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ANALYSIS OF BRITISH COLUMBIA FERRIES  
and  
ITS COMMERCIAL VEHICLE POLICY

by

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FACULTY of COMMERCE AND BUSINESS ADMINISTRATION

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ANALYSIS OF BRITISH COLUMBIA FERRIES

-and-

ITS COMMERCIAL VEHICLE POLICY

A B S T R A C T

Introduction

This thesis deals with the transportation of commercial vehicles by British Columbia Ferries between Vancouver Island and the mainland of British Columbia. B. C. Ferries is a public enterprise operated under the Department of Transport and Communications of the Government of the Province of British Columbia.

Background

There are substantial changes occurring in ferry operations in British Columbia, particularly in ferrying commercial vehicles. Freight traffic associated with Vancouver Island is expanding rapidly. There is a growing emphasis on highway trucks and less on rail cars for freight. This is related to the increasing use of Vancouver as an assembly and distribution point for Island goods. Non-commercial traffic is also expanding. Privately operated ferries have upgraded their services as a consequence of the growing peak-season

pressure of non-commercial vehicles on B. C. Ferries. In 1973 a new vessel increased the capacity of a Canadian Pacific Rail ferry service by some 60% and at the same time a new company, Tilbury Island Terminals Ltd., began operations.

These changes call for an inspection of current commercial vehicle policy on B. C. Ferries. This thesis aims to identify and analyse the issues associated with commercial vehicle policies and to examine alternative policies.

### Analytical framework

The discussion opens by examining the reasons for special government concern in transportation. In B. C., this concern has led to government intervention by participation in the ferry system. The present arrangement is an unregulated, mix public/private system. The policy variables open to the provincial government for influencing the ferry system are limited to the prices charged and the service levels provided by the public carrier, B. C. Ferries. An overall regulatory body is not possible because of jurisdictional considerations. The thesis discusses the effects of these two variables on the entire system and proposes objectives and criteria for setting them. A pricing model suggests that the optimal economic pricing policy of a public enterprise in competition with private enterprise is achieved when the public enterprise sets its rates to cover both fixed and variable costs, just as would

a private enterprise.

### Data base

Literature about ferry operations in the province, or in general, is sparse. This is partially remedied by a discussion of some general characteristics of ferry transportation, followed by an historical account of ferry operations in British Columbia. Certain themes emerge, notably the economic importance and political sensitivity of ferry services and the inhibition of private ferry investment associated with the participation of the government in the transportation market.

A body of data, mostly from original sources, gives an account of current ferry operations in the province and includes inter-carrier comparisons together with data on traffic composition, peaking, revenues, costs and pricing. Traffic trends are identified and growth projections are made. The data suggests that there is an immediate problem in accommodating peak season demand for B. C. Ferries in the next few years. It suggests that privately owned capacity can help to relieve the problem.

### Analysis

Three alternative B.C. Ferries commercial vehicle policies are examined in detail; (A) continuation of present policies, (B) total withdrawal from the commercial vehicle market

and (C) partial withdrawal from the market. Short and long term effects are examined. Finally, the thesis compares the consequences of these alternative policies for B. C. Ferries capacity expansion, the effect on competitors and ferry users and the long term implications for government influence and private investment in the ferry system. The analysis shows that while present policies approach economic efficiency in commercial vehicle ferry operations, there are certain benefits to other ferry users of a (partial) withdrawal of B. C. Ferries from carrying commercial vehicles. These can be weighed, together with strategic and other policy considerations, in a final choice of policy.

Signature of supervisor:

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ANALYSIS OF BRITISH COLUMBIA FERRIES

