (where 1946 equals 100) to arrive at an index of real production per capita[4]. Exports were projected on the basis of real per capita consumption of other food and beverages.

n) Sawmills and Planing Mills

The export projection for the period 1970-1980 was estimated in the Ward and Associates report by applying the provincial growth rate of 5.5% per year experienced from 1950-1970 to the 1970 Okanagan level of production. Estimates from the British Columbia Forest Service indicate the maximum sustained yield of timber for the Okanagan basin is approximately 2.36 times the 1970 production level. Because of this constraint upon raw material supply, it is forecast that sawmill production will cease to increase as this ceiling is reached shortly after 1980. For further details, see sector (h), logging in this section.

Per capita consumption of sawmill products by Okanagan households was projected at .8% per year to 2020, a rate of increase anticipated for housing maintenance repairs in Canada to 1975 by the Economic Council of Canada[5].

---

4 Statistics Canada "Canadian Statistical Review", Historical Summary, August 1971.

5 Economic Council of Canada Study no.___, "Household Expenditure in Canada, by T.Schweitzer, Part II, p.31.

o) Other Wood Products

Export projections from the Ward and Associates report were estimated on the basis of the industry's average provincial growth rate of 4% from 1950 to 1969. This growth was expected to continue to 2000 with no increases after that time.

Household demand, mainly for plywood, was projected using the same growth rates as the sawmills.

p) Metal Fabricating and Transport Equipment Industries

This is a complex sector composed of seven major sub-sectors; the exports of each were projected by Ward and Associates. The primary metal industries, which include aluminum pipe extrusion and iron foundries, are primarily oriented towards local manufacturing and investment activities. Exports were expected to increase by approximately 20% per decade. Steel culverts, ornamental iron products, heating equipment, and cans for fruit and vegetable canning, all part of the metal fabricating subsector, are also heavily oriented to the Okanagan market. Exports for this subgroup were forecast on the basis of the value of exports tripling between 1970 and 1980, and doubling during each succeeding decade. The agricultural implement manufacturers in the Okanagan have also been largely concerned with supplying local demands with exports totalling only about 30% of production in 1970. In veiw of the growth of agricultural production in the province, it was expected that exports would increase by only 20% to 1980 and by 10% per decade thereafter.

Over 80% of the output and exports for the sector are concentrated in the mobile homes, boat building, moter vehicles, and miscellaneous machinery subsectors. The most dynamic industry in the group is mobile home manufacturing, an industry which was established in the Okanagan during the period of the Federal Government's Regional Development Incentives Act. The number of mobile homes produced in Canada increased ten-fold from 1963 to 1971[6]; and during the same period in the United States, the number of mobile homes produced increased approximately three-fold. Over the next decade, it is expected that the factors contributing to the growth in the United States in the past 8 years should exert a similar influence upon the Canadian industry and as a result increase the number of units produced from approximately 15,000 in 1971 to 50,000 by 1980. Over the long term after 1980, Canadian production is expected to increase by only 10,000 units per decade. In addition, the average real unit value of mobile homes produced in Canada increased from $5,300 to $5,500 from 1967 to 1971. In order to reflect this trend to more sophisticated, larger homes, a similar increase is forecast for each succeeding decade. The product of unit and

---

6 A base year of 1971 was chosen for the mobile home industry projections to take into account two additional lines brought on-stream during 1970-71.

price per unit projections yielded output projections for Canada and with the assumption that the Okanagan maintains its share of national production, basin exports were projected.

Almost all the exports of Okanagan boat manufacturers are destined for the rest of British Columbia. Therefore future provincial production trends considering the high rates of growth experienced by the industry during the recent past, were deemed essential to project exports for this sub-sector. In real terms, per capita production of boats in British Columbia increased about $2.50 over the past decade. This trend is expected to continue to 2020 but the Okanagan is forecast to realize a smaller proportion of provincial output, down from 21% in 1970 to approximately 16% by 2020, as larger vessels are expected to be produced.

Motor vehicles manufacturing includes a truck assembly plant established in Kelowna during the late 1960's. Exports, which total almost 100% of production were projected to increase at about 15% per decade to 2020 according to industry opinion.

As of the base year 1970, only one firm of appreciable size, a manufacturer of logging equipment, was operating in the machinery industries subsector. In the opinion of Ward and Associates, additional export capacity in a more broadly defined machinery industry of approximately $1.8 million should be added by 1980; and an increase of about $7.2 million is expected over the long run to 2020.

Household consumption, an item less than 1% of the total output of this sector in 1970, includes sales and repair services by machine shops and ornamental iron manufacturers to Okanagan residents. The growth forecast for imputed rents per capita for Canadian households to 1975 of 4 3/8% per year[7] was used to forecast Okanagan per capita consumption to 1980. Long run projections of per capita spending were calculated from income elasticity of demand for this item in the ECC report over the period from 1926 to 1961 applied to a preliminary estimate of the change in per capita income in the Okanagan 1980-2000, 2000-2020.

q) Non-Metallic Mineral Products

This sector includes the manufacture of glass bottles, concrete, and ready-mix products. The concrete products subsector is almost entirely oriented to the service of construction activities in the Okanagan through the construction sector (sector 27) and own-account construction by other sectors (invest-

---

7 ibid, Economic Council of Canada, part I, p.58.

ment final demand). Exports are very minor and were projected in proportion to anticipated population growth in the Okanagan-Shuswap region as gleaned from the Economic Base Study.

In contrast to concrete products, glass bottle production is in most part shipped to the British Columbia and Canadian market with less than 10% of sales accounted for as input to local wineries and distilleries. However, local sales should increase in importance as it is forecast that a larger proportion of local bottle requirements are to be supplied by the Okanagan plant(s)[8]. Given the forecasts of consumption of wine and liquor (sector 12, this section), the Ward and Associates report expected that the demand for glass bottles in the Okanagan's export markets will double by 1980. Exports in succeeding years are based on the assumption that per capita demands in these markets will be maintained at these 1980 levels.

r) Other Manufacturing Industries

This sector includes five major sub-sectors: printing and publishing, carpets, furniture, plastics, and cardboard containers. Export projections for the last two sub-sectors were completed by Ward and Associates.

As of the base year 1970, the plastics industry sub-sector included one manufacturer of synthetic resins and three smaller plants fabricating plastic products. About 40% of the output of this sub-sector was purchased by other Okanagan sectors, in particular, synthetic resins were utilized by the boat and mobile home manufacturers, and plastic products were fabricated for the basin's motor vehicle manufacturer. Exports to the rest of British Columbia almost entirely constitute the balance. On the basis that the production of synthetic resins and plastics in British Columbia increased in per capita constant dollar terms from $3.30 in 1961 to $4.40 in 1971, Ward and Associates expected production to increase by a similar amount per capita per decade ($1.10) to 2020.

About 20% of total cardboard container production was exported in 1970. The largest share of production was consumed by packing houses and smaller amounts by meat and dairy products, fruit and vegetable canning, wineries, soft drinks, and distilleries, and non-metallic mineral products (glass) sectors. The majority of growth is forecast in response to interindustry demands as an increasing share of basin requirements are expected to be supplied locally.[9] Exports were projected by Ward and Associates according to the growth rate anticipated for the Okanagan fruit and vegetable sectors.

---

8 See section 4.4 Projected Changes in Direct Production Coefficients

9 See section 4.4 Projected Changes in Direct Production Coefficients

Household expenditure within the Okanagan and exports to the rest of British Columbia by the printing and publishing sub-sector were projected to 1980 on the basis that per capita expenditure would increase at 3% per year, the rate of growth envisaged for printed matter by the Economic Council of Canada study from 1969 to 1975[10]. Long run projections of per capita expenditure were gleaned from an earlier study of Canadian consumption from which it was calculated that per capita consumption of stationery, newspapers, and magazines increased by 2 9/16% per year from 1926-1929 to 1952-1955[11].

Carpet sales to households and exports to the rest of British Columbia and Canada were estimated to grow at 9% per capita per year to 1980, the rate of growth forecasted for per capita Canadian consumer expenditure for this product from 1969 to 1975 by the Economic Council of Canada[12]. A lower long run growth rate in per capita consumption of just over 7% per year was estimated from the statistics presented on the graph in the Economic Council report for this product[13].

The Economic Council of Canada forecast of the increase in per capita expenditure on furniture from 1969 to 1975 of 7% per year was used to project household consumption and exports of Okanagan furniture. Long run estimates to 2000 and 2020 are calculated from the Royal Commission study which showed per capita expenditure for this product to increase at 3 1/4% per year from 1926-1929 to 1952-1955.

Household consumer and tourism demand for the output of dental mechanics, ice manufacturers and other minor activities also included in this sector are projected on a proportional basis to projected population and the number of visitors expected for the Okanagan respectively.

s) Packing Houses

Since the output of this sector is completely absorbed on an inter-industry basis by the tree fruits and vegetables sectors, output projections for this sector's output are determined by the model.

---

[10] ibid, Part III, P. 25.

[11] Royal Commission on Canada's Economic Prospects "Consumption in Canada" by David W. Slater, Ottawa: Queen's Printer 1957, p. 187 (unsure of exact reference).

[12] ibid, Economic Council of Canada, Part II, p. 24.

[13] ibid, Part II, p.23.

t) Wholesale Trade

Although the wholesale trade sector does not directly sell its services or output (defined as the "markup" on wholesale sales only) to Okanagan households and tourists, sales are made via the retail trade sector to these final demand categories. Since this sector is in this way tied to retail trade, the growth rates projected for retail trade for household and tourist final demand were applied to the wholesale trade sector. After preliminary runs of the model were made with exports held at 1970 levels, exports, about 15% of total output in 1970, were projected at a similar rate to total output. Several iterations were made, successively increasing exports until the precentage change in output became very small, i.e. less than 5%.

u) Retail Trade

Household expenditure[14] to 1980 was estimated by projecting sales per capita according to a weighted average of the growth rate of a representative group of nineteen products, which were projected by the Economic Council of Canada over the period 1968-1975, taking into account the changes in real income and relative prices. For example, as presented in Table 4.1, the product 'food purchased retail' consumption per capita was estimated by the E.C.C. to grow 19.6%over the period 1968-1975 (column 2). This growth rate was multiplied by the consumption weight for the Vancouver area[15] (column 3) giving the weighted growth figure (column 5). This procedure was repeated for the remaining products to arrive at an estimate of the growth of real per capita consumption of 28.96% over the period or 4 3/8% per year. Applying this growth rate to the 1970 per capita consumption figure the projected 1980 consumption per capita was derived. Multiplying by the 1980 Okanagan population gives the total retail sales for 1980.

For the long run estimates, 1980-2020, the same E.C.C. publication provided long term estimates of income elasticity of demand for each of the nineteen products (column 1). In order to determine the weighted average income, elasticity was multiplied by the per capita change in income in the period 1980-2000 and 2000-2020. These were estimated at 75% from preliminary runs of the model. This yielded the change in per capita expenditure which, when multiplied by population estimates for 1980, 2000 and 2020, gave projected retail sales. Error was introduced into the projections when using preliminary runs of the model to estimate per capita income and also during the recalculation of per capita income after all the runs have been made. However, it was felt that the differences were not significant enough to recalculate all the changes in household expenditures.

---

14 Output of the retail trade sector is defined to include only the "markup" of retail sales, i.e. Total Sales - Cost of Goods Sold and Markup.

15 Statistics Canada, Urban Family Expenditure in Canada 1969.

TABLE 4.1

DERIVATION OF THE WEIGHTED AVERAGE PER CAPITA CONSUMPTION GROWTH

AND LONG RUN INCOME ELASTICITY OF DEMAND

Part I	E.C.C. Personal Consumption Expenditure Group	1 Past Long Term Income Elasticity	2 Projected Growth of Per Capita Consumption Canada 1968-1975	3 Consumption Weight Vancouver area	4 Weighted Average Calculation Income Elasticity	5 Weighted Average Calculation Growth 1969-1975
P21	Food purchased retail	.39	1.196	44,047	17,178	52,680
27	Non alcoholic beverages	1.16	1.338	837	971	1,120
29	Alcoholic beverages	.94	1.415	3,873	3,641	5,480
31	Tobacco	.66	1.196	4,342	2,866	5,193
33	Men's and boys' clothing	.17	1.172	6,633	1,128	7,774
35	Women's & Children's clothing	.76	1.311	9,936	7,551	13,026
40	Footwear	.12	1.209	3,477	417	4,024
44	Luggage & Leather goods	.73	1.226	472	345	579
46	Jewellry, watches, rings	1.20	1.278	772	926	987
Part II						
P23	Carpets & floor coverings	6.98	1.722	1,269	8,858	2,185
25	Household Textiles & other Furnishings	.81	1.250	1,306	1,058	1,633
27	Household appliences	1.53	1.582	4,527	6,926	7,162
29	Glassware, tableware	1.12	1.396	284	318	396
31	Household operation goods	.70	1.280	3,631	1,842	3,368
35	Medical & Pharmaceutical Products	2.55	1.225	1,963	5,006	2,405
39	Personal transport durables	1.40	1.332	28,083	39,316	27,407
41	Gasoline, oil and grease	1.53	1.411	18,571	28,414	26,204
Part III						
P30	Cosmetics	1.59	1.177	1,241	1,973	1,461
Part IV						
P21	Recreation durables	1.72	1.273	6,855	11,791	8,726
				141,119	140,525	181,990
					÷141,119	÷141,119
					= .99579	=4 3/8%/year

SOURCE: See text

The Ward and Associates report, forecasted per visitor day spending to 2020. A forecast of retail spending was then concluded by multiplying expenditure per visitor day estimates by the forecast of visitor days to the Okanagan.

Outside of tourism purposes, about 6% of total output is accounted for as export sales to residents of contiguous areas to the Okanagan basin such as the Shuswap Lake area and Similkameen Valley. As the Economic Base Study used an approximately similar rate of growth to the Okanagan-Shuswap-Similkameen region, exports were projected to grow at the same rate as Okanagan household consumption.

v) Hotel, Motel, Tourist Camps and Restaurants

Household expenditures in sector 22 were projected along similar lines as sector 21. That is, the growth rate of per capita expenditures estimated for the restaurant, cafe and hotel group by the E.C.C. study over the period 1968-1975 of 2 3/8% per year, was used to project expenditures to 1980[16]. Over the long run 1980-2000 and 2000-2020,the growth rates of income, determined from preliminary runs of the model, were multiplied by the long run income elasticity of demand.

The Ward and Associates forecasts for the tourist industry indicated that per visitor-day spending should increase in real terms by 2% per year in tourist camps, restaurants, public houses, and cocktail lounges, and 1.4% per year in hotel and motel accommodation to 2020. As in sector 21, multiplication of projected per visitor-day expenditure by the estimated number of visitor-days yields a forecast of tourist expenditure.

Exports, about 7% of output in 1970, were projected as per sector 21, at the same rate as Okanagan household expenditure.

w) Health, Education

In the health field excellent information was obtained from a survey of the three major hospitals in the basin regarding 1970 total revenues and the shares of total revenue from local and provincial sources. Household expenditure for the services of physicians and dentists, less provincial contributions, was estimated from the share of household income payments. These services, representative of Vancouver families[17], was applied to the estimate of Okanagan household income in 1970. For educational services in 1970 the local contribution was obtained from the municipal statistics for the province of British Columbia.

---

[16] Part III, p. 34.

[17] ibid, Statistics Canada, "Urban Family Expenditure in Canada"

The E.C.C. estimated the household consumption of educational services to be growing at 15% per year over the short run. This rate of growth was considered to be too high resulting from the high priority on education in the mid 1960's. The British Columbia Financial and Economic Review[18] provided an estimate of growth of per capita expenditure in Provincial, General and Education Grants over the period 1952-1969. Converted to constant dollars, using the wholesale price index, the annual per capita expenditure was rising at about nine percent per year. This growth rate was applied to the 1970 figure to project expenditures to 1980. After 1980 a lower rate of growth was anticipated. From the 1970 Canadian Statistical Review it was estimated that real per capita product of educational services over the period 1935-1971 grew at 2 7/16% per year[19]. This figure was applied to project per capita household expenditures in the basin over the period 1980-2020.

Growth in household expenditure per capita for hospitals was estimated in the E.C.C. report at 5 1/4% per year over the short run from 1969 to 1975. This growth rate was used to project Okanagan expenditures to 1980. Over the long run, a growth rate of 3 3/8% per capita per year for health and welfare services in Canada from 1935 to 1971 was observed in the Canadian Statistical Review[20]. This growth rate was applied as the projection of per capita household expenditures for the period 1980-2020.

The provincial share, which accounts for about 3/4 of the total revenue of the Okanagan health and education sector is forecast to be maintained to the end of the projection period.

As per justification in sector 21, exports were projected at the same rate as household expenditure.

x) Other Services

This sector includes all service trades defined by Statistics Canada in the Census of Merchandising and Services, less the hotels, motels, tourist camps and restaurants. Also included are legal services, post offices and the output of British Columbia Tree Fruits Limited, which is completely absorbed on an interindustry basis by sector 1, Tree Fruits and Grapes.

The projections were estimated as in Sector 21, retail trade, using a weighted average of the growth rates of three representative items; 'personal services',

---

18 Gov't of British Columbia, Dept. of Finance, "British Columbia Financial and Economic Review", 1952/53 to 1969/70.

19 ibid, Statistics Canada "Can. Stat. Rev.", Aug, 1970, p.33.

20 ibid

entertainment and 'other services' obtained from the E.C.C. projections for the period 1969-1975. This rate was applied to the short run projection to 1980 (5 7/8% per year). The long run income elasticity of demand for the projections 1980-2000 and 2000-2020, (1.25) was applied to the percentage change in household consumption per capita. As in Sectors 21, 22, 23, exports were projected at the same rate as household expenditure.

y) Transportation, Storage, and Communication

The Economic Council of Canada projection of per capita household consumption of transportation services in Canada from 1969 to 1975 at 7 3/4% per year was used to estimate the increase in per capita household consumption for this sector in the Okanagan to 1980. For the long run projections to 2000 and 2020, the growth rate of real product per capita for transportation services in Canada from 1935 to 1971 of 3 ½% per year was applied to the 1980 levels of Okanagan per capita household expenditure [21].

Since it was impossible to calculate or impute the local transport services included in the purchase value of all inputs and sales value of output for each sector respectively, interindustry purchases of transportation services have been underestimated. As a result, exports include both sales to non-Okanagan firms and households and unaccounted interindustry sales. Thus, estimated total output minus household, government, and interindustry demand equals a residual - exports. Thus total output projections for this sector, which include interindustry and household projections, were felt to be indicative for the projections of this export activity. As in sector 20, an iterative process of adjusting the change in exports to the change in total output was carried out until the change in total output became negligible (less than 5%).

z) Finance, Insurance, Real Estate

The Economic Council of Canada study projected the per capita consumption of financial services in Canada to increase at 3 3/8% per year from 1969 to 1975. It was expected that the per capita consumption for this product in the Okanagan would follow this rate from 1970 to 1980. The E.C.C. study provided the short run growth rate which was applied to the 1970 output for the projection to 1980. For the long run projections it was assumed that the proportion of the increase in real income spent on the sector would be the same as in the short run. Since per capita expenditure was rising 3 3/8% per year and real income 4 1/8% per year over the period 1969-1975 and the expected growth rate in real income 1980-2020 is 2 7/8% per year, the growth in per capitat expenditure over the long run would be 2 3/8% per year. This growth rate was then applied to arrive at the 2000 and 2020 projections.

---

21 Statistics Canada, "Canadian Statistical Review" 1970, p.32

aa) Construction

About 80% of the output of the construction sector is accounted for by Okanagan investment demand (for methods of estimation, see section 4.3). Per capita household expenditure, which includes construction repair services only, was projected to 2020 on the basis of the Economic Council of Canada forecast increase in the per capita consumption of household repair services at 5/6% per year from 1969 to 1975. As in sectors 20 and 25, exports were estimated as a constant share of projected output.

bb) Municipal Government

Data gleaned from the 1970 Annual Report of the City of Kelowna provided the basis to project per capita household consumption of municipal services to 1980. A time series of total revenues from 1956 to 1970, from which senior government and home owners grants were subtacted, were converted to constant dollars using the Canadian wholesale price index. Over this period, it was calculated that per capita business and homeowner taxes increased at 7 1/2% per year, and this rate was used to project per capita household consumption to 1980. Given the lack of long-term time series for the output of municipal governments, projections of per capita household consumption to 2020 were assumed to increase at a constant proportion of the change in per capita income.

cc) Utilities

Similar to the method employed for sector 21, a weighted average of the projections, of per capita expenditure on electricity, telephone, gas and other fuels, for Canada from 1968 to 1975, (4 5/8% per year), was applied to per capita Okanagan household consumption of utilities services (less water) from 1970 to 1980. Projections to 2000 and 2020 were based upon a weighted average of income elasticity of demand (1.37) for these products.

Expenditures per capita on water utilities were increased according to increases in gallons per capita per day figures used by the B.C. Pollution Control Branch. Exports were projected in constant proportion to output projections.

4.3.2 Forecast of Investment and Senior Government Expenditures

Investment and senior government final demand categories were assumed to expand in proportion to the other categories of final demand and to the "export" income (transfer payments and property income) of the retired population. This method was used to determine investment and government expenditure in all sectors except the agricultural sectors; sector 14, "Sawmills and Planing Mills"; and sector 15, "Other Wood Products" where more accurate estimates were available as described above.

4.3.3 Final Demand Assumptions: High Economic Growth - Projection II

Projection II assumed a greater emphasis on economic growth could be achieved by a continuation of the industrial incentives program similar to the "Federal Department of Regional Economic Expansion's Area Development Incentives Act" which was in effect in the Okanagan basin between 1965 and 1971. The impact of such an incentives program, assumed to be in effect in the Okanagan from 1980 to 1990, was estimated from confidential, firm by firm information from DREE on the amount of activity and employment generated in the study area. This activity was pro-rated over a ten-year period.

As of 1970, the Economic Base Study showed that the establishment of one or possibly two small (160 ton per day) groundwood pulp mills in the Okanagan is economically feasible. Under Projection I, however, it was felt that the plants would not be environmentally acceptable to the residents in the study area. However, under Projection II with a high economic growth preference, it was assumed a plant of 200 tons per day would open by 1990 and capacity would increase about 3.5 fold by 2020. Input requirements were obtained from personal communication with consultants in the pulp and paper industry, converted to constant 1970 dollars and added to export final demand for the relevant sectors. Agricultural and tourist activity forecasts are similar to Projection I.

4.3.4 Final Demand Assumptions: Low Economic Growth - Projection III

Under Projection III, a lower population growth rate of 1.3% per year was simulated for the Okanagan Basin from 1980 to 2020. It was assumed that from 1951 to 1961, when the population of the Okanagan grew at a fraction of the provincial rate, a higher level of environmental quality was achieved. Therefore, applying this fraction to projected provincial population growth rates from the Economic Base Study[22] a lower rate of population growth consistent with this objective was achieved. In addition, tourist activity and associated expenditures were also revised downwards in proportion to the reduced population forecasts. The development of the agricultural base in the Okanagan is deemed consistent with a high level of environmental quality. As a result, it is assumed that a program by governments to maximize agricultural development is simulated to increase production of tree fruits, grapes, and livestock from increased acreage under forage crops (see Chapter 5, sect.5.3). The total labour force was estimated from the population projection using the population to labour force ratios from Projection I. Employment requirements for agriculture and tourism, determined from the model, were subtacted from the total labour force. Exports from manufacturing and service industries with the exception of canneries and wineries, were then scaled down so that employment requirements for these industries and their support industries, estimated from the model, are consistent with the labour force forecast.

---

[22] British Columbia Department of Ind. Dev. Trade & Comm., An Economic Study p.80.

4.3.5 Final Demand Tables

The Final Demand Tables are given in Appendix B.

4.4 PROJECTED CHANGES IN DIRECT PRODUCTION COEFFICIENTS

The direct production coefficients for 1970 were developed from the questionnaire surveys and represent the relationships between the various industrial sectors. The tables of direct production coefficients for 1970, 1980, 2000 and 2020 are given in Appendix B. These coefficients show the dollar purchases that each industry sector makes from the output of each sector.

As the relationship between sectors within the model is likely to change over time, for forecasting purposes, the coefficients must be modified to reflect the changes of the economy within the basin. Not all sectors were affected.

Sector 11 - - Fruit and Vegetable Canning. It was assumed that 80% of the cans required beyond 1980 will be supplied by Sector 16. Similarly, the number of cartons and labels supplied within the basin will increase to 10% and be supplied by Sector 18. Presently imports supply a larger share of these commodities.

Sector 12 - - Wineries and Soft Drinks. The projections given in Ward and Associates report were modified. The firms presently exhibit about 2/3 local and 1/3 import purchases of bottles. These proportions were assumed to remain constant for the 1980 to 2020 period because total dependence on local supplies could cause disruption of output, if local supplies could not meet commitments due to strikes, etc.

Sector 16 - - Metal Fabrication. A larger proportion of the basin's requirements will be met by Sector 16.

Assumption by Product	% Supplied by Local Manufacturer			
	1970	1980	2000	2020
- furnace ducting	12%	20%	40%	60%
- exterior metal	0	50	100	100
- frames	30	50	60	70
- windows and doors	2	50	40	60

These estimates are from the Ward and Associates report on manufacturing, and represent the increase in the proportion of output that Sector 16 buys from itself.

Sector 19 - - Packing Houses. By 1980, the purchases of boxes from Sector 18 should increase to 50% of requirements. By 2000 and 2020 this proportion should have reached 75%.

Sector 27 - - Construction

	% Supplied by Local Manufacture (Sector 16)			
	1970	1980	2000	2020
Heating Equipment	0%	20%	40%	60%
Windows and doors	0%	20%	40%	60%

These assumptions will result in increased purchases by Sector 27 from Sector 16.

Besides the basic changes in the relationships between some of the direct production functions, a further adjustment in coefficients was made. It was assumed that labours share of total inputs to one sector decreased with time. This was done by determining the relative share of goods, labour and profits used by any one sector and then keeping profit's share constant. In this way, the goods' share was adjusted upwards as labour's share fell. The direct procution coefficients were then recalculated. The tables in Appendix C reflect this redistribution plus the internal reallocations descirbed earlier.

CHAPTER 5

Discussion of Projections to 2020

5.1 INTRODUCTION

The main purpose of this chapter is to discuss the actual projections though in the case of the sections on Land Use and Multipliers a discussion of the methodology used to obtain these projections is also included. These discussions are included in this chapter rather than in Chapter 4 because they are rather short sections and can be better dealt under one heading.

The projections to 1980 can be considered to be reasonably accurate as they are based on reliable historical data coupled with a good information base for 1970. After 1980 to the year 2020, the projections were much more difficult to make and subject to larger errors. Factors which cannot be foreseen can have major influences. For example, in estimating regional employment within the valley, a factor, such as choosing between two locations, say, Kelowna or Penticton, can drastically change the projected figures within these locations.

A certain amount of this uncertainty is overcome by using high and low projections. As described in Chapter 4, the actual outcome has a greater likelihood of being between these two limits in the year 2020 than it has of falling exactly on one projection or the other. This fact can increase the usefulness of the data to the long range planner who must have information on growth projections and who is interested in the projection's upper and lower bounds.

The following sections discuss various projections made. The projections to 1980 are first discussed, followed by the long range forecast to 2000 and 2020.

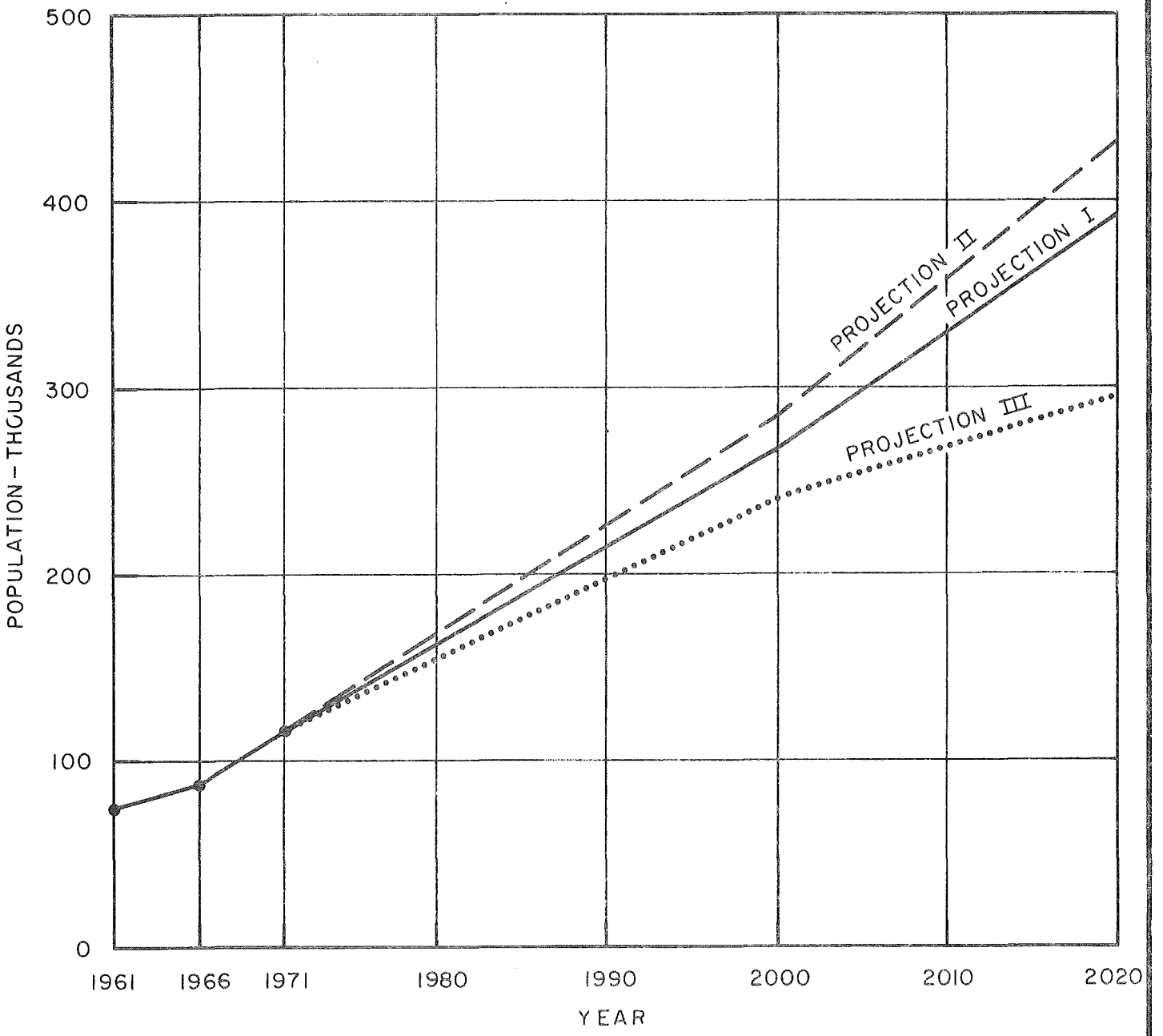
5.2 POPULATION

5.2.1 Population Growth

Figure 5.1 & Table 5.1 compare population growth for all three projections to 2020. Due to termination of the Regional Incentives Program in 1971, population for all projections is forecast to increase at a slower rate of 3.9% per year to reach 162,000 in 1980 in contrast to the rapid rate of 5.6% sustained during the Program period from 1966 to 1971. However, the momentum generated by the Program should enable the Okanagan to grow at a faster rate than the Province as a whole - 3.1%.[1]

---

[1] Task 201 pp. 34-35.



POPULATION OKANAGAN BASIN
1961, 1966, 1971 AND PROJECTED 1980, 2000 AND 2020

Figure 5.1

TABLE 5.1

POPULATION BY SUB-REGION, OKANAGAN BASIN - 1961, 1966, 1971 AND PROJECTED 1980, 2000 AND 2020

Sub-Region	1961*	1966*	1971*	Projected 1980	PROJECTION I Present Economic Policies		PROJECTION II High Economic Growth		PROJECTION III Low Economic Growth	
					Projected 2000	Projected 2020	Projected 2000	Projected 2020	Projected 2000	Projected 2020
Oliver-Osoyoos										
Oliver-urban	1,774	1,563	1,598	1,700	2,000	2,200	2,200	2,400	1,800	1,800
Osoyoos-urban	1,022	1,166	1,279	1,600	2,300	3,000	2,500	3,300	2,100	2,200
Rural	3,964	4,732	5,775	7,700	11,800	16,400	12,700	18,000	10,700	12,000
Sub-Total	6,760	7,461	8,652	11,00	16,100	21,600	17,400	23,700	14,600	16,000
Penticton										
Penticton-urban	14,516	16,157	18,955	24,400	35,800	48,100	38,800	52,900	32,400	35,700
Skaha Lake-rural	736	775	1,036	1,400	2,100	2,900	2,300	3,300	1,900	2,200
Summerland-urban	4,307	4,585	5,551	7,100	10,400	13,900	11,200	15,100	9,400	10,300
Naramata-Summerland-rural	848	815	1,141	1,500	2,300	3,200	2,500	3,500	2,000	2,300
Vaseux Lake-rural	551	904	996	1,600	2,800	4,500	3,100	5,100	2,600	3,400
Sub-Total	20,958	23,236	27,679	36,000	53,400	72,600	57,900	79,900	48,300	53,900
Kelowna										
Kelowna - urban	20,809	26,266	35,852	52,800	87,600	132,200	94,900	145,400	79,200	98,000
- rural	3,195	4,217	8,152	14,800	30,100	55,800	32,700	61,400	27,300	41,400
Wood Lake-urban	1,857	2,089	3,090	4,500	7,400	11,000	8,000	12,100	6,700	8,200
Peachland-urban	641	709	1,446	2,500	4,900	8,700	5,300	9,600	4,400	6,500
Westbank-urban	728	755	1,620	2,800	5,500	9,900	6,000	10,800	5,000	7,300
Sub-Total	27,230	34,036	50,160	77,400	135,500	217,600	146,900	239,300	122,600	161,400
Vernon										
Vernon-urban	13,697	15,149	18,845	25,200	38,000	52,400	41,200	57,600	34,300	38,800
-rural	3,247	3,211	3,955	5,000	7,100	9,200	7,700	10,200	6,400	6,900
Kalamalka Lake-rural	2,161	2,660	3,617	5,300	8,800	13,400	9,500	14,700	8,000	9,900
Armstrong-urban	1,228	1,426	1,631	2,100	3,100	4,200	3,400	4,600	2,800	3,100
Sub-Total	20,333	22,446	28,048	37,600	57,000	79,200	61,800	87,100	51,500	58,700
TOTALS	75,281	87,179	114,539	162,000	262,000	391,000	284,000	430,000	237,000	290,000

SOURCE: * Statistics Canada

After 1980, population growth under Projection I is expected to increase at approximately expected provincial rates to 262,000 by the year 2000 (2.4% per annum). In Projection II, the simulated industrial incentives program for the Okanagan is forecast to attract an additional 22,000 people to the valley by 2000 compared to Projection I, and thereafter, population is projected to grow at a similar rate as Projection I, resulting in a total population of 430,000 by 2020. Under the low growth assumptions of Projection III, population growth is constrained to 1.9% and 1.0% per year from 1980 to 2000, and 2000 to 2020 respectively, resulting in 25,000 and 101,000 fewer residents relative to Projection I at the end of each period respectively.

5.2.2 Population by Region

The growth of Okanagan regions depends upon the expansion of job opportunities and demographic factors, especially retirement immigration. The extrapolation of the 1961 to 1971 trend of regional proportion to basin population growth, the method used here, is an implicit assessment of the interaction of these growth factors and assumes the trend should continue into the future. The stability of these relationships is affected by the following: the regions, with the possible exception of Oliver-Osoyoos, exhibit equal comparative advantage for the location of many economic activities; the desirability of a region as a retirement centre may change; and even given an accurate forecast of demographic factors (births and deaths) from the basin-wide projection, a change in population mix dictated by the two factors above is another source projection instability.

As shown on Table 5.2, the Kelowna region will continue to expand at a faster rate than the rest of the Okanagan, increasing its share of population from 43.8% in 1971 to 55.6% in 2020. Although the population of the other regions should grow over the next 50 years, they are forecast to realize a decreasing proportion of valley population. The next largest growth in population is expected to occur in the Vernon region, followed closely by growth in the Penticton region. The Oliver-Osoyoos region is expected to maintain a relatively slow growth character and show the smallest expansion.

The expanded City of Kelowna is expected to realize the largest increase in the Kelowna region as the present population of 36,000 is forecast to expand to over 132,000 and 145,000 under Projections I and II respectively and to almost 100,000 under Projection III by 2020. As was the case in the 1960's the fastest rate of growth is expected to occur in the rural areas as suburbanization should continue adjacent to the city of Kelowna. Other economic nodes in the region, such as Westbank, Peachland and Winfield are expected to grow to medium-sized communities of 8 to 12,000 people.

TABLE 5.2

SHARE OF POPULATION BY REGION

OKANAGAN BASIN 1961, 1971, AND PROJECTED 1980, 2000, AND 2020

(IN PERCENT)

REGION	1961	1971	1980	2000	2020
Oliver-Osoyoos	9.0	7.6	6.8	6.1	5.5
Penticton	27.8	24.2	22.2	20.4	18.6
Kelowna	36.2	43.8	47.8	51.7	55.6
Vernon	27.0	24.4	23.2	21.8	20.3
TOTAL	100.0	100.0	100.0	100.0	100.0

SOURCE: Calculated from Table 5.1

Most of the growth in the Vernon region is forecast to occur within the Vernon urban area which stretches from Okanagan Landing on the South to Swan Lake on the north. The present population of 20,000 could increase between two or three-fold over the next 50 years. As in the past decade, the Kalamalka Lake rural area, essentially Coldstream Municipality, should realize the fastest rate of growth in the region as a suburban area for Vernon and industrial sub-centre (Lavington). The Armstrong urban area is expected to maintain the role of an agricultural service and resource-based manufacturing centre and grow at a rate similar to the Vernon urban area. The Vernon rural area (largely Spallumcheen Municipality) should continue as an agricultural area with only minor population increase.

As in the Kelowna and Vernon regions, the Penticton urban area as the principal central place within its region, should expect the largest increase in population. The secondary node in the region, the Summerland urban area, will maintain a growth rate similar to Penticton and attain a size of 10 to 15 thousand by 2020. The rural areas, especially the Vaseux Lake region (Okanagan Falls) which is to show a 3.5 to 5 fold increase in population, are forecast to achieve the fastest rates of growth in the region.

From the experience of the 1960's, it is expected the rural area should acquire the majority of population increase anticipated for the Oliver-Osoyoos region. The urban areas of Oliver and Osoyoos are estimated to show minor increases of population; Osoyoos is expected to increase at a faster rate than and surpass Oliver by the year 2000 and become a centre of between 2200 and 3300 persons at the end of the projection period.

5.3 ECONOMIC ACTIVITY

5.3.1 Output

a) Output to 1980

Although non-resource-based manufacturing is not expected to maintain the very high growth rate of output experienced from 1961 to 1970 (22% per annum - Table 5.3), the stimulus provided by the Federal Government's Area Industrial Incentives Program, which was in effect from 1965 to 1971, should enable growth to occur at about 12% per year to 1980, the fastest rate of growth among major economic activities, see Tables 5.3 and 5.4 and Figures 5.2 to 5.5.

In particular, the expansion of export demand for mobile homes($50 million), motor vehicles ($3 million), boats ($3 million), wineries and distilleries ($64 million), and a combination of the growth of export demand and inter-industry requirements for glass ($11 million), carpets ($7 million), furniture ($1.7 million), plastics ($2.3 million), and corrugated box manufacture ($4.7 million) by wineries and distilleries, construction and mobile homes, motor vehicles, and packing houses respectively should account for about 80% of the output increase of $190 million to 1980[2] (Table 5.5).

The other services group (Table 5.6 and Figure 5.5), which should realize the largest aggregate output increase of about 450 million dollars, follows with a growth rate of 9 1/2% per year to 1980. Expansion of household consumer, interindustry, and investment plus government demand contribute equally to output increases; exports, projected as a constant residual output, constitute the balance of growth[3].