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CHAPTER 1

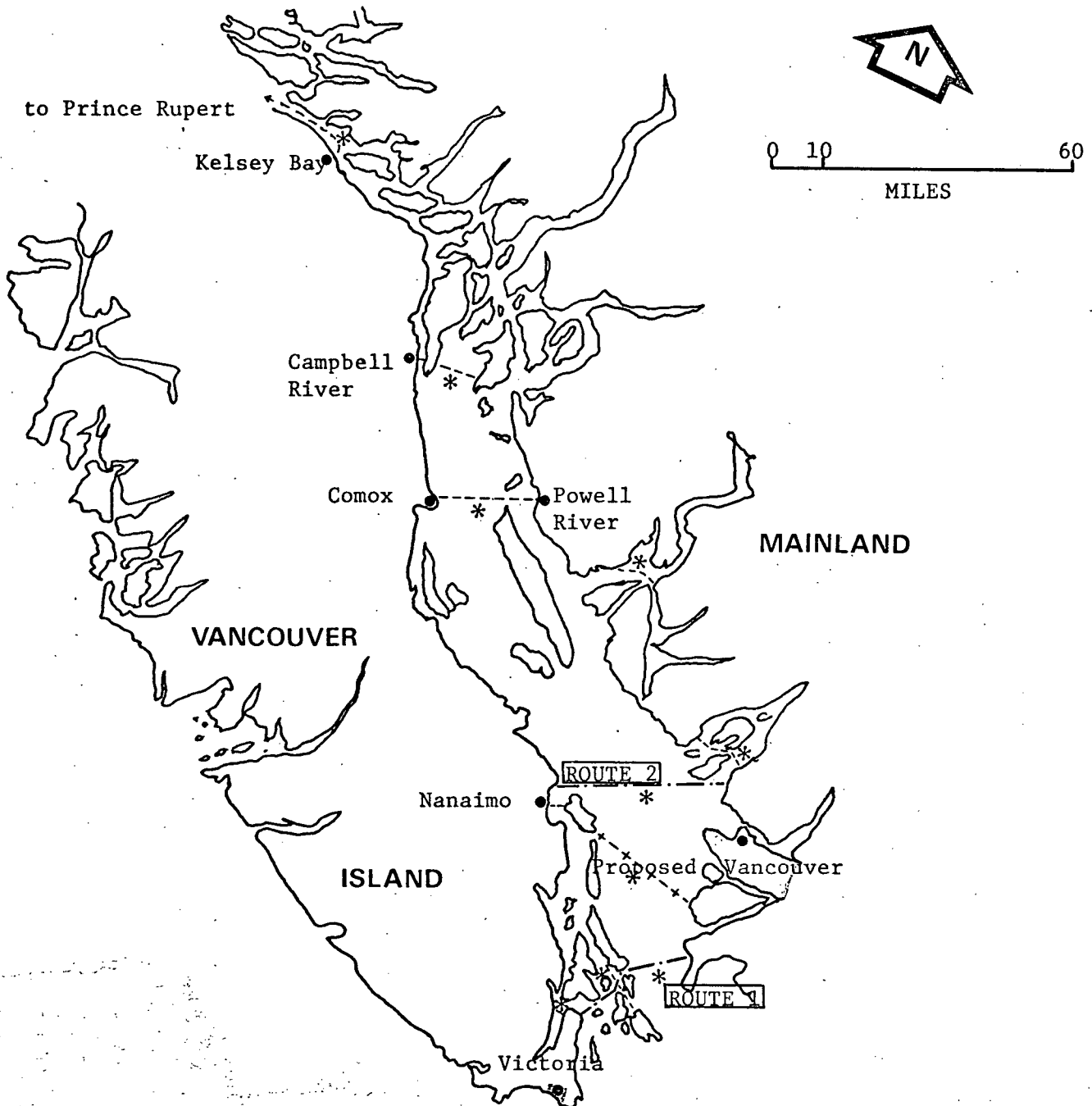
INTRODUCTION: OBJECTIVES AND ORGANISATION

### 1.1 The area of interest

The main area of interest of this thesis is the service provided and prices charged for the transportation of commercial vehicles by British Columbia Ferries between Vancouver Island and the B. C. mainland. B. C. Ferries is wholly owned and operated by the government of British Columbia.

This area of interest is closely associated with other transportation activities and markets. In addition to the ferry service provided to commercial vehicles, a service exists for Island residents, mainland visitors, foreign visitors and other groups. Because these groups use the same deck space (and all are part of the provincial economy), the policies towards each group are interrelated. The private ferry operators serving similar transportation markets are directly affected by government action and they too must be considered in government policies. Therefore the discussion in this thesis necessarily embraces all types of traffic and both public and private ferry operations.