Past provincial trends, including local plus senior government contributions, indicate a doubling of per capita expenditure on health and education. As a result, government expenditures are expected to be concentrated within this sector and allow it to realize a three-fold increase of output (Table 5.6), the most rapid rate of growth within the service category. The other service sectors, except packing houses which should grow in approximate proportion to the 50% increase of the tree fruit crop (Table 5.7), are expected to expand between 2 and 2.9 times their 1970 levels as a response to general expansion within the Okanagan economy (Table 5.5). Household and interindustry demands together are significant factors for the development of wholesale trade, transportation, finance, insurance, and real estate, and utilities sectors, and assuming proportional increases of provincial government aid, the municipal government sector. Construction and wholesale trade, retail and local services are dependent upon increases of household demands and investment requirements of an

---

2 Detailed projection of final demands for manufacturing appear in Chapter 4.

3 Final demand projections for service sectors are present in Chapter 4.

TABLE 5.3

GROWTH OF OUTPUT BY MAJOR ECONOMIC ACTIVITY
OKANAGAN BASIN 1961, 1970, AND PROJECTED
1980, 2000, AND 2020
(IN AVERAGE ANNUAL PERCENTAGE RATES OF CHANGE)

	AGRICULTURE	MINING & LOGGING	MANUFACTURING		SERVICES		TOTAL
			Resource Based	Non-Resource Based	Tourism	Other	
1961-1970	2.4	N/A	3.0	22.0	7.3	N/A	N/A
1970-1980	4.3	2.3	7.3	12.0	5.1	9.5	9.5
Projection I 1980-2020	0.9	-2.8	1.9	2.6	3.6	4.8	4.0
Projection II 1980-2020	0.9	-2.5	2.0	3.4	3.6	5.0	4.4
Projection III 1980-2020	1.2	-2.8	1.8	2.0	3.1	3.9	3.3

N/A Not Available

SOURCE: Calculated from Table 5.4

TABLE 5.4

VALUE OF OUTPUT BY MAJOR ECONOMIC ACTIVITY
OKANAGAN BASIN 1961, 1970, AND PROJECTED 1980, 2000 AND 2020
(IN THOUSANDS OF CONSTANT 1970 DOLLARS)

	AGRICULTURE	MINING & LOGGING	MANUFACTURING		SERVICES		TOTAL
			Resource Based	Non-Resource Based	Tourism	Other	
1961	31,785.3	N/A	32,937	11,291	5,526	N/A	N/A
1970	40,212.2	29,495.8	44,356.4	84,190.6	11,093.1	306,789.6	516,137.7
1980	61,311.3	36,858.4	88,728.3	273,917.4	18,352.5	758,759.5	1,237,927.4
2000 I	76,335.8	9,979.7	142,959.7	456,537.1	40,460.1	2,037,136.4	2,763,408.8
2000 II	76,073.6	10,802.8	155,069.7	659,287.8	40,460.1	2,273,992.2	3,215,686.2
2000 III	81,581.1	9,838.5	141,244.7	438,301.5	34,600.1	1,816,286.8	2,521,852.7
2020 I	89,025.1	12,188.5	188,238.8	748,539.4	74,733.5	4,871,954.2	5,984,679,5
2020 II	89,711.2	13,458.3	197,087.2	1,050,373.9	74,733.5	5,436,780.5	6,862,144.6
2020 III	98,570.8	11,284.7	182,249.6	597,701.6	63,584.7	3,479,339.6	4,432,731.0

SOURCE: I/O Tables

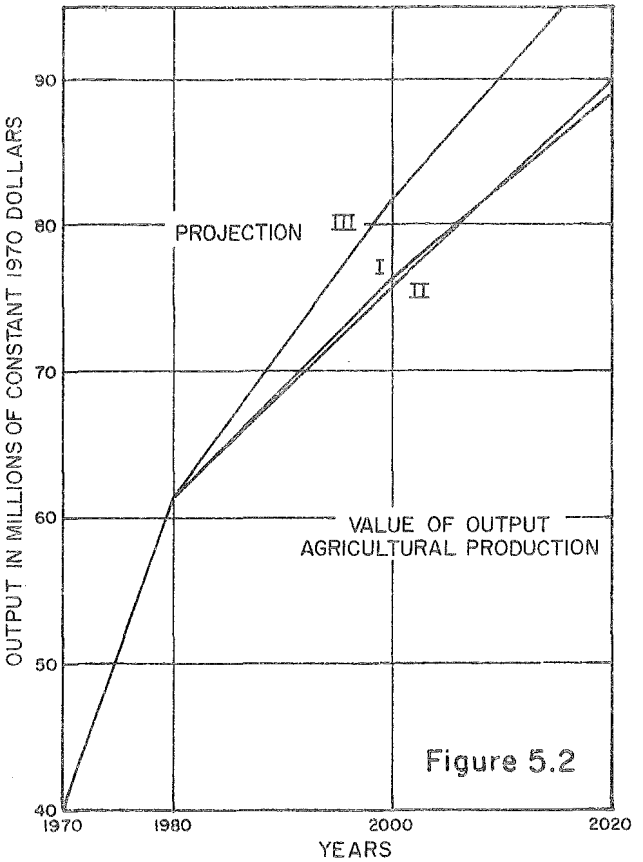


Figure 5.2

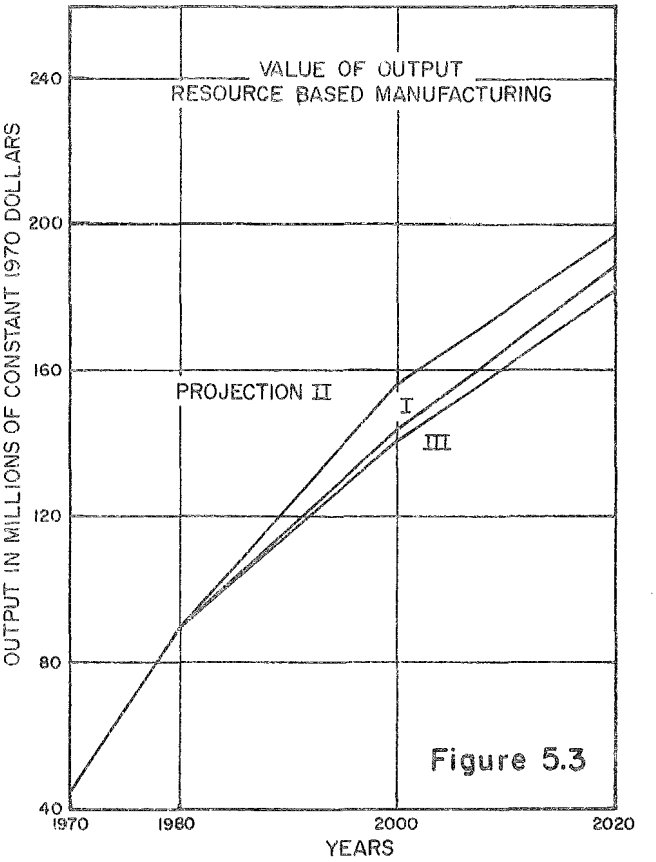


Figure 5.3

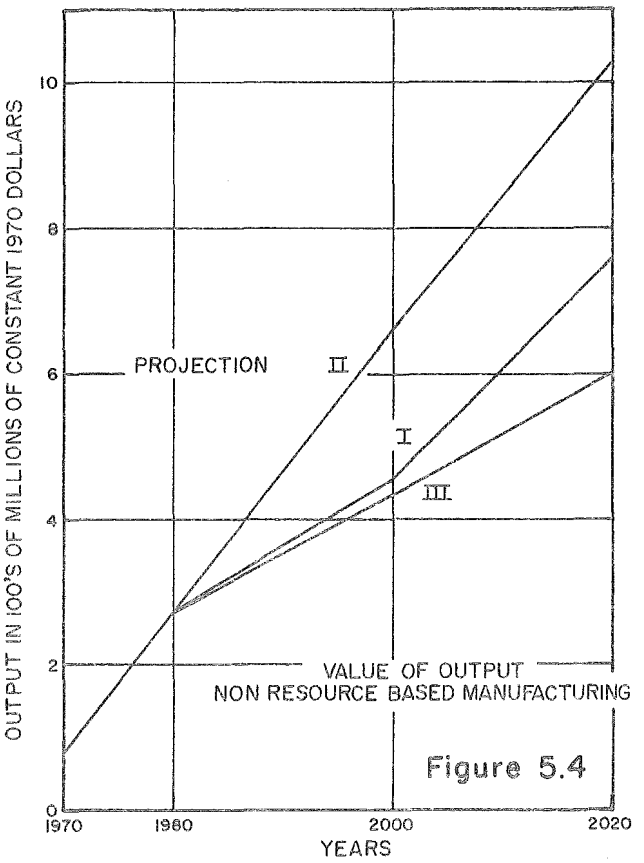


Figure 5.4

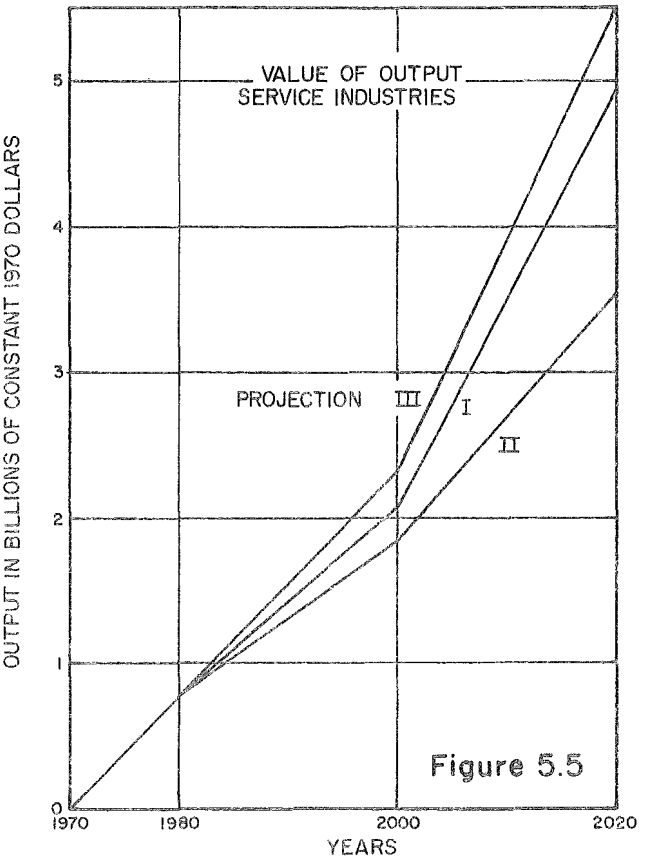


Figure 5.5

Figure 5.2 - 5.5

TABLE 5.5

VALUE OF MANUFACTURING OUTPUT, OKANAGAN BASIN 1970, AND PROJECTED 1980, 2000, AND 2020
(IN THOUSANDS OF CONSTANT 1970 DOLLARS)

SECTOR	INDUSTRY	1970	1980	2000			2020		
	RESOURCE BASED MANUFACTURING			Projection I	Projection II	Projection III	Projection I	Projection II	Projection III
10.	Dairy Products	10,746.7	16,169.1	28,606.5	32,509.0	27,281.5	43,309.0	49,897.2	39,194.9
11.	Fruit & Vegetable Canners	16,002.0	27.726.4	55,326.4	55,636,3	55,130.7	83,167.0	83,597.7	82,319.4
14.	Sawmills & Planning Mills	13,438.7	27,829.8	31,715.3	31,715.3	31,715.3	31,715.3	31,715.3	31,715.3
15.	Plywood	4,169.0	17,003.0	27,311.5	28,639.1	27,117.2	30,047.5	31,877.0	29,020.0
	Pulp Mills	-	-	-	6,570.0	-	-	22,995.0	-
	TOTAL	44,356.4	88,728.3	142,959.7	155,069.7	141,244.7	188,238.2	220,082.2	182,249.6
	NON-RESOURCE-BASED MANUFACTURING								
10.	Meat Products	3,255.2	5,443.3	12,675.9	17,316.3	11,894.0	23.050.5	29.760.4	18,110.8
12.	Wineries, Soft Drinks & Distilleries	9,049.1	73,535.1	94,234.5	134.925.8	93,686.8	109,518.7	154,682.2	105,913.4
13.	Other Food & Beverage Industries	5,119.5	7,648.2	13,157.5	19,674.4	12,578.1	19,654.8	28,449.0	15,236.0
15.	Wood Products other than Plywood	5,358.0	9,479.5	19,606.0	41,118.5	18,526.1	30,827.4	53,910.2	27,334.1
16.	Metal Fabricating and Transport Equipment	36,597.9	108,496.4	171,572.5	252,782.6	170,326.0	297,963.7	421,230.9	226,356.6
17.	Non Metallic Mineral Products	13,646.1	33,785.8	64,609.8	83,930.6	61,588.8	109.314.4	137.790.9	89,454.3
18.	Other Manufacturing	11,164.8	35,529.1	80,680.9	109.539.6	69,701.7	158,209.9	224,550.3	115,296.4
	TOTAL	84,190.6	273,917.4	456,537.1	659,287.8	438,301.5	748,539.4	1,050,373.9	597,701.6
	TOTAL MANUFACTURING	128,547.0	362,645.7	599.496.8	814,357.5	597.546.2	936,778.2	1,270,456.1	779,951.2

SOURCE: I/O model

TABLE 5.6

VALUE OF OUTPUT FOR SERVICE TRADES
OKANAGAN BASIN 1970, AND PROJECTED 1980, 2000, AND 2020
(IN THOUSANDS OF CONSTANT 1970 DOLLARS)

SECTOR	1970	1980	2000			2020		
			Projection I	Projection II	Projection III	Projection I	Projection II	Projection III
19. Packing Houses	11,392.9	17,116.7	22,695.0	22,207.4	24,256.7	26.464.7	25,679.0	30,219.7
20. Wholesale Trade-Tourism	242.1	410.8	891.5	891.5	763.8	1,542.3	1,542.3	1,312.9
-Other	23,500.8	56,377.2	137,814.0	158,812.5	122,815.0	318,400.7	361,179.2	228,463.2
21. Retail Trade-Tourism	1,883.0	3,195.3	6,934.3	6,934.3	5,941.2	11,996.5	11,996.5	10,212.2
-Other	49,675.8	114,444.9	319,709.0	355,581.0	289,900.9	840,465.3	944,134.4	616,746.4
22. Hotel, Motel, Restaurant & Campgrounds-Tourism	8,189.4	13,430.6	29,795.7	29,795.7	25,472.6	56,325.8	56,325.8	47,915.2
-Other	9,828.0	18,662.1	55,107.2	60,968.9	49,848.7	153,002.9	171,479.9	111,159.7
23. Health & Education	39,702.8	121,296.1	343,353.3	372,397.1	310,579.0	877,659.9	966,481.3	639,811.7
24. Other Service Trades-[1] -Tourism	778.6	1,315.8	2,838.6	2,838.6	2,422.5	4,868.9	4,868.9	4,144.4
-Other	14,866.0	40,563.9	120,925.8	134,603.9	110,027.5	305,761.2	343,582.5	224,976.4
25. Transportation	21,625.1	62,266.1	176,344.3	200,027.6	161,287.3	450,816.9	480,137.9	320,122.4
26. Finance, Insurance & Real Estate	44,609.5	112,134.8	326,630.3	364,044.6	261,212.6	716,589.9	804,073.0	448,438.5
27. Construction	41,547.3	94,048.8	205,299.9	235,833.9	183,127.4	425,825.4	489,164.9	354,803.4
28. Municipal Government	17,968.6	42,267.6	114,213.6	124,499.8	103,276.8	251,612.2	281,637.8	143,737.4
29. Utilities	23,742.1	61,067.2	176,753.0	199,147.0	163,688.8	418,161.8	469,819.9	285,871.3
Senior Government Employment	6,985.6	15,659.6	31,339.1	38,332.8	29,977.6	69,172.3	79,592.3	61,623.4
Services not included above[2]	1,345.2	2,854.5	6,951.9	7,535.7	6,288.5	18,021.1	19,818.5	13,366.1
TOTAL - TOURISM	11,093.1	18,352.4	40,460.1	40,460.1	34,600.1	74,733.5	74,733.5	63,584.7
OTHER	306,789.6	758,759.5	2,037,136.4	2,273,992.2	1,816,286.8	4,871,954.2	5,436,780.5	3,479,339.6
TOTAL	317,882.7	777,111.9	2,077,596.5	2,314,452.3	1,850,886.9	4,946,687.7	5,511,514.0	3,542,924.3

[1] Personal, business, repair, amusement, and miscellaneous services such as funeral directors and janitorial services; Post Offices; Lawyers; and the office of B.C. Tree Fruits Ltd.

[2] Services not included in the model of the Okanagan economy. Includes self-employed service trades such as domestic service.

TABLE 5.7

VALUE OF AGRICULTURAL PRODUCTION
1970 AND PROJECTED 1980, 2000, AND 2020
(IN THOUSANDS OF CONSTANT 1970 DOLLARS)

	1970	1980	2000			2020		
			Projection I	Projection II	Projection III	Projection I	Projection II	Projection III
Tree Fruits	30,378.3	46,703.8	53,025.6	50,801.5	57,176.6	56,102.0	53,336.9	65,593.4
Grapes	1,500.0	3,287.9	5,852.4	5,852.4	6,691.9	7,608.0	7,608.0	8,528.7
Livestock	2,749.9	3,124.0	4,532.0	5,030.0	5,389.0	6,469.0	7,489.4	8,151.0
Dairying	1,535.5	2,479.4	4,914.3	5,916.4	4,680.1	8,019.3	9,607.8	6,987.9
Vegetables	1,241.3	1,769.2	2,128.1	2,128.1	2,128.1	2,391.8	2,391.8	2,391.8
Field Crops	432.2	684.2	1,050.0	1,276.5	1,035.5	1,539.4	1,892.2	1,380.4
Poultry & eggs	1,304.0	2,095.9	3,563.5	3,797.9	3,210.0	5,510.0	5,999.5	4,152.0
Nursery Crops	1,021.0	1,166.9	1,269.9	1,269.9	1,269.9	1,385.6	1,385.6	1,385.6
TOTAL	40,212.2	61,311.3	76,335.8	76,073.6	81,581.1	89,025.1	89,711.2	98,570.8

SOURCE: I/O Model

expanding Okanagan economy, respectively. Exports should provide the balance (about 10% of the total increase of 450 million) of growth in the service sectors. Wholesale trade, transportation, finance, insurance, and real estate, and utilities sectors are assumed to maintain their role of service centre to the growing adjacent regions.

Resource-based manufacturing is expected to more than double its growth rate of 3.5% per year achieved from 1961 to 1970 (Figure 5.3). The addition of a second plant at Armstrong during 1971-1972 and the expansion of export demand to 1980 should allow plywood manufacturing to expand four-fold over 1970 (Table 5.5). Sawmill output is expected to double by 1980 as lumber exports, requirements for wood products manufacturing, and sales directly to Okanagan investment activity are forecast to encourage additional small wood capacity to handle available logs harvested on close utilization and third band standards. Fruit and vegetable canning and dairy products follow with growth of 73% and 51% to 1980. Rapid population growth in the Fraser Valley which is expected to convert agricultural land gradually to other uses, is forecast to shift dairy products manufacturing and fruit and vegetable canning to sources of raw materials in the Okanagan.

Between 1961 and 1970, tourist service output grew at the rapid rate of 7.3% per year (Table 5.8). The completion of the Rogers Pass section of the Trans-Canada Highway in 1962 enabled the Okanagan to attract a large increase of tourist from Western Canada[4]. Although conventions attract only about 5% of all visitors to the Okanagan, development and promotion of the region as a convention site during the 1960's was an important factor in the increase of off-season travel to the basin.

Consolidation of existing "visitor markets" is expected to be in large part responsible for the modification of growth in tourist services to 5.1% per year to 1980. About 62% of the total number of visitors are holiday visitors who stay at commercial accommmodation. Visitors for this purpose from each region of origin such as Alberta are expected to increase by its present visitation rate to the Okanagan (visits to the Okanagan per thousand population) times the projected population of each region. The balance of visitors - convention delegates, and business and holiday visitors staying at private residences in the Okanagan - are forecast to increase at provincial and basin population growth rates respectively.

As shown by Table 5.8, visitor-days are expected to increase by only 41.5% (3.5% per year), while tourist service output (wholesale, retail, and service

---

[4] Task 201, pp. 121-2.

TABLE 5.8

VISITOR-DAYS AND EXPENDITURES BY VISITORS BY SECTOR IN THE OKANAGAN BASIN 1970-2020

	1970	1980	High Growth 2000	Low Growth 2000	High Growth 2020	Low Growth 2020
Visitor Days (in thousands)						
Holiday	3,319.3	4,727.4	7,626.3	6,475.8	10,552.2	8,863.0
Business	234.0	342.0	521.6	506.6	835.8	619.8
Convention	174.3	206.5	342.6	342.6	482.3	482.3
TOTAL	3,727.6	5,276.0	8,500.5	7,325.0	11,870.3	9,965.1
Expenditures by Visitors (in Thousands of 1970 Dollars)						
1. Tree Fruits and Grapes	1,966.4	3,342.6	6,527.9	5,614.0	9,026.1	7,672.2
4. Vegetables	167.2	245.2	428.4	366.2	636.5	541.0
6. Poultry & Eggs	126.2	192.7	313.6	267.9	433.7	367.5
10. Meat and Dairy Products	518.6	626.2	890.7	761.3	1,231.5	1,045.3
11. Fruit and Vegetable Canners	13.4	31.7	86.2	73.7	119.2	101.5
12. Wineries, Soft Drinks and Distillers	91.1	154.6	317.9	272.3	461.9	393.2
13. Other Food & Beverage Industries	235.8	324.8	506.5	434.0	694.8	591.4
18. Other Manufacturing	20.0	28.4	46.0	39.5	63.9	54.4
20. Wholesale Trade	242.1	410.8	891.5	763.8	1,542.3	1,312.9
21. Retal Trade	1,883.0	3,195.3	6,934.3	5,941.2	11,996.5	10,212.2
22. Hotels, Motels, Restaurants & campgrounds	8,189.4	13,430.6	29,795.7	25,472.6	56,325.8	47,915.2
24. Other Services (personal & amusement)	778.6	1,315.8	2,838.6	2,422.5	4,868.9	2,144.4
TOTAL	14,231.8	23,298.7	49,577.3	42,429.0	87,400.1	74,351.2
Growth index:						
Visitor Days	100.0	141.5	228.0	196.5	318.4	267.3
Expenditure	100.0	163.7	348.4	298.1	614.1	522.4

trades) is projected to expand by 63.7% (5.1% per yesr). Therefore about one third of tourism output is accounted for by increased visitor expenditure per capita. In addition to expenditure within service sectors, Table 5.8 shows visitors make purchases, in most cases through the intermediary of retail trade, from agriculture and manufacturing sectors. Roadside stand sales of tree fruits to visitors in 1970 amounted to $1.9 million which is about 6.4% by weight of the total tree fruit crop, and in particular, 28.5% of Okanagan soft fruit projection[5]. By 1980, the share of tree fruit and soft fruit crop to visitors should reach 6.6% and 35.2% respectively. Significant output from meat and dairy products, other food and beverages industries (bakeries), vegetables, and poultry and eggs sectors is projected to be directed to visitor demand.

Provincial land use policy established under the Land Commission Act will prevent the past rapid rate of transfer of agricultural land to non-agricultural use and assuming government assistance in marketing the tree fruit crop and the introduction of high density planting in tree fruits, total agricultural output is expected to increase by about 50% to 1980 (Table 5.7). Since suitable land is available especially in the South Okanagan, acreage in grapes is expected to double and production to expand by $1.8 million (2.2 times) by 1980 in response to rising consumption by wineries within the province. As previously mentioned for dairy products manufacturing, relocation of dairying from the Lower Mainland should increase Okanagan production, $1 million (67%) by 1980. The balance of expected agricultural growth is due to increased household and tourist demand fon poultry and eggs ($0.8), expanded potato and asparagus acreage in response to export and basin cannery demand ($0.6 million), additonal exports of beef cattle ($0.3 million), increased forage requirements for beef and dairy sectors from the field crop sector ($0.2 million), and enlarged investment demand for ornamental plants and fruit trees from the nursery crop sector ($0.1 million).

Since little expansion of mining is expected to 1980, the resource extractive sectors of mining and logging as a unit are forecast to realize the slowest rate of growth, about 2.3% per year. The Brenda Mine is expected to maintain present production levels to 1980; additional mining activity should be restricted to small, local market oriented gravel pit operations. The logging sector should provide almost all the growth in the resource extractive group to 1980. As small woood capacity is added to the Okanagan sawmill sector, log production is estimated to increase by about 75% from a move to harvesting on a complete close utilization standard and exploitation of third band timber[6].

---

5 Chapter 4.

6 Task 201, pp.68-71 and Chapter 4.

b) Output - from 1980 to 2020

Growth of output after 1980 is forecast between 3.3% and 4.4% per year, less than one-half the rate expected for 1970-1980 (Table 5.4). It is anticipated service trades other than tourism should maintain the fastest rate of growth and provide from about 83% to 87% of output expansion to 2020. Tourist services should continue in relative importance to the Okanagan by expanding at rates near the regional average. Although non-resource-based manufacturing is predicted to add between $300 and $800 million to regional output by 2020, this activity should grow at less than one-quarter of the 12% per year rate achieved from 1970 to 1980. Since sawmill and plywood capacity is not expected to expand much past 1980 and 2000 respectively, resource-based manufacturing should also grow at much slower rates of between 1.8% and 2% per year. The western Canadian market[7] should provide the only scope for expansion of tree fruit production after 1980 and as a result, agricultural output growth should decrease to between 0.9 and 1.2% per year from the rapid rate of 4.3% per year to be achieved during the 1970's.

A decrease of output between $23 and $27 million is forecast for the mining and logging activity because log production is expected to reach the ceiling of maximum sustained yield shortly after 1980; and the Brenda Mine is expected to cease production by the year 2000 and no additional mining activity other than gravel pit operations is anticipated.

From 1970 to 1980, household demand, investment and government expenditures and interindustry purchases are expected to contribute equally, with exports projected as the constant residual, to achieve a growth rate of 9.5% per year for other service trades. After 1980, growth rates of around one-half of the previous decade - 3.9% to 4.8% per year - are expected as all categories of demand for services are forecast to increase more slowly. However, the mix of demand should change. Household demand is expected to rise to contribute about 40% of growth; investment and government expenditure is not expected to grow quite as fast and is expected to decrease to about 27%, while interindustry demand is forecast to expand at the slowest rate, contributing around 23% to output growth.

Lower rates of population growth - 1.5% to 2.4% relative to 3.9% per year - and income expansion per capita[8] - 2.9% to 3.9% versus 4.1% per year - are responsible for the decrease in the expansion of household demand from 9% per year growth for the 1970's to 4.4% and 5.5% per year forecast after 1980[9]. Investment and government expenditures were assumed to expand in proportion to the growth of all non-household final demand - manufacturing, agriculture,

---

[7] From 1970 to 1980 production per acre is projected to increase 1.84 times, and from 1980 to 2020, the corresponding increase is between 1.25 and 1.56 times. Source: Chapter 4.

[8] Table 5.17

[9] The growth of each demand category for other service trades is calculated from information presented in Table 5.4.

logging and mining exports, plus tourist expenditures - and the "export income" of the retired population, i.e. transfer payments and property income accruing to retired residents from sources outside the Okanagan[10]. The long term rate of growth of property income accruing to retired residents per capita from extra-regional sources is expected to fall from 5.1% per year in 1970 to 3.8% per year in 1980; tourist expenditures and especially exports of manufacturing and agriculture should grow at much slower rates after 1980[11]. Mining exports are forecast to reduce to zero[11], investment and government expenditures as a result should fall to rates of growth between 3.9% and 4.9% per year from 9.5% per year. Although a diminished rate of growth after 1980 for all activities is anticipated, much slower than average growth rates for agriculture, logging and mining, and manufacturing weigh most heavily upon the inter-industry demand for the products of other service trades to produce the lowest rates of increase for this demand group - 3.6% to 4.8% per year.

According to Table 5.6, the service sectors which have a high percentage of sales to household - hotel, motel and restaurant services, personal and amusement services, and retail trade - are expected to show the highest rates of growthe from 1980 to 2020 (5 1/2 and 8 1/2-fold increases). Although the health and education sector should not grow as fast as from 1970 to 1980, extrapolation of long-run Canadian data indicates that expenditure by households, local and senior governments should increase at about 3% per capita per year,[12] which allows the sector to expand from five to eight fold by 2020, the largest aggregate increase of any service sector. The remaining sectors, except packing houses, have a relatively larger dependence upon investment and government expenditure and interindustry demand, and as a result show lower rates of increase from 1980 to 2020. Packing houses are expected to follow growth of tree fruit production and expand between 50% and 70% by 2020.

Tourist services should expect to maintain a somewhat lower rate of expansion after 1980 as a result of declining rates of growth in the numbers of visitors to the Okanagan. Since the population growth in the areas of origin of holiday visitors staying at commercial accommodation is forecast to taper off past 1980[13] and assuming constant visitation rates to the Okangan, it follows the rate of increase of these visitors to the basin should fall. The same applies

---

10 "Export income" is estimated to be a measure of the contribution of retirement as a final demand sector along with exports and tourism. See Chapter 4.

11 Chapter 4.

12 Average of per capita expenditure increase estimated for health and education services. Chapter 4.

13 Chapter 4.

to convention visitor-day projections which are calculated in proportion to British Columbia population growth. Business visitors and holiday visitors staying at private residences in the Okanagan should also realize declining rates of growth after 1980 because each is tied to the diminished population growth rates for the basin after this date. However, tourism should grow at faster rates than manufacturing, mining and logging, and agriculture after 1980 and become almost as important to the Okanagan as agriculture by the end of the period.

Exports of mobile homes, motor vehicles, boats, wineries and distilleries, glass, carpets, furniture, plastics, and corrugated paper box industries, activities which were among those established or expanded while the Okanagan was designated for aid to manufacturing under the Area Development Incentives Act from 1965 to 1971, together are estimated to account directly for 80% of the increase of output in non-resource based manufacturing. This stimulus is expected to allow these activities to expand by 12% per year to 1980. However from 1980 to 2020, these industries should provide only 30% to 47% of the output increase in non-resource based manufacturing contributing largely to the decline in the growth rate for this activity to 2.0% to 3.4% per year.

The difference in growth rates between the two periods for these industries results from the assumption that the high growth rates experienced provincially and nationally during the 1960's should continue for the Okanagan to 1980; but will modify over the long run[14]. Mobile home and boat manufacturing, nationally and provincially, respectively, appear to be at a developmental stage in which high growth rates of 20% and 15% per year should be expected for Okanagan exports to 1980. The long term trend of output growth is expected for Okanagan exports to 1980, after which per capita consumption is expected to stabilize resulting in a 2.3 to 2.9 fold growth over the next forty years. Similary, the Okanagan should realize a doubling of production (exports) from 1972 to 1980 from an equal share in the expected increase of Canadian distillery production. After 1980, it is expected that increased production should be realized by regions with similar comparative advantages to the Okanagan. Glass exports and consumption by local wineries and distilleries are expected to follow national forecasts of wine and liquor consumption and double by 1980. However, after this date, the increase in consumption per capita is expected to cease and exports should follow expected growth of Canadian population and

---

[14] Chapter 4 outlines projections of final demand for industries within non-resource-based manufacturing.

increase between 1.7 to 3-fold by 2020. Consumption trends in Okanagan export markets indicate a rapid increase of exports to 1980 for carpets (3-fold), furniture (7-fold), plastics (3-fold), and corrugated paper boxes (1.7 fold) and growth rates less than one-half these over the long run to 2020. In addition, this group depends more heavily upon interindustry demand and as a result decreased rates of growth after 1980 for mobile homes affects the output of carpets and furniture industries, motor vehicles-plastics, wineries, distilleries, and packing houses-corrugated paper boxes, and construction-carpets, respectively

Industries primarily oriented to local markets constitute the balance of growth in non-resource-based manufacturing to 2020[15]. Again, as in the export oriented industries in the group, rates of growth for these industries are expected to decline rapidly after 1980, reflecting decreased activity in the Okanagan economy over the long run. As previously mentioned, these industries are expected to increase in importance relative to those that are export oriented as over one-half the total increase in non-resource-based manufacturing is estimated for this group.

The largest increase of between $50.2 and $90.7 million is expected for the printing and publishing industry within the other manufacturing sector, chiefly as a result of increased interindustry demands of service trades, especially retail trade. The construction sector is forecast to stimulate ready-mix concrete and concrete products manufacture (non-metallic mineral products sector) by $37.6 to $56.7 million by 2020. Interindustry demand from all sectors, especially those in manufacturing and the construction sector, should induce expansion of approximately equal magnitude for the metal fabricating and machine shop activities.

Smaller increases are forecast for the remaining local market-oriented non-resource-based manufacturing industries, most of which received aid along with the export oriented group under the Regional Incentives Program. Soft drinks, meat, and bread (other food and beverage industries sector) are expected to respond to demands from the household and service sectors. Okanagan investment activity should provide the major stimulus to aluminum pipe, agricultural implements and machinery industries (metal fabricating and transport equipment sector). The advance in the livestock, dairy and poultry sectors in the Okanagan should enhance feed mill production (other food and beverage industries sector); and the demand for laminated beams and sash and door products on an interindustry basis from the mobile home and construction industries, and for investment purposes in other sectors in the Okanagan is responsible for expansion of the other wood products sector.

---

[15] Chapter 4.

Although the establishment of pulp mill capacity is simulated to add $6.6 million and $22.9 million in Projection II, raw material constraints for sawmills and planing mills, plywood plants, and lower long term rates of growth for dairy products and fruit and vegetable canning are expected to reduce the rapid rate of growth in resource-based manufacturing of 7.3% per year forecast for the 1970's to 1.8% to 2.0% per year after 1980[16]. Log requirements for Okanagan sawmills and planing mills are expected to reach the limit of maximum sustained yield within the basin shortly after 1980. After the year 2,000, imports of peeler logs which are converted to plywood at Okanagan plants are expected to decline. A diminished rate of export growth as a result of anticipated declining rates of British Columbia population increase, modification of the expansion in tourist activity, slower rates of population growth in the Okanagan coupled with projected decreases in per capita consumption of milk products are responsible for the anticipated down turn in dairy products manufacture after 1980. Provincial production in the fruit and vegetable canning industry is forecast on the basis of anticipated population growth and projected change in consumption per capita. After 1980, given the Okanagan should maintain its share of provincial production, the rate of growth in the basin canning industry should decline as consumption per capita is not expected to continue to increase and provincial population is estimated to increase at a reduced rate.

Table 5.7 shows tree fruits to be primarily responsible for the fortunes of agriculture through to 2020. Despite a loss of over 3000 acres to urban use[17], the introduction of high density planting and dwarf species and lower projected levels of population for Projections II and III respectively are reflected in corresponding production changes in the dairying and poultry and eggs sectors. The livestock sector should also experience an increase in production in Projection II for this reason, however, an additional 7000 acres of pasture developed under Projection III is assumed to encourage expansion of exports in this sector.

5.3.2 Employment

a) Employment to 1980

Accompanying the past record in the growth of output from 1961-1970, significant changes in the structure of employment in the Okanagan basin have also taken place. According to Tables 5.9 and 5.10, other services and non-resource-based manufacturing increased in relative importance to the traditional employment base of agriculture, logging, and resource-based manufacturing, and

---

[16] Chapter 4.

[17] Table 5.7 and Chapter 4.

TABLE 5.9

EMPLOYMENT BY MAJOR ECONOMIC ACTIVITY, OKANAGAN BASIN 1961, 1970, AND PROJECTED 1980, 2000, AND 2020

	AGRICULTURE	MINING & LOGGING	MANUFACTURING		SERVICES		TOTAL
			Resource Based	Non Resource Based	Tourism	Other	
1961	2930	540	1650	720	640	12,120	18,600
1970	2632	664	1764	2407	1121	21,185	29,773
1980	2870	470	2030	4350	1620	35,460	46,800
2000 I	2370	200	1520	4990	2700	60,920	72,700
2000 II	2320	200	1630	7000	2700	66,550	80,400
2000 III	2530	200	1510	4680	2330	54,850	6,100
2020 I	1800	80	910	5480	3660	92,970	104,900
2020 II	1810	80	1100	7730	3660	104,120	118,500
2020 III	1950	80	880	4160	3080	66,250	76,400

SOURCE: I/O Model

TABLE 5.10

SHARE OF EMPLOYMENT BY MAJOR ECONOMIC ACTIVITY OKANAGAN BASIN 1961, 1970 AND PROJECTED 1980, 2000 AND 2020 (IN PERCENT)

	AGRICULTURE	MINING & LOGGING	MANUFACTURING		SERVICES		TOTAL
			Resource Based	Non Resource Based	Tourism	Other	
1961	15.7	2.9	8.9	3.9	3.4	65.2	100.0
1970	8.8	2.2	5.9	8.1	3.8	71.2	100.0
1980	6.1	1.0	4.3	9.3	3.5	75.8	100.0
2000 I	3.3	0.3	2.1	6.9	3.7	83.7	100.0
2000 II	2.9	0.2	2.0	8.7	3.4	82.8	100.0
2000 III	3.8	0.3	2.3	7.1	3.5	83.0	100.0
2020 I	1.7	0.1	0.9	5.2	3.5	88.6	100.0
2020 II	1.5	0.1	0.9	6.5	3.1	87.9	100.0
2020 III	2.6	0.1	1.2	5.4	4.0	86.7	100.0

SOURCE: Calculated from Table 5.9 .

were in large part responsible for the rapid growth of the employment to 1970. Primarily as a result of the Regional Incentives Program, employment in non-resource-based manufacturing expanded three-fold, providing economic activities previously unknown to the Okanagan such as mobile home, motor vehicle, glass, chemicals, and plastics manufacturing. Although some growth of service trades can be accounted for as a response to the influx of retired population to the Okanagan[18] service trades are largely local in scope and expanded due to increased demands of new industrial capacity and concomitant population growth induced by a growing labour force.

Agriculture, logging, and resource-based manufacturing employment decreased by 298, 200 and increased 114 respectively from 1961 to 1970 as a consequence of relatively moderate increases of output and improved productivity per worker. The centralization of sawmilling from small mills to larger facilities,[19] development of new methods of log harvesting[20], and improved methods of production in fruit and vegetable canning is estimated to have increased labour productivity 5%, 7.8% and 7% per year respectively[21]. Agricultural labour productivity in the Okanagan is estimated to have grown at 1.9% per year over the period 1951 to 1971 in response to improvement in labour productivity in all farm activities and the increase in importance of beef and dairy production with a lower labour requirement per unit of output relative to tree fruits[22].

The opening of the Brenda Mine near Peachland and the expansion of tourism after the completion of the Rogers Pass section of the Trans-Canada Highway in 1962 contributed the balance of employment growth of over 300 and almost 500 jobs respectively.

Following the output projection in Section 5.2.1, non-resource-based manufacturing is expected to maintain the fastest rate of job expansion to 1980. According to Table 5.11, an increase of 81%, (1,943 jobs), over 1970, is expected to almost entirely be concentrated within sectors 16 and 18, metal fabricating and transport equipment and other manufacturing (700 each), sector 12, - wineries, soft drinks, and distilleries (370), and sector 17 - non-metallic mineral products (200). Within these sectors, industries which were

---

18 Chapter 4.

19 Task 201 pp.73-78.

20 ibid pp. 72-73

21 Chapter 4, outlines data sources and methods.

22 Chapter 4.

TABLE 5.11

MANUFACTURING EMPLOYMENT BY SECTOR, OKANAGAN BASIN 1970, AND PROJECTED 1980, 2000 AND 2020

SECTOR	INDUSTRY	1970	1980	2000			2020		
				Proj. I	Proj. II	Proj. III	Proj. I	Proj. II	Proj. III
	Resource-based Manufacturing								
10	Dairy Products	203	210	240	260	230	220	250	200
11	Fruit & Vegetable Canners	439	350	320	310	320	200	200	200
14	Sawmills & Planing Mills	946	1,100	640	640	650	310	310	310
15	Plywood	176	370	320	320	310	180	190	170
	Pulp Mills	-	-	-	80	-	-	120	-
	TOTAL	1,764	2,030	1,520	1,610	1,510	910	1,070	880
	Non-Resource-based Manufacturing								
10	Meat Products	84	100	150	200	140	180	220	140
12	Wineries, Soft Drinks & Distilleries	148	520	490	680	490	360	510	340
13	Other Food & Beverage Industries	196	200	210	320	210	190	270	140
15	Wood Products other than Plywood	284	250	280	550	270	220	380	200
16	Metal Fabricating & Transport Equip.	744	1,430	1,190	1,720	1,190	1,040	1,480	780
17	Non-Metallic Mineral Products	437	640	660	840	630	550	690	440
18	Other Manufacturing	514	1,210	2,010	2,690	1,750	2,940	4,180	2,120
	TOTAL	2,407	4,350	4,990	7,000	4,680	5,480	7,730	4,160
	TOTAL MANUFACTURING	4,171	6,380	6,510	8,630	6,190	6,390	8,800	5,040

SOURCE: I/O Model

introduced to the Okanagan by the Regional Incentive Program - mobile homes, motor vehicles and boats (sector 16), the new distillery at Winfield constructed during 1971-72 and the expansion of winery production (sector 12), glass manufacturing (sector 17), and furniture, plastics, and the corrugated box industry (sector 18) - are expected to provide about 80% of the expansion of output (section 5.2.1) and employment to 1980. The remainder of employment growth is anticipated for the long established local market-oriented industries of sector 18 - printing and publishing, sector 17 - ready-mix cement and cement products, sector 16 - machine shops, and sector 12 - soft drinks.

Only minor changes of employment are forecast for other non-resource-based manufacturing sectors. The demand for meat packing (sector 10) and bakery products, the largest part of the "other food and beverages" sector, is expected to increase due to interindustry demands for these products in the service trades. Due to the anticipated increase in the per capita household consumption of beef relative to baked goods[23], employment in meat packing is expected to increase by about 20 employees[24], though there should be no significant change in bakery products employment. Labour productivity advance over 80% in other wood products manufacturing[25] is expected to more than overcome investment and interindustry (through construction) induced expansion of output for millwork and laminated wood products, resulting in little employment change to 1980.

As a consequency of higher labour requirements per dollar of output and lower forecasted increases in labour productivity[26], the other serivces group should realize 83% of the growth of employment to 1980 form only 62% of gross Okanagan production expansion. Following the forecast of the largest increase in output within the other services group, the maximum employment growth also belongs to the Health and Education sector with 3,400 jobs out of the total increase of 14,800 (Table 5.12). At the other end of the scale, packing house employment is expected to be virtually unchanged as increased production is to be offset by improved production methods.

---

23 Chapter 4.

24 ibid

25 Chapter 4.

26 The other services group in 1970 averaged 70.17 employees per million dollars of output as opposed to lower labour coefficients of 32.44 and 22.51 for manufacturing, and logging and mining respectively. Laobur productivity increase to 1980 is as follows: other services 4.1% per year; manufacturing 6.3%; and logging and mining 6%. The present employment coefficient for agriculture is estimated at 65.45 employees per million dollars of output and this is expected to grow at 3.5% per annum to 1980. Methods of estimation and sources of information appear in Chapter 4.

TABLE 5.12

SERVICE EMPLOYMENT BY SECTOR, OKANAGAN BASIN 1970
AND PROJECTED 1980, 2000 AND 2020

SECTOR	1970	1980	2000			2020		
			Proj. I	Proj. II	Proj. III	Proj. I	Proj. II	Proj. III
19. Packing Houses	1,229	1,160	900	860	960	580	570	660
20. Wholesale Trade - Tourism [1]	16	20	20	20	20	20	20	20
- Other	1,588	2,530	3,420	3,870	3,060	4,180	4,760	2,960
21. Retail Trade - Tourism	182	210	270	270	240	270	270	230
- Other	4,792	7,590	12,630	13,800	11,530	18,880	21,230	13,660
22. Hotel, Motel, Restaurants-Tourism	859	1,290	2,220	2,220	1,910	3,130	3,130	2,630
-Other	1,031	1,780	4,110	4,440	3,740	8,510	9,550	6,100
23. Health & Education	3,593	7,010	11,440	12,190	10,420	16,130	17,790	11,600
24. Other Service Trades-Tourism	80	120	210	210	180	260	260	220
-Other	1,520	3,790	8,800	9,610	8,060	16,570	18,650	12,030
25. Transportation	959	1,450	2,220	2,480	2,040	2,760	2,940	1,930
26. Finance, Insurance & Real Estate	1,542	3,540	8,240	9,020	6,630	13,800	15,510	8,520
27. Construction	2,121	2,890	3,810	4,300	3,420	4,560	5,240	3,740
28. Municipal Government	645	690	1,190	1,280	1,080	1,610	1,800	910
29. Utilities	914	1,090	1,710	1,890	1,590	2,080	2,360	1,410
Senior Government Employment	907	1,390	1,640	1,970	1,580	2,030	2,340	1,790
Services not included above	328	510	790	840	720	1,260	1,390	920
TOTAL - Tourism	1,121	1,620	2,700	2,700	2,330	3,660	3,660	3,080
TOTAL - Other	21,185	35,460	60,920	66,570	54,850	92,970	104,150	66,250
TOTAL	22,306	37,080	63,620	69,270	57,180	96,630	107,810	69,330

[1] Since employment in this sector does not directly serve tourists, the statistics for total tourism

Output in most of the remaining service sectors should increase between 2 and 2.9 times 1971 levels resulting in employment increases of 30% to 60% by 1980. Retail trade, with an increase of 2,826 jobs, wholesale trade (946), construction (769), transportation (491), senior government employment (483), and services "not included above" (182) are included in these secotrs. Since labour productivity for hotels, motels, restaurants, and campgrounds, other service trades (personal, business, and amusement services) and finance, insurance, and real estate sectors is not expected to improve to 1980, these sectors are forecast to increase employment by 73% for hotels et al servicing residents, 149% for Other Service Trades - residents, and 129% for Finance, Insurance and Real Estate, or 749, 2,270,and 1,998 jobs respectively. Relatively higher labour productivity increase is expected to modify employment growth of the utilities and municipal governments sectors to 176 and 45 jobs respectively.

About 500 additional jobs are forecast for the tourist industry to 1980 (Table 5.12). Except for retail trade, labour productivity is expected to remain constant so that increased visitor expenditure of 64% should be closely translated to an employment increase of 44%. Although aggregate increase is small in comparison to non-resource-based manufacturing and other services, the additional employment opportunities are expected to play an important role in the development of the Penticton and Oliver- Osoyoos regions (see Section b below).

According to Table 5.10, agricultural employment is expected to continue to decline in relative importance from 8.8% of the labour force in 1970 to 6.1% in 1980 (see also Table 5.1). Of the additional 200 jobs to be created in agriculture to 1980, about 97% will be involved in the expansion of tree fruit and grape production. Although the introduction of dwarf varieties and high density planting for tree fruits, especially apples, is expected to increase production by over 50% despite an acreage reduction of 10%, increased labour productivity with these methods should constrain employment requirements to only 6% above 1970[27]. A rapidly expanding market for grapes and the availability of suitable land, especially in the South Okanagan should allow production to more than double and employment to increase by 64%. The remaining sectors, on a net basis, contribute only six additional jobs to the agricultural labour force. As a consequence of output growth, employment increases are forecast in the dairying (about 20), poultry and eggs.

---

[27] Tree Fruits required 63.24 employees per million dollars of output in 1970; and by 1980, the employment coefficient is expected to decline to 43.47, 69% of the 1970 requirement. See Chapter 4 for sources of information

TABLE 5.13

AGRICULTURAL EMPLOYMENT BY SECTOR, OKANAGAN BASIN 1970 AND PROJECTED 1980, 2000 AND 2020

SECTOR	1970	1980	2000			2020		
			Projection I	Projection II	Projection III	Projection I	Projection II	Projection III
1. Tree Fruits	1,921	2,030	1,430	1,330	1,520	930	870	1,060
1. Grapes	189	310	400	400	450	350	350	390
2. Livestock	129	110	110	120	140	110	130	140
3. Dairying	97	120	170	190	160	180	220	160
4. Vegetables	125	130	110	110	120	90	90	90
5. Field Crops	33	40	40	50	40	40	50	30
6. Poultry & Eggs	31	40	40	50	40	50	50	30
7. Nursery Crops	107	90	70	70	70	50	50	50
TOTAL	2,632	2,870	2,370	2,320	2,530	1,800	1,810	1,950
% yearly change from previous Forecast Period		+0.869	-0.953	-1.058	-0.628	-1.366	-1.234	-1.294

vegetables, and field crop sectors (less than 10 each); and reductions are expected for livestock and nursery crop sectors (20 each).

Although the output of resource-based manufacturing should double by 1980, employment is expected to increase by only 15%, about 270 jobs. The construction of an additional plywood plant at Armstrong during 1971-72 (200 jobs), and expansion of sawmilling (150 jobs) are expected to provide almost all the increase in employment. Dairy products employment should increase marginally as output is estimated to grow slightly faster than labour productivity (2.9% per year). In spite of significant output growth at 5.6% per year to 1980, a reduction of almost 100 jobs is forecast in fruit and vegetable canning since labour productivity gains at 7% per year achieved during the past two decades are expected to continue.

Both primary extractive sectors - mining and logging - are expected to realize decreases of employment to 1980. Since the output of the Brenda Mine is not forecast to increase past 1970 levels and the output of other mining operations (gravel pits), which are expected to expand in response to inter-industry demands from construction is small in comparison, employment should decline at the anticipated rate of increase in labour productivity - 5.5% per year or by 130 jobs. Although logging activity should expand by 75% to 1980, logging employment is expected to fall by 20% (60 jobs) by 1980, as a result of an estimated two-fold increase of labour productivity.

b) Employment Forecasts to Year 2020

The agriculture employment forecast figures are given in Tables 5.9, 5.10 and 5.13 for the years 2000 and 2020. Table 5.13 gives the breakdown by industry sector, while in Table 5.9 the totals for each period and projection are summarized. The share in the overall agricultural employment picture is given in Table 5.10.

Referring to the totals given in Table 5.13, agricultural employment levels are agriculture are seen to decrease in all three projections for the first period, 1980 to 2000 and for the second period, 2000 to 2020. The percentage decreases per year for each alternative are shown in the bottom row of this table. This decrease is less for Projection III than for the other two projections, as would be expected from the assumptions described in Chapter 4. Tree fruits (section 1) is the largest employer of labour, however, as production in this sector slows down after 1980, the employment also is expected to fall. Growth in production of grapes, livestock, dairying, poultry and eggs, coupled with some increase in productivity, causes major changes in employment in these sectors although there is in general a small decrese in totals by the year 2020. Tree fruits have by far the largest decline in employment for all projections to 2020. Dairying is the only sector showing an increase in employment except for Projection

III, which has an overall decrease of 0.11%. With continuing industrial incentives, employment in Projection II increases at the rate of 2.41% per year for the first period, and 0.50% during the second period to 2020. This compares to the 1970-80 rate of 6.1% per year.

Within the non-resource-based manufacturing group, Meat Products (Sector 10) shows an increasing employment picture but, since most of the output is for local consumption, a levelling off after 2000 can be expected because of population growth limitations. Per capita consumption is not expected to increase at the same rate after 1990. In Sector 12, distilleries constitute a large share of the employment and are not expected to grow in production after 1980. Further incentives in Projection II will more or less maintain employment in this sector.

Other Food and Beverage Industries show small changes in employment with Projection I showing a decrease of 0.13% per year to 2020, Projection II showing an increase of 0.75% over the same 40-year period and Projection III decreasing at a rate of 0.89% per year. Increased production is offset by increased productivity thus reducing the rates of increase. Since the total employment in 1980 for this industry is only 2000, these changes are not too significant in the overall manufacturing employment picture.

A similar picture exists for the remaining portion of Sector 15, Wood Products other than Plywood, although and industrial incentive program is likely to increase production in projection II to 550 employees by the year 2000. Again the increased production discussed in the previous section of this report is offset by increased productivity resulting in a lower overall gain in employment and for some projections resulting in a decrease in employment.

Metal Fabricating and Transport Equipment showed a very rapid growth between 1970 and 1980 of 6.75% per year. For Projection II this growth rate can be expected to fall to less than 1% per year to the year 2000 and then decline at 0.75%. From Table 5.10, employment in the other projections is expected to decline with an overall rate of 1.5% per year for Projection I between 1980 and the year 2020.

In the non-metallic mineral products sector the glass output will level off as the wine and distilleries outputs stabilize. Concrete products are expected to show a healthy growth so the overall effect, considering increased productivity, will be a fairly stable employment picture with only Projection III showing a significant drop in employment during the period 2000 to 2020.

The carpet, cardboard box and furniture manufactures included in Sector 18 can be expected to experience healthy growth under all projections as the demands of the other local industries grow. This sector can be expected to provide the largest share of employment in the non-resource-based manufacturing group. For Projections I, II, III, the growths to 2020 are 2.24%, 3.15% and 1.41% per year respectively.

The projected service industries employment figures are shown in Table 5.12. Taken as a whole these sectors of the economy parallel the growth in output discussed in an earlier section of this report. In Table 5.9, the Service Industries are seen to provide 79.2% of the jobs in 1980 and this grows to over 91.0% in 2020 for all projections. The expected growth rate per year for Projection II is 3.17% during the years 1980 to 2000, and 2.24% for 2000 to 2020. Projection III rates are lower at 2.19% and 0.97% per year for each 20 year period respectively.

In summary, the Service industries are expected to grow at a high rate during the forecast period to 2020, and continue to be the major employer within the valley. The non-resource-based manufacturers will likely contribute relatively less to the overall employment, while the resource-based manufacturing section is expected to contribute only 1% of the employment by the year 2020 (compared to over 8% at present), experiencing an actual loss in total employment. This is due to resource limitations and increased productivity. Agriculture's initial share of total employment in 1970 was 8.8% but this will fall to between 1.5 and 2.6% by 2020 as the overall employment falls due to increased productivity.

The share of employment shown in Table 5.14 is similar to that shown in Table 5.10 except that the other services category has been eliminated. This recalculation of employment distributions shows more clearly how changes in employment occur between the smaller groups under the projection assumptions. Non-resource-based manufacturing shows an increasing share in employment to 2000 and then a levelling off. Tourism services show continuing growth to 2020, whereas Agriculture, Mining and Logging, and resource-based manufacturing show steady decreases.

The following table summarizes the overall rates of growth in employment and compares them to production growth rates taken from Table 5.6.

YEARLY TOTAL EMPLOYMENT GROWTH RATES[1]

	1970-1980	1980-2000	2000-2020
Projection I	5.21%/year	+2.74%/year	+2.11%/year
Projection II	-	+3.17%/year	+2.24%/year
Projection III	-	+2.19%/year	+0.97%/year

YEARLY TOTAL VALUE OF OUTPUT GROWTH RATES[2]

	1970-1980	1980-2000	2000-2020
Projection I	9.351%/year	5.04%/year	3.30%/year
Projection II	-	5.61%/year	4.43%/year
Projection III	-	4.40%/year	2.15%/year

[1]Taken from totals given in Table 5.9 .

[2]Taken from the totals given in Table 5.6

TABLE 5.14

SHARE OF EMPLOYMENT BY MAJOR ECONOMIC ACTIVITIES - EXCLUDING OTHER SERVICES
OKANAGAN BASIN 1961, 1970 AND PROJECTED 1980, 2000 AND 2020
(IN PERCENT)

	AGRICULTURE	MINING & LOGGING	MANUFACTURING		TOURISM SERVICES	TOTAL
			Resource Based	Non Resource Based		
1961	45	08	26	11	10	10 .0
1970	30	08	21	28	13	100.0
1980	26	04	18	38	14	100.0
2000 I	20	02	13	42	23	100.0
2000 II	17	01	12	50	20	100.0
2000 III	22	02	13	42	21	100.0
2020 I	15	01	08	45	31	100.0
2020 II	13	01	07	53	26	100.0
2020 III	19	01	09	41	30	100.0

In these tables it is seen that overall employment grows in all sectors and under all the projection assumptions. The difference in growth rates between output and employment can be attributed to increases in productivity over the forecast periods.

5.3.3 Employment by Region

a) Employment by Region to 1980

Significant differences in employment structure exist among the regions of the Okanagan (Table 5.15, 5.16). The most significant differences occur in service trades as a higher proportion of total employment is involved in this sector in the three larger regions. As a result of a larger economic base, the large regions are able to provide a wider range of service trades to households and other industries. Although the other regions, except Vernon, have a larger agricultural labour force, no region is as dependent upon agriculture as the Oliver-Osoyoos region with 23.9% of total employment involved in this activity compared to 8.8% for the Okanagan as a whole. With the exception of a larger commitment to tourism and a slightly smaller involvement in non-resource-based manufacturing, the Penticton region exhibits an employment pattern similar to the Okanagan as a whole.

Kelowna Region

The Kelowna region dominates all categories of economic activity except tourism. The region contains the majority of acreage in tree fruits, the Brenda Mine at Peachland, the basin's only plywood plant, one-third and almost one-half the Okanagan's sawmill and fruit and vegetable canning capacity respectively, and a large part of non-resource-based manufacturing activity which settled in the Okanagan during the period of the Regional Incentives Program. In terms of aggregate employment, the Kelowna region surpasses the Vernon region in both categories of manufacturing activity, though resource-based and non-resource-based

TABLE 5.15

OKANAGAN BASIN

EMPLOYMENT BY MAJOR ECONOMIC ACTIVITY AND REGION

1970 AND PROJECTED 1980, 2000 AND 2020

SECTOR	AGRICULTURE	MINING & LOGGING	MANUFACTURING		SERVICES			TOTAL
			Resource-based	Non-Resource-based	Tourism	Other	Other (including Government)	
1970								
Oliver-Osoyoos	551	33	47	88	126		1,461	2,306
Penticton	659	48	438	554	441		5,524	7,664
Kelowna	1,024	471	680	1,021	360		8,673	12,228
Vernon	398	112	559	744	194		5,527	7,574
TOTAL	2,632	664	1,764	2,407	1,121	0	21,185	29,773
1980								
Oliver-Osoyoos	700	20	50	280	170	1,980		3,200
Penticton	660	40	410	860	620	8,510		11,100
Kelowna	1,060	320	600	2,010	550	16,560		21,100
Vernon	450	90	970	1,200	280	8,410		11,400
TOTAL	2,870	470	2,030	4,350	1,620	35,460	0	46,800
2000								
Projection I								
Oliver-Osoyoos	640	20	20	290	360		3,270	4,600
Penticton	460	30	300	950	940		13,220	15,900
Kelowna	830	80	400	2,360	940		30,990	35,600
Vernon	440	70	800	1,390	460		13,440	16,600
TOTAL	2,370	200	1,520	4,990	2,700	0	60,920	72,700
Projection II								
Oliver-Osoyoos	620	20	20	360	360	3,620		5,000
Penticton	440	30	290	1,210	940	14,690		17,600
Kelowna	780	80	400	3,430	940	33,770		39,400
Vernon	480	70	900	2,000	460	14,490		18,400
TOTAL	2,320	200	1,610	7,000	2,700	66,570	0	80,400
Projection III								
Oliver-Osoyoos	690	20	20	270	320	2,880		4,200
Penticton	500	30	300	890	730	11,950		14,400
Kelowna	890	80	400	2,210	850	27,970		32,400
Vernon	450	70	790	1,310	430	12,050		15,100
TOTAL	2,530	200	1,510	4,680	2,330	54,850	0	66,100
2020								
Projection I								
Oliver-Osoyoos	490	10	10	300	490		4,700	6,000
Penticton	320	10	170	1,030	1,240		18,230	21,000
Kelowna	590	30	220	2,670	1,310		50,680	55,500
Vernon	400	30	510	1,480	620		19,360	22,400
TOTAL	1,800	80	910	5,480	3,660	0	92,970	104,900
Projection II								
Oliver-Osoyoos	500	10	10	390	490	5,400		6,800
Penticton	290	10	170	1,300	1,240	20,690		23,700
Kelowna	560	30	230	3,880	1,310	56,690		62,700
Vernon	460	30	660	2,160	620	21,370		25,300
TOTAL	1,810	80	1,070	7,730	3,660	104,150	0	118,500
Projection III								
Oliver-Osoyoos	530	10	10	230	400	3,220		4,400
Penticton	360	10	170	800	1,050	12,910		15,300
Kelowna	680	30	220	2,050	1,110	36,310		40,400
Vernon	380	30	480	1,080	520	13,810		16,300
TOTAL	1,950	80	880	4,160	3,080	66,250	0	76,400

SOURCE: I/O Models for totals.

manufacturing play a relatively more important role in the development of the Vernon region than the Okanagan as a whole.

Projections of employment by major ecomomic activity and region appear on Table 5.15. The growth of the agricultural, manufacturing, and tourism sectors is disaggregated directly to the regions. Estimates of other services employment for each region, the largest employment group, are calculated on the basis of projected population growth. Applying basin-wide projected trends for the employment to population ratio to the ratio for each region, the total required labour force is calculated from the projected population at each future date. Estimated employment in agriculture, manufacturing and tourism for each region is then subtracted from the total required labour force to arrive at employment in the service sector (for residents).

Employment projections by region are probably subject to a greater degree of error than basin-wide projections. For agriculture, manufacturing, and tourism development, regional projections take into account, when possible, changes in regional comparative advantage. However, in many sectors, all regions, except possibly Oliver-Osoyoos, exhibit approximately equal comparative advantage, and the existing distribution of output by region is assumed operative in the future. In addition, local government policies have played an important role in affecting the type of development allowed to occur in each region; and these policies could radically change in the future. As mentioned, in section 5.2.2, population projections for each region are calculated with the assumption that growth factors establishing the differential between regional and basin population growth rates from 1961 to 1971 should be maintained through to 2020. To the extent that each region changes its relative growth potential i.e., its comparative attraction of ecomomic activities and demographic characteristics, both population and service employment will be altered from that projected. Therefore, employment projections by region are meant to be only indicative of a likely pattern of regional economic structure, considering the limitations of past trends and projections of each economic activity.

Following the projection for the basin as a whole, other service employment is expected to realize the largest gains in each region to 1980 (Table 5.15). To the extent that projected employment of all activities except other services falls short of "required labour force" for a future population level, the region should attract household, investment, government, interindustry, and export demands for the product of the various sectors of other services to fill the employment gap. For this reason, the Kelowna region should experience the largest increase in service trade employment to 1980, followed by Penticton, Vernon and Oliver-Osoyoos. Since the estimation of resident service employment by region is dependent upon population projections and estimates of regional disaggregations of other economic activities, rather than a direct assessment of the factors of growth for each resident service sector within each region, growth of service employment by region shall not be discussed.

The Kelowna region should increase its supremacy as the centre of non-resource-based manufacturing. The construction of a distillery at Winfield during 1971-1972 and the expansion of winery capacity (350 jobs); continued growth of trailer, motor vehicle, machinery, and boat manufacturing (160 jobs); and additional development of carpets, chemicals, plastics, corrugated box, printing and publishing, cement products, and furniture industries as a result of expanding export and inter-industry demand (460 jobs) contribute to the growth of almost 1,000 jobs in non-resource-based manufacturing to 1980. Tourism is expected to maintain its importance to the Kelowna region by adding almost 200 jobs to the regional labour force by 1980. A small decline in employment in logging and resource-based manufacturing is expected by 1980.

Increased production per acre in tree fruits, despite a loss of over 1,000 acres to urban use (Table 5.17) is expected to increase agricultural production and employment, though the significance of farm employment to the Kelowna labour force should decline. Forecasted employment decline in the Okanagan fruit and vegetable canning industry and relocation of some sawmill capacity to the Vernon region should result in a decrease of 80 jobs in resource-based-manufacturing. Since the Brenda Mine and 28% of logging employment is located in the Kelowna region, about 150 out of the 200 jobs forecast to be lost basin-wide should be realized in the region.

Vernon Region

Along with minor increases in agricultural and tourist service employment, development of the Vernon region is characterized by an increasing dependence upon the expansion of manufacturing activities. Approximately one-third of the increase of 450 jobs in non-resource based manufacturing is due to expansion of glass production. A share of expansion in plastics products, printing and publishing, and furniture manufacturing (140 jobs) and metal fabricating and transport equipment industries (mobile homes, boats, aluminum products, and machinery - 120 jobs) conclude the balance of growth in this activity. The establishment of a plywood plant at Armstrong during 1971 and the attraction of a higher proportion of the Okanagan's sawmill capacity should compose almost the entire increase of 270 employees in resource-based manufacturing. Although tourism employment is not expected to grow at the rate of manufacturing activities, the industry should add almost 100 jobs to the Vernon labour force by 1980. Following the basin-wide trend, agricultural employment should increase but decline in relative importance to other economic activities. Expansion of household and export demand for dairy products, potatoes, and asparagus is expected to be met by the development of suitable lands for dairying and vegetable production in the North Okanagan (30 jobs). Since acreage in tree fruits is expected to decline by less than 10%, considering productivity advance per acre, production and employment is expected to result in a decline of less than 1% of the Vernon labour force by 1980 as the region is forecast to experience a proportionate share of the decrease of Okanagan logging employment.

Penticton Region

Non-resource-based manufacturing and tourism together with mining, logging and resource-based manufacturing are expected to provide the major thrust to growth in the Penticton region to 1980. Penticton is forecast to remain the centre of the mobile home industry in the Okanagan, and as a result, this industry should provide about three-quarters of the total increase of 300 jobs anticipated for non-resource-based manufacturing. Local market oriented manufacturing industries - metal fabricating, machine shops, furniture, and printing and publishing - constitute the balance of growth of this group. Tourism should continue to be more significant for the development of the region than for the Okanagan as a whole as almost 200 additional workers are forecast to be required for tourism service. Employment in agriculture is not expected to change to 1980. Although 1400 acres of land under tree fruits (Table 5.19) is forecast to be lost to urban uses by 1980, tree fruit production is expected to increase at about the same rate as labour productivity expansion due to expanded production per acre. Thus no change of employment over the period is expected. The Penticton region should capitalize upon increased employment opportunities in Okanagan sawmilling, but a proportionate share of forecasted employment reduction in the basin's fruit and vegetable canning industry should result in a net employment deline of about 7% (30 jobs) in resource-based manufacturing. A fate similar to canning is forecast for logging employment as the region should participate in the basin-wide reduction of labour requirements in this industry.

Oliver-Osoyoos Region

In addition to increasing dependence upon agricultural and tourism service employment, the Oliver-Osoyoos region is expected to gain part of the Okanagan's expansion of non-resource-based manufacturing activity. Mobile home manufacturing was established near Oliver during 1971 and it is forecast that the industry should be a major employer of similar size as tourism (170 jobs) by 1980. Printing and publishing, and machine shops - local market oriented industries - should provide the balance of growth in non-resource-based manufacturing (20 jobs). Since most of the suitable land for the cultivation of grapes in the Okanagan exists in the region, 1700 out of 1900 (see Table 5.19) acres and almost all of the 120 workers projected to be added to basin grape production should be realized here. With 30 more jobs from increased production of tree fruits, in total the region should experience over 60% (150 jobs) of the expansion of agricultural employment in the basin. Although a lower rate of population growth should diminish the increase of business travel and numbers of holiday visitors staying at private homes relative to other regions, growth of holiday visitors staying at commercial accommodation should enable tourism service to maintain its significance and add almost 50 jobs to the regions labour force by 1980. In terms of employment, resource-based manufacturing, which includes sawmills only, and logging are expected to remain unchanged and decline respectively.

As capacity is centralized in larger operations, the small sawmills located in the Oliver-Osoyoos region are expected to realize a decreasing share of Okanagan production. The logging sector in the Oliver-Osoyoos region should follow in proportion to anticipated employment losses for the basin as a whole.

b) Employment by Region from 1980 to 2020

Data on employment by major economic activity and region are given in Tables 5.15 and 5.16. As discussed in Section a, these projections of employment by region are probably subject to larger individual errors than the basin-wide projection. The information in these two tables should however give insight into possible regional growth patterns within the basin.

The increasing share in overall employment in the Kelowna region is particularly evident over this 40 year period. This growth occurs at the expense of other regions and other industry sectors. The relatively high growth rate of population for the Kelowna region is not unexpected since a large population can support a larger service trade. Although the growth in "Other Services" is most noticeable, the non-resource-based manufacturing sector is also growing somewhat faster than other industry sectors (see also Table 5.14). This is due mainly to the growth in mobile home manufacturing located in the Penticton region. Mining and Logging in the Vernon region will also experience an increasing share of employment in this sector because of the availability of timber resources in this area.

Agriculture is also seen to increase its share of employment within the Oliver-Osoyoos region. This increase is based on the land-use projection discussed elsewhere in this report.

5.3.4 Income

The projections for household incomes are given in Table 5.17, using information taken directly from the model. The 'Working Resident Property' income is projected on the basis of comparing earned income with property from Canadian data from 1950 to 1970, and was found to be a growing percentage of income (0.80% per year). In 1970 property income (18.0 million dollars) was 9.109% of earned income (197.6 million dollars) but in 1980 this percentage was increased to 9.865% based on an increase of 0.802% per year. Similarly, for the other resident property income projections for the resident transfer and miscellaneous income were projected as a constant percentage (18%) of earned income.

For the retired residents, the property projection to 1980 is based on the British Columbia average growth rate of 5.125% per year per capita.

The projection to 2020 uses the Canadian average rate of 3.75% per year per capita. In 1970 the per capita property income was $777 and based on a growth

TABLE 5.16A

SHARE OF EMPLOYMENT BY MAJOR ECONOMIC ACTIVITY AND REGION*

SHARE OF TOTAL EMPLOYMENT BY MAJOR ECONOMIC ACTIVITY

YEAR	REGION	AGRICULTURE	MINING & LOGGING	MANUFACTURING		SERVICES		TOTAL
				Resource-based	Non Resource-based	Tourism	Other	
1970								
	Oliver-Osoyoos	23.8	1.4	2.0	3.8	5.5	63.4	100.0
	Penticton	8.6	0.6	5.7	7.2	5.8	72.1	100.0
	Kelowna	8.4	3.9	5.6	9.3	2.9	70.9	100.0
	Vernon	5.3	1.5	7.9	9.8	2.6	73.0	100.0
1980								
	Oliver-Osoyoos	21.9	0.6	1.6	8.8	5.3	61.9	100.0
	Penticton	5.9	0.4	3.7	9.5	2.6	78.5	100.0
	Kelowna	5.0	1.5	2.8	9.5	2.6	78.5	100.0
	Vernon	3.9	0.8	8.5	10.5	2.6	73.8	100.0
2000	Projection I							
	Oliver-Osoyoos	13.9	0.4	0.4	6.3	7.8	61.1	100.0
	Penticton	2.9	0.2	1.9	6.0	5.9	83.1	100.0
	Kelowna	2.3	0.2	1.1	6.6	2.6	87.1	100.0
	Vernon	2.6	0.4	4.8	8.4	2.8	81.0	100.0
2000	Projection II							
	Oliver-Osoyoos	12.4	0.4	0.4	7.2	7.2	72.4	100.0
	Penticton	2.5	0.2	1.6	6.9	5.3	83.5	100.0
	Kelowna	2.0	0.2	1.0	8.7	2.4	85.7	100.0
	Vernon	2.6	0.4	4.9	10.9	2.5	78.8	100.0
2000	Projection III							
	Oliver-Osoyoos	16.4	0.5	0.5	6.4	7.6	68.6	100.0
	Penticton	3.5	0.2	2.1	6.2	5.1	83.0	100.0
	Kelowna	2.7	0.2	1.2	6.8	2.6	86.3	100.0
	Vernon	3.0	0.5	5.2	8.7	2.8	79.8	100.0
2020	Projection I							
	Oliver-Osoyoos	8.2	0.2	0.2	5.0	8.2	78.3	100.0
	Penticton	1.5	0.0	0.8	4.9	5.9	86.8	100.0
	Kelowna	1.1	0.1	0.4	4.9	2.4	91.3	100.0
	Vernon	1.9	0.1	2.3	6.6	2.8	86.4	100.0
2020	Projection II							
	Oliver-Osoyoos	7.4	0.1	0.1	5.7	7.2	79.4	100.0
	Penticton	1.2	0.0	0.6	5.5	5.2	87.3	100.0
	Kelowna	0.0	0.0	0.4	6.2	2.1	90.4	100.0
	Vernon	1.9	0.1	2.6	8.5	2.5	84.5	100.0
2020	Projection III							
	Oliver-Osoyoos	12.0	0.2	0.2	5.2	9.1	73.2	100.0
	Penticton	2.4	0.1	1.1	5.2	6.9	84.4	100.0
	Kelowna	1.7	0.1	0.5	5.1	2.6	89.9	100.0
	Vernon	2.3	0.2	2.9	6.6	3.2	84.7	100.0

* SOURCE: Table 5.15

TABLE 5.16B

SHARE OF EMPLOYMENT BY MAJOR ECONOMIC ACTIVITY AND REGION*

OVERALL SHARE OF TOTAL EMPLOYMENT

PERCENT

YEAR	REGION	AGRICULTURE	MINING & LOGGING	MANUFACTURING		SERVICES		TOTAL
				Resource-based	Non Resource-based	Tourism	Other	
1970								
	Oliver-Osoyoos	1.8	0.1	0.2	0.3	0.4	4.9	7.7
	Penticton	2.2	0.2	1.5	1.9	1.5	18.6	25.9
	Kelowna	3.4	1.6	2.3	3.4	1.2	29.1	41.0
	Vernon	1.3	0.4	2.0	2.5	0.6	18.6	25.4
	TOTAL	8.7	2.3	6.0	8.1	3.7	71.2	100.0
1980								
	Oliver-Osoyoos	1.5	0.0	0.1	0.6	0.4	4.2	6.8
	Penticton	1.4	0.1	0.9	1.8	1.3	18.2	23.7
	Kelowna	2.3	0.5	1.3	4.3	1.2	35.4	45.0
	Vernon	1.0	0.2	2.1	2.6	0.6	18.0	24.5
	TOTAL	6.2	0.8	4.4	9.3	3.5	75.8	100.0
2000	Projection I							
	Oliver-Osoyoos	0.9	0.0	0.0	0.4	0.5	4.5	6.3
	Penticton	0.6	0.0	0.4	1.3	1.3	18.2	21.9
	Kelowna	1.1	0.1	0.6	3.2	1.3	43.6	49.0
	Vernon	0.6	0.1	1.1	1.9	0.6	18.5	22.8
	TOTAL	3.2	0.2	2.1	6.8	3.7	84.0	100.0
2000	Projection II							
	Oliver-Osoyoos	0.8	0.0	0.0	0.4	0.4	4.5	6.1
	Penticton	0.5	0.0	0.4	15.	1.2	18.3	21.9
	Kelowna	1.0	0.1	0.5	4.3	1.2	42.0	49.2
	Vernon	0.6	0.1	1.1	2.5	0.6	18.0	22.9
	TOTAL	2.9	0.2	2.0	8.7	3.4	82.8	100.0
2000	Projection III							
	Oliver-Osoyoos	1.0	0.0	0.0	0.4	0.5	4.4	6.3
	Penticton	0.8	0.0	0.5	1.3	1.1	18.1	21.8
	Kelowna	1.3	0.1	0.6	3.3	1.3	42.6	49.8
	Vernon	0.6	0.1	1.2	2.0	0.6	18.2	22.7
	TOTAL	3.7	0.3	2.3	7.0	3.5	83.3	100.0
2020	Projection I							
	Oliver-Osoyoos	0.5	0.0	0.0	0.3	0.5	4.4	5.7
	Penticton	0.3	0.0	0.2	1.0	1.2	17.4	20.1
	Kelowna	0.6	0.0	0.2	2.5	1.2	48.2	52.7
	Vernon	0.4	0.0**	0.5	1.4	0.6	18.5	21.4
	TOTAL	1.8	0.1	0.9	5.2	3.5	88.5	100.0
2020	Projection II							
	Oliver-Osoyoos	0.4	0.0	0.0	0.4	0.4	4.6	5.8
	Penticton	0.2	0.0	0.1	1.1	1.0	16.5	18.9
	Kelowna	0.5	0.0	0.2	3.3	1.1	47.8	52.9
	Vernon	0.4	0.0**	0.6	1.8	0.5	18.0	21.
	TOTAL	1.5	0.1	0.9	6.6	3.0	86.9	100.0
2020	Projection III							
	Oliver-Osoyoos	0.7	0.0	0.0	0.3	0.5	4.2	5.7
	Penticton	0.5	0.0	0.2	1.0	1.4	16.9	20.0
	Kelowna	0.9	0.0	0.3	2.6	1.5	47.6	53.0
	Vernon	0.5	0.0**	0.6	1.4	0.7	18.1	21.3
	TOTAL	2.6	0.1	1.1	5.3	4.1	86.8	100.0

* SOURCE: Table 5.15

** regional shares are less than 0.5%

TABLE 5.17

REAL HOUSEHOLD INCOME BY SOURCE, OKANAGAN BASIN 1970,
AND PROJECTED 1980, 2000 AND 2020
(IN MILLIONS OF 1970 DOLLARS)

	1970	1980	2000			2020		
			Projection I	Projection II	Projection III	Projection I	Projection II	Projection III
Income from Okanagan Sources[1]	197.6	475.6	1193.5	1349.1	1076.9	2875.6	3251.5	2114.2
Income from outside the Okanagan								
Working Residents - Property[2]	18.0	46.9	139.9	158.2	126.1	396.1	448.2	289.8
Transfer and Miscellaneous[3]	35.4	84.9	215.8	244.0	194.4	520.7	589.2	380.9
Retired Residents - Property[2]	10.7	30.5	150.8	163.3	133.7	511.8	562.6	379.5
Transfer and Miscellaneous[3]	19.1	47.4	228.1	247.1	202.2	756.1	831.1	560.7
Total Income	280.8	685.4	1928.1	2161.7	1733.3	5060.3	5682.6	3725.1
Income per Capita ($)	2590	4200	7400	7600	7300	12900	13200	12800

[1] Wage and salaries, professional income, business profits, property income, interest income paid by Okanagan economic activities to Okanagan residents. Also includes local government welfare payments made to residents

[2] Interest, dividends and other forms of business income accruing to Okanagan residents.

[3] Transfer payments include pensions of all types, unemployment insurance, etc.
Miscellaneous income includes non-taxable income such as workmen's compensation and military income.

of 5.12% per year is estimated at $1280 in 1980.

The following table gives the projected number of retired residents with the Valley. These figures are based on provincial figures.

For Projection I

	No. of Retired Residents	
1970	13,762	retirement age 65
1980	23,900	retirement age 60
2000	56,400	retirement age 55
2020	91,700	retirement age 55

From Projections II and III, these figures have been adjusted slightly to reflect the different assumptions.

The growth to 2020 of Transfer and Miscellaneous Income for retired residents was dealt with in a similar fashion using the provincial growth rate of 3.62% per year per capita.

As for the projections themselves, the bottom row of the table indicates a per capita input of $2590 per person in the valley in 1970, rising to $4200 by 1980 and finally to approximately $13000 by the year 2020. This represents an increase of 400% or 3.28% per year. These estimates appear high but in fact the ratio of income from working and retired residents derived from sources outside the Valley to Income from Okanagan sources, taken from the model, only increases by 77%.

5.4 LAND USE

In this section, agricultural and urban land use for each economic projection is discussed, both for the various regions of the Okanagan and for the eight selected tributary streams. These results are based in the land capability analyses, mentioned in section 2.3 of this report. The basic assumptions underlying this land capability study generally follow the major set of assumptions associated with the development of the three economic growth projections. These assumptions are as follows:

Projection I

a) Agricultural and potentially agricultural lands will be protected under the guidelines outlined in the Land Commission Act.
b) Some agricultural lands will be lost due to development of "land banks" within or close to urban areas.
c) There may also be development of new agricultural acreage to replace that lost within or close to the urban areas.
d) This Projection generally implies moderate urban growth within a relatively distinct transition zone between the urban and rural environments.

Projection II

a) Agricultural and potentially agricultural land will not be protected from subdivision.
b) The decrease in agricultural land will occur in accordance with the pressures from urban and industrial development
c) This projection generally implies an urban sprawl condition with a broad transition zone between the urban and rural environments due to industrial growth.

Projection III

a) Agricultural lands will remain protected, as in Projection I, and government subsidies and incentives will stimulate development of new acreage on potentially agricultural lands
b) This increase will include development of agricultural acreage on Indian Reserves.
c) This Projection implies limited urban growth with minimum urban sprawl and a low level of industrial development.

Actual projections of agricultural landuse to 2020 were based on both physical land capability and economic assumptions underlying the demand for irrigated crops and changes in technology. Before actual projections could be made, the total agricultural capability was assessed. Canada Land Inventory maps were examined and two groups of agricultural lands identified and measured - Group 1 including Classes 1 to 3 inclusive, representing good agricultural potential for irrigated agriculture, and Group 2 which comprised of Class 4 agricultural lands, more suited to dryland range management. Table 5.18 lists the areas for each of these two groups for the major map sheets in the valley.

Based on this land capability base plus the projections of urban and rural population included in Table 5.1, agricultural land use projections were developed. These projections were prepared for both irrigated and non-irrigated lands as shown in Table 5.19 for each sub-region of the valley. Maps of these agricultural lands are included in the back of this report.

It was assumed that future sub-division for urban and industrial development would take place on irrigated tree fruit and pasture acreages near urban centres. Acreages under grapes, vegetables, nursery crops and unirrigated croplands are expected to remain unaffected by urban development. Major assumptions concerning projections of these acreages are as follows:

Grapes - the acreage was projected on the basis of future projected winery production on a regional basis - past trends 1962 to 1970, given by the British Columbia Department of Agriculture, were extrapolated to the year 2020.

TABLE 5.18

TOTAL AREA OF AGRICULTURAL CAPABILITY LANDS - GROUP 1 and 2 - OKANAGAN BASIN

NATIONAL TOPOGRAPHIC SYSTEM NUMBER	AREA	AREA IN ACRES	
		GROUP 1	GROUP 2
82E/3E	Osoyoos	915	3,104
82E/3W	Osoyoos	9,612	8,768
82E/4E	Keremeos	19,176	641
82E/6	Beaverdell	-	4,688
82E/5E	Penticton	14,961	4,390
82E/5W	Penticton	-	-
82E/11	Wilkinson Creek	-	-
82E/12E	Summerland	10,905	4,290
82E/12W	Summerland	1,707	20,437
92H/9	Bankier	-	-
82E/215	Damfino Creek	-	-
82E/14E	Kelowna	-	5,894
82E/14W	Kelowna	29,209	9,154
82E/13	Peachland	15,844	11,402
92H/16	Paradise Lake	-	-
82L/2	Creighton Creek	-	-
82L/3E	Oyama	9,425	199
82L/3W	Oyama	14,599	8,581
82L/4E	Shorts Creek	1,317	9,031
82L/4W	Shorts Creek	-	-
82L/6E	Vernon	14,678	5,795
82L/6W	Vernon	19,880	6,905
82L/5E	Westwold	-	1,329
82L/11E	Salmon Arm	4,020	903
82L/11W	Salmon Arm	215	88
TOTAL FOR BASIN		166,463	105,599

TABLE 5.19

AGRICULTURAL LAND USE BY SUB-REGION, OKANAGAN BASIN 1970,

AND PROJECTED 1980, 2000 AND 2020

ACRES

YEAR	REGION	TREE FRUITS	PASTURE	OTHER	TOTAL IRRIGATED	TOTAL NON-IRRIGATED	TOTAL AGRICULTURE	TOTAL URBAN
1970								
	Vernon	2,939	11,652	1,042	15,633	22,351	37,984	3,980
	Kelowna	14,259	5,885	2,003	22,147	5,935	28,082	6,910
	Penticton	8,905	2,290	139	11,334	1,892	13,226	4,270
	Oliver-Osoyoos	5,716	3,872	1,368	10,956	2,594	13,550	750
	Basin	31,819	23,699	4,552	60,070	32,772	92,842	15,910
1980								
	Vernon	2,720	11,890	1,290	15,900	23,200	39,100	5,050
	Kelowna	13,190	5,860	2,050	21,100	5,900	27,000	8,440
	Penticton	7,510	2,650	240	10,400	2,100	12,500	5,700
	Oliver-Osoyoos	5,270	3,590	3,240	12,100	2,600	14,700	810
	Basin	28,690	23,990	6,820	59,500	33,800	93,300	20,000
2000	Projection I							
	Vernon	2,500	12,440	1,360	16,300	24,300	40,600	6,150
	Kelowna	12,010	5,690	2,600	20,300	5,700	26,000	10,160
	Penticton	6,400	2,970	330	9,700	2,100	11,800	6,800
	Oliver-Osoyoos	5,220	3,550	4,330	13,100	2,600	15,700	890
	Basin	26,130	24,650	8,620	59,400	34,700	94,100	24,000
2000	Projection II							
	Vernon	2,500	12,440	1,360	16,300	24,300	40,600	6,700
	Kelowna	11,510	5,590	2,600	19,700	5,600	25,300	11,750
	Penticton	6,190	2,970	330	9,500	2,100	11,600	7,500
	Oliver-Osoyoos	5,160	3,510	4,330	13,000	2,600	15,600	1,050
	Basin	25,360	24,510	8,620	58,500	34,600	93,100	27,000
2000	Projection III							
	Vernon	2,560	16,180	1,360	20,100	24,300	44,400	5,850
	Kelowna	14,170	6,630	2,600	23,400	7,500	30,900	9,890
	Penticton	7,520	3,150	330	11,000	2,100	13,100	6,400
	Oliver-Osoyoos	5,460	3,560	5,180	14,200	2,600	16,800	860
	Basin	29,710	29,520	9,470	68,700	36,500	105,200	23,000
2020	Projection I							
	Vernon	2,290	12,750	1,460	16,500	25,000	41,500	7,200
	Kelowna	11,200	5,510	3,190	19,900	5,500	25,400	11,330
	Penticton	5,680	3,090	430	9,200	2,100	11,200	7,500
	Oliver-Osoyoos	5,090	3,460	5,460	14,000	2,600	16,600	970
	Basin	24,250	24,810	10,540	59,600	35,200	94,800	27,000
2020	Projection II							
	Vernon	2,290	12,750	1,460	16,500	25,000	41,500	7,770
	Kelowna	9,730	4,980	3,190	17,900	5,000	22,900	14,200
	Penticton	4,880	3,090	430	8,400	2,100	10,500	8,800
	Oliver-Osoyoos	4,960	3,380	5,460	13,800	2,600	16,400	1,230
	Basin	21,860	24,200	10,540	56,600	34,700	91,300	32,000
2020	Projection III							
	Vernon	2,440	17,600	1,460	21,500	25,000	46,500	6,450
	Kelowna	15,160	7,050	3,190	25,400	9,200	34,600	10,760
	Penticton	7,660	3,310	430	11,400	2,100	13,500	6,900
	Oliver-Osoyoos	5,460	3,550	6,390	15,400	2,600	18,000	890
	Basin	30,720	31,510	11,470	73,700	38,900	112,600	25,000

Vegetables - Again figures were based on BCDA projection for each variety of vegetables. For regional breakdowns, 1959 to 1971 trends for each variety (source: Interior Vegetables Marketing Agency) were extrapolated to 2020.