The B. C. government ferry routes of interest are known as Route 1 (Tsawwassen-Swartz Bay) and Route 2 (Horseshoe Bay-Departure Bay). These are the principal services connecting Vancouver Island to the mainland. Exhibit 1 gives a comprehensive picture of government saltwater ferry routes and highlights Routes 1 and 2. The route of the confirmed new major



# **EXHIBIT 1** **B.C. FERRIES SALTWATER ROUTES**

B. C. Ferry Route \*

Major Route - - - - -

Minor Route - - - - -

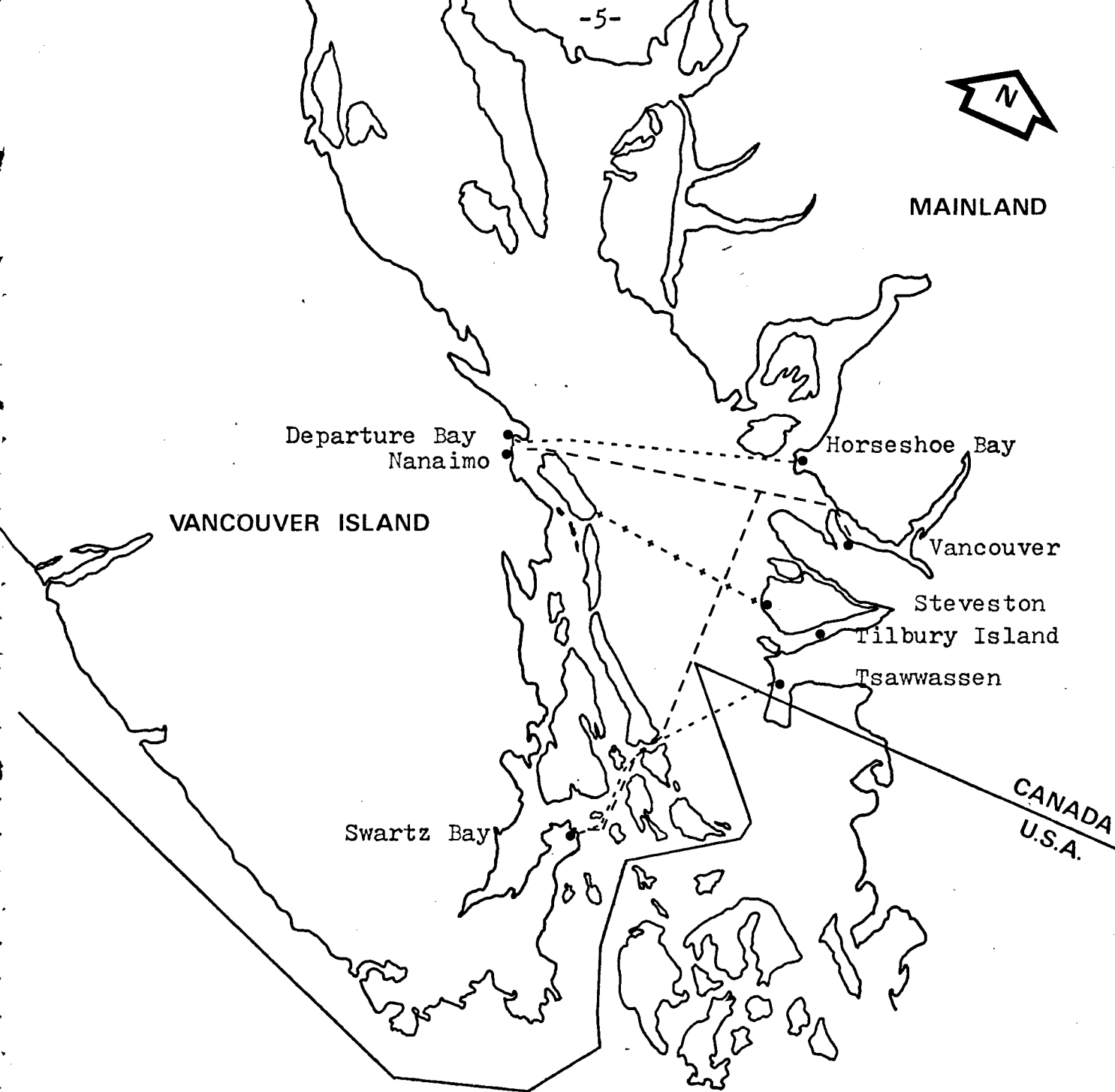
Proposed Route + - + -

Source: B. C. Ferries Route Map 1973

service between Steveston and Gabriola Island is also shown (construction of terminals has yet to begin).