Nursery - Based on BCDA projections and regional breakdowns were assumed constant over the forecast period.

Croplands - same as Nursery.

Based on previous trends, the depletion of agricultural lands around urban centres was considered to affect irrigated tree fruit and pasture lands by a ratio of 4 to 1 except in the Penticton area where only tree fruit acreages surround the city. In this region all urban growth was subtracted from tree fruit acreages. Generally, a density of 10 persons per acre was assumed in the determination of agricultural land losses, though it was assumed that all vacant agricultural lands within urban boundaries would be developed for urban purposes. For Projections I and II, it was assumed that tree fruit acreages would not be expanded above existing levels because most of the suitable lands had already been developed and no agricultural incentives were included (as for Projection III) to encourage farmers to develop these lands.

Table 5.20 gives the population density (per acre) for the various subregions within the basin. These figures were derived from Table 5.1 and 5.3. The major growth and increase in population density is seen to be in the Kelowna area where the urban density almost doubles. Similarly, the rural population is seen to increase almost three times under the low growth assumption and by more than fifteen times under the high growth assumptions to the year 2020. The reasons for the high growth rate in the Kelowna region should have become apparent from discussions in previous sections on the output incomes and employment projections for the basin and the Kelowna region.

5.4.1 Land Use Projections in Tributary Basins

As mentioned in section 2.3, a range of projections of future population and agricultural acreages were prepared for eight selected tributary watersheds. These projections allowed a range of water requirements to be assessed and in turn permitted the capability of water supplies to meet these demands to be determined. This range of projections was deliberately oriented towards preparing extreme high and low forecast of water requirements. The high water demand was based on maximum agricultural land development (Classes 1-4 inclusive) plus maximum likely population growth (based on Projection II) on non-agricultural lands. The low water demand projection was based on low population growth (Projection III) assumed to occur on agricultural lands, resulting in a reduction of agricultural acreage. In addition a median projection was prepared representing the arithmetic mean between the two extreme projections.

TABLE 5.20

PROJECTIONS OF POPULATION DENSITIES BY SUB-REGION 1970-2020

SUB-REGION	1970	1980	2000		2020	
			High Projection II	Low Projection III	High Projection II	Low Projection III
Oliver-Osoyoos						
Urban-Pop/Acre						
Oliver (450 acres)	5.15	5.00	4.88	5.01	4.53	5.28
Osoyoos	2.91	3.40	4.16	4.20	6.56	4.15
Rural-Pop/Acre	0.43	0.51	1.15	0.57	1.80	0.60
Pop./Irrigated Acre	0.78	0.82	1.33	1.02	1.71	1.03
Penticton						
Urban-Pop/Acre						
Penticton	5.85	5.67	7.05	6.75	8.26	6.87
Summerland	5.39	5.07	5.60	5.83	6.32	6.06
Rural-Pop/Acre	0.24	0.33	0.67	0.45	1.18	0.55
Pop/Irrigated Acre	2.44	3.46	6.09	4.39	9.51	4.72
Kelowna						
Urban-Pop/Acre						
Kelowna	6.40	7.76	9.99	9.90	12.65	11.26
Wood Lake (Winfield/Oyama)	4.61	5.63	8.42	7.44	11.00	8.63
Peachland	4.38	6.25	8.83	9.17	13.71	12.26
Westbank	5.23	6.36	8.57	9.80	12.00	12.59
Rural-Pop/Acre	0.29	0.53	1.69	0.86	4.39	1.21
Pop/Irrigated Acre	2.26	3.67	7.46	5.24	13.37	6.35
Vernon						
Urban-Pop/Acre						
Vernon	5.38	5.60	6.86	6.59	8.23	6.68
Armstrong	3.40	3.82	4.85	4.31	5.97	4.77
Rural-Pop/Acre	0.20	0.27	0.54	0.32	0.96	0.36
Pop/Irrigated Acre	1.79	2.36	3.79	2.56	5.28	2.73

The results of these three projections to 2020 are tabulated on Table 5.21 because of the nature of the assumptions, there is a large range in population and irrigated acreage and consequently water requirements between the high and low projections. It is interesting to note that in all creeks with the exception of Vernon and Kelowna Creeks, there appeared to be adequate water supplies in all but consecutive drought years to meet the high water demand projections. Additional storages and modifications to existing release patterns from headwater storages would be required in some creeks as future water requirements increase.

5.5 OUTPUT, INCOME AND EMPLOYMENT MULTIPLIERS

Important benefits from the Input/Output model are the development of output, income and employment multipliers. From these multipliers it is possible to determine the effect of the overall increase of, say, employment when the number of jobs in a sector is increased. For example, if the final demand for tree fruits is increased so that 1 new job is created in this sector, then the total number of jobs within the Okanagan is increased by an additional 0.85 jobs. In other words, an increase of 100 jobs represents an overall increase of 185 jobs. The reason for this is the interdependence of various industries within the economy. New jobs in the tree fruit sector means that there will be additional work created in other sectors which support the tree fruit industry, for example, Packing Houses, Wholesale Trade, Other Services, and Finance and Insurance. Direct increases in employment, income or output in one industry sector, affects other sectors, resulting in further secondary or indirect increases.

Table 5.22, 5.23 and 5.24 give the output, income and employment multipliers for the Okanagan Basin for the years 1970, 1980, 2000 and 2020. These figures are the ratio of total (direct and indirect) to the direct effect on the economy for each of the multiplier categories. For example, in the Sector 12 - Wineries, Soft Drinks and Distilleries, the income multiplier is 2.31 in 1970. This means that, if sales to the Final Demand of the model for this sector are increased sufficiently to increase the income to sector 12 by one dollar, the overall increase within the Okanagan Basin will be 2.31 dollars. In the year 2020 this figure drops to 1.78 dollars.

TABLE 5.21

POPULATION AND IRRIGATED LAND PROJECTIONS
FOR EIGHT SELECTED TRIBUTARY STREAMS TO 2020

PROJECTION		TRIBUTARY								TOTAL
		Trout Creek	Peachland Creek	Powers Creek	Equesis Creek	Vernon Creek	Kelowna Creek	Mission Creek	Penticton Creek	
Irrigated Acreage	1970	4,306	617	1,637	356	14,075	4,848	10,135	1,666	37,640
	2020 High	6,274	1,591	1,818	1,282	23,157	8,176	12,371	1,433	56,102
	2020 Medium	5,354	1,236	1,719	1,189	20,021	5,905	9,678	1,464	46,566
	2020 Low	3,918	514	1,432	355	13,410	4,446	8,501	1,426	34,002
Population	1970	5,960	1,444	3,490	90	24,360	10,420	10,340	18,146	74,250
	2020 High	21,360	4,670	6,510	410	100,050	15,335	48,940	51,850	249,125
	2020 Medium	17,380	3,105	5,450	345	83,020	11,802	41,090	48,055	210,247
	2020 Low	13,400	1,540	4,390	280	65,990	8,270	33,240	44,260	171,370
Water Requirements (Diversion in Acre-Feet)	1970	13,384	3,446	5,293	1,021	33,525	12,888	31,814	11,173	112,314
	2020 High	25,109	7,527	7,372	3,613	72,887	26,432	51,315	19,036	213,351
	2020 Medium	21,221	6,143	6,757	3,340	62,994	19,086	41,142	18,083	178,766
	2020 Low	15,718	3,536	5,576	1,027	46,115	13,704	34,377	16,924	137,977

TABLE 5.22

OUTPUT MULTIPLIERS BY INDUSTRY SECTOR

INDUSTRIAL SECTOR	OUTPUT MULTIPLIERS			
	1970	1980	2000	2020
1. Tree Fruits	1.69	1.72	1.81	1.98
2. Livestock	1.46	1.50	1.57	1.60
3. Dairying	1.59	1.65	1.73	1.78
4. Vegetables	1.29	1.34	1.41	1.45
5. Field Crops	1.28	1.30	1.32	1.32
6. Poultry and Eggs	1.40	1.42	1.45	1.47
7. Nursery	1.18	1.21	1.26	1.28
8. Logging	1.15	1.26	1.31	1.33
9. Mining	1.10	1.10	1.10	1.10
10. Meat and Dairy Products	1.26	1.29	1.31	1.32
11. Fruit and Vegetable Canners	1.52	1.70	1.57	1.54
12. Wineries, Soft Drinks, & Distilleries	1.46	1.23	1.30	1.35
13. Other Food and Beverage	1.10	1.11	1.13	1.13
14. Sawmills and Planing Mills	1.33	1.42	1.49	1.45
15. Other Wood Products	1.48	1.54	1.60	1.61
16. Metal Fabricating	1.10	1.13	1.11	1.16
17. Non Metallic	1.18	1.22	1.26	1.27
18. Other Manufacturing	1.11	1.13	1.14	1.14
19. Packing Houses	1.25	1.40	1.37	1.66
20. Wholesale Trade	1.24	1.37	1.54	1.55
21. Retail Trade	1.26	1.40	1.51	1.46
22. Hotel, Tourist Camp	1.41	1.42	1.57	1.49
23. Health and Education	1.09	1.21	1.29	1.23
24. Other Services	1.19	1.20	1.34	1.27
25. Transport	1.10	1.12	1.13	1.14
26. Finance, Insurance	1.05	1.07	1.08	1.07
27. Construction	1.31	1.44	1.51	1.56
28. Municipal Government	1.40	1.62	1.70	1.57
29. Utilities	1.07	1.10	1.11	1.11

TABLE 5.23

INCOME MULTIPLIERS BY INDUSTRY SECTOR

INDUSTRIAL SECTOR	INCOME MULTIPLIERS			
	1970	1980	2000	2020
1. Tree Fruits	2.13	1.89	2.10	2.42
2. Livestock	1.53	1.63	1.74	1.82
3. Dairying	1.53	1.72	1.84	1.91
4. Vegetables	1.30	1.36	1.45	1.51
5. Field Crops	1.00	1.37	1.40	1.42
6. Poultry and Eggs	1.73	1.77	1.83	1.86
7. Nursery	1.15	1.18	1.22	1.25
8. Logging	1.10	1.29	1.34	1.36
9. Mining	1.20	1.18	1.18	1.19
10. Meat and Dairy Products	1.46	1.54	1.62	1.67
11. Fruit and Vegetable Canners	1.94	3.49	3.10	3.51
12. Wineries, Soft Drinks, & Distilleries	2.31	1.68	1.76	1.78
13. Other Food and Beverage	1.10	1.14	1.16	1.18
14. Sawmills and Planing Mills	1.37	1.40	1.50	1.50
15. Other Wood Products	1.69	1.79	1.97	2.10
16. Metal Fabricating	1.24	1.32	1.40	1.60
17. Non Metallic	1.17	1.24	1.33	1.42
18. Other Manufacturing	1.13	1.12	1.15	1.16
19. Packing Houses	1.22	1.31	1.30	1.56
20. Wholesale Trade	1.12	1.19	1.29	1.31
21. Retail Trade	1.14	1.24	1.33	1.33
22. Hotel, Tourist Camp	1.35	1.31	1.40	1.32
23. Health and Education	1.04	1.09	1.15	1.13
24. Other Services	1.11	1.10	1.16	1.12
25. Transport	1.14	1.20	1.28	1.35
26. Finance, Insurance	1.06	1.07	1.07	1.06
27. Construction	1.27	1.33	1.36	1.34
28. Municipal Government	1.59	2.12	2.10	1.80
29. Utilities	1.11	1.20	1.24	1.26

TABLE 5.24

EMPLOYMENT MULTIPLIERS BY INDUSTRY SECTOR

INDUSTRIAL SECTOR	EMPLOYMENT MULTIPLIERS			
	1970	1980	2000	2020
1. Tree Fruits	1.82	1.83	1.91	2.03
2. Livestock	1.46	1.49	1.53	1.55
3. Dairying	1.46	1.49	1.53	1.55
4. Vegetables	1.18	1.20	1.22	1.24
5. Field Crops	1.23	1.23	1.22	1.20
6. Poultry and Eggs	1.68	1.67	1.66	1.62
7. Nursery	1.10	1.11	1.12	1.13
8. Logging	1.07	1.23	1.31	1.64
9. Mining	1.28	1.30	1.31	1.31
10. Meat and Dairy Products	1.68	1.78	1.89	1.97
11. Fruit and Vegetable Canners	2.06	3.05	3.19	3.95
12. Wineries, Soft Drinks, & Distilleries	2.29	1.95	2.06	2.19
13. Other Food and Beverage	1.12	1.15	1.18	1.22
14. Sawmills and Planing Mills	1.37	1.43	1.61	1.64
15. Other Wood Products	1.68	1.83	1.96	2.02
16. Metal Fabricating	1.21	1.26	1.30	1.45
17. Non Metallic	1.23	1.30	1.43	1.54
18. Other Manufacturing	1.12	1.13	1.13	1.11
19. Packing Houses	1.12	1.21	1.23	1.53
20. Wholesale Trade	1.17	1.26	1.47	1.58
21. Retail Trade	1.12	1.21	1.32	1.36
22. Hotel, Tourist Camp	1.12	1.21	1.32	1.36
23. Health and Education	1.04	1.13	1.22	1.22
24. Other Services	1.09	1.07	1.11	1.08
25. Transport	1.12	1.17	1.22	1.29
26. Finance, Insurance	1.07	1.08	1.09	1.06
27. Construction	1.31	1.46	1.55	1.58
28. Municipal Government	1.80	2.82	2.98	2.64
29. Utilities	1.10	1.19	1.25	1.32

CHAPTER 6

Summary and Discussion

6.1 SUMMARY

The major social and economic characteristics of the three economic projections in the year 2020 are compared in Table 6.1. In essence, there are few significant differences in Projections I and II suggesting that considerably greater investments in industrial development than occurred during the Industrial Incentives Program of the late 1960's would be required to increase the pace of economic growth significantly in the Okanagan Valley. This conclusion is more indicative of the present healthy state of the Okanagan economy than the inability of the basin economy to absorb a faster pace of investment.

Under Projection III, population growth rates could be significantly reduced by a reduction in the availability of job opportunities, and thus, a slowing down in the rate of economic investment. It should be emphasized that if population totals are to be constrained, investment in the so-called 'clean' industries, such as carpet, trailer and glass manufacturing may be necessary in addition to controls on development of resource-based industries such as wood products and food processing which are more usually associated with public concerns about pollution.

Reduction of the rate of employment growth appears to be the only realistic way of controlling the pace of economic growth and consequent population increase. Other approaches, such as placing quotas on migration into the basin, do not appear practical at this time. Placing some restrictions on job availability, however, may in turn create other social problems in the valley. There is already a relatively larger proportion of older people (over 50 years) in the Okanagan compared to the Province as a whole, and restricting the pace of employment can only aggravate this situation as the younger age groups seek employment outside the basin. This, in turn, could lead to a continued decline in the rate of natural births in the valley. In addition, due to the attractiveness of the area for retirement and the gradual reduction in the retirement age, it may be expected that relatively more middle-aged and older people will decide to move to the valley.

Residents will have to compare these consequences of a low growth policy with some of the social and environmental benefits, such as lower population densities, especially in urban areas and greater greenbelt and recreational space. Some of these characteristics are compared in the three Projections in

TABLE 6.1

EXAMPLES OF RANGE OF ECONOMIC GROWTH THAT MAY OCCUR IN THE OKANAGAN VALLEY TO THE YEAR 2020

PROJECTION	DESCRIPTION OF PROJECTION	POPULATION	EMPLOYMENT	TOTAL VALUE OF BASIN INCOME (millions)+	VALUE OF BASIN INCOME PER PERSON (dollars)+	IRRIGATED ACREAGE * (acres)	TOURISTS
1970 Situation		115,500	29,800	$ 280.8	2,590	60,000	700,000
Projection I Continuation of Existing Economic Policies	Continuation of existing economic growth policies in the valley. The high rate of population, employment and industrial development experienced in the past 10 years is expected to continue until 1980 and then gradually decline over the next 40 years to 2020. In accordance with present government policy, agricultural lands in the valley will be protected from subdivision for residential and industrial purposes.	391,000	104,900	5,060.3	12,900	59,600	2,300,000
Projection II High Economic Growth	Growth that may be realized if the Okanagan economy is stimulated through senior government support for industrial development and employment-creating activities. To provide a contrast with the first projection described above, it is assumed that existing controls on subdivision of agricultural land would be relaxed and some transfers of land-use from agriculture to residential and industrial development would result.	430,000	118,500	562.6	13,200	56,600	2,300,000
Projection III Low Economic Growth	Growth that may be realized if there is a retardation of the current economic trends through controls on industrial development. These controls would apply to both non-resource based, or clean industries, such as trailer manufacturing, as well as resource based industries such as lumber mills and pulp mills. In this projection the emphasis would be on environmental quality, agricultural lands would be protected from subdivision, and additional agricultural development encouraged.	290,000	76,400	3,725.1	12,800	73,700	1,800,000

*Totals for Irrigated Acreage in 2020 are preliminary and subject to revision.

+Figures shown based on 1970 Dollars

Table 6.2. Presently, urban population densities average about 5.6 people per acre, but this density could almost double to 10.6 people per acre, in 2020 under Projection I, in which agricultural land is preserved and higher urban densities can be anticipated. Urban densities under Projection II may be expected to be somewhat lower than in Projection I, because of the small increase of sub-division of agricultural lands, but there would be less green space in the basin. Under Projection III, urban densities would be the lowest of all three Projections, together with the lowest ratio of population per acre of irrigated land compared with the other projections.

Under Projection III, due to the relative decrease in the rate of economic growth compared with Projections I and II, total income in the valley and per capita income could be lower. This impact is not expected to be significant, however, as the generally buoyant and diversified economy in the Okanagan under all three Projections is expected to result in large increases in income per capita over current levels.

In conclusion, the Okanagan Valley has a soundly based economy, which is expected to grow steadily over the next 50 years. Only through careful economic planning, however, can the present healthy balance between economic growth and high environmental quality be maintained. The opportunities for water and related resource management necessary to achieve the economic, environmental and social goals for the Okanagan within this framework of economic growth are discussed in the main report of the Okanagan Basin Study.

6.2 DISCUSSION

As mentioned in the introductory chapter of this report, the input-output model approach was employed partly as an experimental method in river-basin planning. The advantages and disadvantages of the approach are summarized in this chapter, hopefully as an aid to future basin planning studies.

6.2.1 Advantages

The major advantage of the input-output approach is its ability to assess changes in economic policies in a region and consequently to develop sensitivity analysis. Through the detailed information base which relates all economic sectors to all other sectors, it is possible to trace the impact of changes of output in one sector throughout the entire economy. Consequently, alternative growth policies which were an integral component of the economic studies could be analysed with a reasonable degree of success.

The second major advantage of the model is the detailed data base that was produced for the 1970 economic conditions. Even though this model cannot project economic growth with a very high degree of reliability beyond 10 years, this information base should be invaluable for regional planners in the Okanagan

TABLE 6.2

POPULATION AND AGRICULTURAL STATISTICS, 1970-2020

FEATURE	1970 (1971 Census)	1980	PROJECTION I		PROJECTION II		PROJECTION III	
			2000	2020	2000	2020	2000	2020
1. Population								
Urban	89,861	124,700	197,000	285,000	213,800	314,400	177,900	211,900
Rural	24,672	37,300	65,000	105,700	70,200	115,600	59,100	78,100
TOTAL	114,539	162,000	262,000	391,000	284,000	430,000	237,000	290,000
2. Population Density (People per acre)								
Urban	5.65	6.24	8.21	10.57	7.91	9.83	7.73	8.48
Rural	0.27	0.39	0.63	1.05	1.00	1.92	0.54	0.67
3. Urban Area (Acres)	15,910	20,000	24,000	27,000	27,000	32,000	23,000	25,000
4. Agricultural Area								
Irrigated (acres)	60,070	59,500	59,400	59,600	58,500	56,600	68,700	73,700
Pop. per Irrigated Acre	1.91	2.72	4.41	6.56	4.85	7.60	3.44	3.93

over that period to help them prepare their more detailed regional growth projections.

A third advantage, which was not properly demonstrated in this report is the opportunity to use the model density to project both the value of and demand for water resources in alternative consumptive uses as well as to project waste loadings from major sectors of the economy. Early in the Okanagan Study, it was agreed that projections of water requirements and waste loadings would be undertaken indirectly and by using the outputs of population, irrigated acreage and industrial growth and applying general water use and waste loading coefficients. A more direct approach to these projections is possible through the calculation of water use and waste loading coefficients per dollar of output. In this approach, both direct and indirect growth factors can be incorporated right into the economic model and projections performed quickly through computer analysis. The indirect approach, developing projections from the economic model outputs is somewhat slower and potentially less accurate.

6.2.2 Disadvantages

The major disadvantages of the model are time, costs and the problem of preparing model assumptions. The large data base required to build the 1970 economic model of the Okanagan economy involved costly questionnaire interviews of a sample of business firms. Generally speaking, Canada Census data are simply not adequate in small regions for the construction of the model. These time and cost requirements can be critical in a planning study, especially when many other components of the study rely directly on the information contained in economic projections, Thus, water quantity, water quality and recreation studies had to wait upon the development of economic growth projections before the capability of the water resource to meet projected demands could be assessed. In this study, the delay in preparing economic projections resulted in a significant reduction in the time available to complete the comprehensive evaluations required under the study.

The other major disadvantage is not peculiar to the input-output approach, but is relevant to all efforts to project economic growth in a small region over a 50 year period. In all cases, critical assumptions have to be made regarding changes in a host of economic parameters such as labour productivity, income and labour coefficients, final demands by sector, etc. Many of these assumptions are so sensitive to the development of total economic projections that they can overshadow the quality of the data base prepared for 1970 conditions. In other words, one has to question if it is worth the costs and time to develop a strong 1970 economic model only to have its usefulness cast into doubt after the 1980 projections because of the difficulty in forecasting these critical assumptions.

In this regard, the Economic Base Model approach has much to commend it. The Economic Base Model can generally be prepared using existing Census of Canada data without the need to generate additional information. Projections can thus be made with a minimum of expense and time, though they are probably subject to greater inaccuracies. Consequently, relative accuracy must be 'traded-off' against minimum cost and time commitments.

It would appear that the use of both the economic base model and the input-output model in tandem could be a useful tool in basin planning. The economic base model would be used first to integrate the existing economic data base and prepare general projections. Though these economic projections would be relatively inaccurate, they could be used to point out important sensitivies in water and related resource demands and consequent management alternatives. Thus, it may be seen that once water demands rise above a certain critical level, the available supplies in the basin are inadequate and importation is required to sustain economic growth.

Input-output models could then be devised to zero in on these economic forecasts and attempt to reduce their relative inaccuracies. Furthermore, the economic and social consequences of slowing down the rate of economic growth could be assessed against the net benefits of water importation associated with the continued high levels of economic development if this approach is properly developed it may also be possible to reduce the data requirements involved in preparing the input-output model by examining closely those sectors that are critical in controlling economic growth.

It would be an interesting exercise to compare economic projections produced in this report from an input-output model based on say 15 sectors rather than 29. The reduction of costs of data gathering and analysis could then be compared with any changes in the relative accuracy of projections. It would also be illuminating to undertake sensitivity analysis on various levels of sector aggregation. This would indicate which sectors were critical in defining the three economic projections and which sectors were less important. It is possible that, aggregation of the less important sectors might lead to cost and data efficiencies with a minimum loss in the relative reliability of demand projections.

In conclusion, much experience was gained in undertaking these detailed economic projections for the Okanagan Basin Study. More research into economic methodology is required, however, to assess the value of this experience more accurately.

REFERENCES

REFERENCES

Allen, Robert Loring and Watson, D.A.	The Structure of the Oregon Economy: An Input-Output Study, Bureau of Business & Economic Research, University of Oregon, Eugene, 1965.
Anderson, Bonem, Chapman Miernyk, Price and Udis	Colorado River Basin Study, U.S. Department of The Interior, Federal Water Pollution Control Administration and the University of Colorado, August, 1967.
Bargur, J.S., E.M. Lofting, H.C. Davis	An Intersectoral Programming Model for the Management of the Waste Water Economy of the San Francisco Bay Region (unpublished).
B.C. Department of Agriculture	Agricultural Resources-Productions and Potential 1970
B.C. Department of Finance	"B.C. Financial and Economic Review"1952/53 to 1969/70.
B.C. Department of Trade and Commerce	"An Economic Study of the Okanagan-Shuswap Region" April, 1971
B.C. Water Resources Service	"Preliminary Report on Future Land Use in the Okanagan Basin".
Canada-British Columbia Okanagan Basin Agreement	"Water-based Recreation in the Okanagan Valley"-Technical Supplement VIII.
Dunn, E.S.	"A Statistical and Analytical Technique for Regional Analysis", Papers and Proceedings, Regional Science Association, Vol. VI (1960), pp. 97-112.
Economic Council of Canada	Canadian Consumer Function Study (T.Schweitzer) 3 parts.
Hartman, L.M. and Seastone, D.	Water Transfers: Economic Efficiency and Alternative Institutions, John Hopkins Press, Baltimore, 1970.
Isard, Walter	"Methods of Regional Analysis: An Introduction to Regional Science:, M.I.T. Press, Cambridge, Mass., 5th ed., 1967.
Kendrick, J.S.	"Productivity Trends in U.S." (1959)
Leontieff, W.W.	"The Structure of American Economy: Oxford University Press, New York, 1951.
Leontieff, W.W. et al	"Studies in the Structure of the American Economy" Oxford University Press, New York, 1953.
Level, C.L.	"Exogenous and Endogenous Factors in Area Growth: Survey and Evaluation of Present Methods of Analyses", Regional Development Analysis, Agricultural Policy Institute, North Carolina, pp. 23.36, May 1963.

References Continued

Lofting, E.M.	An Interindustry Analysis of the California Water Economy Engecon Publications, Berkey, Calif. 1970
Martin, W.E.	The Use and Value of Input-Output Models in the Analysis of Water Pollution Abatement- Discussion Paper No. 68-5, Harvard Water Program, Harvard University, Cambridge, Mass., 1968.
Miernyk, William H.	Simulating Regional Economic Development: An Inter industry Analysis of the West Virginia Economy, Heath Lexington Books, D.C. Heath & CO.,Lexington, Mass., 1970.
Schweitzer, T.	Personal Consumer Expenditures in Canada, 1926-1975", Economic Council of Canada Staff Study 26
Slater, D.	"Consumption in Canada" - Royal Commission on Canada's Economic Prospects, Ottawa Queen's Printer, 1957.
Statistics Canada	Input-Output Analysis of Canadian Economy, 1961
Statistics Canada	:Canadian Statistical Review" 1970
Statistics Canada	"Canadian Statistical Review, Historical Summary" 1971.
Statistics Canada	"Urban Family Expenditure" 1969.
Tiebout, Charles	Projections 1980, 2000 and 2020: An Economic Study of the Puget Sound and Adjacent Waters Area, Seattle, Consulting Services Corporation, 1968.
Udis, Bernard	Regional Input-Output Analysis as a Tool for Natural Resource Management-The Colorado River Basin Economic Study (unpublished) 1964.
U.S. Dept. of Labour	Technological Trends in U.S. Industries.
Ward, J.B.	"Final Demands and Input Requirements to 2020: Mining, Forestry and Manufacturing Activities in the Okanagan Basin" 1972 (a)
Wright, R.W.	The Alberta Economy: An Input-Output Analysis Dept. of Economics, University of Alberta, Calgary, 1964.

APPENDICES

APPENDIX A

SURVEY QUESTIONNAIRES

&

COVERING LETTER

A.1 - Covering Letter

A.2 - Questionnaire for Interindustry Analysis of the Okanagan Water Economy

A.3 - Questionnaire for Interindustry Analysis of the Okanagan Water Economy, Wholesale and Retail Trades

A.4 - Questionnaire for Interindustry Analysis of the Okanagan Water Economy, Agriculture

A.5 - Questionnaire for Interindustry Analysis of the Okanagan Water Economy, Construction Trades

A.6 - Questionnaire for Interindustry Analysis of the Okanagan Water Economy, Service Trades.

APPENDIX A.1



CANADA BRITISH COLUMBIA OKANAGAN BASIN AGREEMENT

OFFICE OF THE STUDY DIRECTOR
264 WESTMINSTER AVENUE
PENTICTON, BRITISH COLUMBIA
P.O. BOX 458
TELEPHONE (604) 493-0008

Dear Sir:

The Planning Divison of the Federal Department of the Environment is conducting Interviews with a sample of farming enterprises and business establishments in the Okanagan Valley during the months of April and May as part of the economic growth studies of the joint federal-provincial socio-economic task force, Canada-British Columbia Okanagan Basin Study.

The purpose of the studies is to project changes in the economic structure, and growth in employment and population in the Okanagan Basin to the year 2020. Forecasts of future water quantity requirements and waste-water discharges will then be made in order to aid the planning of water resource use in the basin. The questionnaire will provide the information necessary to carry out these projections.

General information relating to employment, payrolls, seasonality of production, water use, and purchases of plant and equipment is requested in the first two parts of the questionnaire to supplement existing data on the region. The third part of the questionnaire will identify the basin's economic structure by determining the economic links among the sectors of the regional economy, and between the regional figures are requested by economic sector and region of destination. Similarly, total value of materials and services used in production are requested by economic sector and region of origin. In order that you may identify the Okanagan basin region, a map is attached to the questionnaire.

The questionnaire is left at your disposal for a period that will allow adequate time for you to provide, as far as possible, the information requested from your business records. We shall contact you shortly by telephone so that an interview may be arranged to complete the questionnaire.

Replies to all questionnaires are kept in the strictest confidence. The information requested would appear in the final report of the economic growth studies in May of 1972 aggregated within industry sectors. (see last section of questionnaire). Data on individual firms will not be published.

Mr. R.D. Bjonback, who is in charge of the study, and Mr. G.R. Staple, and Mr. D.R. Baillet will be conducting the interviews. If you have any questions at this time, please do not hesitate to call 493-0008 (collect) or write the Okanagan Basin Study Office in Penticton.

I hope this letter will serve as an introduction to our economic growth studies, Okanagan Basin Study, and that co-operation will be forthcoming. Since the economy of the Okanagan Basin is heavily dependent on the quality and quantity of its limited water resource, forecasting water use is vital in the planning of future development in the Valley. Thus, the information requested form you is of the utmost significance in the formulation of such a plan.

Yours sincerely,

Dr. J. O'Riordan,
Assistant Head, Pacific Region,
Planning Division,
Department of the Environment (Canada)

Mr. C.H. Thomas, P.Econ.,
Research Officer, Water Resources Service
Department of Lands Forests and Water
Resources (British Columbia)

APPENDIX A.2

QUESTIONNAIRE FOR INTERINDUSTRY ANALYSIS OF THE OKANAGAN WATER ECONOMY

PART I - General

1. Name of establishment (or farm enterprise):_____
2. Address of establishment (or farm enterprise):_____
3. Respondent's name and title:_____
4. Average employment, production 1966_____;1970_____, and administration and other 1966_____;1970_____.
5. Wages and salaries (production) 1966_____;1970_____. Wages and salaries (administration and other) 1966_____;1970_____.

If operation schedule is seasonal, please give the actual and potential number of production-days and employment for each month.

	1970		
	Employment		For Firms with Visitor Accommodation, Vacancy Rate
	Potential	Actual	
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			

Did the same month-to-month operation pattern exist in 1966? If not, please specify the changes on the back of this page.

6. Area of residence of the shareholders of the establishment, 1970. (or residence of owner-proprietor or partners if unincorporarted).

_____ % of shares held by residents of the Okanagan Valley.
_____ % of shares held by residents of the rest of B.C.
_____ % of shares held by residents of the rest of Canada.
_____ % of shares held by residents of the rest of the world.

7. Where does the establishment obtain water supply?_____

How much water (physical quantity) was withdrawn by the establishment in 1970?_____ At what price per unit volume?_____

By what method (if any) are water withdrawals or outfalls of waste water measured?_____

If your present water rates (price of water) were increased by (a) 50% and (b) 100%, how would your water use be affected?_____

8. What factors specifically attracted your company to originally locate in the Okanagan basin? Please rank the following factor(s) and give particulars, if any:

	Rank	Particulars
(A) Accessibility of raw materials		
(i) Materials		
(ii) Power and Fuels		
(iii) Water Supply		
(B) Accessibility to markets		
(i) within the Okanagan basin - consumer market -		
industrial market -		
(ii) within the rest of B.C.		
(iii) within the rest of Western Canada		
(iv) within the WesternUnited States		
(C) Labour		
(i) costs		
(ii) availability of skills		
(D) Transportation		
(E) Amenities		
(i) climate		
(ii) outdoor recreation amenities		
(F) Area Development Agency Incentives (Department of Regional Economic Expansion)		
(G) All Other Factors		

Since your company selected to locate in the Okanagan basin, why was a particular area within the basin chosen?_____

If another region outside the Okanagan basin or if another area within the basin is contemplated as the future location of a new plant or expansion of an existing plant, please give the region or sub-basin area and the location factors which make re-location necessary._____

PART II - Purchases of Plant and Equipment (Investment) - 1966 and 1970

	1966		
	Amount	Sector (see sales questionnaire below) purchased from	Location of Seller
1. Construction			
2. Machinery			
3. Other equipment			
4. Land			

	1970		
	Amount	Sector (see sales questionnaire below) purchased from	Location of Seller
1. Construction			
2. Machinery			
3. Other equipment			
4. Land			

5. Total investment expenditures in 1966 for expansion _____% for replacement _____%
Total investment expenditures in 1970 for expansion _____% for replacement _____%
6. What was the depreciated book value of plant and equipment as of January 1, 1966? $_____ January 1, 1970 $_____
7. Depreciation expense 1966 $_____ 1970 $_____
8. Estimated annual dollar current operating recipts potential of plant and equipment, 1966 and 1970.
1966: $_____ current operating receipts $_____ 1970: $_____ current operating receipts $_____

QUESTIONNAIRE FOR INTERINDUSTRY ANALYSIS OF THE OKANAGAN WATER ECONOMY (Cont'd)

PART III - INTERINDUSTRY QUESTIONNAIRE

Detailed information is requested only for calendar year 1970, or the nearest available year. Total current operating earnings and expenses should be reported for both calendar years 1966 and 1970.

Total Current Operating Receipts
(operating earnings)

- Accommodation or Room Sales $_____ Food and Beverage Sales $_____ Other (rentals, telephone, etc.) $_____ Total$_____

Current Operating Expenses (exclude labour and captial expense)

		Location of Supplier				Location of Supplier
(a) Utilities (excl. water)	$_____	not applicable		(d) rent	$_____	_____
(b) taxes - federal	_____	"	"	(e) business and professional services	_____	_____
- provincial	_____	"	"			
- municipal	_____	"	"	(f) food and beverages (specify if applicable)	_____	_____
(c) water	_____	"	"			
				(g) other expenses (specify)	_____	_____

Recalling the information requested above, how do you expect purchase patterns to change in the near future (5 to 10 years)?

(a) Will different materials be purchased? Please specify, and from which region._____

(b) Will more or fewer purchases be made from other firms within the region? Please enumerate._____

APPENDIX A.3

QUESTIONNAIRE FOR INTERINDUSTRY ANALYSIS OF THE OKANAGAN WATER ECONOMY, Wholesale and Retail Trades

PART I - General

1. Name of establishment (or farm enterprise):_____
2. Address of establishment (or farm enterprise):_____
3. Respondent's name and title:_____
4. Average employment, production of service 1966_____; 1970_____,
   and administration and other 1966_____;1970_____.
5. Wages and salaries (production of service) 1966_____; 1970_____.
   Wages and salaries (administration and other) 1966_____; 1970_____.
7. Area of residence of the shareholders of the establishment, 1970. (or residence of owner-proprietor or partners if unincorporated).

   _____% of shares held by residents of the Okanagan Valley.
   _____% of shares held by residents of the rest of B.C.
   _____% of shares held by residents of the rest of Canada.
   _____% of shares held by residents of the rest of the world.

6. Working proprietors of unincorporated business: How many proprietors were actively engaged in operating this business during 1970?_____. Family or other workers not receiving pay: How many unpaid workers were actively engaged in operating this business during 1970 in a typical week?_____; Total number of hours worked in a typical week? 1970_____. (Omit "proprietors" referred to above).

   If operation schedule is seasonal, please give the following information: (Note: potential employment refers to the number that could be employed if the operation was at full capacity). 1970

	Employment		Man Hours (or Payroll) Paid	Sales by the Month
	Potential Number	Acutal Number		
January				
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				

Did the same month-to-month operation pattern exist in 1966? If not, please specify the changes on the back of this page.

PART II - Purchases of Plant and Equipment (Investment) - 1966 and 1970

	1966 Amount	1966 Sector (see receipts questionnaire below) purchased from	Location of Seller
1. Construction			
2. Machinery			
3. Other Equipment			
4. Land			

	1970 Amount	1970 Sector (see receipts questionnaire below) purchased from	Location of Seller
1. Construction			
2. Machinery			
3. Other Equipment			
4. Land			

5. Total investment expenditures in 1966 for expansion _____% for replacement _____%
   Total investment expenditures in 1970 for expansion _____% for replacement _____%
6. Whatwas the depreciated book value of plant and equipment as of January 1, 1966? $_____ January 1, 1970 $_____.
7. Depreciation expense 1966 $_____ 1970 $_____.
8. Estimated annual dollar sales potential of plant and equipment, 1966 and 1970. 1966: $_____; actual sales $_____ 1970: $_____; actual sales $_____. (Note: Sales potential refers to the maximum possible of plant given the size of plant and amount of equipment in each year).

PART III - Interindustry Questionnaire

1. Purchases for Resale

Purchase* (specify in detail)	Total Costs	Transport costs, (and indicate if transport costs are included in total costs)	Address of Firm supplying the Materila (please identify if a wholesaler)
Example: Hardware	$5,000	$200, transport costs included	Vancouver (wholesaler)
a.			
b.			
c.			
d.			
e.			
f.			
g.			
h.			
i.			
j.			
k.			
Total Value of Purchases for Resale			

2. Other Current Operating Expenses (exclude wages and salaries, depreciation, and purchases for resale).

		Location of Purchase
(a) Utilities	$_____	n/a
(b) water	_____	n/a
(c) telephone	_____	n/a
(d) taxes - federal	_____	n/a
- provincial	_____	n/a
- municipal	_____	n/a
(e) rent	_____	_____
(f) transportation expenses (maintenance of vehicles gas, oil, etc. specify)	_____	_____
(g) insurance	_____	_____
(h) repairs and maintenance	_____	_____
(i) interest (mortgage and other)	_____	_____
(j) business and professional services	_____	_____
(k) advertising (specify types)	_____	_____
(l) other operating expenses (specify)	_____	_____
TOTAL	$_____	

QUESTIONNAIRE FOR INTERINDUSTRY ANALYSIS OF THE OKANAGAN WATER ECONOMY, (Cont'd)
Wholesale and Retail Trades

PART III - Interindustry Questionnaire (continued)

* If there is a great variety of purchases for resale, then group these purchases using the economic sectors as shown on Pages 9 to 11 of this questionnaire.

Recalling the information requested on the previous page, how do you expect purchase patterns to change in the near future (5 to 10 years)?

(a) Will different relative amounts of labour and operating supplies and services be purchased? Please specify, and from which region._____

(b) Will more or fewer purchases be made from other firms within the region? Please enumerate._____

APPENDIX A.4

QUESTIONNAIRE FOR INTERINDUSTRY ANALYSIS OF THE OKANAGAN WATER ECONOMY - AGRICULTURE

PART I - General

1. Name and address of operator:_____

3. What was the income you (the operator) received from non-agricultural and agricultural work off this holding during 1970? (Include salaries, wages, commissions, net income from custom work, non-agricultural business, or professional practice.)

Non-agricultural work: $_____ Occupation_____.
$_____ Occupation_____.
Agricultural work $_____ Occupation_____.
$_____ Occupation_____.

How many days work was involved in each off-farm occupation? (do not include exchange work)_____

4. Please give the number of hired agricultural workers (if any) and man hours or payroll paid by month for 1970.

Month	Total number Employed	Full-Time	Part-Time	Manhours or Payroll Paid
Jan.				
Feb.				
Mar.				
Apr.				
May				
June				
July				
Aug.				
Sept.				
Oct.				
Nov.				
Dec.				

2. How long have you farmed in the present location?_____

If you farmed in another location previously, why was a move made to the present location?_____

If farming was not your previous occupation, please specify the occupation and why you chose to farm in the present location_____

In the next five to ten years, will you continue farming at the present site? (reasons)_____

(a) farm at another location? Please state location and reasons for move._____

(b) discontinue farming but remain living at the present site and seek alternative employment? Please give particulars._____

(c) discontinue farming full-time or farming to the same degree but remain living at the present site and seek additional employment? Please give particulars.

(d) pursue other options? Please give particulars.

5. Areaof land cultivated by type of crop and numbers of livestock 1970.

Crop Type	Area	Livestock	Number

6. Where does the operation obtain water supply?_____

By what method (if any) are water withdrawals measured?_____

If measured, how much water did you withdraw in 1970?_____

What quantity of water per acre is recommended and actually applied to your crops during the growing season?

Recommended use: _____ feet/acre
Actual use: _____ feet/acre

If your present water rates (price of water) were increased by (a) 50% and (b) 100%, how would your water use be affected? (assuming the price of farm produce cannot be increased as compensation)_____

PART II - Capital Purchases, 1966 & 1970

1.

1966	Amount	Purchased from	Location
A. Construction and improvements of buildings and fences			
- Labour (specify, if own)			
- Materials			
B. Land (include improvements)			
- Labour (specify, if own)			
- Materials			
C. Equipment (specify)			
D. Natural Assets			
- Animals (kept for breeding purposes)			
- Trees			
- Other (specify)			

2.

1970	Amount	Purchased from	Location
A. Construction and improvements of buildings and fences			
- Labour (specify, if own)			
- Materials			
B. Land (include improvements)			
- Labour (specify, if own)			
- Materials)			
C. Equipment (specify)			
D. Natural Assets			
- Animals (kept for breeding purposes)			
- Trees			
- Other (specify)			

3. Total investment expenditures in 1966 for expansion _____% for replacement _____%

Total investment expenditures in 1970 for expansion _____% for replacement _____%

4. What was the depreciated book value of equipment and buildings as of January 1, 1966? $_____; January 1, 1970 $_____ (Not including natural assets)

5. Depreciation expense: 1966 $_____; 1970 $_____ (not including natural assets).

QUESTIONNAIRE FOR INTERINDUSTRY ANALYSIS OF THE OKANAGAN WATER ECONOMY - AGRICULTURE

PART III - Current Purchases & Sales, 1970

Please use your 1970 or 1971 Income Tax Statement (whichever is available) to answer this section.

1. Farm Sales:

Crops (specify types)	$
Livestock (specify types)	
Milk Shipments	
Poultry & Eggs	
Forest Products	
Greenhouse & Nursery Products	
Value of Saleable Products consumed by your family on the farm	
Other (specify)	
TOTAL	

3. Destination of Farm Sales Please indicate if transportation costs are included and the amount.

Slaes to:	Within the Okanagan Basin	Outside the Okanagan Basin (specify area)
1. Packing Houses		
2. Other Food Wholesalers (e.g. Slade & Stewart, H.Y. Louie, Malkins, Kelly-Douglas, etc.)		
3. Canneries		
4. Households through roadside stands		
5. Retail Trade		
6. Other Farming Enterprises-		
-treefruits & small fruits		
-livestock		
-dairying		
-vegetables		
-field crops		
-poultry & eggs		
-other (greenhouse, forest products)		
7. Other Industries (specify)		
TOTAL SALES		

2. Farm Operating Expenses (exclude investment in buildings and equipment) Please use your 1970 or 1971 Income Tax Statement for this section.

	TOTAL COSTS	ADDRESS OF THE FIRM SUPPLYING THE MATERIAL
Labour Expense		
Hired Labour (Include Can. Pension, Workmen's Compensation)		
Operator's Labour		n/a
Room & Board Expenses-hired labour		n/a
Buildings & Equipment Operating Expenses		
Truck Expense (gas, oil, repairs)		
Tractor & Equipment Expense (gas oil, repairs) (specify)		
Maintenance of Buildings;specify		
Overhead Expense		
Hydro, Telephone, Heating		
Insurance-Buildings		
-Equipment		
Taxes-Federal (income)		
-Provincial		
-Municipal		
Irrigation Expense		
Depreciation Expense		
Interest & Bank Charges		
Rental of Land, Buildings		
Office Expense		
Accounting & Legal Fees		
Other; specify		
Crop Expense		
Fertilizer Expense		
Chemical & Seed Treatment Expense		
Crop Insurance		
Seed Purchase		
Packaging Material, Pallets, (specify)		
Packing House Charges		
Freight to Market		
Spray Expense		
Custom Work		
Equipment Rental		
Other; specify		
Livestock Expense		
Grain & Prepared Feed Purchases		
Mineral Expense		
Hay - Silage		
Pasture & Range Rent Expense		
Veterinary & Medicine Expense		
Animal Purchase Expense		
Frieght to Market		
Other; specify		
Dairy Cattle Expense		
Grain & Prepared Feed Purchases		
Mineral Supplements		
Hay & Silage		
Pasture and Range Expense		
Veterinary & Medicine Expense		
Breeding Fees		
Animal Purchase Expense		
Freight to Market		
Other; specify		
GRAND TOTAL COSTS		

APPENDIX A.5

QUESTIONNAIRE FOR INTERINDUSTRY ANALYSIS OF THE OKANAGAN WATER ECONOMY, "Construction Trades"

PART I - General

1. Name of establishment:_____
2. Address of establishment:_____
3. Respondent's name and title:_____
4. Average employment, production of service 1970_____, and administration and other 1970_____. (omit question if work is seasonal)
5. Wages and salaries[1] (production of service) 1970_____, Wages and salaries[1] (administration and other 1970_____.
7. Area or residence of the shareholders of the establishment, 1970. (or residence of owner-proprietor or partners if unincorporated).

   _____% of shares held by residents of the Okanagan Valley.
   _____% of shares held by residents of the rest of B.C.
   _____% of shares held by residents of the rest of Canada.
   _____% of shares held by residents of the rest of the world.
8. Dollar volume of construction work performed, or put in place, during 1970[2] $_____ Percent of work which was repair or replacement[3] _____%
9. Value of sub-contracts during 1970[4] $_____.

Trades covered by sub-contracts	Value	Headquarters of sub-contractor (City or Region)

6. Working proprietors of unincorporated business: How many were actively engaged in operating this business during 1970?_____ Family or other workers not receiving pay: How many unpaid workers were actively engaged in operating this business during 1970 in a typical week? _____. Total number of hours worked in a typical week? 1970_____. (Omit "proprietors" referred to above).

If operation schedule is seasonal, please give the following information: (Note: potential employment refers to the number that could be employed if the operation was at full capacity).

	1970		
	Employment Potential Number	Actual Number	Man Hours or Payroll Paid
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			

10. Receipts from non-construction activities during 1970:

    Equipment lease or rental $_____
    Services sold to other firms (specify) _____
    Materials sold to other firms (specify) _____
    Other (specify) _____

PART II - Purchases of Plant and Equipment (Investment)

	1970		Location of seller
	Amount	Sector (see receipts questionnaire below) purchased from	
1. Construction			
2. Machinery			
3. Other Equipment			
4. Land			

5. Total investment expenditures in 1970 for expansion _____% for replacement _____%
6. What was the depreciated book value of plant and equipment as of January 1, 1970 $_____
7. Depreciation expense 1966 $_____ 1970 $_____
8. What would be the potential annual value of construction work performed if the firm operated at full capacity in 1970?

   Potential value of construction work $____ (both values less actual value of construction work $____ sub-contracted work) (Note: Work potential refers to the maximum possible given the amount of investment in equipment in 1970)

PART III - Interindustry Questionnaire

1. Value of Material Purchases, 1970[6] (exclude investment in equipment) If this question is complex for your firm to complete, please see footnote 5 on page for simiplification.

Type of Material (specify in detail)	Total Costs	Transport costs, (and indicate if transport costs are included in total costs)	Address of firm supplying the material (specify if wholesaler of Manufacturer)
Example: Lumber	$100,000	$1,000, transport costs included	Kelowna (Manufacturer)
a.			
b.			
c.			
d.			
e.			
f.			
g.			
h.			
i.			
j.			
k.			
Total Value of Materials			

2. Other operating expenses, 1970 (please exclude labour, depreciation, investment expenditures and material purchases).

		Location of Purchase
(a) utilities	$_____	n/a
(b) taxes - federal	_____	n/a
- provincial	_____	n/a
- municipal	_____	n/a
(c) telephone	_____	n/a
(d) rent (land & buildings)	_____	_____
(e) business and professional services	_____	_____
(f) transportation-gase & oil	_____	_____
- vehicle maintenance	_____	_____
- other	_____	_____
(g) insurance and bonding charges	_____	_____
(h) advertising (specify types)	_____	_____
(i) mortgage interest	_____	_____
(j) interest other than mortgage	_____	_____
(k) equipment rental	_____	_____
(l) maintenance and repair of equipment (e.g. parts, lubes, etc.)	_____	_____
(m) other operating expenses (specify)	_____	_____
TOTAL	_____	_____

QUESTIONNAIRE FOR INTERINDUSTRY ANALYSIS OF THE OKANAGAN WATER ECONOMY, (Cont'd)
"Construction Trades"

PART III - Interindustry Questionnaire (continued)

3. Recalling the information requirested on the previous pages, how do you expect purchase patterns to change in the near future (5 to 10 years)?

   (a) Will different relative amounts of labour and operating supplies and services by purchased? Please specify, and from which region._____

   (b) Will more or fewer purchases be made from other firms within the region? Please enumerate._____

4. Please allocate the dollar value of construction work completed in 1970 among your clients which appear below within industry groups (Sectors) and regions of residence.

	OKANAGAN BASIN	REMAINDER OF B.C.	REST OF CANADA	U.S.A.	REST OF WORLD
1. Tree fruits & small fruits					
2. Livestock (includes cattle, sheep, pigs, horses)					
3. Dairying					
4. Vegetables					
5. Field crops (includes wheat, other grains, hay, & Potatoes)					
6. Poultry & eggs					
7. Other agricultural products (forest products of farms, greenhouse products)					
8. Logging					
9. Mining					
10. Meat & dairy products (mfg.)					
11. Fruit & vegetable canners					
12. Wineries & soft drinks					
13. Other food & beverage industries (feed manufacturing, bakeries, confectionery)					
14. Sawmills & planing mills					
15. Other wood industries (sash, door & millwork, wooden boxes, veneer & plywood)					
16. Metal fabricating & transport equipment industries					
17. Non-metallic mineral products (glass products, cement)					
18. All other manufacturing industries					
19. Wholesalers of food (merchants & co-operative)					
20. Other wholesale trade					
21. Retail trade					
22. Hotel, tourist camp & restaurant grou-service trades					
23. Amusement & Recreation groupservice trades					
24. All other service trades (includes hospitals)					
25. Transportation, Storage, & Communication					
26. Finance, Insurance, & Real Estate					
27. Residential Construction					
28. Non-Residential Construction					
29. Local government (municipal or city)					
30. Provincial government					
31. Federal government					
32. Utilities					
33. Households					

TOTALS

5. Please state, above, in round brackets, the sales pattern that prevailed in 1966.
   Similarly, please estimate in square brackets in the appropriate squares above, the sales pattern that will most likely be in effect five to ten years into the future.

FOOTNOTES:

1. Wages and salaries should include all compensation such as commissions, bonuses, vacation pay, etc., before deductions of taxes and other similar items.

2. Dollar volume of construction work, 1970

   Construction work done for the year represents the value of installations, demolition of structures, or excavation of sites accomplished during the calendar year. This value is intended to represent the value of installation, demolition, and excavation on all construction sites during the given year, regardless of when the work on each individual active project was started or completed.

   This value represents a summation of the cost of materials actually used or consumed during the period, regardless of when the materials were purchased or delivered at the site; the cost of labour performed during the period; and the proportionate allowances for overhead costs, profit on construction operations, and the cost of architectural and engineering services, if applicable.

3. Repair or replacement construction

   This consists of minor renovations and alterations made to maintain the operating efficiency of the existing structures.

4. Value of sub-contracts

   This represents the total value of sub-contracts let by your firm to other firms for construction work done by them during the period. That is, your estimate of the value of work put in place by the sub-contractor.

5. Equipment expenditures

   Equipment investment expenditures are defined as those expenditures which are depreciable under the current tax codes.

6. Value of material purchases, 1970

Please include all the purchases of materials used in the construction operations of your firm during the year. To simplify presentation, your purchases can be allocated to the following industry groups, unsing the lines under "Type of Material":

Manufacturing

1. Sawmills and planing mills
2. Other wood industries (includes mfg. of sash, door & millwork, wooden boxes, veneer & plywood)
3. metal fabricating and transport equipment industries
4. non-metallic mineral products (includes mfg. of cement and products)
5. All other manufacturing industries (includes mfg. of plastic products, carpets, chemicals, signs.)

Trade

6. Wholesale trade (lumber and building materials, metal products, hardware, plumbing and heating equipment, electrical machinery, motor vehicle equipment).
7. Retail trade (hardware stores)

APPENDIX A.6

QUESTIONNAIRE FOR INTERINDUSTRY ANALYSIS OF THE OKANAGAN WATER ECONOMY, "Service Trades"

PART I - General

1. Name of establishment (or farm enterprise):_____
2. Address of establishment (or farm enterprise):_____
3. Respondent's name and title:_____
4. Average employment[1], production of service 1966_____; 1970_____,
   and administration and other 1966_____; 1970_____.
5. Wages and salaries (production of service)[2] 1966_____; 1970_____.
   Wages and salaries (administration and other)[2] 1966_____; 1970_____.
7. Area of residence of the shareholders of the establishment, 1970 (or residence of owner-proprietor or partners if unincorporated).
   _____% of shares held by residents of the Okanagan Valley.
   _____% of shares held by residents of the rest of B.C.
   _____% of shares held by residents of the rest of Canada.
   _____% of shares held by residents of the rest of the world.

6. Working proprietors of unincorporated business: How many proprietors were actively engaged in operating this business during 1970?_____ Family or other workers not receiving pay: How many unpaid workers were actively engaged in operating this business during 1970 in a typical week? _____ Total number of hours worked in a typical week? 1970_____. (Omit "proprietors" referred to above).

	1970			
	Employment		Man Hours (or Payroll) Paid	Receipts By Month
	Potential Number	Actual Number		
January				
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				

Did the same month-to-month operation pattern exist in 1966? If not, please specify the changes on the back of this page.

PART II - Purchases of Plant and Equipment (investment) - 1966 and 1970

	1966		
	Amount	Sector (see sales questionnaire below) purchased from	Location of Seller
1. Construction			
2. Machinery			
3. Other equipment			
4. Land			

	1970		
	Amount	Sector (see sales questionnaire below) purchased from	Location of Seller
1. Construction			
2. Machinery			
3. Other equipment			
4. Land			

5. Total investment expenditures in 1966 for expansion _____% for replacement _____%
   Total investment expenditures in 1970 for expansion _____% for replacement _____%
6. What was the depreciated book value of plant and equipment as of January 1, 1966? $_____ January 1, 1970 $_____
7. Depreciation expense 1966 $_____ 1970 $_____.
8. Estimated annual dollar sales potential of plant and equipment, 1966 and 1970.
   1966: $_____; current operating receipts $_____
   1970: $_____; current operating receipts $_____
   (Note: Operating receipts potential refers to the maximum possible given the size of plant and amount of equipment in each year).

PART III - Interindustry Questionnaire

Detailed information is requested only for calendar year 1970, or the nearest available year. Total current operating earnings and expenses should be reported for both calendar years 1966 and 1970.

Total current operating receipts (operating earnings)

Receipts from services $_____
Receipts from merchandise sales $_____
Other receipts (specify) $_____
TOTAL $_____

QUESTIONNAIRE FOR INTERINDUSTRY ANALYSIS OF THE OKANAGAN WATER ECONOMY, (Cont'd)

"Service Trades"

PART III - Interindustry Questionnaire (Continued)

Current operating expenses (exclude labour, capital, and depreciation expense)

		Location of Supplier
(a) Utilities (specify water expenses)	$____	n/a
(b) taxes - federal	____	n/a
- provincial	____	n/a
- municipal	____	n/a
(c) telephone	____	n/a
(d) rent	____	____
(e) business and professional services	____	____
(f) transportation (Maintenance vehicles, gas, oil, etc., specify)	____	____
(g) insurance	____	____
(h) advertising (specify types)	____	____
(i) mortgage interest	____	____
(j) interest other than mortgage	____	____
(k) repairs and maintenance	____	____
(l) other operating expenses (specify)	____	____
TOTAL	____	

Recalling the information requested on the previous page, how do you expect purchase patterns to change in the near future (5 to 10 years)?

(a) Will different relative amounts of labour and operating supplies and services be purchased? Please specify, and from which region.____

(b) Will more or fewer purchases be made from other firms within the region? Please enumerate.

RECEIPTS (operating earnings) from Economic Sectors by Region of Residence

To SECTOR	LOCATION OF SECTOR				
	OKANAGAN BASIN	REMAINDER OF B.C.	REST OF CANADA	U.S.A.	REST OF WORLD
1. Tree fruits & small fruits					
2. Livestock (includes cattle, sheep, pigs, horses)					
3. Dairying					
4. Vegetables					
5. Field crops (includes wheat, other grains, hay, & Potatoes)					
6. Poultry & eggs					
7. Other agricultural products (forest products of farms, greenhouse products)					
8. Logging					
9. Mining					
10. Meat & dairy products (mfg.)					
11. Fruit & vegetable canners					
12. Wineries & soft drinks					
13. Other food & beverage industries (feed manufacturing, bakeries, confectionery)					
14. Sawmills & planing mills					
15. Other wood industries (sash, door & millwork, wooden boxes, veneer & plywood)					
16. Metal fabricating & transport equipment industries					
17. Non-metallic mineral products (glass products, cement)					
18. All other manufacturing industries					
19. Wholesalers of food (merchants & co-operative)					
20. Other wholesale trade					
21. Retail trade					
22. Hotel, tourist camp & restaurant grou-service trades					
23. Amusement & Recreation groupservice trades					
24. All other service trades (includes hospitals)					
25. Transportation, Storage, & Communication					
26. Finance, Insurance, & Real Estate					
27. Residential Construction					
28. Non-Residential Construction					
29. Local government (municipal or city)					
30. Provincial government					
31. Federal government					
32. Utilities					
33. Households					
TOTALS					

Please state, above, in round brackets, the sales pattern that prevailed in 1966.

Similarly, please estimate in square brackets in the appropriate squares above, the sales pattern that will most likely be in effect five to ten years into the future.

FOOTNOTES

1. If you have to calculate a figure, it should be the sum of the average employment for each month of the year divided by 12.

2. Wages and salaries should include all compensation such as commissions, bonuses, vacation pay, etc., before deductions of taxes and other similar items.

APPENDIX B

FINAL DEMAND TABLES

B.1 Final Demand 1970 Projection I
B.2 Final Demand 1980 Projection I
B.3 Final Demand 2000 Projection I
B.4 Final Demand 2020 Projection I
B.5 Final Demand 2000 Projection II
B.6 Final Demand 2020 Projection II
B.7 Final Demand 2000 Projection III
B.8 Final Demand 2020 Projection III

APPENDIX B.1

FINAL DEMAND 1970

Projection I

SECTOR	INTERINDUSTRY DEMAND	HOUSEHOLD CONSUMPTION	INVESTMENT	FEDERAL GOVERNMENT	PROVINCIAL GOVERNMENT	EXPORTS	TOURISM	TOTAL
1. Tree Fruits	3,817,269	559,659	-	-	-	25,535,608	1,966,356	28,061,623
2. Livestock	462,979	-	57,900	-	1,680	2,227,334	-	2,286,914
3. Dairying	1,411,099	-	112,227	-	-	12,176	-	124,403
4. Vegetables	199,951	73,248	-	-	-	800,880	167,210	1,041,338
5. Field Crops	285,544	-	-	-	-	196,661	-	196,661
6. Poultry & Eggs	55,800	884,443	-	-	-	237,575	126,182	1,248,200
7. Nursery	43,081	-	864,720	-	-	113,199	-	977,919
8. Logging	3,026,400	-	-	-	-	-	-	-
9. Mining	437,873	-	-	-	11,940	26,019,584	-	26,031,524
10. Meat & Dairy Products	1,611,434	4,321,281	-	143,800	62,812	7,344,026	518,569	12,390,488
11. Fruit & Vegetable Canners	104,983	251,856	-	-	3,753	15,628,013	13,444	15,897,066
12. Wineries, Soft Drinks, Distilleries	972,159	836,673	-	-	-	7,149,224	91,074	8,076,971
13. Other Food & Beverage	1,063,539	1,118,924	-	-	-	2,701,226	235,796	4,055,946
14. Sawmills & Planing Mills	4,330,137	69,100	354,100	8,800	35,900	631,224	-	9,108,571
15. Other Wood Products	1,741,689	9,800	424,352	1,200	13,008	7,338,059	-	7,786,419
16. Metal Fabricating	3,698,341	200,000	3,169,221	-	61,000	29,467,577	-	32,899,600
17. Non Metallic	4,105,963	-	1,517,517	-	31,051	7,991,618	-	9,540,186
18. Other Manufacturing	5,213,714	1,559,096	-	2,908	6,967	4,362,090	20,000	5,951,061
19. Packing Houses	11,392,946	-	-	-	-	-	-	-
20. Wholesale Trade	5,549,315	6,742,070	7,088,007	169,329	302,540	3,649,419	242,085	18,193,450
21. Retail Trade	1,641,779	42,126,859	2,579,758	6,019	75,242	3,273,120	1,883,023	49,944,021
22. Hotel, Tourist Camp	63,098	8,920,807	-	-	18,827	825,310	8,189,365	17,954,309
23. Health & Education	3,627,370	5,674,167	-	-	28,996,411	1,404,847	-	36,075,425
24. Other Services	7,048,432	6,169,187	199,500	43,078	32,984	1,372,863	778,600	8,596,212
25. Transport	7,715,869	2,678,355	-	35,360	154,223	11,041,279	-	13,909,217
26. Finance, Insurance	16,453,992	15,429,538	2,835,677	-	143,338	9,885,186	-	28,293,739
27. Construction	2,010,509	1,368,625	33,424,736	28,909	1,642,953	3,071,557	-	39,536,780
28. Municipal Government	4,079,882	2,067,125	-	-	11,821,567	-	-	13,860,742
29. Utilities	11,070,257	10,003,375	-	161,877	140,000	2,366,636	-	12,671,888

APPENDIX B.2

FINAL DEMAND 1980

Projection I

SECTOR	PROVINCIAL GOVERNMENT	FEDERAL GOVERNMENT	EXPORTS	INVESTMENT	TOURISM	HOUSEHOLDS	TOTAL
1. Tree Fruits	-	-	38,294,100	-	3,342,600	610,700	42,247,400
2. Livestock	3,000	-	2,407,700	65,800	-	-	2,476,500
3. Dairying	-	-	17,800	163,700	-	-	181,500
4. Vegetables	-	-	1,018,500	-	245,200	111,800	1,375,500
5. Field Crops	-	-	228,400	-	-	-	228,400
6. Poultry and Eggs	-	-	380,100	-	192,700	1,423,700	1,996,500
7. Nursery	-	-	133,400	978,100	-	-	1,120,500
8. Logging	-	-	-	-	-	-	-
9. Mining	26,800	-	30,000,000	-	-	-	30,026,800
10. Meat and Dairy Products	75,000	156,300	11,692,400	-	626,200	5,958,400	18,508,300
11. Fruit & Vegetable Canners	8,400	-	26,821,000	-	31,700	626,900	27,488,000
12. Wineries, Soft Drinks, Distilleries	-	-	69,916,200	-	154,600	1,500,100	71,570,900
13. Other Food and Beverage	-	-	3,917,600	-	324,800	1,584,400	5,826,800
14. Sawmills and Planing Mills	80,500	19,700	13,393,300	793,800	-	111,300	14,398,600
15. Other Wood Products	29,200	2,700	20,184,500	950,300	-	15,800	21,182,500
16. Metal Fabricating	136,700	-	87,230,000	7,108,400	-	456,800	94,931,900
17. Non Metallic	69,600	-	15,951,000	1,962,500	-	-	17,983,100
18. Other Manufacturing	15,600	6,500	13,304,000	-	28,400	3,878,100	17,232,600
19. Packing Houses	-	-	-	-	-	-	-
20. Wholesale Trade	678,200	379,600	8,591,900	15,889,200	410,800	15,442,200	36,449,400
21. Retail Trade	168,700	13,500	7,447,700	5,783,000	3,195,300	96,488,800	108,922,400
22. Hotel, Tourist Camp	42,200	-	1,557,600	-	13,430,600	16,836,700	31,867,100
23. Health and Education	-	-	-	-	-	109,097,300	109,097,300
24. Other Services	73,900	96,600	3,627,500	447,200	1,315,800	16,300,400	21,861,400
25. Transport	345,700	79,300	28,331,200	-	-	8,432,100	19,898,400
26. Finance, Insurance	321,300	-	24,057,100	6,356,700	-	32,114,900	48,678,100
27. Construction	3,683,000	64,800	6,912,900	74,928,200	-	2,217,800	83,965,400
28. Municipal Government	24,191,700	-	-	-	-	6,360,100	18,181,700
29. Utilities	313,800	362,900	5,762,900	-	-	22,684,800	25,728,100
30. Households - Wages & Labour	7,796,800	7,862,800	-	-	-	-	-

APPENDIX B.3

FINAL DEMAND 2000

Projection I

SECTOR	PROVINCIAL GOVERNMENT	FEDERAL GOVERNMENT	EXPORTS	INVESTMENT	TOURISM	HOUSEHOLDS	TOTAL
1. Tree Fruits	-	-	41,087,200	-	6,527,900	1,184,200	48,799,300
2. Livestock	5,300	-	3,377,500	95,400	-	-	3,478,200
3. Dairying	-	-	28,500	262,300	-	-	290,800
4. Vegetables	-	-	733,600	-	428,400	191,300	1,353,300
5. Field Crops	-	-	128,500	-	-	-	128,500
6. Poultry and Eggs	-	-	612,000	-	313,600	2,294,800	3,220,400
7. Nursery	-	-	143,900	1,055,000	-	-	1,198,900
8. Logging	-	-	-	-	-	-	-
9. Mining	53,600	-	-	-	-	-	53,600
10. Meat and Dairy Products	96,900	208,000	20,388,300	-	890,700	9,238,100	30,822,000
11. Fruit & Vegetable Canners	16,800	-	52,992,900	-	86,200	1,692,500	54,788,400
12. Wineries, Soft Drinks, Distilleries	-	-	86,212,100	-	317,900	3,073,300	89,603,300
13. Other Food and Beverage	-	-	6,067,200	-	506,500	2,292,500	8,866,200
14. Sawmills and Planing Mills	161,100	39,400	17,679,200	1,588,600	-	209,300	19,677,600
15. Other Wood Products	58,400	5,400	32,226,800	1,901,800	-	29,700	34,222,100
16. Metal Frabricating	273,600	-	134,907,900	14,217,800	-	1,336,200	150,735,500
17. Non Metallic	139,300	-	25,056,600	3,925,000	-	-	32,003,800
18. Other Manufacturing	31,200	13,000	23,262,900	-	46,000	9,377,300	34,967,200
19. Packing Houses	-	-	-	-	-	-	-
20. Wholesale Trade	1,357,300	759,700	20,846,100	31,798,600	891,500	43,816,000	82,272,500
21. Retail Trade	337,600	27,000	20,687,300	11,573,300	6,934,300	273,779,500	295,924,800
22. Hotel, Tourist Camp	84,500	-	42,220,300	-	29,795,700	49,717,100	125,591,700
23. Health and Education	-	-	-	-	-	308,481,400	308,481,400
24. Other Services	147,900	193,300	11,418,600	895,000	2,838,600	51,310,100	66,803,500
25. Transport	691,800	158,700	76,665,500	-	-	27,135,300	39,027,100
26. Finance, Insurance	643,000	-	69,740,800	12,721,500	-	83,051,400	106,301,100
27. Construction	7,370,700	129,700	24,676,700	149,951,600	-	4,063,600	164,587,200
28. Municipal Government	61,590,500	-	-	-	-	18,078,000	29,899,600
29. Utilities	628,000	726,300	17,576,900	-	-	67,061,500	70,782,400
30. Households-Wages & Labour	15,603,500	15,735,600	-	-	-	-	-

APPENDIX B.4

FINAL DEMAND 2020

Projection I

SECTOR	PROVINCIAL GOVERNMENT	FEDERAL GOVERNMENT	EXPORTS	INVESTMENT	TOURISM	HOUSEHOLDS	TOTAL
1. Tree Fruits	-	-	40,836,900	-	9,026,100	1,767,300	51,630,000
2. Livestock	8,500	-	4,833,900	136,200	-	-	4,978,600
3. Dairying	-	-	41,600	382,700	-	-	424,300
4. Vegetables	-	-	259,600	-	635,500	305,000	1,200,100
5. Field Crops	-	-	-	-	-	-	-
6. Poultry and Eggs	-	-	912,300	-	433,700	3,421,900	4,767,900
7. Nursery	-	-	155,200	1,138,300	-	-	1,293,500
8. Logging	-	-	-	-	-	-	-
9. Mining	118,300	-	-	-	-	-	118,300
10. Meat and Dairy Products	144,700	290,800	29,085,000	-	1,231,500	13,786,700	44,538,700
11. Fruit & Vegetable Canners	37,100	-	79,589,500	-	119,200	2,525,900	82,271,700
12. Wineries, Soft Drinks, Distilleries	-	-	96,266,400	-	461,900	4,809,300	101,537,600
13. Other Food and Beverage	-	-	8,078,100	-	694,800	3,018,500	11,791,400
14. Sawmills and Planing Mills	161,100	39,400	17,679,200	1,588,600	-	363,300	19,831,600
15. Other Wood Products	128,900	11,900	32,226,800	4,197,700	-	51,600	36,616,900
16. Metal Fabricating	601,900	-	191,251,000	31,381,800	-	3,593,300	226,828,000
17. Non Metallic	307,500	-	34,091,100	8,663,300	-	-	49,425,100
18. Other Manufacturing	68,900	28,700	37,786,900	-	63,900	22,137,800	56,126,500
19. Packing Houses	-	-	-	-	-	-	-
20. Wholesale Trade	2,995,900	1,676,800	47,895,900	70,186,500	1,542,300	117,140,300	197,191,200
21. Retail Trade	745,200	59,600	53,871,800	25,544,800	11,996,500	731,940,300	773,559,500
22. Hotel, Tourist Camp	186,500	-	12,810,300	-	56,325,800	138,472,700	207,795,300
23. Health and Education	-	-	-	-	-	812,306,500	812,306,500
24. Other Services	326,400	426,700	33,957,900	1,975,500	4,868,900	152,591,700	194,147,100
25. Transport	1,527,000	350,300	192,969,900	-	-	80,573,400	107,235,000
26. Finance, Insurance	1,419,200	-	150,702,800	28,079,100	-	198,197,900	237,581,400
27. Construction	16,268,800	286,300	31,149,800	330,976,200	-	6,866,000	357,468,900
28. Municipal Government	130,681,000	-	-	-	-	48,421,400	60,243,000
29. Utilities	1,386,100	1,603,100	40,804,200	-	-	185,408,300	190,764,100
30. Households-Wages and Labour	34,440,400	34,731,900	-	-	-	-	-

APPENDIX B.5

FINAL DEMAND 2000

Projection II

SECTOR	PROVINCIAL GOVERNMENT	FEDERAL GOVERNMENT	EXPORTS	INVESTMENT	TOURISM	HOUSEHOLDS	TOTAL
1. Tree Fruits	-	-	38,441,100	-	6,527,900	1,278,900	46,247,900
2. Livestock	5,800	-	3,377,500	95,400	-	-	3,483,200
3. Dairying	-	-	33,000	304,500	-	-	337,500
4. Vegetables	-	-	717,600	-	428,400	207,300	1,353,300
5. Field Crops	-	-	128,500	-	-	-	128,500
6. Poultry and Eggs	-	-	623,400	-	313,600	2,494,200	3,431,200
7. Nursery	-	-	143,900	1,055,000	-	-	1,198,900
8. Logging	-	-	-	-	-	-	-
9. Mining	65,600	-	-	-	-	-	65,600
10. Meat and Dairy Products	105,100	208,000	27,266,600	-	890,700	10,013,900	38,484,300
11. Fruit & Vegetable Canners	20,600	-	52,992,900	-	86,200	1,834,600	54,934,300
12. Wineries, Soft Drinks, Distilleries	-	-	125,279,200	-	317,900	3,331,300	128,928,400
13. Other Food and Beverage	-	-	11,967,900	-	506,500	2,485,000	14,959,400
14. Sawmills and Planing Mills	197,100	48,200	17,679,200	1,943,100	-	226,900	20,094,500
15. Other Wood Products	71,500	6,600	52,019,600	2,326,200	-	32,100	54,456,000
16. Metal Fabricating	334,600	-	209,308,300	17,400,500	-	1,448,400	228,491,800
17. Non Metallic	170,400	-	35,845,400	4,804,000	-	-	40,819,800
18. Other Manufacturing	38,200	15,900	44,530,700	-	4,600	10,166,000	56,992,200
19. Packing Houses	-	-	-	-	-	-	-
20. Wholesale Trade	1,660,200	929,200	23,948,000	38,894,900	891,500	48,355,800	94,381,000
21. Retail Trade	413,000	33,000	22,912,600	14,156,100	6,934,300	303,138,800	327,948,300
22. Hotel, Tourist Camp	103,300	-	4,967,400	-	29,795,700	55,107,400	89,973,800
23. Health and Education	-	-	-	-	-	334,384,400	334,384,400
24. Other Services	180,900	236,400	12,674,600	1,094,700	2,838,600	56,973,200	73,998,500
25. Transport	846,200	194,100	86,687,500	-	-	29,413,900	41,495,500
26. Finance, Insurance	786,500	-	76,724,300	15,560,400	-	92,274,400	118,506,500
27. Construction	9,015,500	158,600	17,262,200	183,415,200	-	4,404,800	200,065,700
28. Municipal Government	65,850,600	-	-	-	-	19,605,000	31,426,600
29. Utilities	768,100	888,300	19,430,600	-	-	75,765,500	79,788,500
30. Households-Wages and Labour	19,085,600	19,247,200	-	-	-	-	-

APPENDIX B.6

FINAL DEMAND 2020

Projection II

SECTOR	PROVINCIAL GOVERNMENT	FEDERAL GOVERNMENT	EXPORTS	INVESTMENT	TOURISM	HOUSEHOLDS	TOTAL
1. Tree Fruits	-	-	37,124,100	-	9,026,100	1,943,600	48,093,800
2. Livestock	9,400	-	4,833,900	136,200	-	-	4,979,500
3. Dairying	-	-	48,200	444,600	-	-	492,800
4. Vegetables	-	-	229,200	-	635,500	335,400	1,200,100
5. Field Crops	-	-	-	-	-	-	-
6. Poultry and Eggs	-	-	1,003,700	-	433,700	3,764,300	5,201,700
7. Nursery	-	-	155,200	1,138,300	-	-	1,293,500
8. Logging	-	-	-	-	-	-	-
9. Mining	136,200	-	-	-	-	-	136,200
10. Meat and Dairy Products	159,100	290,800	38,844,900	-	1,231,500	15,161,800	55,688,100
11. Fruit & Vegetable Canners	42,800	-	79,589,500	-	43,000	2,777,800	82,453,100
12. Wineries, Soft Drinks, Distilleries	-	-	138,840,200	-	461,900	5,289,000	144,591,100
13. Other Food and Beverage	-	-	15,692,800	-	694,800	3,319,600	19,707,200
14. Sawmills and Planing Mills	197,100	48,200	17,679,200	1,943,100	-	399,900	20,267,500
15. Other Wood Products	148,500	13,700	52,019,600	4,830,000	-	56,700	57,068,500
16. Metal Fabricating	694,700	-	295,068,400	36,129,500	-	3,951,700	335,844,300
17. Non Metallic	353,800	-	48,763,800	9,974,900	-	-	66,407,800
18. Other Manufacturing	79,300	33,000	76,515,100	-	63,900	24,349,200	108,916,300
19. Packing Houses	-	-	-	-	-	-	-
20. Wholesale Trade	3,477,200	1,929,300	54,302,300	80,759,400	1,542,300	131,044,200	222,401,800
21. Retail Trade	857,500	68,500	60,424,800	29,393,000	11,996,500	821,566,600	867,155,200
22. Hotel, Tourist Camp	214,500	-	14,347,500	-	56,325,800	155,191,300	226,079,100
23. Health and Education	-	-	-	-	-	893,329,300	893,329,300
24. Other Services	375,600	491,100	38,032,800	2,273,000	4,868,900	171,660,300	217,701,700
25. Transport	1,757,000	403,000	205,215,100	-	-	88,610,100	101,811,400
26. Finance, Insurance	1,633,000	-	169,066,500	32,308,800	-	222,138,000	265,965,000
27. Construction	18,719,300	329,300	35,785,200	380,834,200	-	7,550,800	410,505,200
28. Municipal Government	146,031,500	-	-	-	-	53,251,200	65,072,800
29. Utilities	1,594,800	1,844,400	41,065,600	-	-	212,106,100	217,911,900
30. Households-Wages & Labour	39,628,400	39,963,900					

APPENDIX B.7

FINAL DEMAND 2000

Projection III

SECTOR	PROVINCIAL GOVERNMENT	FEDERAL GOVERNMENT	EXPORTS	INVESTMENT	TOURISM	HOUSEHOLDS	TOTAL
1. Tree Fruits	-	-	46,298,800	-	5,614,000	1,065,800	52,978,600
2. Livestock	5,200	-	4,168,000	113,400	-	-	4,286,600
3. Dairying	-	-	28,500	262,300	-	-	290,800
4. Vegetables	-	-	814,100	-	366,200	173,000	1,353,300
5. Field Crops	-	-	128,500	-	-	-	128,500
6. Poultry and Eggs	-	-	554,900	-	267,900	2,082,900	2,905,700
7. Nursery	-	-	143,900	1,055,000	-	-	1,198,900
8. Logging	-	-	-	-	-	-	-
9. Mining	51,300	-	-	-	-	-	51,300
10. Meat and Dairy Products	107,300	208,000	20,388,300	-	761,300	8,356,600	29,821,500
11. Fruit & Vegetable Canners	16,100	-	52,992,900	-	73,700	1,531,000	54,613,700
12. Wineries, Soft Drinks, Distilleries	-	-	86,212,100	-	272,300	2,780,000	89,264,400
13. Other Food and Beverage	-	-	6,067,200	-	434,000	2,073,800	8,575,000
14. Sawmills and Planing Mills	154,100	37,700	17,679,200	1,519,600	-	189,400	19,580,000
15. Other Wood Products	55,900	5,200	32,226,800	1,819,200	-	26,700	34,133,800
16. Metal Fabricating	261,700	-	134,907,900	13,607,800	-	1,208,700	149,986,100
17. Non Metallic	133,200	-	25,056,600	3,756,900	-	-	28,946,700
18. Other Manufacturing	29,900	12,400	19,023,800	-	39,500	8,483,500	27,589,100
19. Packing Houses	-	-	-	-	-	-	-
20. Wholesale Trade	1,298,300	726,700	14,887,900	30,417,200	763,800	39,532,000	87,625,900
21. Retail Trade	322,900	25,800	18,707,700	11,070,600	5,941,200	247,655,500	268,289,100
22. Hotel, Tourist Camp	80,800	-	4,160,600	-	-	44,973,100	74,687,100
23. Health and Education	-	-	-	-	-	279,046,200	279,046,200
24. Other Services	141,500	184,900	10,329,000	856,100	2,422,500	46,414,100	60,348,100
25. Transport	661,800	151,800	70,797,800	-	-	24,546,100	36,401,000
26. Finance, Insurance	615,100	-	27,746,100	12,126,800	-	75,126,600	115,614,600
27. Construction	7,050,500	124,000	11,530,500	143,437,300	-	3,675,900	165,818,200
28. Municipal Government	55,342,700	-	-	-	-	16,353,000	28,174,600
29. Utilities	600,700	694,700	19,023,800	-	-	60,660,200	80,879,400
30. Households-Wages & Labour	14,925,600	15,052,000	-	-	-	-	-

APPENDIX B.8

FINAL DEMAND 2020

Projection III

SECTOR	PROVINCIAL GOVERNMENT	FEDERAL GOVERNMENT	EXPORTS	INVESTMENT	TOURISM	HOUSEHOLDS	TOTAL
1. Tree Fruits	-	-	52,265,800	-	7,672,200	1,307,800	61,245,800
2. Livestock	6,300	-	6,387,200	171,600	-	-	6,565,100
3. Dairying	-	-	41,600	382,700	-	-	424,300
4. Vegetables	-	-	453,800	-	541,000	226,200	1,221,000
5. Field Crops	-	-	-	-	-	-	-
6. Poultry and Eggs	-	-	677,000	-	367,500	2,550,400	3,594,900
7. Nursery	-	-	155,200	1,138,300	-	-	1,293,500
8. Logging	-	-	-	-	-	-	-
9. Mining	105,500	-	-	-	-	-	105,500
10. Meat and Dairy Products	87,700	290,800	29,085,000	-	1,045,300	10,225,400	40,734,200
11. Fruit and Vegetable Canners	33,100	-	79,589,500	-	101,500	1,821,000	81,545,100
12. Wineries, Soft Drinks, Distilleries	-	-	95,086,900	-	393,200	3,567,000	99,047,100
13. Other Food and Beverage	-	-	6,067,200	-	591,400	2,238,800	8,897,400
14. Sawmills and Planing Mills	154,100	37,700	17,679,200	1,519,600	-	269,700	19,660,300
15. Other Wood Products	114,900	10,700	32,226,800	3,739,600	-	37,900	36,129,900
16. Metal Fabricating	538,000	-	134,907,900	27,972,900	-	2,665,100	166,083,900
17. Non Metallic	273,800	-	25,056,600	7,722,800	-	-	38,717,200
18. Other Manufacturing	61,500	25,500	19,023,800	-	54,400	16,422,300	35,587,500
19. Packing Houses	-	-	-	-	-	-	-
20. Wholesale Trade	2,668,900	1,493,800	14,887,900	62,527,100	1,312,900	85,137,100	168,027,700
21. Retail Trade	663,800	53,000	39,645,600	22,757,300	10,212,200	532,558,900	569,518,300
22. Hotel, Tourist Camp	166,100	-	9,312,000	-	47,915,200	100,656,100	158,049,400
23. Health and Education	-	-	-	-	-	602,477,900	602,477,900
24. Other Services	290,900	380,100	24,645,200	1,759,800	4,144,400	110,745,200	141,965,600
25. Transport	1,360,400	312,000	138,918,700	-	-	59,760,300	72,474,000
26. Finance, Insurance	1,264,400	-	27,746,100	24,928,500	-	144,243,100	198,182,100
27. Construction	14,493,400	254,900	11,530,500	294,856,900	-	5,092,400	326,228,100
28. Municipal Government	55,482,900	-	-	-	-	35,913,600	47,735,200
29. Utilities	1,234,800	1,428,100	10,923,500	-	-	131,033,600	144,620,000
30. Households-Wages & Labour	30,681,800	30,941,600					

APPENDIX C

INPUT - OUTPUT TABLES FOR 1970, 1980, 2000 AND 2020.