Privately operated ferry routes in the area of interest are shown in the map of Exhibit 2. The Canadian Pacific Railway's B. C. Coast Steamship service (B.C.C.S.) provides a downtown to downtown service between Vancouver and Nanaimo which carries all types of vehicles. Services for commercial vehicles only are provided from Vancouver to Nanaimo and Swartz Bay (for Victoria). The summer of 1973 saw the inauguration of a B.C.C.S. service from Vancouver to Swartz Bay aboard the newly built Carrier Princess. This vessel carries primarily commercial vehicles but accommodates non-commercial traffic as space permits. A comparatively recent arrival on the scene is Tilbury Island Terminals Ltd. (T.I.T.L.) which has operated a service from the estuary of the Fraser River to lower Vancouver Island since April, 1973. The company operates a barge carrying general freight, rail cars and drop trailers. This is also shown in Exhibit 2.

Other general freight services exist. These include the marine arm of MacMillan Bloedel (Kingcome Navigation) which transports general freight and rail cars and accommodates highway vehicles only if space allows. Seaspan International provides northern and western Vancouver Island with a general freight service but the carriage of vehicles is rare. Neither



## EXHIBIT 2

### PRINCIPAL FERRY ROUTES BETWEEN VANCOUVER ISLAND AND THE LOWER MAINLAND

- ..... B.C. Ferries routes
- Canadian Pacific Railway routes
- ..... Proposed new B.C. Ferries route
- Ferry terminal



of these companies (nor the several bulk-towing companies) is of interest in this thesis by virtue of the small overlap in the commercial vehicle market.

## 1.2 Relevance and significance of thesis

The immediate rationale for this thesis lies in the state of flux which exists in the transportation of freight in the southerly waters of British Columbia. This state of flux originates in the following factors:

(i) The overall growth of traffic, both commercial and non-commercial, which is currently in excess of 10% per year.

(ii) The ousting of commercial vehicles from government ferry services onto privately operated services, concomitant with the swelling demands of leisure traffic on the government services.

(iii) The trend away from the use of rail cars as freight vehicles towards the use of highway trucks and particularly towards the use of tractor-trailer combinations.

When these circumstances of change are recognised, certain questions naturally arise for government ferry operations:

(a) What would be the consequences if current practices and plans were followed and no further action taken?

- (b) In what other ways might action be taken?
- (c) What would be the consequences of these actions?
- (d) What are the criteria by which the alternative courses of action or inaction might be judged?
- (e) On the basis of these criteria, what should be done?

### 1.3 Objectives of thesis

The principal objective of the thesis is to examine and compare alternative commercial vehicle policies on B. C. Ferries, including the continuation of present policy. A further objective is to establish some criteria on which to base the examination and comparison of the policies.

The achievement of these objectives requires historical, financial and operational information about B. C. Ferries. It seems that no such body of information exists. A subsidiary objective is therefore to develop a coherent body of information about B. C. Ferries which may prove useful to future researchers.

### 1.4 Limitations of thesis

Several limitations govern the scope, comprehensiveness, accuracy and sophistication of this thesis. Some are through choice because of the finite effort and time available. Others exist by virtue of the unavailability of information.

Not all events and facts of history, operation and

finance of ferries are recorded and not all of those which are recorded are accessible. The following factors are limiting:

(i) The policy of past provincial administrations not to release data. Historical financial and traffic data was either inaccessible or nonexistent for the government ferry services. Some information could be extracted from newspaper articles of the time and from personal interviews with those then involved in ferry operation.

(ii) The understandable reluctance of private operators to divulge information which might be to their disadvantage. This was the case with Canadian Pacific Rail, where assistance with traffic or financial data was not given. A notable exception was the cooperation of the management of a newly formed company, Tilbury Island Terminals Ltd.

(iii) The treatment of the provincial economy is as an external environment to the operation of ferry services. The analysis is limited to the examination of vehicular traffic and does not venture into the commodities and origins of the goods transported by the vehicles which are themselves carried by the ferry system. That is, a "systems approach" is not adopted which might include matters of provincial budgetting, provincial priorities for investment, etc. The ferry system is taken as a well defined segment of the transportation system and that segment is analysed. This is in effect an a priori

constraint on the types of criteria which can be established for the comparison of alternative policies.

### 1.5 Organisation of thesis

The analysis of policy requires that certain general questions be answered. Why is the government concerned with transportation? What are the policy variables open to the government? What are government objectives in using these policy variables? What are their effects? What is the place of the analyst in policymaking? How can theory be applied? Chapter 2, which follows, attempts to answer these questions.

It is helpful to analyse policies in the light of past developments so that recurring themes and trends relevant to the present can be identified. Chapter 3 examines the general features of ferry transportation and looks at the history of ferry operations in the province.

Chapter 4 provides the essential data base of operating and financial information about the ferry system and the market it serves. This includes the identification and projection of trends.