C.1.1. Input Matrix of Okanagan Basin Economy 1970
C.1.2. Direct Purchases Per Dollar of Output 1970
C.1.3. Direct and Indirect Requirements per Dollar of Final Demand 1970

C.2.1. Direct Purchases Per Dollar of Output 1980
C.2.2. Direct and Indirect Requirements Per Dollar of Final Demand 1980

C.3.1. Direct Purchases Per Dollar of Output 2000
C.3.2. Direct and Indirect Requirements Per Dollar of Final Demand 2000

C.4.1. Direct Purchases Per Dollar of Output 2020
C.4.2. Direct and Indirect Requirements Per Dollar of Final Demand 2020

APPENDIX C.1.1.

INPUT MATRIX OF OKANAGAN BASIN

ECONOMY 1970

(In 1000's of 1970 Dollars)

	SECTORS	1 TREE FRUITS	2 LIVE-STOCK	3 DAIRY-ING	4 VEGET-ABLES	5 FIELD CROPS	6 POULTRY & EGGS	7 NURSER-IES	8 LOGGING	9 MINING	10 MEAT & DAIRY	11 FRUIT & VEGET-ABLE CANNING	12 WINERIES & SOFT DRINKS	13 OTHER FOOD
1	Tree Fruits	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2981.5	734.1	0.0
2	Livestock	0.0	156.2	9.6	0.0	0.0	0.0	0.0	0.0	0.0	297.2	0.0	0.0	0.0
3	Dairying	0.0	3.2	27.4	0.0	0.0	0.0	0.0	0.0	0.0	1380.6	0.0	0.0	0.0
4	Vegetables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	182.2	0.0	0.0
5	Field Crops	0.0	65.4	154.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.3
6	Poultry & Eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Nurseries	0.0	0.0	0.0	0.0	0.0	0.0	33.4	0.0	0.0	0.0	0.0	0.0	0.0
8	Logging	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	Mining	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	Meat & Dairy	0.0	8.9	22.9	0.0	0.0	0.0	0.0	0.0	0.0	120.8	0.0	0.0	43.6
11	Fruit & Vegetable Canning	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0.0	72.9	7.1
12	Wineries & Soft Drinks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	719.8	0.0
13	Other Food	0.0	191.7	247.3	0.0	0.0	380.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
14	Sawmills & Planing Mills	76.6	5.1	12.0	3.0	0.0	8.0	0.3	0.0	0.0	4.2	8.4	6.3	5.8
15	Other Wood	4.5	0.8	0.6	0.2	0.0	0.6	0.0	0.0	0.0	0.6	1.3	1.0	0.9
16	Metal Fabricating	36.9	5.2	1.4	0.0	0.0	0.0	0.0	43.1	10.0	0.0	2007.9	69.3	10.2
17	Non-Metallic Minerals	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	652.8	0.0
18	Other Manufacturing	0.0	0.0	0.0	44.9	0.0	0.1	9.7	0.0	0.0	51.9	45.5	93.7	141.8
19	Packing Houses	11378.9	0.0	0.0	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	Wholesale Trade	612.0	54.5	18.5	42.8	54.1	7.1	13.4	112.3	219.2	122.2	26.3	56.4	11.0
21	Retail Trade	229.7	25.9	6.9	34.0	7.0	2.1	4.9	5.8	0.0	67.9	3.2	28.5	6.9
22	Tourist Services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0
23	Education & Health Services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	Other Services	1977.7	55.9	33.9	57.4	6.5	5.3	5.2	43.3	0.0	34.3	30.9	32.3	12.2
25	Transport, Storage, Communi-cation	44.9	32.0	55.2	20.0	10.4	0.3	31.5	0.0	648.3	45.1	149.6	252.1	10.0
26	Finance, Insurance, Real Estate	1998.6	245.9	124.1	24.1	29.1	37.9	13.9	181.9	0.0	121.1	232.7	196.6	48.4
27	Construction	0.0	49.0	2.1	0.0	0.0	4.3	22.0	0.0	0.0	63.9	0.0	10.2	0.0
28	Local Government	288.9	14.4	17.0	0.0	0.0	7.3	5.4	0.0	0.0	32.3	72.5	54.4	25.5
29	Utilities	1566.9	153.1	39.7	75.2	7.8	20.4	15.2	9.4	1218.3	126.5	164.9	79.4	51.8

APPENDIX C.1.1.(cont'd)

INPUT MATRIX OF OKANAGAN BASIN

ECONOMY 1970

(In 1000's of 1970 Dollars)

	14 SAWMILLS & PLANING MILLS	15 OTHER WOOD	16 METAL FABRI-CATING	17 NON METALLIC MINERALS	18 OTHER MANU-FACT-URING	19 PACKING HOUSES	20 WHOLE-SALE TRADE	21 RETAIL TRADE	22 TOURIST SERV-ICES	23 EDUCA-TION & HEALTH SERVICES	24 OTHER SERV-ICES	25 TRANSPORT STORAGE COMMUNI-CATION	26 FINANCE, INSURANCE REAL ESTATE	27 CONST-RUCTION	28 LOCAL GOVERN-MENT	29 UTIL-ITIES
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	92.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	55.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	7.0	0.0
8	2318.1	707.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	418.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1336.0	45.4	28.2	0.0	0.0	0.0	5.5	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	209.2	1.3	23.9	0.0	0.0	0.0	17.9	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	208.7	11.5	6.4	0.0	0.0	0.0	17.0	0.0
14	424.9	1925.2	279.2	51.7	67.3	75.4	19.5	49.6	74.4	2.4	24.3	211.3	0.0	972.6	3.0	19.5
15	14.7	271.1	39.7	14.0	35.8	12.1	3.3	7.9	11.8	1.0	23.6	7.5	0.0	1284.7	0.0	3.1
16	103.0	253.6	723.8	15.0	9.5	0.0	0.0	0.0	0.0	7.4	0.0	30.0	0.0	303.8	38.2	30.0
17	0.0	0.0	0.0	194.1	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	3186.6	71.3	0.0
18	2.8	0.6	670.2	295.9	43.5	827.8	277.6	1589.1	143.2	68.9	174.2	118.0	354.2	193.8	53.2	12.6
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	172.0	93.4	202.4	84.5	53.2	265.5	203.6	332.0	243.3	150.5	155.5	120.6	71.6	1824.7	77.9	148.7
21	5.2	2.1	3.6	11.6	13.5	12.4	118.8	201.4	198.7	60.0	79.8	31.0	53.4	186.7	58.0	155.7
22	0.0	0.0	0.0	0.0	0.0	0.0	29.9	0.0	0.0	2.6	0.0	0.0	0.0	0.0	29.6	0.0
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3627.4	0.0
24	216.5	12.6	98.1	34.8	131.0	172.5	332.7	1024.1	333.3	447.2	236.3	139.1	310.8	634.7	462.9	116.9
25	50.7	170.4	411.8	53.4	100.1	40.3	1733.5	1692.4	91.8	138.7	269.8	782.3	134.9	626.7	33.4	26.8
26	217.6	43.1	226.1	125.1	110.5	571.8	1148.5	4893.4	1201.0	1093.1	959.5	237.9	517.9	645.8	475.6	175.6
27	1.0	6.3	45.3	219.6	49.6	32.9	182.3	302.6	269.7	95.0	87.6	2.7	69.5	0.0	488.4	5.9
28	109.6	61.9	100.4	182.6	129.9	184.0	222.6	470.9	577.7	141.0	139.6	18.2	42.7	106.5	581.9	492.6
29	203.9	55.8	233.9	424.7	219.1	267.4	890.4	1321.7	1051.6	882.3	476.0	251.5	413.8	420.7	175.2	254.1

APPENDIX C.1.2

DIRECT PURCHASES PER DOLLAR OF OUTPUT 1970

Sector Producing \ Sector Buying	1	2	3	4	5	6	7	8	9	10	11	12
1. Tree Fruits	.00029	.00000	.00000	.00000	.00000	.00000.	.00000	.00000	.00000	.00000	.18632	.08112
2. Livestock	.00000	.05680	.00625	.00000	.00000	.00000	.00000	.00000	.00000	.02122	.00000	.00000
3. Dairying	.00000	.00116	.01784	.00000	.00000	.00000	.00000	.00000	.00000	.09860	.00000	.00000
4. Vegetables	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.01159	.00000
5. Field Crops	.00000	.02378	.10081	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
6. Poultry and Eggs	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
7. Nurseries	.00000	.00000	.00000	.00000	.00000	.00000	.03271	.00000	.00000	.00000	.00000	.00000
8. Logging	.00003	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
9. Mining	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
10. Meat and Dairy	.00000	.00324	.01491	.00000	.00000	.00000	.00000	.00000	.00000	.00863	.00000	.00000
11. Fruit and Vegetable Canning	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00179	.00000	.00806
12. Wineries and Soft Drinks	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.07954
13. Other Food	.00000	.06971	.16106	.00000	.00000	.29141	.00000	.00000	.00000	.00000	.00000	.00011
14. Sawmills and Planing Mills	.00240	.00185	.00782	.00242	.00000	.00613	.00029	.00000	.00000	.00030	.00052	.00070
15. Other Wood	.00014	.00029	.00039	.00016	.00000	.00046	.00000	.00000	.00000	.00004	.00008	.00011
16. Metal Fabricating	.00116	.00189	.00091	.00000	.00000	.00000	.00000	.01424	.00058	.00000	.12548	.00766
17. Non-metal Minerals	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.07214
18. Other Manufacturing	.00000	.00000	.00000	.03617	.00000	.00008	.00950	.00000	.00000	.00371	.00284	.01055
19. Packing Houses	.35695	.00000	.00000	.01128	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
20. Wholesale Trade	.01920	.01982	.01205	.03448	.11219	.00544	.01312	.03711	.00828	.00875	.00164	.00625
21. Retail Trade	.00721	.00942	.00449	.02739	.01452	.00161	.00480	.00192	.00000	.00484	.00020	.00315
22. Tourist Services	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00011	.00000	.00000
23. Education and Health Services	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
24. Other Services	.06204	.02032	.02208	.04624	.01348	.00406	.00509	.01431	.00000	.00245	.00193	.00357
25. Transport, Storage, Communication	.00141	.01164	.03595	.01611	.02157	.00023	.03085	.00000	.02449	.00522	.00955	.02786
26. Finance, Insurance, Real Estate	.06269	.08942	.08082	.01942	.06035	.02906	.01361	.06010	.00000	.00865	.01454	.02175
27. Construction	.00000	.01782	.00137	.00000	.00000	.00330	.02155	.00000	.00000	.00456	.00000	.00113
28. Local Government	.00906	.00524	.01107	.00000	.00000	.00560	.00529	.00000	.00000	.00231	.00453	.00601
29. Utilities	.04915	.05567	.02585	.06050	.01618	.01564	.01489	.00311	.04603	.00903	.01050	.00877

Note: Each entry shows the input directly required from the industry at the left of the table to produce one dollar's worth of output by the industry at the top of the table. (Industries numbered across the top correspond to those numbered at the left.)

APPENDIX C.1.2(cont'd)

13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00513	.00000	.00000	.00000	.00000	.00000	.00000	.00000	1.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	2.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	3.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00099	.00000	.00000	.00000	.00000	.00000	.00000	.00000	4.
.01276	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	5.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00310	.00000	.00000	.00000	.00000	.00000	.00000	.00000	6.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00007	.00000	.00000	.00000	.00000	.00039	.00000	7.
.00000	.17250	.07425	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	8.
.00000	.00000	.00000	.00000	.03069	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00046	.00000	.00000	9.
.00852	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.07415	.00114	.00180	.00000	.00000	.00000	.00031	.00000	10.
.00139	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00014	.00000	.00000	.00000	.00000	.00000	.00000	11.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.01161	.00003	.00153	.00000	.00000	.00000	.00100	.00000	12.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.01158	.00029	.00041	.00000	.00000	.00000	.00095	.00000	13.
.00113	.03162	.20208	.00763	.00379	.00603	.00662	.00082	.00096	.00413	.00006	.00155	.00977	.00000	.02541	.00017	.00052	14.
.00018	.00109	.02846	.00108	.00103	.00321	.00106	.00013	.00015	.00065	.00003	.00151	.00035	.00000	.03092	.00000	.00013	15.
.00199	.00766	.02662	.01978	.00110	.00085	.00000	.00000	.00000	.00000	.00019	.00000	.00139	.00000	.00731	.00215	.00126	16.
.00000	.00000	.00000	.00000	.01422	.00000	.00000	.00000	.00000	.00000	.00003	.00000	.00000	.00000	.07670	.00397	.00000	17.
.02770	.00021	.00006	.01831	.02168	.00390	.07266	.01170	.03082	.00795	.00174	.01115	.00546	.00794	.00466	.00296	.00053	18.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	19.
.00215	.01280	.00980	.00553	.00619	.00476	.02530	.00858	.00644	.01350	.00379	.00994	.00558	.00161	.04392	.00454	.00626	20.
.00155	.00039	.00042	.00010	.00085	.00121	.00109	.00500	.00391	.01103	.00151	.00510	.00143	.00120	.00449	.00323	.00656	21.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00124	.00000	.00000	.00007	.00000	.00000	.00000	.00000	.00165	.00000	22.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.20187	.00000	23.
.03258	.01611	.00132	.00268	.00255	.01175	.01514	.01401	.01986	.01850	.01126	.01510	.00643	.00697	.01648	.02576	.00492	24.
.00195	.00377	.01789	.01125	.00391	.01434	.00354	.07300	.03282	.00510	.00349	.01725	.03618	.00302	.01508	.00186	.00112	25.
.00945	.01619	.00452	.00618	.00917	.00990	.05019	.04857	.09491	.06666	.02753	.06133	.01100	.01161	.01554	.02647	.00740	26.
.00000	.00007	.00066	.00124	.01609	.00444	.00289	.00772	.00587	.01497	.00239	.00560	.00012	.00156	.00000	.02718	.00024	27.
.00498	.00816	.00650	.00274	.01338	.01163	.01615	.00938	.00913	.03206	.00355	.00892	.00084	.00096	.00256	.03258	.02075	28.
.01012	.01517	.00586	.00639	.03112	.01962	.02347	.03750	.02563	.05837	.02222	.03043	.01163	.00928	.01013	.00975	.01070	29.

APPENDIX C.1.3.
DIRECT AND INDIRECT REQUIREMENTS
PER DOLLAR OF FINAL DEMAND 1970

Sector Buying \ Sector Producing	1	2	3	4	5	6	7	8	9	10	11	12
1. Tree Fruits	1.00030	0.00000	0.00001	0.00000	0.00000	0.00000	0.00001	0.00106	0.00001	0.00014	0.00000	0.00014
2. Livestock	0.00005	1.06033	0.00168	0.00000	0.02633	0.00000	0.00000	0.00063	0.00006	0.00418	0.00011	0.00005
3. Dairying	0.00005	0.00714	1.01987	0.00000	0.10509	0.00000	0.00001	0.00164	0.00001	0.01684	0.00026	0.00006
4. Vegetables	0.00001	0.00000	0.00001	1.00000	0.00000	0.00000	0.00000	0.00061	0.00000	0.00010	0.00000	0.00009
5. Field Crops	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	0.00000	0.00010	0.00000	0.00004	0.00000	0.00003
6. Poultry and Eggs	0.00008	0.00006	0.00025	0.00000	0.00374	1.00000	0.00000	0.00127	0.00001	0.00252	0.00041	0.00002
7. Nurseries	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.03382	0.00032	0.00007	0.00002	0.00000	0.00002
8. Logging	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00005	0.00000	0.00003	0.00000	0.00005
9. Mining	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00006	1.00000	0.00000	0.00000	0.00000
10. Meat and Dairy	0.00034	0.02341	0.10147	0.00002	0.01102	0.00000	0.00000	0.00029	0.00002	1.01045	0.00185	0.00002
11. Fruit and Vegetable Canning	0.18638	0.00000	0.00000	0.01139	0.00000	0.00000	0.00000	0.00053	0.00000	0.00004	1.00000	0.00004
12. Wineries and Soft Drinks	0.08979	0.00000	0.00000	0.00010	0.00000	0.00000	0.00000	0.00043	0.00245	0.00003	0.00875	1.08644
13. Other Food	0.00026	0.00020	0.00087	0.00002	0.01285	0.00000	0.00000	0.00028	0.00000	0.00862	0.00140	0.00001
14. Sawmills and Planing Mills	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.17830	0.00000	0.00005	0.00000	0.00005
15. Other Wood	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.11361	0.00000	0.00002	0.00000	0.00002
16. Metal Fabricating	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00158	0.00000	0.00001	0.00000	0.00001
17. Non-metal Minerals	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00099	0.03118	0.00002	0.00000	0.00002
18. Other Manufacturing	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00152	0.00002	0.00003	0.00000	0.00004
19. Packing Houses	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00147	0.00001	0.00005	0.00000	0.00005
20. Wholesale Trade	0.00001	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00040	0.00003	0.00013	0.00000	0.00006
21. Retail Trade	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00037	0.00002	0.00005	0.00000	0.00005
22. Tourist Services	0.00621	0.00174	0.00754	0.00099	0.00098	0.00310	0.00002	0.00103	0.00008	0.07510	0.00026	0.01269
23. Education and Health Services	0.00003	0.00003	0.00012	0.00000	0.00002	0.00000	0.00007	0.00006	0.00001	0.00119	0.00014	0.00006
24. Other Services	0.00014	0.00004	0.00019	0.00000	-0.00003	0.00000	0.00000	0.00057	0.00002	0.00186	0.00002	0.00170
25. Transport, Storage, Communication	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00187	0.00000	0.00002	0.00000	0.00001
26. Finance, Insurance, Real Estate	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00004	0.00001	0.00001	0.00000	0.00001
27. Construction	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00784	0.00285	0.00004	0.00000	0.00004
28. Local Government	0.00011	0.00002	0.00008	0.00000	0.00002	0.00001	0.00043	0.00030	0.00021	0.00078	0.00004	0.00120
29. Utilities	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00018	0.00001	0.00003	0.00000	0.00003

Note: Each entry shows the total dollar production directly and indirectly required from the industry at the top of the table per dollar of deliveries to final demand by the industry at the left (Industries numbered across the top correspond to those numbered at the left).

APPENDIX C.1.3.(cont'd)

13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
0.00005	0.00565	0.00084	0.00144	0.00028	0.02836	0.35706	0.02960	0.00879	0.00007	0.00368	0.07112	0.00751	0.08994	0.00251	0.01824	0.06361	1.
0.07421	0.00319	0.00104	0.00255	0.00158	0.00419	0.00001	0.02643	0.01150	0.00005	0.00170	0.02495	0.01733	0.10380	0.01979	0.00842	0.06473	2.
0.16478	0.00924	0.00063	0.00161	0.00026	0.00662	0.00002	0.02630	0.00726	0.00006	0.00287	0.02727	0.04419	0.09746	0.00259	0.01424	0.05461	3.
0.00003	0.00336	0.00045	0.00022	0.00010	0.03942	0.01128	0.03665	0.02852	0.00005	0.00066	0.04955	0.02220	0.02919	0.00109	0.00326	0.06660	4.
0.00001	0.00055	0.00011	0.00010	0.00011	0.00277	0.00000	0.11396	0.01553	0.00014	0.00041	0.01657	0.03215	0.06982	0.00126	0.00204	0.02274	5.
0.29147	0.00704	0.00070	0.00082	0.00033	0.00878	0.00003	0.00725	0.00239	0.00002	0.00164	0.00595	0.00207	0.03425	0.00374	0.00811	0.02023	6.
0.00001	0.00151	0.00079	0.00031	0.00180	0.01080	0.00000	0.01527	0.00542	0.00003	0.00133	0.00685	0.03520	0.01721	0.02276	0.00658	0.01770	7.
0.00001	0.00025	0.00007	0.01455	0.00005	0.00150	0.00000	0.03789	0.00233	0.00005	0.00016	0.01572	0.00364	0.06410	0.00054	0.00079	0.00592	8.
0.00000	0.00053	0.00002	0.00049	0.00001	0.00032	0.00000	0.00283	0.00040	0.00001	0.00023	0.00060	0.02618	0.00121	0.00012	0.00114	0.04724	9.
0.01798	0.00157	0.00031	0.00052	0.00045	0.00498	0.00012	0.01252	0.00607	0.00013	0.00091	0.00640	0.00930	0.02231	0.00553	0.00450	0.01502	10.
0.00002	0.00288	0.00043	0.12836	0.00012	0.01124	0.06666	0.00861	0.00235	0.00003	0.00180	0.01668	0.01330	0.03346	0.00088	0.00891	0.02457	11.
0.00014	0.00329	0.00046	0.00998	0.07980	0.01651	0.03205	0.01076	0.00460	0.00003	0.00208	0.01174	0.03390	0.03498	0.00321	0.01028	0.01981	12.
1.00016	0.00151	0.00030	0.00230	0.00006	0.02818	0.00009	0.00411	0.00178	0.00002	0.00119	0.00347	0.00336	0.01181	0.00042	0.00591	0.01173	13.
0.00002	1.03515	0.00124	0.01076	0.00010	0.00125	0.00000	0.02059	0.00116	0.00004	0.00194	0.02049	0.00633	0.03078	0.00070	0.00061	0.01846	14.
0.00001	0.21541	1.02965	0.05137	0.00015	0.00131	0.00000	0.01781	0.00083	0.00004	0.00189	0.00754	0.02196	0.01744	0.00122	0.00938	0.01149	15.
0.00001	0.00861	0.00127	1.02036	0.00013	0.01904	0.00000	0.00622	0.00028	0.00001	0.00071	0.00357	0.01287	0.00771	0.00155	0.00349	0.00776	16.
0.00002	0.00501	0.00171	0.00149	1.01581	0.02260	0.00000	0.00800	0.00135	0.00004	0.00310	0.00416	0.00643	0.01169	0.01700	0.01533	0.03500	17.
0.00002	0.00785	0.00351	0.00116	0.00044	1.00447	0.00000	0.00570	0.00157	0.00003	0.00260	0.01298	0.01595	0.01237	0.00498	0.01287	0.02125	18.
0.00003	0.00787	0.00152	0.00051	0.00040	0.07409	1.00000	0.02482	0.00175	0.00006	0.00379	0.01798	0.00742	0.05522	0.00414	0.01877	0.02731	19.
0.00004	0.00211	0.00051	0.00030	0.00071	0.01321	0.00000	1.01019	0.00571	0.00127	0.00227	0.01626	0.07760	0.05296	0.00843	0.01126	0.04100	20.
0.00002	0.00191	0.00055	0.00025	0.00057	0.03252	0.00000	0.00786	1.00455	0.00003	0.00221	0.02231	0.03620	0.09971	0.00671	0.01097	0.02930	21.
0.01587	0.00542	0.00133	0.00059	0.00239	0.01077	0.00225	0.01688	0.01259	1.00009	0.00725	0.02271	0.00931	0.07572	0.01693	0.03593	0.06429	22.
0.00032	0.00027	0.00015	0.00029	0.00026	0.00231	0.00001	0.00436	0.00184	0.00008	1.00089	0.01211	0.00447	0.02948	0.00270	0.00444	0.02356	23.
0.00046	0.00250	0.00184	0.00025	0.00066	0.01245	0.00005	0.01117	0.00569	0.00003	0.00214	1.01700	0.01991	0.06542	0.00650	0.01058	0.05324	24.
0.00000	0.01066	0.00043	0.00162	0.00003	0.00605	0.00000	0.00630	0.00169	0.00001	0.00031	0.00739	1.03842	0.01300	0.00033	0.00152	0.01317	25.
0.00000	0.00018	0.00010	0.00005	0.00014	0.00826	0.00000	0.00194	0.00136	0.00000	0.00039	0.00747	0.00367	1.01271	0.00172	0.00145	0.01009	26.
0.00001	0.03165	0.03209	0.00887	0.07799	0.00780	0.00000	0.04652	0.00515	0.00007	0.00109	0.01906	0.02116	0.02225	1.00201	0.00542	0.01678	27.
0.00109	0.00132	0.00101	0.00260	0.00653	0.00473	0.00004	0.00752	0.00421	0.00173	0.20902	0.03069	0.00482	0.03721	0.02913	1.03537	0.01745	28.
0.00005	0.00099	0.00019	0.00138	0.00012	0.00110	0.00000	0.00672	0.00683	0.00005	0.00443	0.00606	0.00217	0.00974	0.00101	0.02195	1.01194	29.

APPENDIX C.2.1.

DIRECT PURCHASES PER DOLLAR OF OUTPUT 1980

Sector Producing \ Sector Buying	1	2	3	4	5	6	7	8	9	10	11	12
1. Tree Fruits	.00026	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.21617	.02185
2. Livestock	.00000	.06040	.00671	.00000	.00000	.00000	.00000	.00000	.00000	.02237	.00000	.00000
3. Dairying	.00000	.00124	.01915	.00000	.00000	.00000	.00000	.00000	.00000	.10394	.00000	.00000
4. Vegetables	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.01138	.00000
5. Field Crops	.00000	.02531	.10817	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
6. Poultry and Eggs	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
7. Nurseries	.00000	.00000	.00000	.00000	.00000	.00000	.03692	.00000	.00000	.00000	.00000	.00000
8. Logging	.00001	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
9. Mining	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
10. Meat and Dairy	.00000	.00345	.01602	.00000	.00000	.00000	.00000	.00000	.00000	.00909	.00000	.00000
11. Fruit and Vegetable Canning	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00189	.00000	.00200
12. Wineries and Soft Drinks	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.01985
13. Other Food	.00000	.07415	.17278	.00000	.00000	.30130	.00000	.00000	.00000	.00000	.00000	.00002
14. Sawmills and Planing Mills	.00229	.00200	.00840	.00274	.00000	.00657	.00029	.00000	.00000	.00031	.00057	.00017
15. Other Wood	.00013	.00033	.00039	.00016	.00000	.00046	.00000	.00000	.00000	.00040	.00008	.00002
16. Metal Fabricating	.00110	.00200	.00098	.00000	.00000	.00000	.00000	.02382	.00040	.00000	.18337	.00218
17. Non-metal Minerals	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.05452
18. Other Manufacturing	.00000	.00000	.00000	.04020	.00000	.00008	.01077	.00000	.00000	.00391	.04175	.01146
19. Packing Houses	.34174	.00000	.00000	.01249	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
20. Wholesale Trade	.01836	.02109	.01296	.03827	.11261	.00567	.01489	.06219	.00879	.00920	.00181	.00627
21. Retail Trade	.00689	.01004	.00482	.03045	.01452	.00161	.00548	.00321	.00000	.00511	.00022	.00316
22. Tourist Services	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00012	.00000	.00000
23. Education and Health Services	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
24. Other Services	.05938	.02164	.02371	.05132	.01348	.00422	.00578	.02396	.00000	.00258	.00213	.00562
25. Transport, Storage, Communication	.00134	.01236	.03855	.01780	.02178	.00023	.03487	.00000	.02598	.00339	.01032	.02800
26. Finance, Insurance, Real Estate	.06002	.09513	.08668	.02159	.06056	.03006	.01538	.10068	.00000	.00912	.01607	.00677
27. Construction	.00000	.01895	.00143	.00000	.00000	.00337	.02429	.00000	.00000	.00480	.00000	.00112
28. Local Government	.00867	.00556	.01192	.00000	.00000	.00006	.00597	.00000	.00000	.00244	.00500	.00149
29. Utilities	.04704	.05920	.02774	.06727	.01618	.01618	.01675	.00519	.04883	.00952	.01138	.02047

Note: Each entry shows the input directly required from the industry at the left of the table to produce one dollar's worth of output by the industry at the top of the table. (Industries numbered across the top correspond to those numbered at the left.)

APPENDIX C.2.1.(cont'd)

13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00513	.00000	.00000	.00000	.00000	.00000	.00000	.00000	1.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	2.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	3.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00059	.00000	.00000	.00000	.00000	.00000	.00000	.00000	4.
.01404	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	5.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00310	.00000	.00000	.00000	.00000	.00000	.00000	.00000	6.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00016	.00000	.00000	.00000	.00000	.00056	.00000	7.
.00000	.17249	.02827	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00061	.00000	.00000	8.
.00000	.00000	.00000	.00000	.03626	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	9.
.00938	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.07415	.00257	.00180	.00000	.00000	.00000	.00044	.00000	10.
.00152	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00032	.00000	.00000	.00000	.00000	.00000	.00000	11.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.01161	.00007	.00153	.00000	.00000	.00000	.00143	.00000	12.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.01158	.00065	.00041	.00000	.00000	.00000	.00136	.00000	13.
.00123	.04445	.24500	.00793	.00448	.00662	.00774	.00121	.00145	.00413	.00014	.00155	.01107	.00000	.03095	.00023	.00097	14.
.00020	.00154	.03450	.00113	.00122	.00352	.00124	.00019	.00023	.00065	.00007	.00151	.00040	.00000	.04088	.00000	.00015	15.
.00219	.01076	.03227	.04429	.00130	.00093	.00000	.00000	.00000	.00000	.00043	.00000	.00016	.00000	.01794	.00305	.00149	16.
.00000	.00000	.00000	.00000	.01680	.00000	.00000	.00000	.00000	.00000	.00007	.00000	.00000	.00000	.10141	.00568	.00000	17.
.03049	.00029	.00007	.01903	.02561	.00427	.17435	.01723	.04649	.00795	.00392	.01113	.00619	.00886	.00616	.00423	.00063	18.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	19.
.00236	.01799	.01189	.00575	.00731	.00523	.02723	.01263	.00971	.01350	.00855	.00994	.00632	.00180	.05807	.00619	.00739	20.
.00148	.00054	.00026	.00010	.00100	.00131	.00127	.00736	.00590	.01103	.00340	.00510	.00162	.00134	.00594	.00462	.00774	21.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00183	.00000	.00000	.00016	.00000	.00000	.00000	.00000	.00236	.00000	22.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.28862	.00000	23.
.00264	.02264	.00160	.00279	.00301	.01265	.01770	.02063	.02996	.01850	.02539	.01510	.00729	.00777	.02179	.03683	.00581	24.
.00215	.00529	.02168	.01169	.00462	.01571	.00413	.10748	.04950	.00510	.00787	.01725	.04100	.00337	.01994	.00266	.00132	25.
.01037	.02276	.00548	.00642	.01063	.01084	.05865	.07121	.14315	.06666	.06207	.06133	.01247	.02344	.02055	.03784	.00875	26.
.00000	.00009	.00080	.00129	.01901	.00486	.00338	.01137	.00885	.01497	.00539	.00560	.00014	.00174	.00000	.03886	.00030	27.
.00549	.01145	.00786	.00285	.01561	.01275	.01888	.01381	.01377	.03206	.00800	.00892	.00055	.00107	.00338	.04629	02449	28.
.01115	.02132	.00710	.00664	.03677	.02149	.02743	.05521	.03866	.05837	.05010	.03043	.01318	.01035	.01339	.01394	01263	29.

APPENDIX C.2.2.
DIRECT AND INDIRECT REQUIREMENTS
PER DOLLAR OF FINAL DEMAND 1980

Sector Buying \ Sector Producing	1	2	3	4	5	6	7	8	9	10	11	12
1. Tree Fruits	1.00026	0.00000	0.00002	0.00000	0.00000	0.00000	0.00001	0.00114	0.00002	0.00016	0.00000	0.00014
2. Livestock	0.00003	1.06440	0.00182	0.00000	0.02825	0.00000	0.00001	0.00072	0.00008	0.00456	0.00013	0.00006
3. Dairying	0.00007	0.00773	1.02147	0.00000	0.11318	0.00000	0.00001	0.00180	0.00002	0.01830	0.00031	0.00007
4. Vegetables	0.00000	0.00000	0.00001	1.00000	0.00000	0.00000	0.00000	0.00072	0.00001	0.00011	0.00000	0.00010
5. Field Crops	0.00000	0.00000	0.00001	0.00000	1.00000	0.00000	0.00000	0.00014	0.00001	0.00005	0.00000	0.00003
6. Poultry and Eggs	0.00010	0.00007	0.00031	0.00001	0.00427	1.00000	0.00001	0.00133	0.00002	0.00288	0.00047	0.00002
7. Nurseries	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.03834	0.00042	0.00010	0.00003	0.00000	0.00003
8. Logging	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	1.00010	0.00001	0.00006	0.00000	0.00005
9. Mining	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00007	1.00000	0.00000	0.00000	0.00000
10. Meat and Dairy	0.00042	0.02484	0.10719	0.00002	0.01251	0.00000	0.00000	0.00037	0.00002	1.01122	0.00195	0.00002
11. Fruit and Vegetable Canning	0.21623	0.00000	0.00001	0.01138	0.00000	0.00000	0.00001	0.00077	0.00001	0.00005	1.00000	0.00005
12. Wineries and Soft Drinks	0.02272	0.00000	0.00000	0.00002	0.00000	0.00000	0.00000	0.00023	0.00206	0.00002	0.00204	1.02027
13. Other Food	0.00033	0.00023	0.00101	0.00002	0.01416	0.00000	0.00000	0.00031	0.00000	0.00950	0.00155	0.00002
14. Sawmills and Planing Mills	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00001	0.18072	0.00001	0.00008	0.00000	0.00007
15. Other Wood	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.07527	0.00001	0.00004	0.00000	0.00004
16. Metal Fabricating	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00167	0.00001	0.00001	0.00000	0.00001
17. Non-metal Minerals	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00118	0.03696	0.00004	0.00000	0.00004
18. Other Manufacturing	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00001	0.00157	0.00002	0.00005	0.00000	0.00005
19. Packing Houses	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00002	0.00185	0.00003	0.00008	0.00000	0.00007
20. Wholesale Trade	0.00001	0.00001	0.00002	0.00000	0.00000	0.00001	0.00001	0.00065	0.00005	0.00021	0.00000	0.00009
21. Retail Trade	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00001	0.00059	0.00004	0.00009	0.00000	0.00008
22. Tourist Services	0.00544	0.00185	0.00797	0.00099	0.00111	0.00310	0.00002	0.00106	0.00010	0.07520	0.00019	0.01194
23. Education and Health Services	0.00007	0.00007	0.00028	0.00000	0.00004	0.00000	0.00017	0.00015	0.00003	0.00268	0.00033	0.00013
24. Other Services	0.00004	0.00005	0.00020	0.00000	0.00003	0.00000	0.00001	0.00054	0.00003	0.00188	0.00001	0.00160
25. Transport, Storage, Communication	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00215	0.00000	0.00002	0.00000	0.00002
26. Finance, Insurance, Real Estate	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00005	0.00001	0.00002	0.00000	0.00002
27. Construction	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00001	0.00954	0.00375	0.00007	0.00000	0.00006
28. Local Government	0.00007	0.00004	0.00017	0.00000	0.00004	0.00001	0.00067	0.00054	0.00039	0.00156	0.00011	0.00167
29. Utilities	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00002	0.00022	0.00001	0.00005	0.00000	0.00005

Note: Each entry shows the total dollar production directly and indirectly required from the industry at the top of the table per dollar of deliveries to final demand by the industry at the left (Industries numbered across the top correspond to those numbered at the left).

APPENDIX C.2.2.(cont'd)

13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
0.00006	0.00635	0.00108	0.00160	0.00046	0.06268	0.34183	0.03046	0.00883	0.00010	0.00573	0.07051	0.00971	0.09285	0.00328	0.01986	0.06465	1.
0.07927	0.00388	0.00139	0.00513	0.00228	0.00535	0.00001	0.02903	0.01260	0.00008	0.00283	0.02761	0.02022	0.11438	0.02148	0.00980	0.07062	2.
0.17710	0.01031	0.00073	0.00197	0.00043	0.00818	0.00002	0.02896	0.00807	0.00009	0.00467	0.03032	0.04923	0.10822	0.00318	0.01617	0.03883	3.
0.00005	0.00407	0.00055	0.00034	0.00020	0.04598	0.01249	0.04130	0.03203	0.00009	0.00131	0.05606	0.02708	0.03610	0.00161	0.00454	0.07577	4.
0.00002	0.00079	0.00017	0.00017	0.00021	0.00389	0.00000	0.11514	0.01594	0.00022	0.00085	0.01785	0.03718	0.07487	0.00184	0.00293	0.02551	5.
0.30138	0.00755	0.00078	0.00108	0.00047	0.01014	0.00003	0.00794	0.00256	0.00004	0.00256	0.00669	0.00272	0.03697	0.00403	0.00888	0.02182	6.
0.00002	0.00212	0.00119	0.00071	0.00273	0.01269	0.00000	0.01804	0.00639	0.00005	0.00228	0.00843	0.04121	0.02112	0.02601	0.00790	0.02093	7.
0.00002	0.00055	0.00016	0.02504	0.00014	0.00315	0.00000	0.06391	0.00412	0.00012	0.00052	0.02703	0.00867	0.11064	0.00124	0.00180	0.01145	8.
0.00000	0.00042	0.00003	0.00056	0.00003	0.00044	0.00000	0.00952	0.00053	0.00002	0.00043	0.00083	0.02831	0.00175	0.00020	0.00150	0.05050	9.
0.02038	0.00198	0.00078	0.00082	0.00065	0.00574	0.00014	0.01375	0.00659	0.00016	0.00150	0.00741	0.01098	0.02576	0.00604	0.00520	0.01685	10.
0.00005	0.00429	0.00078	0.19241	0.00023	0.06014	0.07404	0.01074	0.00284	0.00005	0.00328	0.02005	0.01695	0.04019	0.00160	0.01136	0.02970	11.
0.00003	0.00129	0.00032	0.00303	0.05688	0.01550	0.00776	0.00845	0.00392	0.00003	0.00120	0.00880	0.03198	0.01254	0.00271	0.00416	0.02869	12.
1.00020	0.00173	0.00036	0.00272	0.00010	0.03122	0.00011	0.00467	0.00203	0.00003	0.00196	0.00411	0.00404	0.01368	0.00061	0.00678	0.01332	13.
0.00004	1.04743	0.00182	0.01650	0.00023	0.00221	0.00000	0.03150	0.00194	0.00009	0.00412	0.03057	0.01055	0.04893	0.00135	0.01426	0.02762	14.
0.00003	0.26652	1.03633	0.04002	0.00027	0.00199	0.00000	0.02302	0.00119	0.00007	0.00372	0.01141	0.02848	0.02394	0.00183	0.01287	0.01664	15.
0.00001	0.00943	0.00140	1.04664	0.00020	0.02040	0.00000	0.00685	0.00035	0.00002	0.00114	0.00409	0.01414	0.00884	0.00174	0.00593	0.00866	16.
0.00003	0.00640	0.00228	0.00213	1.01931	0.02703	0.00000	0.01010	0.00176	0.00006	0.00543	0.00565	0.00843	0.01525	0.02048	0.01882	0.04246	17.
0.00003	0.00844	0.00396	0.00147	0.00068	1.00507	0.00000	0.00659	0.00181	0.00005	0.00420	0.01472	0.01800	0.01462	0.00570	0.01456	0.02392	18.
0.00005	0.01036	0.00225	0.00068	0.00075	0.17690	1.00000	0.03014	0.00243	0.00011	0.00696	0.02333	0.01179	0.06848	0.00586	0.02411	0.03607	19.
0.00007	0.00356	0.00092	0.00070	0.00143	0.01998	0.00000	1.01565	0.00865	0.00190	0.00501	0.02486	0.11585	0.08071	0.01280	0.01735	0.06166	20.
0.00004	0.00324	0.00096	0.00055	0.00119	0.04957	0.00000	0.01238	1.00708	0.00006	0.00498	0.03454	0.05577	0.15374	0.01050	0.01725	0.04540	21.
0.01410	0.00585	0.00158	0.00085	0.00270	0.01161	0.00187	0.01768	0.01292	1.00013	0.01069	0.02399	0.01066	0.07905	0.01762	0.03703	0.06605	22.
0.00073	0.00076	0.00043	0.00080	0.00079	0.00552	0.00003	0.01016	0.00430	0.00021	1.00303	0.02780	0.01072	0.06823	0.00633	0.01050	0.05583	23.
0.00047	0.00276	0.00194	0.00038	0.00083	0.01277	0.00001	0.01151	0.00584	0.00005	0.00319	1.01755	0.02071	0.06729	0.00655	0.01104	0.05408	24.
0.00001	0.01235	0.00052	0.00198	0.00006	0.00702	0.00000	0.00739	0.00198	0.00002	0.00056	0.00869	1.04415	0.01557	0.00044	0.00193	0.01537	25.
0.00001	0.00025	0.00014	0.00009	0.00022	0.00939	0.00000	0.00228	0.00158	0.00001	0.00050	0.00854	0.00432	1.02535	0.00200	0.00173	0.01156	26.
0.00003	0.04475	0.04283	0.02130	0.10355	0.01156	0.00000	0.06280	0.00712	0.00014	0.00242	0.02661	0.03121	0.03521	1.00343	0.00838	0.02499	27.
0.00171	0.00264	0.00201	0.00455	0.01069	0.00821	0.00002	0.01316	0.00701	0.00256	0.30405	0.04981	0.00976	0.06724	0.04351	1.05545	0.03522	28.
0.00005	0.00125	0.00026	0.00174	0.00032	0.00159	0.00000	0.00819	0.00819	0.00008	0.00765	0.00783	0.00316	0.01305	0.00163	0.02651	1.01487	29.

APPENDIX C.3.1.
DIRECT PURCHASES PER DOLLAR OF OUTPUT 2000

Sector Producing \ Sector Buying	1	2	3	4	5	6	7	8	9	10	11	12
1. Tree Fruits	.00029	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.12611	.02951
2. Livestock	.00000	.06586	.00742	.00000	.00000	.00000	.00000	.00000	.00000	.02353	.00000	.00000
3. Dairying	.00000	.00135	.02110	.00000	.00000	.00000	.00000	.00000	.00000	.10933	.00000	.00000
4. Vegetables	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.01138	.00000
5. Field Crops	.00000	.02760	.11918	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
6. Poultry and Eggs	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
7. Nurseries	.00000	.00000	.00000	.00000	.00000	.00000	.04329	.00000	.00000	.00000	.00000	.00000
8. Logging	.00001	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
9. Mining	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
10. Meat and Dairy	.00000	.00375	.01765	.00000	.00000	.00000	.00000	.00000	.00000	.00957	.00000	.00000
11. Fruit and Vegetable Canning	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00198	.00000	.00304
12. Wineries and Soft Drinks	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.03012
13. Other Food	.00000	.08084	.19049	.00000	.00000	.31618	.00000	.00000	.00000	.00000	.00000	.00004
14. Sawmills and Planing Mills	.00256	.00218	.00925	.00314	.00000	.00667	.00029	.00000	.00000	.00033	.00060	.00027
15. Other Wood	.00014	.00033	.00046	.00016	.00000	.00054	.00000	.00000	.00000	.00004	.00009	.00004
16. Metal Fabricating	.00123	.00218	.00104	.00000	.00000	.00000	.00000	.02730	.00042	.00000	.19187	.00312
17. Non-metal Minerals	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.07462
18. Other Manufacturing	.00000	.00000	.00000	.04616	.00000	.00008	.01254	.00000	.00000	.00411	.04368	.01176
19. Packing Houses	.38323	.00000	.00000	.01442	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
20. Wholesale Trade	.02058	.02298	.01426	.04399	.11344	.00590	.01743	.07111	.00912	.00968	.00189	.00653
21. Retail Trade	.00772	.01091	.00534	.03496	.01472	.00169	.00637	.00367	.00000	.00538	.00023	.00329
22. Tourist Services	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00012	.00000	.00000
23. Education and Health Services	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
24. Other Services	.06658	.02356	.02612	.05897	.01369	.00445	.00676	.02743	.00000	.00272	.00223	.00554
25. Transport, Storage, Communication	.00150	.01349	.04253	.02054	.02198	.00031	.04084	.00000	.02694	.00357	.01080	.02915
26. Finance, Insurance, Real Estate	.06730	.10371	.09554	.02481	.06097	.03152	.01802	.11509	.00000	.00959	.01682	.00942
27. Construction	.00000	.02066	.00156	.00000	.00000	.00353	.02840	.00000	.00000	.00506	.00000	.00116
28. Local Government	.00972	.00607	.01309	.00000	.00000	.00606	.00705	.00000	.00000	.00256	.00524	.00227
29. Utilities	.05275	.06455	.03054	.07734	.01638	.01695	.01969	.00591	.05063	.01001	.01191	.01948

Note: Each entry shows the input directly required from the industry at the left of the table to produce one dollar's worth of output by the industry at the top of the table. (Industries numbered across the top correspond to those numbered at the left.)

APPENDIX C.3.1.(cont'd)

13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00668	.00000	.00000	.00000	.00000	.00000	.00000	.00000	1.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	2.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	3.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00129	.00000	.00000	.00000	.00000	.00000	.00000	.00000	4.
.01545	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	5.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00404	.00000	.00000	.00000	.00000	.00000	.00000	.00000	6.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00021	.00000	.00000	.00000	.00000	.00059	.00000	7.
.00000	.01686	.01712	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	8.
.00000	.00000	.00000	.00000	.04089	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00069	.00000	.00000	9.
.01031	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.09661	.00352	.00291	.00000	.00000	.00000	.00047	.00000	10.
.00168	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00043	.00000	.00000	.00000	.00000	.00000	.00000	11.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.01513	.00009	.00247	.00000	.00000	.00000	.00151	.00000	12.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.01509	.00090	.00066	.00000	.00000	.00000	.00144	.00000	13.
.00137	.05435	.26865	.00828	.00505	.00722	.00519	.00163	.00181	.00538	.00019	.00251	.01188	.00000	.03513	.00024	.00101	14.
.00021	.00189	.03783	.00118	.00137	.00385	.00147	.00026	.00028	.00085	.00009	.00244	.00043	.00000	.04641	.00000	.00016	15.
.00242	.01316	.03538	.02147	.00147	.00102	.00000	.00000	.00000	.00000	.00059	.00000	.00169	.00000	.01097	.00322	.00155	16.
.00000	.00000	.00000	.00000	.01895	.00000	.00000	.00000	.00000	.00000	.00009	.00000	.00000	.00000	.11512	.00600	.00000	17.
.03556	.00357	.00007	.01987	.02888	.00467	.10081	.02326	.05826	.01036	.00538	.01800	.00664	.00957	.00699	.00448	.00065	18.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	19.
.00260	.02200	.01304	.00600	.00825	.00571	.03234	.01706	.01217	.01759	.01172	.01608	.00679	.00190	.06592	.00655	.00772	20.
.00164	.00067	.00029	.00011	.00113	.00145	.00151	.00994	.00739	.01437	.00467	.00825	.00174	.00142	.00674	.00489	.00808	21.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00246	.00000	.00000	.00022	.00000	.00000	.00000	.00000	.00250	.00000	22.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.30533	.00000	23.
.00289	.02769	.00175	.00291	.00340	.01405	.02100	.02785	.03754	.02410	.03481	.02442	.00782	.00822	.02473	.03896	.00606	24.
.00236	.00648	.02379	.01221	.00521	.01718	.00491	.14511	.06204	.00664	.01079	.02788	.04400	.00356	.02263	.00281	.00138	25.
.01145	.02782	.00600	.00671	.01222	.01186	.06962	.12142	.17940	.08685	.08511	.09920	.01338	.02479	.02332	.04004	.00911	26.
.00000	.00012	.00087	.00135	.02144	.00532	.00400	.01535	.01110	.01950	.00739	.00906	.00015	.00184	.00000	.04111	.00031	27.
.00604	.01400	.00862	.00297	.01763	.01395	.02240	.01865	.01726	.04177	.01097	.01444	.00102	.00113	.00384	.04898	.02555	28.
.01227	.02607	.00779	.00693	.04146	.02351	.03256	.07455	.04845	.07603	.06869	.04922	.01414	.01095	.01520	.01475	.01317	29.

APPENDIX C.3.2.

DIRECT AND INDIRECT REQUIREMENTS

PER DOLLAR OF FINAL DEMAND 2000

Sector Buying \ Sector Producing	1	2	3	4	5	6	7	8	9	10	11	12
1. Tree Fruits	1.00030	0.00001	0.00003	0.00000	0.00001	0.00000	0.00002	0.00137	0.00003	0.00030	0.00000	0.00025
2. Livestock	0.00002	1.07064	0.00204	0.00000	0.03114	0.00000	0.00001	0.00081	0.00013	0.00511	0.00016	0.00010
3. Dairying	0.00005	0.00865	1.02385	0.00000	0.12529	0.00000	0.00001	0.00200	0.00003	0.02046	0.00037	0.00012
4. Vegetables	0.00001	0.00001	0.00002	1.00000	0.00000	0.00000	0.00000	0.00086	0.00002	0.00022	0.00000	0.00018
5. Field Crops	0.00000	0.00000	0.00001	0.00000	1.00000	0.00000	0.00000	0.00018	0.00002	0.00009	0.00000	0.00006
6. Poultry and Eggs	0.00007	0.00003	0.00037	0.00001	0.00493	1.00000	0.00001	0.00139	0.00003	0.00334	0.00054	0.00004
7. Nurseries	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	1.04525	0.00050	0.00017	0.00005	0.00000	0.00004
8. Logging	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	1.00014	0.00001	0.00012	0.00000	0.00009
9. Mining	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00008	1.00000	0.00001	0.00000	0.00001
10. Meat and Dairy	0.00026	0.02639	0.11307	0.00002	0.01457	0.00000	0.00000	0.00033	0.00004	1.01207	0.00204	0.00003
11. Fruit and Vegetable Canning	0.02615	0.00000	0.00001	0.01138	0.00000	0.00000	0.00001	0.00073	0.00001	0.00007	1.00000	0.00006
12. Wineries and Soft Drinks	0.03083	0.00000	0.00001	0.00004	0.00000	0.00000	0.00000	0.00032	0.00323	0.00004	0.00313	1.03109
13. Other Food	0.00022	0.00027	0.00117	0.00002	0.01560	0.00000	0.00001	0.00035	0.00001	0.01047	0.00170	0.00002
14. Sawmills and Planing Mills	0.00001	0.00000	0.00002	0.00000	0.00000	0.00000	0.00001	0.17854	0.00002	0.00016	0.00000	0.00013
15. Other Wood	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00001	0.06779	0.00002	0.00008	0.00000	0.00006
16. Metal Fabricating	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00168	0.00001	0.00002	0.00000	0.00002
17. Non-metal Minerals	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00001	0.00133	0.04181	0.00006	0.00000	0.00005
18. Other Manufacturing	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00001	0.00168	0.00004	0.00008	0.00000	0.00007
19. Packing Houses	0.00001	0.00000	0.00002	0.00000	0.00000	0.00000	0.00002	0.00203	0.00004	0.00014	0.00000	0.00012
20. Wholesale Trade	0.00002	0.00001	0.00004	0.00000	0.00001	0.00001	0.00002	0.00092	0.00010	0.00039	0.00000	0.00017
21. Retail Trade	0.00001	0.00000	0.00002	0.00000	0.00000	0.00000	0.00002	0.00077	0.00008	0.00018	0.00000	0.00015
22. Tourist Services	0.00719	0.00256	0.01096	0.00129	0.00167	0.00404	0.00003	0.00140	0.00019	0.09814	0.00028	0.01576
23. Education and Health Services	0.00006	0.00010	0.00042	0.00001	0.00007	0.00000	0.00023	0.00022	0.00006	0.00374	0.00044	0.00022
24. Other Services	0.00008	0.00008	0.00034	0.00000	0.00006	0.00000	0.00001	0.00087	0.00007	0.00308	0.00002	0.00265
25. Transport, Storage, Communication	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00229	0.00000	0.00003	0.00000	0.00005
26. Finance, Insurance, Real Estate	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00006	0.00001	0.00003	0.00000	0.00005
27. Construction	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00001	0.00975	0.00552	0.00013	0.00000	0.00010
28. Local Government	0.00009	0.00006	0.00024	0.00001	0.00006	0.00001	0.00072	0.00062	0.00053	0.00211	0.00015	0.00187
29. Utilities	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00002	0.00024	0.00002	0.00008	0.00000	0.00007

Note: Each Entry shows the total dollar production directly and indirectly required from the industry at the top of the table per dollar of deliveries to final demand by the industry at the left (Industries numbered across the top correspond to those numbered at the left).

APPENDIX C.3.2.(cont'd)

13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
0.00011	0.00791	0.00138	0.00178	0.00070	0.04326	0.38335	0.03708	0.01050	0.00015	0.00749	0.08181	0.01394	0.11492	0.00452	0.02454	0.07728	1.
0.08698	0.00465	0.00170	0.00327	0.00289	0.00695	0.00001	0.03267	0.01413	0.00011	0.00352	0.03136	0.02445	0.12977	0.02396	0.01151	0.07952	2.
0.19579	0.01177	0.00092	0.00221	0.00059	0.01043	0.00002	0.03287	0.00934	0.00013	0.00570	0.03470	0.05679	0.12421	0.00394	0.01865	0.04522	3.
0.00006	0.00505	0.00076	0.00043	0.00035	0.00006	0.01442	0.04855	0.03730	0.00014	0.00196	0.06616	0.03472	0.04885	0.00251	0.00641	0.09040	4.
0.00003	0.00107	0.00026	0.00020	0.00033	0.00521	0.00000	0.11691	0.01666	0.00030	0.00121	0.01962	0.04295	0.08348	0.00254	0.00396	0.02915	5.
0.31628	0.00816	0.00093	0.00121	0.00058	0.01184	0.00003	0.00868	0.00285	0.00005	0.00299	0.00753	0.00364	0.04041	0.00437	0.00980	0.02390	6.
0.00003	0.00281	0.00162	0.00064	0.00368	0.01532	0.00000	0.02183	0.00765	0.00008	0.00298	0.01056	0.05008	0.02724	0.03086	0.00977	0.02588	7.
0.00003	0.00084	0.00026	0.02800	0.00025	0.00455	0.00000	0.07380	0.00509	0.00019	0.00086	0.03211	0.01351	0.13229	0.00192	0.00282	0.01557	8.
0.00000	0.00049	0.00004	0.00058	0.00004	0.00057	0.00000	0.00999	0.00061	0.00003	0.00052	0.00102	0.02989	0.00252	0.00027	0.00170	0.05270	9.
0.02369	0.00226	0.00050	0.00085	0.00082	0.00652	0.00010	0.01515	0.00718	0.00018	0.00181	0.00863	0.01312	0.03032	0.00662	0.00594	0.01912	10.
0.00003	0.00422	0.00079	0.19653	0.00026	0.05446	0.04851	0.00925	0.00240	0.00005	0.00327	0.01570	0.01783	0.03640	0.00161	0.01072	0.02680	11.
0.00006	0.00187	0.00049	0.00429	0.07889	0.01706	0.01181	0.00982	0.00437	0.00004	0.00188	0.01029	0.03481	0.01863	0.00364	0.00614	0.02886	12.
1.00026	0.00201	0.00043	0.00297	0.00014	0.03451	0.00008	0.00530	0.00231	0.00003	0.00233	0.00476	0.00487	0.01587	0.00077	0.00764	0.01509	13.
0.00006	1.05882	0.00234	0.01948	0.00036	0.00336	0.00000	0.03829	0.00262	0.00014	0.00557	0.03823	0.01510	0.06246	0.00207	0.01823	0.03584	14.
0.00004	0.29652	1.04013	0.04367	0.00037	0.00268	0.00000	0.02665	0.00155	0.00011	0.00472	0.01468	0.03337	0.03007	0.00232	0.01545	0.02107	15.
0.00001	0.00982	0.00147	1.02227	0.00025	0.02093	0.00000	0.00717	0.00042	0.00003	0.00128	0.00442	0.01490	0.00982	0.00186	0.00418	0.00926	16.
0.00004	0.00760	0.00276	0.00226	1.02219	0.03082	0.00000	0.01189	0.00214	0.00008	0.00661	0.00694	0.01043	0.01881	0.02335	0.02166	0.04893	17.
0.00004	0.00954	0.00442	0.00159	0.00086	1.00581	0.00000	0.00754	0.00213	0.00006	0.00496	0.01659	0.02041	0.01756	0.00642	0.01624	0.02699	18.
0.00007	0.01185	0.00239	0.00068	0.00098	0.10397	1.00000	0.03578	0.00299	0.00016	0.00850	0.02724	0.01429	0.08370	0.00679	0.02785	0.04234	19.
0.00012	0.00529	0.00144	0.00088	0.00224	0.02804	0.00001	1.02200	0.01207	0.00258	0.00740	0.03496	0.15878	0.13896	0.01775	0.02425	0.08565	20.
0.00007	0.00444	0.00137	0.00065	0.00174	0.06293	0.00000	0.01627	1.00920	0.00010	0.00683	0.04445	0.07176	0.19661	0.01359	0.02238	0.05895	21.
0.01877	0.00808	0.00224	0.00103	0.00426	0.01595	0.00277	0.02405	0.01725	1.00019	0.01503	0.03271	0.01602	0.10782	0.02351	0.04921	0.08847	22.
0.00104	0.00125	0.00069	0.00105	0.00126	0.00816	0.00002	0.01447	0.00616	0.00029	1.00457	0.03895	0.01605	0.09666	0.00899	0.01498	0.07534	23.
0.00078	0.00481	0.00327	0.00058	0.00160	0.02128	0.00003	0.01921	0.00970	0.00010	0.00564	1.02927	0.03507	0.11206	0.01093	0.01846	0.05671	24.
0.00001	0.01350	0.00059	0.00212	0.00008	0.00774	0.00000	0.00819	0.00221	0.00003	0.00070	0.00968	1.04809	0.01789	0.00058	0.00229	0.01710	25.
0.00001	0.00032	0.00018	0.00008	0.00027	0.01008	0.00000	0.00253	0.00173	0.00001	0.00060	0.00923	0.00487	1.02750	0.00218	0.00196	0.01258	26.
0.00005	0.05285	0.04894	0.01437	0.11797	0.01433	0.00000	0.07248	0.00852	0.00021	0.00330	0.03183	0.03937	0.04416	1.00474	0.01080	0.03195	27.
0.00195	0.00344	0.00255	0.00453	0.01220	0.01025	0.00004	0.01621	0.00832	0.00276	0.32326	0.05733	0.01348	0.08367	0.04736	1.05873	0.04593	28.
0.00006	0.00139	0.00030	0.00178	0.00040	0.00194	0.00000	0.00878	0.00866	0.00009	0.00854	0.00861	0.00397	0.01517	0.00189	0.02796	1.01626	29.

(q)

APPENDIX C.4.1.

DIRECT PURCHASES PER DOLLAR

OF OUTPUT 2020

Sector Producing / Sector Buying	1	2	3	4	5	6	7	8	9	10	11	12
1. Tree Fruits	.00031	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.09374	.03275
2. Livestock	.00000	.06959	.00788	.00000	.00000	.00000	.00000	.00000	.00000	.02402	.00000	.00000
3. Dairying	.00000	.00142	.02241	.00000	.00000	.00000	.00000	.00000	.00000	.11160	.00000	.00000
4. Vegetables	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.01138	.00000
5. Field Crops	.00000	.02918	.12667	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
6. Poultry and Eggs	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
7. Nurseries	.00000	.00000	.00000	.00000	.00000	.00000	.04760	.00000	.00000	.00000	.00000	.00000
8. Logging	.00001	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
9. Mining	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
10. Meat and Dairy	.00000	.00397	.01876	.00000	.00000	.00000	.00000	.00000	.00000	.00977	.00000	.00000
11. Fruit and Vegetable Canning	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00203	.00000	.00392
12. Wineries and Soft Drinks	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.03872
13. Other Food	.00000	.08537	.20241	.00000	.00000	.32623	.00000	.00000	.00000	.00000	.00000	.00006
14. Sawmills and Planing Mills	.00308	.00230	.00984	.00339	.00000	.00683	.00040	.00000	.00000	.00035	.00062	.00034
15. Other Wood	.00015	.00037	.00053	.00025	.00000	.00054	.00000	.00000	.00000	.00005	.00009	.00006
16. Metal Fabricating	.00132	.00233	.00111	.00000	.00000	.00000	.00000	.02888	.00043	.00000	.19635	.00393
17. Non-metal Minerals	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.08265
18. Other Manufacturing	.00000	.00000	.00000	.05019	.00000	.00008	.01381	.00000	.00000	.00420	.04470	.01192
19. Packing Houses	.41137	.00000	.00000	.01563	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
20. Wholesale Trade	.02210	.02430	.01518	.04786	.11406	.00614	.01910	.07527	.00928	.00988	.00194	.00668
21. Retail Trade	.00829	.01153	.00567	.03803	.01473	.00177	.00696	.00387	.00000	.00550	.00024	.00337
22. Tourist Services	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00013	.00000	.00000
23. Education and Health Services	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
24. Other Services	.07148	.02488	.02781	.06413	.01369	.00461	.00745	.02902	.00000	.00278	.00228	.00541
25. Transport, Storage, Communication	.00161	.01426	.04520	.02240	.02199	.00031	.04486	.00000	.02742	.00365	.01105	.02986
26. Finance, Insurance, Real Estate	.07225	.10952	.10160	.02699	.06139	.03252	.01979	.12186	.00000	.00980	.01721	.01162
27. Construction	.00000	.02179	.00170	.00000	.00000	.00368	.03125	.00000	.00000	.00517	.00000	.00708
28. Local Government	.01043	.00641	.01394	.00000	.00000	.00629	.00774	.00000	.00000	.00262	.00537	.00292
29. Utilities	.05663	.06817	.03250	.08411	.01639	.01749	.02165	.00628	.05154	.01022	.01220	.01843

Note: Each entry shows the input directly required from the industry at the left of the table to produce one dollar's worth of output by the industry at the top of the table. (Industries numbered across the top correspond to those numbered at the left.)

APPENDIX C.4.1.(cont'd)

13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00579	.00000	.00000	.00000	.00000	.00000	.00000	.00000	1.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	2.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	3.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00113	.00000	.00000	.00000	.00000	.00000	.00000	.00000	4.
.01606	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	5.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00351	.00000	.00000	.00000	.00000	.00000	.00000	.00000	6.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00017	.00000	.00000	.00000	.00000	.00050	.00000	7.
.00000	.13125	.01414	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	8.
.00000	.00000	.00000	.00000	.04248	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00067	.00000	.00000	9.
.01073	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.08371	.00278	.00232	.00000	.00000	.00000	.00040	.00000	10.
.00176	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00034	.00000	.00000	.00000	.00000	.00000	.00000	11.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.01311	.00007	.00197	.00000	.00000	.00000	.00130	.00000	12.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.01307	.00071	.00053	.00000	.00000	.00000	.00122	.00000	13.
.00143	.05788	.28073	.00844	.00524	.00745	.00999	.00176	.00166	.00467	.00016	.00200	.01226	.00000	.03393	.00022	.00107	14.
.00024	.00201	.03953	.00121	.00143	.00396	.00160	.00029	.00026	.00074	.00007	.00195	.00044	.00000	.04482	.00000	.00017	15.
.00250	.00157	.03698	.06746	.00152	.00104	.00000	.00000	.00000	.00000	.00046	.00000	.00174	.00000	.06506	.00274	.00163	16.
.00000	.00000	.00000	.00000	.01969	.00000	.00000	.00000	.00000	.00000	.00007	.00000	.00000	.00000	.11117	.00511	.00000	17.
.03485	.00038	.00009	.02026	.03001	.00481	.33758	.02495	.05327	.00897	.00424	.01433	.00685	.00874	.00675	.00382	.00069	18.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	19.
.00270	.02344	.01363	.00612	.00856	.00588	.03515	.01830	.01113	.01524	.00924	.01281	.00701	.00177	.06366	.00557	.00812	20.
.00170	.00071	.00031	.00011	.00118	.00149	.00165	.01066	.00676	.01245	.00368	.00657	.00179	.00132	.00651	.00416	.00851	21.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00264	.00000	.00000	.00017	.00000	.00000	.00000	.00000	.00212	.00000	22.
.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.25975	.00000	23.
.00301	.02949	.00183	.00296	.00354	.01449	.02284	.02987	.03433	.02088	.02743	.01945	.00807	.00768	.02389	.03315	.00639	24.
.00245	.00690	.02485	.01245	.00541	.01770	.00534	.15558	.05673	.00577	.00850	.02220	.04540	.00334	.02186	.00239	.00145	25.
.01188	.02963	.00627	.00684	.01270	.01222	.07572	.10309	.16406	.07525	.06705	.07900	.01380	.02314	.02252	.03406	.00960	26.
.00000	.00012	.00092	.00137	.02227	.00549	.00436	.01646	.01015	.01690	.00582	.00721	.00015	.00172	.00000	.03498	.00032	27.
.00625	.01492	.00901	.00303	.01851	.01437	.02436	.01999	.01578	.03620	.00865	.01150	.00105	.00106	.00371	.04167	.02691	28.
.01274	.02777	.00814	.00707	.04306	.02422	.03541	.07992	.04430	.06588	.05412	.03919	.01459	.01022	.01468	.01255	.01388	29.

(9)

APPENDIX C.4.2.

DIRECT AND INDIRECT REQUIREMENTS

PER DOLLAR OF FINAL DEMAND 2020

Sector Producing \ Sector Buying	1	2	3	4	5	6	7	8	9	10	11	12
1. Tree Fruits	1.00032	0.00001	0.00003	0.00000	0.00001	0.00000	0.00002	0.00137	0.00004	0.00026	0.00000	0.00022
2. Livestock	0.00002	1.07492	0.00218	0.00000	0.03311	0.00000	0.00001	0.00067	0.00014	0.00544	0.00017	0.00009
3. Dairying	0.00004	0.00925	1.02542	0.00000	0.13350	0.00000	0.00001	0.00167	0.00003	0.02184	0.00041	0.00010
4. Vegetables	0.00001	0.00001	0.00002	1.00000	0.00000	0.00000	0.00000	0.00074	0.00002	0.00019	0.00000	0.00016
5. Field Crops	0.00000	0.00000	0.00001	0.00000	1.00000	0.00000	0.00000	0.00015	0.00002	0.00008	0.00000	0.00005
6. Poultry and Eggs	0.00006	0.00010	0.00041	0.00001	0.00529	1.00000	0.00001	0.00112	0.00003	0.00358	0.00058	0.00003
7. Nurseries	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	1.04998	0.00044	0.00019	0.00005	0.00000	0.00004
8. Logging	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	1.00012	0.00001	0.00010	0.00000	0.00008
9. Mining	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00007	1.00000	0.00001	0.00000	0.00001
10. Meat and Dairy	0.00020	0.02712	0.11561	0.00002	0.01585	0.00000	0.00000	0.00032	0.00004	1.01248	0.00210	0.00005
11. Fruit and Vegetable Canning	0.09376	0.00000	0.00001	0.01138	0.00000	0.00000	0.00001	0.00059	0.00001	0.00005	1.00000	0.00004
12. Wineries and Soft Drinks	0.05446	0.00000	0.00000	0.00005	0.00000	0.00000	0.00000	0.00034	0.00378	0.00004	0.00407	1.04030
13. Other Food	0.00017	0.00029	0.00124	0.00002	0.01623	0.00000	0.00000	0.00028	0.00001	0.01088	0.00178	0.00002
14. Sawmills and Planing Mills	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00001	0.13953	0.00002	0.00013	0.00000	0.00011
15. Other Wood	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00001	0.05563	0.00002	0.00006	0.00000	0.00006
16. Metal Fabricating	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00141	0.00001	0.00002	0.00000	0.00002
17. Non-metal Minerals	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00001	0.00108	0.04346	0.00005	0.00000	0.00005
18. Other Manufacturing	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00001	0.00136	0.00004	0.00006	0.00000	0.00006
19. Packing Houses	0.00001	0.00000	0.00002	0.00000	0.00000	0.00000	0.00002	0.00205	0.00006	0.00013	0.00000	0.00012
20. Wholesale Trade	0.00002	0.00001	0.00004	0.00000	0.00001	0.00001	0.00001	0.00077	0.00011	0.00035	0.00000	0.00015
21. Retail Trade	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00001	0.00055	0.00007	0.00012	0.00000	0.00011
22. Tourist Services	0.00627	0.00228	0.00971	0.00112	0.00156	0.00350	0.00002	0.00095	0.00017	0.08503	0.00026	0.01375
23. Education and Health Services	0.00004	0.00007	0.00033	0.00000	0.00006	0.00000	0.00018	0.00013	0.00004	0.00293	0.00035	0.00015
24. Other Services	0.00007	0.00007	0.00028	0.00000	0.00005	0.00000	0.00001	0.00054	0.00006	0.00243	0.00002	0.00212
25. Transport, Storage, Communication	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00185	0.00000	0.00003	0.00000	0.00002
26. Finance, Insurance, Real Estate	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00004	0.00001	0.00002	0.00000	0.00002
27. Construction	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00001	0.00756	0.00551	0.00010	0.00000	0.00008
28. Local Government	0.00007	0.00004	0.00017	0.00000	0.00005	0.00001	0.00060	0.00040	0.00045	0.00151	0.00010	0.00155
29. Utilities	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00002	0.00019	0.00002	0.00006	0.00000	0.00006

Note: Each entry shows the total dollar production directly and indirectly required from the industry at the top of the table per dollar of deliveries to final demand by the industry at the left (Industries numbered across the top correspond to those numbered at the left).

APPENDIX C.4.2.(cont'd)

13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
0.00010	0.01018	0.00193	0.00249	0.00077	0.14406	0.41150	0.04145	0.01142	0.00017	0.00740	0.08963	0.01717	0.12447	0.00534	0.02850	0.08596	1.
0.09222	0.00493	0.00177	0.00514	0.00293	0.00726	0.00001	0.03454	0.01495	0.00012	0.00315	0.03291	0.02600	0.13563	0.02523	0.01213	0.08395	2.
0.20859	0.01262	0.00100	0.00272	0.00057	0.01115	0.00002	0.03500	0.00989	0.00014	0.00513	0.03665	0.06061	0.13039	0.00404	0.01974	0.04786	3.
0.00005	0.00553	0.00087	0.00065	0.00034	0.06110	0.01563	0.05267	0.04048	0.00015	0.00180	0.07157	0.03783	0.04996	0.00259	0.00692	0.09779	4.
0.00002	0.00112	0.00025	0.00037	0.00032	0.00522	0.00000	0.11762	0.01671	0.00032	0.00106	0.01967	0.04418	0.08099	0.00259	0.00407	0.02952	5.
0.32634	0.00842	0.00095	0.00161	0.00056	0.01259	0.00002	0.00901	0.00297	0.00005	0.00264	0.00770	0.00382	0.04128	0.00447	0.01017	0.02470	6.
0.00002	0.00320	0.00174	0.00272	0.00392	0.01690	0.00000	0.02394	0.00838	0.00009	0.00278	0.01152	0.05543	0.02900	0.03401	0.01071	0.02847	7.
0.00003	0.00091	0.00026	0.03121	0.00025	0.00473	0.00000	0.07809	0.00535	0.00021	0.00077	0.03383	0.01491	0.13754	0.00201	0.00297	0.01643	8.
0.00000	0.00052	0.00005	0.00065	0.00004	0.00060	0.00000	0.01020	0.00065	0.00003	0.00047	0.00106	0.03058	0.00237	0.00028	0.00181	0.05373	9.
0.02573	0.00242	0.00052	0.00134	0.00080	0.00673	0.00008	0.01573	0.00741	0.00018	0.00161	0.00899	0.01392	0.03132	0.00676	0.00618	0.01988	10.
0.00002	0.00443	0.00083	0.21110	0.00023	0.06398	0.03875	0.00869	0.00219	0.00005	0.00273	0.01394	0.01833	0.03388	0.00153	0.01050	0.02563	11.
0.00008	0.00253	0.00085	0.00639	0.08890	0.02151	0.01417	0.01090	0.00463	0.00004	0.00193	0.01104	0.03656	0.02194	0.01016	0.00742	0.02936	12.
1.00029	0.00212	0.00045	0.00327	0.00013	0.03581	0.00007	0.00549	0.00238	0.00003	0.00204	0.00486	0.00508	0.01611	0.00074	0.00787	0.01559	13.
0.00005	1.06285	0.00246	0.02069	0.00033	0.00324	0.00000	0.03760	0.00251	0.00014	0.00498	0.03912	0.01567	0.05906	0.00193	0.01917	0.03720	14.
0.00003	0.31162	1.04204	0.04805	0.00035	0.00281	0.00000	0.02748	0.00156	0.00011	0.00425	0.01544	0.03526	0.02951	0.00232	0.01638	0.02258	15.
0.00001	0.01058	0.00158	1.07282	0.00025	0.02238	0.00000	0.00765	0.00044	0.00003	0.00116	0.00469	0.01602	0.01017	0.00195	0.00446	0.00989	16.
0.00004	0.00794	0.00283	0.00384	1.02293	0.03200	0.00000	0.01225	0.00221	0.00008	0.00581	0.00697	0.01091	0.01874	0.02410	0.02238	0.05070	17.
0.00005	0.00991	0.00452	0.00208	0.00082	1.00589	0.00000	0.00765	0.00214	0.00006	0.00431	0.01685	0.02097	0.01723	0.00646	0.01658	0.02751	18.
0.00007	0.01520	0.00361	0.00165	0.00116	0.34220	1.00000	0.04050	0.00368	0.00018	0.00879	0.03308	0.02053	0.09292	0.00862	0.03385	0.05194	19.
0.00010	0.00572	0.00149	0.00207	0.00227	0.02955	0.00001	1.02333	0.01282	0.00276	0.00668	0.03676	0.17020	0.11912	0.01869	0.02570	0.09092	20.
0.00005	0.00408	0.00122	0.00132	0.00150	0.05723	0.00000	0.01466	1.00832	0.00008	0.00525	0.04015	0.06548	0.17789	0.01219	0.02022	0.05325	21.
0.01645	0.00704	0.00189	0.00211	0.00366	0.01423	0.00260	0.02069	0.01488	1.00015	0.01099	0.02781	0.01384	0.09159	0.02012	0.04233	0.07609	22.
0.00082	0.00096	0.00051	0.00126	0.00093	0.00625	0.00002	0.01126	0.00480	0.00022	1.00303	0.03036	0.01251	0.07489	0.00693	0.01168	0.05892	23.
0.00063	0.00386	0.00258	0.00098	0.00123	0.01678	0.00003	0.01517	0.00767	0.00007	0.00378	1.02301	0.02788	0.08796	0.00856	0.01456	0.04478	24.
0.00001	0.01400	0.00060	0.00234	0.00008	0.00794	0.00000	0.00842	0.00227	0.00002	0.00061	0.00994	1.04971	0.01799	0.00056	0.00236	0.01760	25.
0.00001	0.00029	0.00016	0.00020	0.00024	0.00935	0.00000	0.00232	0.00159	0.00001	0.00047	0.00854	0.00451	1.02535	0.00201	0.00181	0.01162	26.
0.00004	0.05249	0.04743	0.07336	0.11400	0.01513	0.00000	0.07045	0.00825	0.00021	0.00281	0.03096	0.03960	0.04097	1.00472	0.01080	0.03167	27.
0.00157	0.00280	0.00203	0.00623	0.01008	0.00798	0.00003	0.01259	0.00657	0.00230	0.27235	0.04579	0.01021	0.06347	0.03934	1.04855	0.03387	28.
0.00005	0.00145	0.00030	0.00204	0.00036	0.00192	0.00000	0.00912	0.00906	0.00009	0.00757	0.00869	0.00409	0.01493	0.00174	0.02916	1.01672	29.

APPENDIX D

CAPABILITY ANALYSIS MATRIX

D.1 - Projection I

D.2 - Projection II

D.3 - Projection III

D.4 - Total

APPENDIX D.1

PROJECTION I

CAPABILITY ANALYSIS MATRIX

SOCIO-ECONOMIC INDICATOR		LOCATION	1970 (1971 Census)	1980 (Projected)	2000 (Projected)	2020 (Projected)
1. VERNON REGION						
1. Population:	a) Urban	Vernon	18,845	25,200	35,400	52,300
		Armstrong	1,631	2,100	2,900	4,200
	b) Rural	Vernon	3,955	5,000	6,600	9,200
		Kalamalka Lake	3,617	5,300	8,200	13,300
	c) Total		28,048	37,600	53,100	79,000
2. Population Density: (people/acre)	d) Urban	Vernon	5.38	5.60	6.44	8.05
		Armstrong	3.40	3.82	4.46	6.00
	e) Rural		0.20	0.27	0.37	0.56
	f) "Urban" area (acres)	Vernon	3,500	4,500	5,500	7,500
		Armstrong	480	550	650	700
3. Agricultural Areas (acres)	g) Total		37,984	40,500	41,500	42,000
	h) per capita		5.02	3.93	2.80	1.87
	i) irrigated		15,633	16,700	17,100	17,300
2. KELOWNA REGION						
1. Population	a) Urban	Kelowna	35,852	52,800	81,500	131,700
		Wood Lake	3,090	4,500	6,900	11,000
		Peachland	1,446	2,500	4,600	8,700
		Westbank	1,620	2,800	5,100	9,800
	b) Rural	Kelowna	8,152	14,800	28,100	55,800
	c) Total		50,160	77,400	126,200	217,000
2. Population Density (people/acre)	d) Urban	Kelowna	6.40	7.76	9.94	14.47
		Wood Lake	4.61	5.63	7.67	11.00
		Peachland	4.38	6.25	8.36	13.38
		Westbank	5.23	6.36	10.00	16.90
	e) Rural		0.29	0.53	1.00	1.99
	f) "Urban" area (acres)	Kelowna	5,600	6,800	8,200	9,100
		Wood Lake	670	800	900	1,000
		Peachland	330	400	550	650
		Westbank	310	440	510	580
3. Agricultural Area: (acres)	g) Total		28,082	28,000	28,000	28,000
	h) per capita		3.44	1.89	1.00	0.50
	i) irrigated		22,147	22,100	22,100	22,100
3. PENTICTON REGION						
1. Population	a) Urban	Penticton	18,955	24,400	33,400	48,500
		Summerland	5,551	7,100	9,600	13,800
	b) Rural	Skaha Lake	1,036	1,400	2,000	3,000
		Naramata-Summerland	1,141	1,500	2,100	3,100
		Vaseux Lake	996	1,600	2,600	4,600
	c) Total		27,679	36,000	49,700	73,000
2. Population Density (people/acre)	d) Urban	Penticton	5.85	5.67	6.68	8.83
		Summerland	5.39	5.07	5.33	6.90
	e) Rural		0.24	0.33	0.46	0.74
	f) Urban areas (acres)	Penticton	3,240	4,300	5,000	5,500
		Summerland	1,030	1,400	1,800	2,000
3. Agricultural Area: (acres)	g) Total		13,226	13,800	14,500	14,500
	h) per capita		4.17	3.07	2.16	1.36
	i) irrigated		11,334	11,800	12,400	12,400
4. OLIVER-OSOYOOS REGION						
1. Population	a) Urban	Oliver	1,598	1,700	1,900	2,300
		Osoyoos	1,279	1,600	2,100	3,000
	b) Rural		5,775	7,700	11,000	16,700
	c) Total		8,652	11,000	15,000	22,000
2. Population Density (people/acre)	d) Urban	Oliver	5.15	5.00	5.00	5.48
		Osoyoos	2.91	3.40	4.12	5.45
	e) Rural		0.43	0.51	0.67	0.95
	f) "Urban" Area (acres)	Oliver	310	340	380	420
		Osoyoos	440	470	510	550
3. Agricultural Area (acres)	g) Total		13,550	15,000	16,500	17,500
	h) per capita		2.35	1.95	1.50	1.05
	i) irrigated		10,956	12,100	13,300	14,200

APPENDIX D.2

PROJECTION II

CAPABILITY ANALYSIS MATRIX

SOCIO-ECONOMIC INDICATOR		LOCATION	1970 (1971 Census)	1980 (Projected)	2000 (Projected)	2020 (Projected)
1. VERNON REGION						
1. Population	a) Urban	Vernon	18,845	25,200	38,600	57,400
		Armstrong	1,631	2,100	3,200	4,700
	b) Rural	Vernon	3,995	5,000	7,200	10,100
		Armstrong	3,617	5,300	9,000	14,800
	c) Total		28,048	37,600	58,000	87,000
2. Population Density (people/acre)	d) Urban	Vernon	5.38	5.04	6.43	8.20
		Armstrong	3.40	3.33	4.57	6.10
	e) Rural		0.20	0.30	0.54	0.96
	f) Urban area (acres)	Vernon	3,500	5,000	6,000	7,000
		Armstrong	480	630	700	770
3. Agricultural Area (acres)	g) Total		37,984	34,000	30,000	26,000
	h) per capita		5.02	3.30	1.85	1.04
	i) irrigated		15,633	14,000	12,400	10,700
2. KELOWNA REGION						
1. Population	a) Urban	Kelowna	35,852	52,800	88,500	145,100
		Wood Lake	3,090	4,500	7,500	12,200
		Peachland	1,446	2,500	4,900	9,400
		Westbank	1,620	2,800	5,600	10,900
	b) Rural	Kelowna	8,152	14,800	30,500	61,400
	c) Total		50,160	77,400	137,000	239,000
2. Population Density (people/acre)	d) Urban	Kelowna	6.40	7.04	9.32	12,62
		Wood Lake	4.61	5.63	7.89	11.09
		Peachland	4.38	5.00	8.17	13,43
		Westbank	5.23	5.60	8.00	12.11
	e) Rural		0.29	0.67	1.69	4.39
	f) "Urban" Area (acres)	Kelowna	5,600	7,500	9,500	11,500
		Wood Lake	670	800	950	1,100
		Peachland	330	500	600	700
		Westbank	310	500	700	900
3. Agricultural Area (acres)	g) Total		28,082	22,000	18,000	14,000
	h) per capita		3.44	1.49	0.59	0.23
	i) irrigated		22,147	17,400	14,200	11,000
3. PENTICTON REGION						
1. Population	a) Urban	Penticton	18,944	24,400	36,900	53,700
		Summerland	5,551	7,100	10,700	15,500
	b) Rural	Skaha Lake	1,036	1,400	2,200	3,300
		Naramata-Summerland	1,141	1,500	2,300	3,400
		Vaseux Lake	996	1,600	2,900	5,100
	c) Total		27,679	36,000	55,000	81,000
2. Population Density (people/acre)	d) Urban	Penticton	5.85	5.30	6.71	8.39
		Summerland	5.39	4.44	5.35	6.46
	e) Rural		0.24	0.38	0.67	1.18
	f) "Urban" Area (acres)	Penticton	3,240	4,600	5,500	6,400
		Summerland	1,030	1,600	2,000	2,400
3. Agricultural Area (acres)	g) Total		13,226	12,000	11,000	10,000
	h) per capita		4.17	2.67	1.49	0.85
	i) irrigated		11,337	10,300	9,400	8,600
4. OLIVER-OSOYOOS REGION						
1. Population	a) Urban	Oliver	1,598	1,700	2,000	2,300
		Osoyoos	1,279	1,600	2,300	3,200
	b) Rural		5,775	7,700	11,700	17,500
	c) Total		8,652	11,000	16,000	23,000
2. Population Density (people/acre)	d) Urban	Oliver	5.15	4.59	4.44	4.34
		Osoyoos	2.91	3.20	3.83	4.57
	e) Rural		0.43	0.64	1.06	1.75
	f) "Urban" Area (acres)	Oliver	310	370	450	530
		Osoyoos	440	500	600	700
3. Agricultural Area (acres)	g) Total		13,550	12,000	11,000	10,000
	h) per capita		2.35	1.56	0.94	0.57
	i) irrigated		10,956	9,700	8,900	8,100