All the above matter is brought together in Chapter 5, which synthesises the analytical, historical and contemporary material for the analysis of specific commercial vehicle policies on B.C. Ferries. Chapter 6 concludes the thesis and proffers lines of future research.

CHAPTER 2

A POLICY ANALYSIS FRAMEWORK

## 2:1 Introduction

Assured transportation are essential for the life of stable communities. The assurance of services is a responsibility which has been assumed by government. The nature of the assurance may vary from a simple indication of support of private operators to full government ownership and operation of an entire transportation system. In B. C., the provincial government has chosen to participate with private operators in the ferry system. Since there is no overall regulatory body in control, the arrangement can be described as an unregulated, mixed public/private system.

The purpose of this chapter is to develop a general framework for the subsequent analysis of specific commercial vehicle policies in this unregulated, mixed public/private system. To develop the framework, this chapter attempts to answer the following questions:

(a) What are the policymaker's objectives in adopting a particular course of action and what is the function of the analyst in advising the policymaker?

(b) What are appropriate criteria for judging alternative courses of action?

(c) What are the feasible courses of action which the government may take in the present situation (this limits the range of practical policies).

(d) What are the general effects of these courses of action? What are their limitations?

Public policy has various objectives. Economic efficiency is one of them but it can be modified by various social and political objectives (for example, the redistribution of wealth). If these social and political goals are sufficiently meritorious they may override pure efficiency considerations. Unless these various non-economic objectives are spelled out in some detail, the analyst cannot determine the optimal policies to pursue. He can, however, develop an optimal policy purely in terms of economic efficiency. This serves as a reference point for examining the implications of altering the result due to these other social and political considerations.

The present chapter examines the price-service policy appropriate to the public enterprise competing with private enterprise which results in the most efficient allocation of resources. In itself this is too narrow a policy and it must be altered, approximately if not exactly, by incorporating public objectives later in the thesis. A model is developed which examines the optimal pricing policy for commercial vehicles. It concludes that economic efficiency is achieved when the public enterprise sets its prices to cover all costs and to make a return on invested capital (with an allowance for the equivalent of income taxes), i.e. that it should follow pricing principles very similar to those of private enterprise.

Finally, the chapter gives some examples of the social and political considerations which may modify the objective of pure economic efficiency. Others are developed subsequently in the thesis by examining past developments in ferry operations in the Northwest and from a detailed examination of present ferry operations.

This approach conforms with the general consensus that questions faced by government (broadly, welfare questions) involve judgments which lie outside the province of the analyst. It is customary to conceive of economic welfare being maximised when an economic system functions with maximum efficiency to satisfy given ends with available resources. Policymakers modify the economic optimum by external considerations to some broader welfare optimum.<sup>1</sup>

Before the chapter deals with the details of economic theory and its modification by other considerations, it identifies the feasible methods by which public policy may be implemented in the ferry system, i.e. the policy variables open to the government. In the unregulated, mixed public/private ferry system of British Columbia, public policy for the entire system can be implemented only through the influence of the public carrier, B. C. Ferries.

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<sup>1</sup>Rima, Ingrid H. Readings in the History of Economic Theory. New York, Holt, Rinehart and Winston, 1970, p. 202.



## 2.2 The Policy Variables

### 2.2.1 Identifying the policy variables

This section identifies the policy variables open to the provincial government in the present situation. It discusses the effects of the viable policy variables in terms of control of the entire ferry system. It will be seen that public ownership of a substantial proportion of the ferry system can be regarded as a form of regulation of the entire system.

The policy variables fall into the following classes:

(i) Legal and regulatory (over both the parts and the entire system of ferries).

(ii) Pricing of the public carrier.

(iii) Service levels<sup>2</sup> supplied by the public carrier (including operating practices, scheduling, routing, etc.).

#### Legal and regulatory

While C.P.R. services come under Federal jurisdiction, the publicly owned ferries are in the Provincial domain; the boundary between Federal and Provincial jurisdiction divides the ferry system. Therefore, barring legal changes of constitutional significance, no regulatory body can exist with

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<sup>2</sup>For a definition of the term "service levels" see the appendix of this chapter

simultaneous jurisdiction over both C.P.R. services and B.C. Ferries. It is clear that the Government of British Columbia would not be able to regulate the entire system of ferries even if it so desired. The system cannot be legally regulated in the conventional sense by a single government authority.