APPENDIX D.3

PROJECTION III

CAPABILITY ANALYSIS MATRIX

SOCIO-ECONOMIC INDICATOR		LOCATION	1970 (1971 Census)	1980 (Projected)	2000 (Projected)	2020 (Projected)
1. VERNON REGION						
1. Population	a) Urban	Vernon	18,845	25,200	34,000	38,400
		Armstrong	1,631	2,100	2,800	3,100
	b) Rural	Vernon	3,955	5,000	6,300	6,700
		Kalamalka Lake	3,617	5,300	7,900	9,800
	c) Total		28,048	37,600	51,000	58,000
2. Population Density (people/acre)	d) Urban	Vernon	5.38	5.60	6.54	6.62
		Armstrong	3.40	3.82	4.31	4.77
	e) Rural		0.20	0.26	0.32	0.36
	f) "Urban" Area (acres)	Vernon	3,500	4,500	5,200	5,800
		Armstrong	480	550	650	650
3. Agricultural Area (acres)	g) Total		37,984	39,000	44,000	46,000
	h) per capita		5.02	3.79	3.10	2.79
	i) irrigated		15,633	16,100	18,100	18,900
2. KELOWNA REGION						
1. Population	a) Urban	Kelowna	35,852	52,800	79,500	98,400
		Wood Lake	3,090	3,400	6,700	8,200
		Peachland	1,446	2,500	4,400	6,400
		Westbank	1,620	2,800	5,000	7,300
	b) Rural	Kelowna	8,152	14,800	27,400	41,700
	c) Total		50,160	77,400	123,000	162,000
2. Population Density (people/acre)	d) Urban	Kelowna	6.40	7.76	9.94	11.31
		Wood Lake	4.61	5.63	7.44	8.63
		Peachland	4.38	6.25	9.17	12.08
		Westbank	5.23	6.36	9.80	12.59
	e) Rural		0.29	0.51	0.86	1.21
	f) "Urban" Area (Acres)	Kelowna	5,600	6,800	8,000	8,700
		Wood Lake	670	800	900	950
		Peachland	330	400	480	530
		Westbank	310	440	510	580
3. Agricultural Area (acres)	g) Total		28,082	29,000	32,000	34,500
	h) per capita		3.44	1.96	1.17	0.83
	i) irrigated		22,147	22,900	25,200	27,200
3. PENTICTON REGION						
1. Population	a) Urban	Penticton	18,955	24,200	32,200	35,700
		Summerland	5,551	7,100	9,300	10,300
	b) Rural	Skaha Lake	1,036	1,400	1,900	2,300
		Naramata-Summerland	1,141	1,500	2,000	2,300
		Vaseux Lake	996	1,600	2,600	3,500
	c) Total		27,679	36,000	48,000	54,000
2. Population Density (people/acre)	d) Urban	Penticton	5.85	5.67	6.71	6.87
		Summerland	5.39	5.07	5.81	6.06
	e) Rural		0.24	0.32	0.45	0.55
	f) "Urban" Area (acres)	Penticton	3,240	4,300	4,800	5,200
		Summerland	1,030	1,400	1,600	1,700
3. Agricultural Area (acres)	g) Total		13,226	14,000	14,500	14,500
	h) per capita		4.17	3.11	2.23	1.81
	i) irrigated		11,334	12,000	12,400	12,400
4. OLIVER-OSYOOS REGION						
1. Population	a) Urban	Oliver	1,598	1,700	1,900	1,900
		Osoyoos	1,279	1,600	2,100	2,200
	b) Rural		5,775	7,700	11,000	11,900
	c) Total		8,652	11,000	15,000	16,000
2. Population Density (people/acre)	d) Urban	Oliver	5.15	5.00	5.28	5.28
		Osoyoos	2.91	3.40	4.20	4.15
	e) Rural		0.43	0.48	0.59	0.60
	f) "Urban" Area (acres)	Oliver	310	340	360	360
		Osoyoos	440	470	500	530
3. Agricultural Area (acres)	g) Total		13,550	16,000	18,500	20,000
	h) per capita		2.35	2.08	1.68	1.68
	i) irrigated		10,856	12,900	15,000	16,200

APPENDIX D.4

CAPABILITY ANALYSIS MATRIX - TOTAL

Projection I

SOCIO-ECONOMIC INDICATOR		LOCATION	1970 (1971 Census)	1980 (Projected)	2000 (Projected)	2020 (Projected)
OKANAGAN BASIN TOTALS						
1. Population	a) Urban	Okanagan	89,867	124,700	283,400	285,300
	b) Rural	Okanagan	24,672	37,300	60,600	105,700
	c) Total		114,539	162,000	244,000	391,000
2. Population Density (people/acre)	d) Urban	Okanagan	5.65	6.24	7.64	10.57
	e) Rural	Okanagan	0.27	0.39	0.61	1.05
	f) "Urban" Area (acres)	Okanagan	15,910	20,000	24,000	27,000
3. Agricultural Area (acres)	g) Total		92,842	97,300	100,500	102,000
	h) per capita		3.76	2.61	1.66	0.97
	i) irrigated		60,070	62,700	64,900	66,000

PROJECTION II

SOCIO-ECONOMIC INDICATOR		LOCATION	1970 (1971 Census)	1980 (Projected)	2000 (Projected)	2020 (Projected)
OKANAGAN BASIN TOTALS						
1. Population	a) Urban	Okanagan	89,867	124,700	200,200	314,400
	b) Rural	Okanagan	24,672	37,200	65,800	115,600
	c) Total		114,539	162,000	266,000	430,000
2. Population Density (people/acre)	d) Urban	Okanagan	5.65	5.67	7.41	9.83
	e) Rural	Okanagan	0.27	0.46	0.94	1.92
	f) "Urban" Area (acres)	Okanagan	15,910	22,000	27,000	32,000
3. Agricultural Area (acres)	g) Total		92,842	80,000	70,000	60,000
	h) per capita		3.76	2.14	1.06	0.51
	i) irrigated		60,070	51,400	44,900	38,400

PROJECTION III

SOCIO-ECONOMIC INDICATOR		LOCATION	1970 (1971 Census)	1980 (Projected)	2000 (Projected)	2020 (Projected)
OKANAGAN BASIN TOTALS						
1. Population	a) Urban	Okanagan	89,867	124,700	177,900	211,900
	b) Rural	Okanagan	24,672	37,300	50,100	78,100
	c) Total		114,539	162,000	237,000	290,000
2. Population Density (people/acre)	d) Urban	Okanagan	5.65	6.24	7.73	8.48
	e) Rural	Okanagan	0.27	0.39	0.54	0.67
	f) "Urban" Area (acres)	Okanagan	15,910	20,000	23,000	25,000
3. Agricultural Area (acres)	g) Total		92,842	98,000	109,000	115,000
	h) per capita		3.76	2.62	1.83	1.47
	i) irrigated		60,070	63,900	70.700	74,700

APPENDIX E

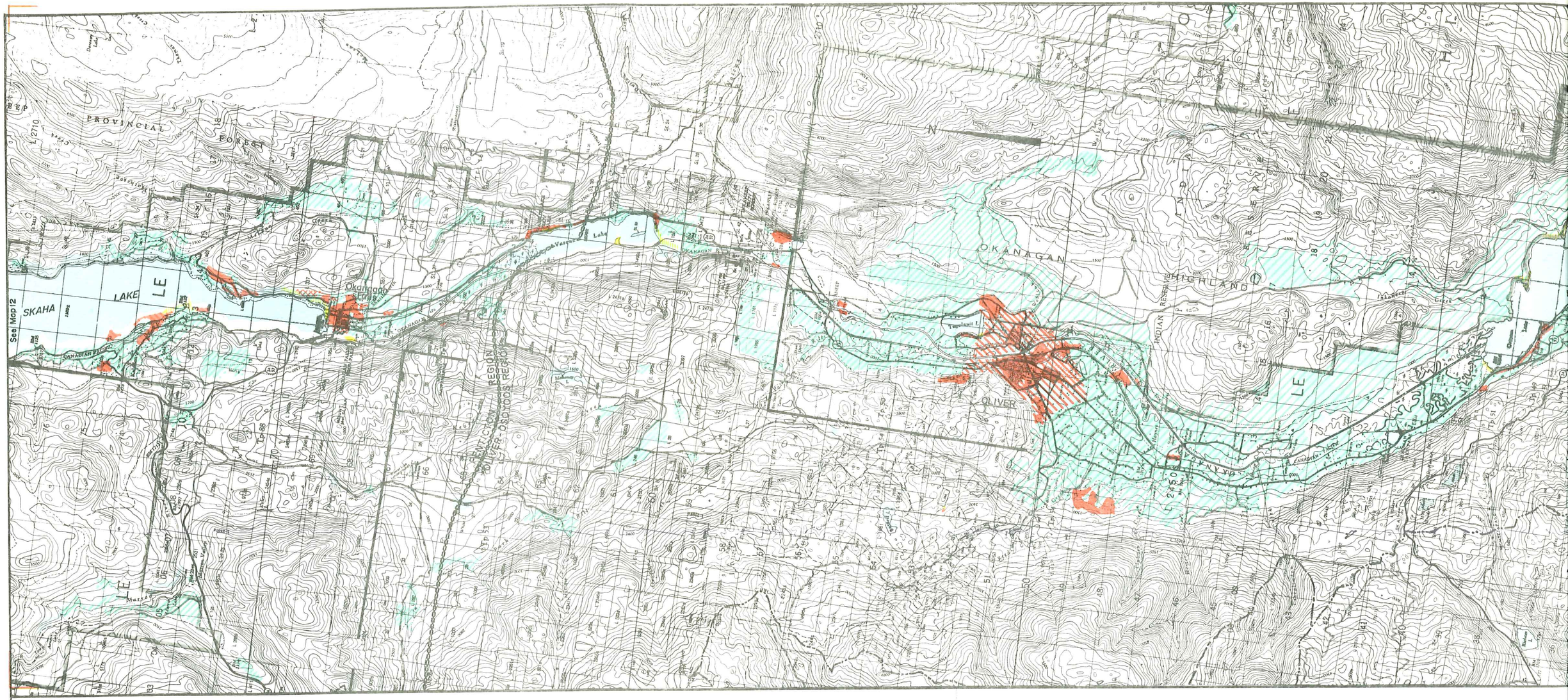
LAND CAPABILITY MAPS

Map E.1 - Effect of Projected Growth on Water and Water Related Resources in the Oliver-Osoyoos Region, 1971 to 2020

Map E.2 - Effect of Projected Growth on Water and Water Related Resources in the Penticton Region, 1971 to 2020

Map E.3 - Effect of Projected Growth on Water and Water Related Resources in the Kelowna Region, 1971 to 2020

Map E.4 - Effect of Projected Growth on Water and Water Related Resources in the Vernon Region, 1971 to 2020



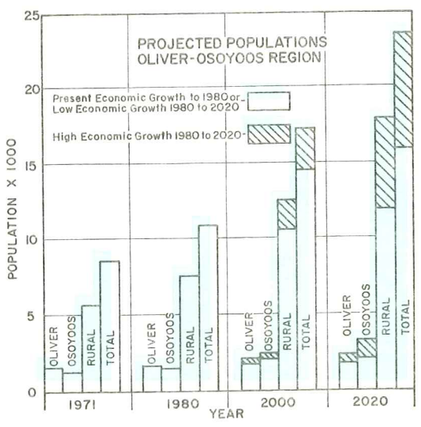
– PLAN SCALE –

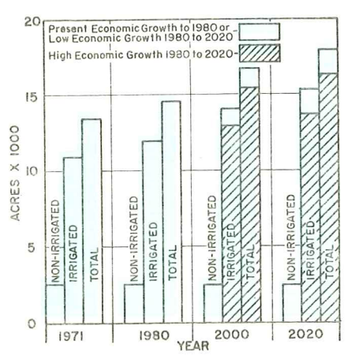
0 1 2 3 Miles

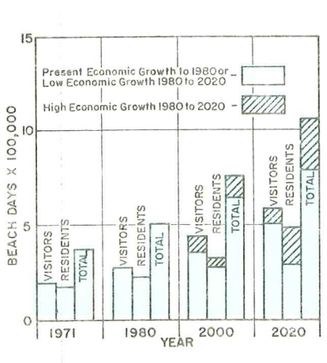
1 0 1 2 3 4 Kilometers

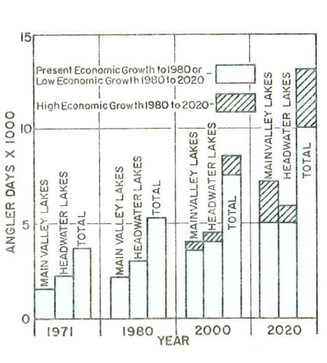
– LEGEND –

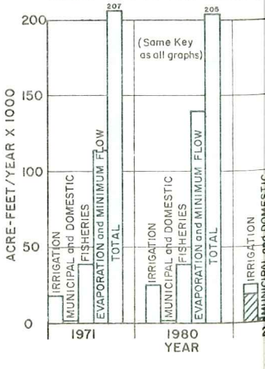
- Existing Agricultural Development (1971).
- Potential Agricultural Development to 2020. (Maximum for All Projections)
- Existing Urban Development (1971).
- Potential Urban Development to 2020. (Low Economic Growth Projection III, Minimum).
- Potential Urban Development to 2020. (High Economic Growth Projection II, Maximum).
- Existing Recreational Development (1971).
- Potential Recreational Sites
- Okanagan Watershed Boundary
- Economic Regions
- Lakes

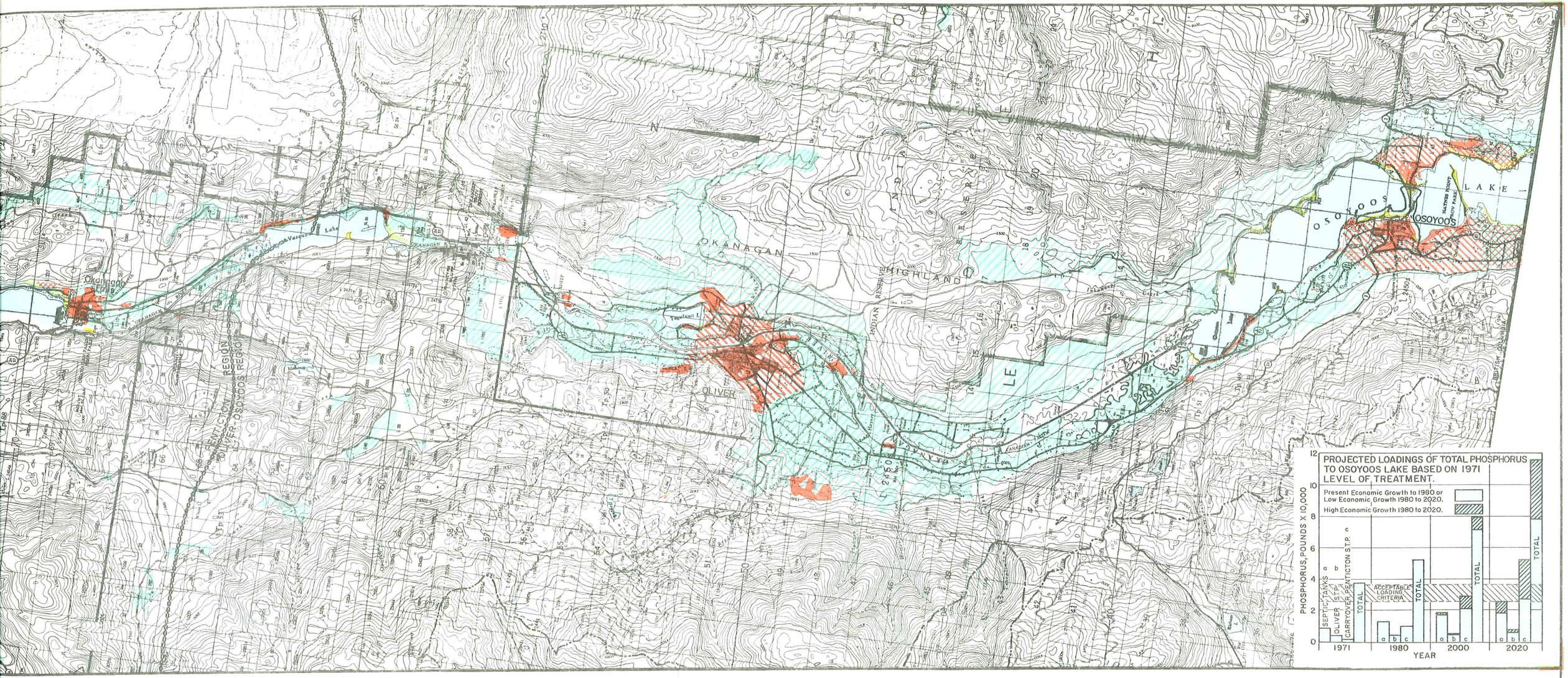




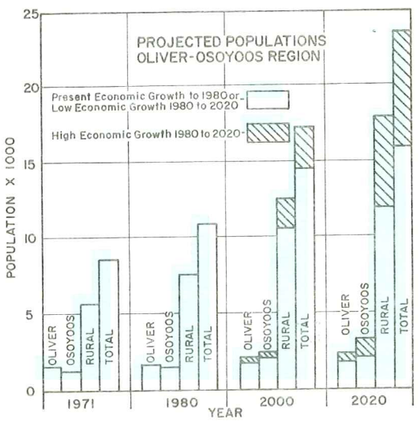


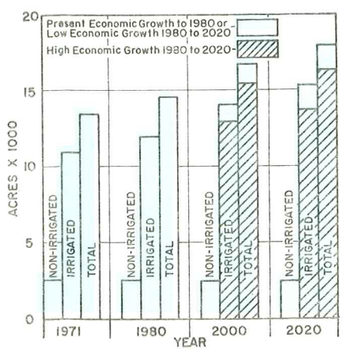


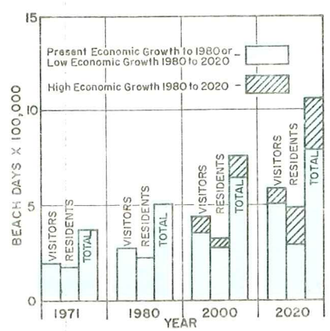


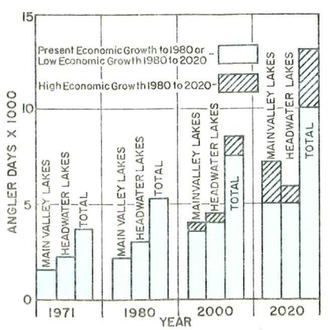


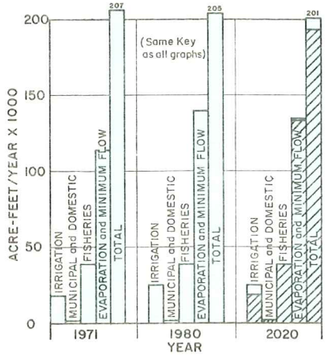
3 Miles
4 Kilometers





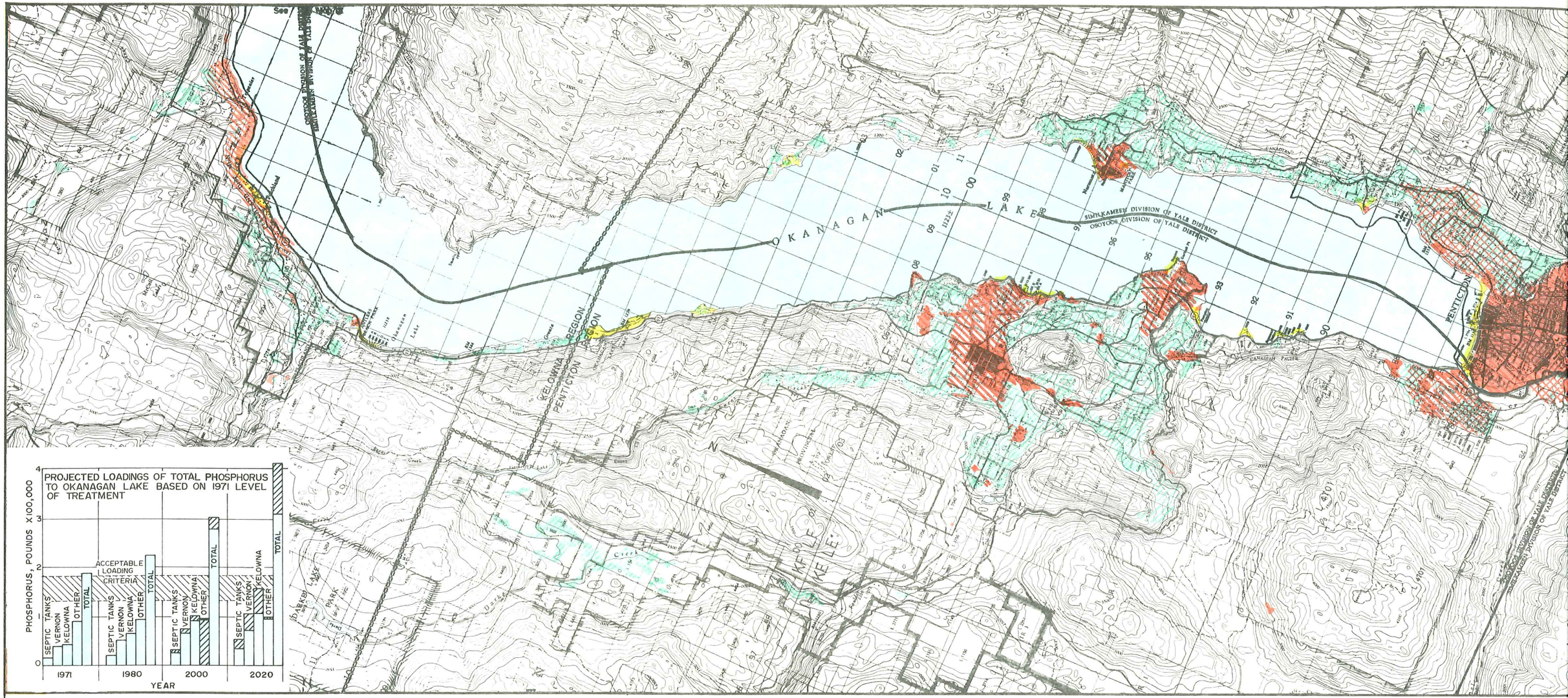






EFFECT OF PROJECTED GROWTH ON WATER AND WATER RELATED RESOURES IN THE OLIVER-OSOYOOS REGION, 1971 to 2020.

Map E.1



-PLAN SCALE-

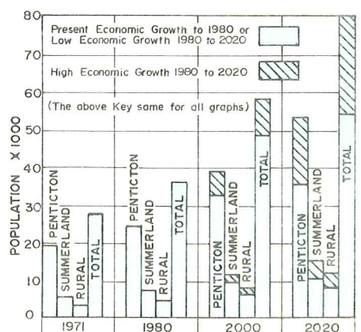
0 2 3 Miles

0 2 3 4 Kilometers

-LEGEND-

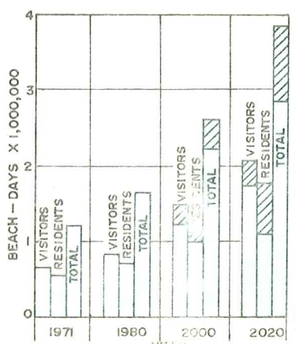
- Existing Agricultural Development (1971).
- Potential Agricultural Development to 2020. (Maximum for All Projections)
- Existing Urban Development (1971).
- Potential Urban Development to 2020. (Low Economic Growth Projection III, Minimum).
- Potential Urban Development to 2020. (High Economic Growth Projection II, Maximum).
- Existing Recreational Development (1971).
- Potential Recreational Sites
- Okanagan Watershed Boundary
- Economic Regions
- Lakes

PROJECTED POPULATIONS, PENTICTON REGION

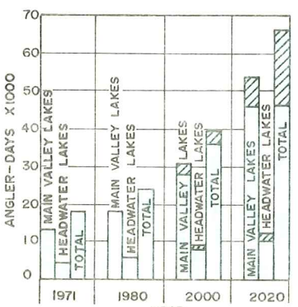


PROJECTED AGRICULTURAL LAND USE, PENTICTON REGION.

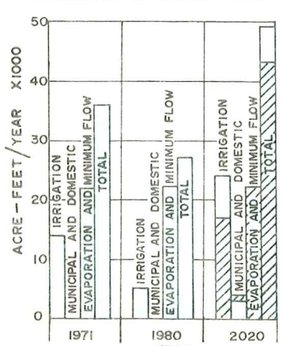
PROJECTED BEACH DAYS, PENTICTON REGION.



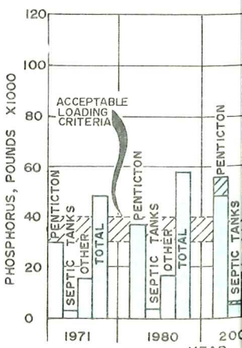
PROJECTED ANGLER DAYS PENTICTON REGION

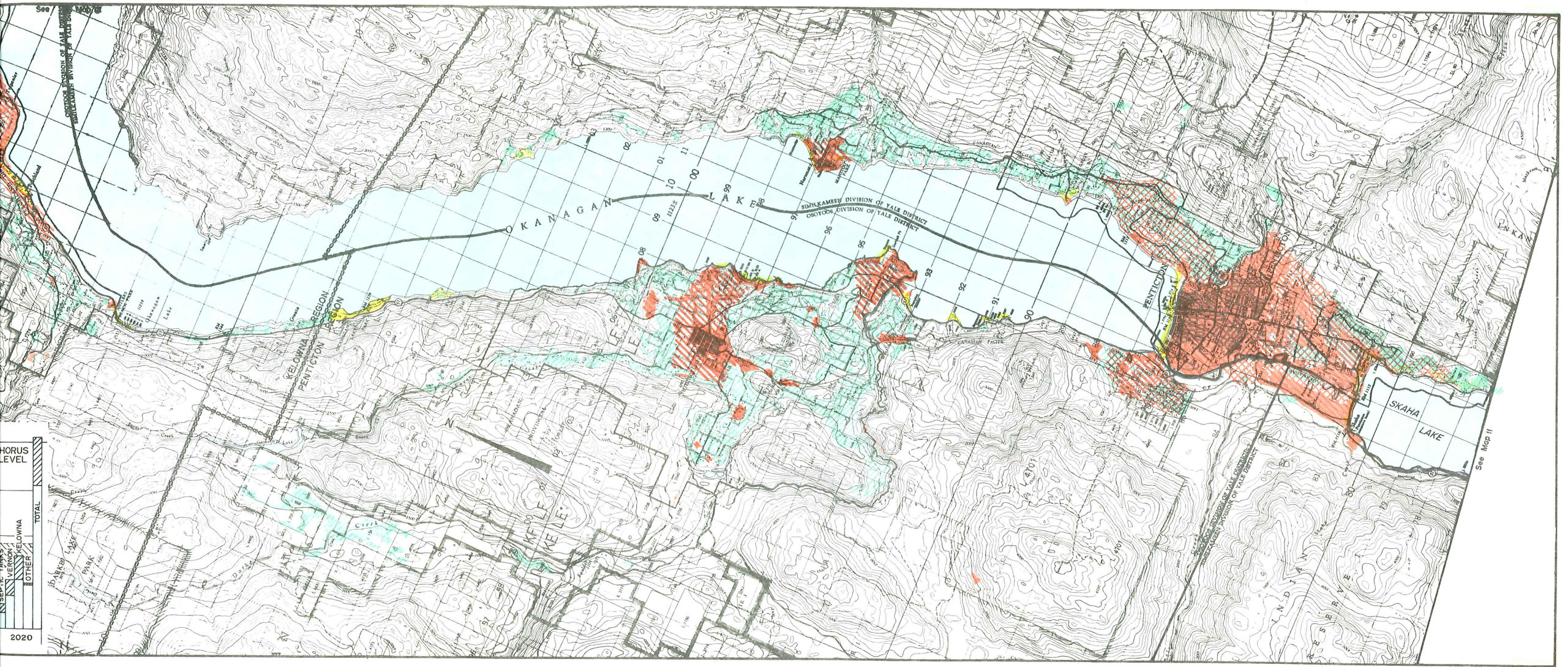


PROJECTED WATER REQUIREMENTS FOR THE OKANAGAN RIVER REGION FROM PENTICTON TO S.O.L.I.D. DAM.

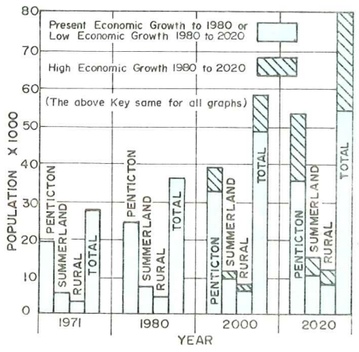


PROJECTED LOADINGS OF TOTAL PHOSPHORUS TO SKAHA LAKE BASED ON 1971 LEVEL OF TREATMENT

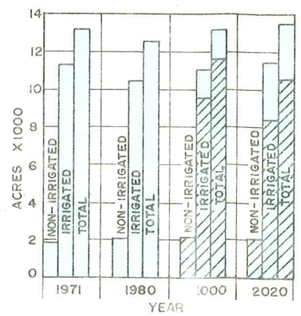




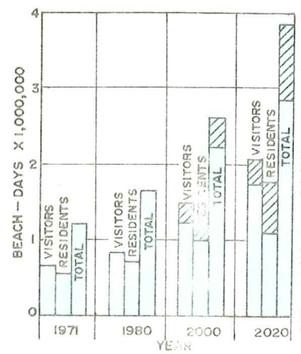
PROJECTED POPULATIONS, PENTICTON REGION



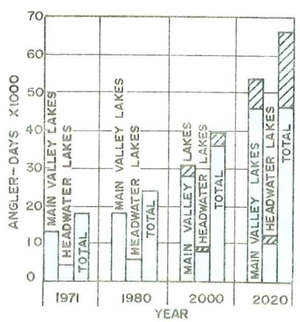
PROJECTED AGRICULTURAL LAND USE, PENTICTON REGION.



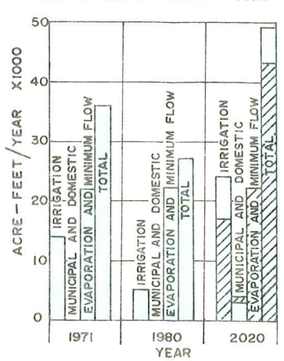
PROJECTED BEACH DAYS, PENTICTON REGION.



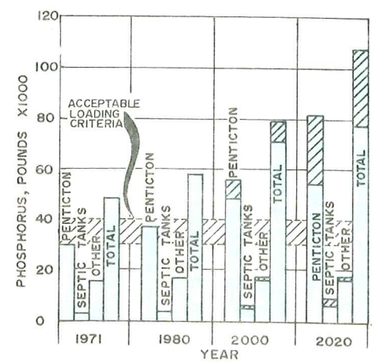
PROJECTED ANGLER DAYS PENTICTON REGION.



PROJECTED WATER REQUIREMENTS FOR THE OKANAGAN RIVER REGION FROM PENTICTON TO S.O.L.I.D. DAM.



PROJECTED LOADINGS OF TOTAL PHOSPHORUS TO SKAHA LAKE BASED ON 1971 LEVEL OF TREATMENT



EFFECT OF PROJECTED GROWTH ON WATER AND WATER RELATED RESOURCES IN THE PENTICTON REGION, 1971 to 2020.

Map E.2

See Map 14

KALAMALKA LAKE

WOOD LAKE

ELLISON LAKE

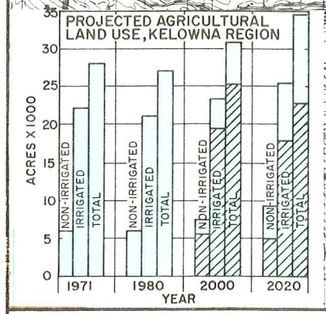
OKANAGAN LAKE

VERNON REGION

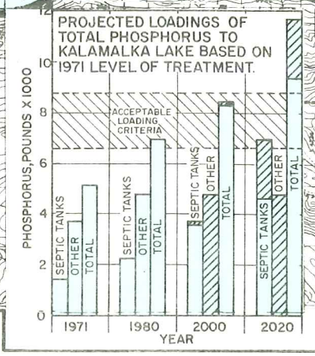
KELOWNA REGION

See Map 14

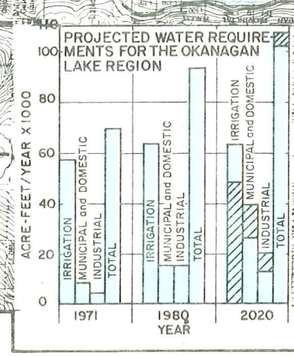
PROJECTED AGRICULTURAL LAND USE, KELOWNA REGION



PROJECTED LOADINGS OF TOTAL PHOSPHORUS TO KALAMALKA LAKE BASED ON 1971 LEVEL OF TREATMENT.



PROJECTED WATER REQUIREMENTS FOR THE OKANAGAN LAKE REGION



-PLAN SCALE-

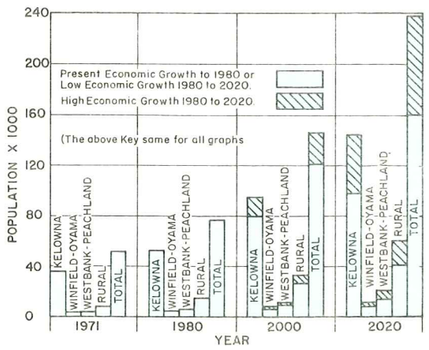
0 2 3 Miles

0 2 3 4 Kilometers

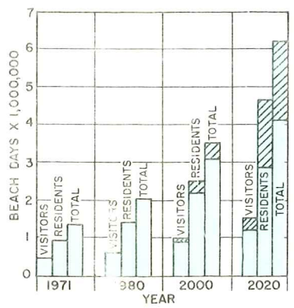
-LEGEND-

- Existing Agricultural Development (1971).
- Potential Agricultural Development to 2020. (Maximum for All Projections)
- Existing Urban Development (1971).
- Potential Urban Development to 2020. (Low Economic Growth Projection III, Minimum).
- Potential Urban Development to 2020. (High Economic Growth Projection II, Maximum).
- Existing Recreational Development (1971).
- Potential Recreational Sites
- Okanagan Watershed Boundary
- Economic Regions
- Lakes

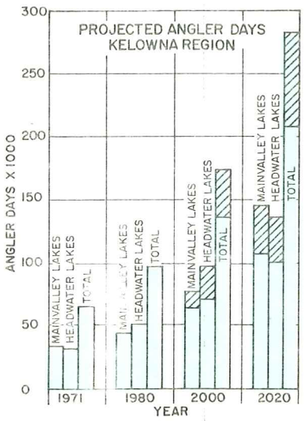
PROJECTED POPULATIONS KELOWNA REGION



PROJECTED BEACH DAYS KELOWNA REGION

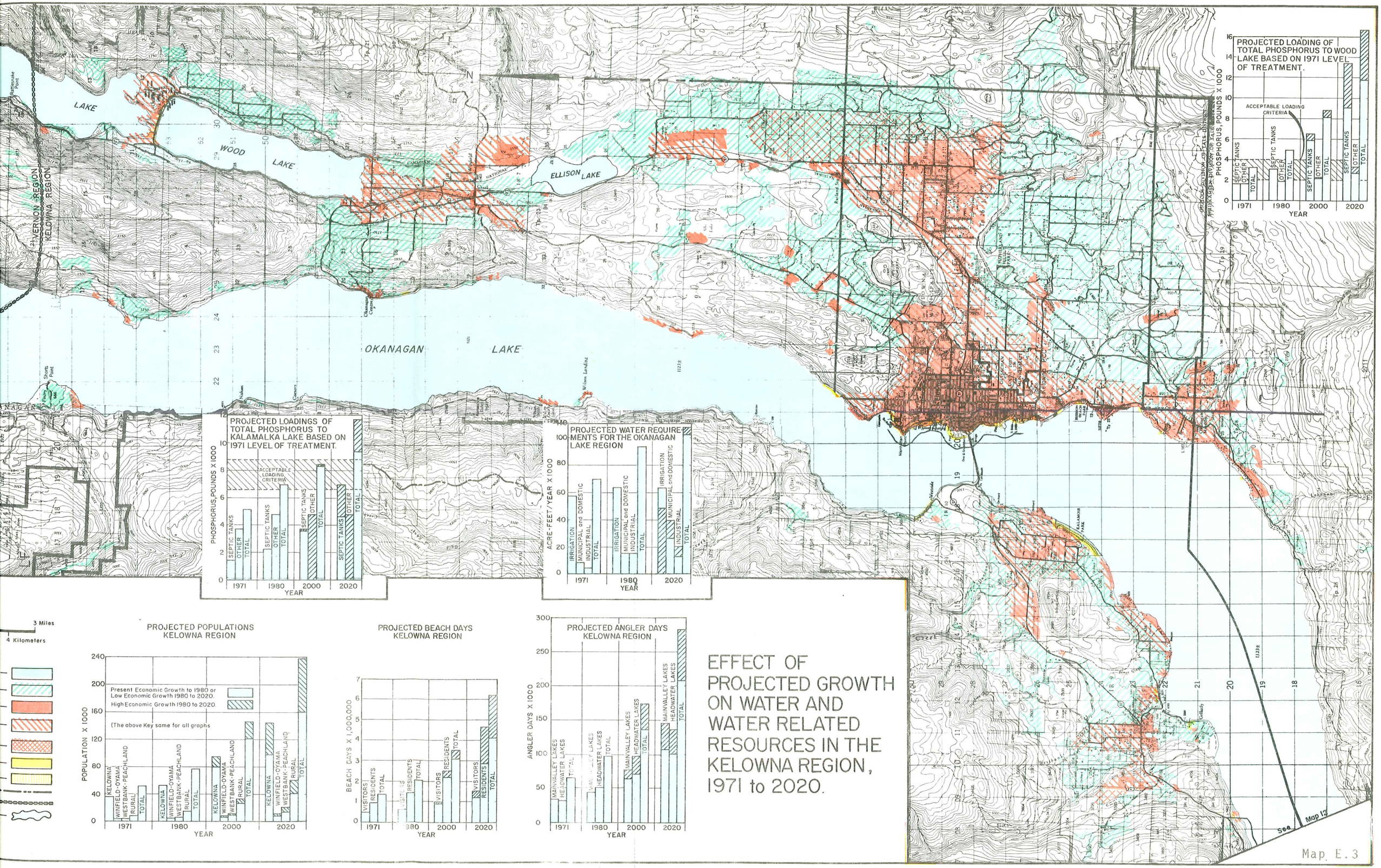


PROJECTED ANGLER DAYS KELOWNA REGION

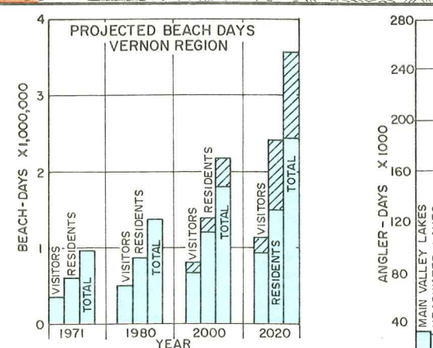


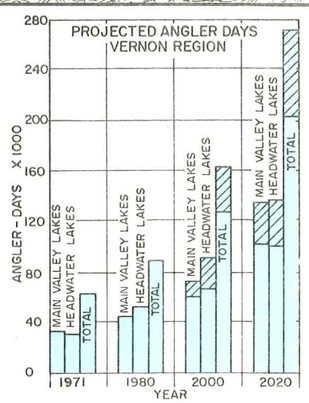
EFFECT OF PROJECTED GROWTH ON WATER AND WATER RELATED RESOURCES IN THE KELOWNA REGION, 1971 to 2020.

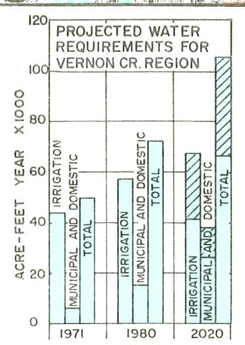
EFFECT OF PROJECTED GROWTH ON WATER AND WATER RELATED RESOURCES IN THE KELOWNA REGION, 1971 to 2020.



Map E.3







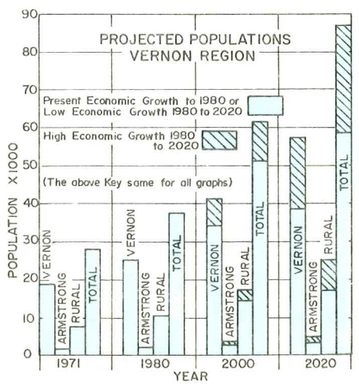
-PLAN SCALE-

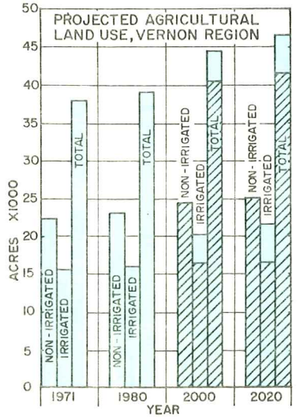
0 1 2 3 Miles

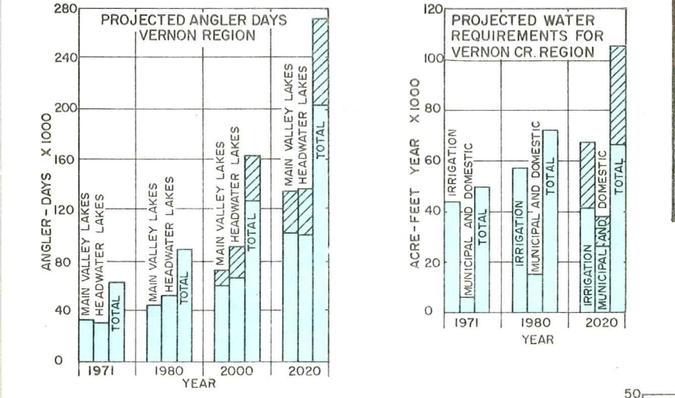
0 1 2 3 4 Kilometers

-LEGEND-

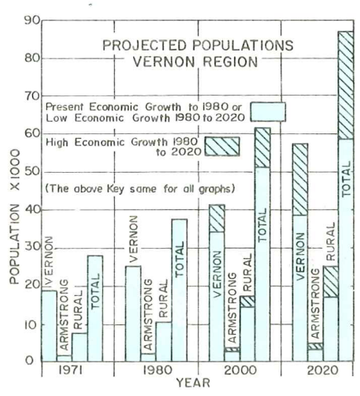
- Existing Agricultural Development (1971).
- Potential Agricultural Development to 2020. (Maximum for All Projections)
- Existing Urban Development (1971).
- Potential Urban Development to 2020. (Low Economic Growth Projection III, Minimum).
- Potential Urban Development to 2020. (High Economic Growth Projection II, Maximum).
- Existing Recreational Development (1971).
- Potential Recreational Sites
- Okanagan Watershed Boundary
- Economic Regions
- Lakes

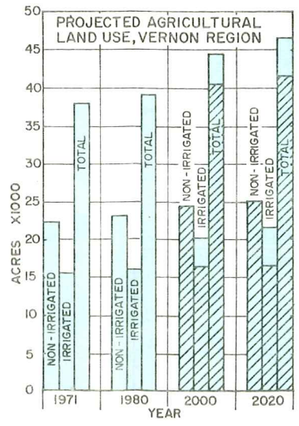












EFFECT OF PROJECTED GROWTH ON WATER AND WATER RELATED RESOURCES IN THE VERNON REGION, 1971 to 2020.

Map E.4

Printed by
Map Production Division
Lands, Service