It is not suggested that C.P.R. services cannot be affected in any way whatsoever by the provincial legislature. The C.P.R. must conform to provincial laws in many matters, including location of terminals, environmental effects of operations and other technical matters. But it is suggested that such influence which the province has should not be used as a substitute for regulation in the determination of routes, schedules or rates of the private carrier since this would amount to circumvention of federal authority. The use of such influence is assumed to be unacceptable. It is concluded that legal means are not open to the province in order to achieve the objectives of regulation of the entire system of ferries.

Though it is not feasible to use legislation to affect the entire system, it is possible to affect parts of it. Private intraprovincial water carriers lie under provincial authority. At present the powers over private intraprovincial ferry operators are not useful since (i) they form only a small fraction of the ferry system and (ii) it could be argued that it is inequitable to affect materially by legal means a private

intraprovincial operator who is in competition with the (unregulated) C.P.R.

Another use of the law as a policy instrument is to change the legal status of the public carrier. At one extreme, the system could be sold off to private enterprise which would take the risk and returns of subsequent operation. Or, the system could be leased to private enterprise which would be responsible for day-to-day operations. In both cases the terms of contract could provide for operating a capital subsidy and make conditions on price and service levels. A further possibility is a return to the status of crown corporation (this would allow the system to raise capital for expansion on the bond market rather than through the budget of the Department of Transport and Communications). But it is not clear what advantages these changes in status might afford in the present situation. Though this power is not presently useful, it is included for completeness.

It is concluded that the law (used as a regulator or to change the status of the system) can be ruled out as a useful instrument of policy in the present situation. The remaining variables are the price and service levels of the public carrier. The following section describes their effects and limitations.

### 2:2:2 Effects of price and service level variables

The general effects of the levels of price and service level are conveniently classed as short and long term:

- (i) Short term: both the price and the service level of the ferry service govern the place and time at which users choose to utilise the system (other things being held constant). In particular, they determine whether individuals use the system at all and determine the allocation of traffic between competing services; i.e., ceteris paribus, they determine the volume and distribution of overall demand in the short term.
- (ii) Long term: the price and the service level affect long term demand, the level of capital investment in facilities and hence the long term development of region, i.e. the pattern of social and industrial location. The implication is that, in setting rates and service levels, attention must be given not only to the short term effects above but also to the long term consequences (which are practically irreversible) and how they conform with development policies for the region.

The allocation of demand between carriers (i.e. the issue of public/private competition in setting price and service levels) occupies the remainder of this subsection. Other effects are discussed subsequently.

### Price effects on competition

Public and private services in B.C. are to some extent in competition with each other. It is possible, therefore, for the government to exert influence on the private carriers. What is the nature of this influence and what are its limitations? Policymakers encounter this question whether or not it is intended policy to affect private operations. The effects of public operation are felt irrespective of the intentions behind them; public ownership of part of the system is a form of regulation.

To what extent does the presence of a public carrier in an unregulated system of private carriers have effects similar to direct regulation? In a directly regulated system, tariffs are commonly restricted in some way by a governmental authority. Carrier initiative can be accommodated by a system of filing of tariffs which are subject to approval. This is intended to protect the carriers from each other and to eliminate rate wars, to protect the shipper who has little bargaining power against high rates or unfair discrimination and to contribute generally to the maintenance of reliable service by assuring reasonable profitable operation. In a non-competitive situation a private monopolist can be prevented from charging the maximum the traffic will bear or can be given a subsidy for an unprofitable route (with specified service level requirements) and be restricted in pricing (there has been much debate

about the efficacy of price regulation but it is not proposed to enter that discussion here).

In contrast, in an unregulated system containing a public carrier, the tariff charged by private carriers can be affected indirectly via competition between the public and private carriers. This effect can apply only to the degree to which the services are in competition (i.e. to the extent to which they are substitutes). This competitive mechanism has the feature of being a more effective price control on high prices than on low prices. If there were more than one private carrier in the system, the presence of a public enterprise would not remove the possibility of a rate war between the private carriers whereas a legal regulatory framework could prevent it. C.P.R. services are in partial competition on the Mainland-Vancouver Island B.C. Ferries routes but this does not exclude the possibility of a rate war between C.P.R. and a third Mainland-Island carrier.

The presence of a public carrier operating at a low tariff may induce internal cross-subsidisation in a competing carrier. To maintain the competitive service at low tariff the private carrier may be forced to transfer funds from higher tariffs on some (effectively monopolised) service. For example, the passenger services of C.P.R. (which are competitive with those of B.C. Ferries) are cross-subsidised by freight

services<sup>3</sup>, an area where C.P.R. has a partial monopoly position.

Service level effects on competition

One of the objectives of regulation is to maintain a reliable service. This objective can also be achieved by the presence of a public carrier in competition with private carriers. In case of default by the private carrier, the public carrier can take a temporary excess load (given some excess capacity). In the past a common direct cause of failure of ferry services has been labour strife. The employees of the public and private carriers in B.C. belong to different unions. This is added insurance against the possibility of total disruption of ferry services between the Mainland and Vancouver Island.<sup>4</sup>

On unprofitable routes private competition for the public carrier will generally not exist. These routes can be run by the public carrier which accepts the loss incurred by operating as a utility. Alternatively a private carrier can be offered a subsidy (as with a fully regulated system). Both circumstances occur in B.C. Some routes (particularly short

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<sup>3</sup>Personal Interview, Mr. Ron K. Gamey, Manager, Analysis and Planning, Canadian Pacific Railway Ltd., Vancouver.

<sup>4</sup>But it is no guarantee. In August 1973 both B.C. Ferries and C.P.R. were simultaneously strikebound in separate labour disputes.

cross-river or lake runs operated under the Department of Highways separately from saltwater routes) are served by the public carrier at considerable loss; other runs are operated by single-vessel private operators under subsidy.<sup>5</sup>

There are several ways in which a private carrier might be said to be disadvantaged in competition with a public carrier. Private enterprises are required to earn a fair return on capital, which is not necessarily required of a public enterprise. Private enterprise must pay corporate taxes, which public enterprises do not (de facto taxation on a public enterprise would be effected by requiring net cash inflows to the exchequer). Whenever revenues or costs are perceived differently by private and public operators, some distortion of competition results (usually to the detriment of private operations).

It is not only in price levels that the advantage of the public enterprise may materialise. The factors mentioned above might appear as improved service levels for the same price. The private operator, though not undercut in price, may be undercut in service level because of the different ground rules under which the public enterprise operates. In B.C., while the

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<sup>5</sup>British Columbia. Annual Report of the Minister of Highways for the fiscal year ending March 31, 1972.



passenger services of the C.P.R. and B.C. Ferries are comparable, the government services are much more frequent and conveniently scheduled.<sup>6</sup> The government maintains a better level of service to users.<sup>7</sup>

This discussion has concentrated on the impact of price and service level policies of the public carrier on the entire system. No judgement has been made whether or not this impact is beneficial to an overall economic context. The following sections contain the economic theory relevant for setting prices and service levels of the public carrier.

## 2:3 Economic theory and application

### 2:3:1 Introduction: marginal cost pricing

This section presents the relevant economic theory for developing economically efficient policies for commercial vehicles on B.C. Ferries. The social and political objectives of public policy are set aside at this point but will be re-introduced later in the thesis.

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<sup>6</sup>This can also be regarded as a scale effect, i.e. dominance of public carrier by virtue of size. But again, the private operator was disadvantaged by heavy capital subsidy for expansion of the government fleet to its present size. (See chapter 4).

<sup>7</sup>The appendix to this chapter discusses the equivalence of the effects of price and service level variables.

The general rule for economic efficiency (which is a stated objective) is to set the price charged per unit of service equal to the cost of providing the marginal unit. This formula or "first best" solution is unsatisfactory for two reasons:

- (i) It is not clear what is meant by the marginal cost. Should the costs be long term or short term and what happens when joint, common and indivisible costs occur?
- (ii) The formula is invalidated by deviations from marginal cost in the prices of factor inputs and competing services, which are found in the real non-marginalist world. A "second best" solution to the problem is required.

These two shortcomings are discussed in turn.

(i) Defining marginal cost

The marginal cost of an output unit is the escapable cost if one less unit is produced. This escapable cost is the opportunity forgone of the most valued alternative use of the released resources (and is sometimes termed the opportunity cost). When considerations normally valued by governments are included as part of the cost, the adjective "social" is added. The marginal cost pricing rule becomes:

$$\begin{array}{lcl} \text{price to be charged} & & \text{marginal social oppor-} \\ \text{per unit of service} & = & \text{tunity cost} \end{array}$$

Definitional problems arise because the meaning of "escapable" is not clear. Some costs are escapable in the long term but not in the short term. Many industries have output costs which are joint or common with other outputs and there often exist indivisible costs of production which confuse the meaning of escapable.<sup>8</sup>

#### Short and long term costs

Some commitments to use resources cannot be altered rapidly even if output contracts to a lower level. For example, the construction of a ferry terminal is a long term commitment of resources (practically infinite for durable earthworks and docks). In contrast, the cost of fuel and vessel wear and tear are immediately escaped if a sailing is cancelled. Some commitments are intermediate term (e.g. hiring contracts for labour which have an expiry date (typically 24 months)). Investment in assets such as vessels may be escapable in the intermediate term through sale or alternative use. Therefore the marginal cost of output is seen to vary with the time scale considered.

#### Joint and indivisible costs

There are several examples of joint and indivisible

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<sup>8</sup> Heggie, Ian G. Transport Engineering Economics McGraw-Hill Book Company, Maidenhead, England, 1972. Chapter 4.

costs in ferry operations. Using the present fleet, the proportion of passenger and vehicle accommodation is fixed and their costs are joint. Passenger service cannot be escaped without eliminating vehicle service and vice versa. Likewise, the costs of east- and west-bound services are joint. The costs of a single sailing are largely indivisible (except perhaps for personnel associated directly with on-board passenger service) and are common to all the vehicles and people using the vessel. The costs of operating a terminal serving more than one ferry route are common between the routes (as at Horseshoe Bay).

(iii) Second best solutions

In industries where marginal cost is less than average cost a deficit results from the application of the marginal cost pricing rule. Deviations from marginal cost pricing arise from the need for revenues in such an enterprise and as well as from the distorting effects of taxation. The marginal cost pricing of a single output in the presence of non-marginally priced inputs and substitutes does not necessarily lead to optimal resource allocation.

Even if it is decided to make up private enterprise's inescapable costs by subsidy from the treasury by excise taxes, this is obviously a decision to make some prices deviate from marginal cost after all. Alternatively, an income tax drives

the price of labour from its marginal cost. Any level of treasury revenue must produce some distortion. The search for an optimal price for government ferry services can be viewed as the search for an optimal revenue from operations, assuming that output is achieved at minimum cost.<sup>9</sup>

### 2:3:2 A pricing model for government services

#### Abstract of pricing model

This section presents a model for the (second best) optimal pricing of government ferry services. The aim is to arrive at a pricing rule for economic efficiency. The model is based on partial equilibrium of ferry services and related sectors. The objective function to be maximised is the net social benefit of public ferry operations. The model deals specifically with the transportation of commercial vehicles. The objective function is maximised subject to the constraint that trucking firms maximise their profits.

The model indicates that economically efficient pricing is achieved when the public enterprise sets its prices above marginal cost to the extent that a competing private enterprise sets its prices above marginal cost. Since the costs of the private enterprise are usually not known by public

<sup>9</sup>Baumol, W.J. and Bradford, D.F. "Optimal departures from marginal cost pricing." Amer. Econ. Rev. 1970, 60, no. 3, pp. 265-83.

policymakers, the rule reduces to the following (in ignorance of private operators' costs): set the public enterprise's price at a level which recovers all costs (both variable and fixed) and which makes a reasonable return on investment, with an allowance for the equivalent of income tax, i.e. adopt pricing principles very similar to those of private enterprise.

The model<sup>10</sup>

The object of the model is to derive a rule for the pricing behaviour of a public enterprise in the presence of private competition. The criterion which distinguishes the (second best) optimal pricing of the public enterprise is that it maximises the net social benefit (social benefit minus social cost) of its actions. This is what is meant by economic efficiency and it is assumed to be one of the objectives in the operation of government ferry services (as in the policymaker's objectives stated in section 2:1). The principal assumptions in the model are that the social benefit of an operation (in our case trucking services) is measured by the willingness to pay for it on the part of the shippers. The social costs are measured by the expenditure of the enterprise (net of taxes). The model cannot encompass other policy objectives (e.g. redistribution of income, regional development) unless they can be valued explicitly as a cost or

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<sup>10</sup>This section is heavily influenced by chapter 3 of Turvey, Ralph. Economic Analysis and Public Enterprises. London, Allen and Unwin Limited, 1972.

benefit. Since their value is unknown, they are ignored at this point; it is assumed that the policymaker would weigh them later together with the policy objective of economic efficiency.

The model deals with a subsystem of the economy (it is partial), internally at equilibrium and at equilibrium with the external economy. It admits the possibility that the external economy and the elements of the subsystem do not base prices on marginal cost. The model contains no explicit time element.

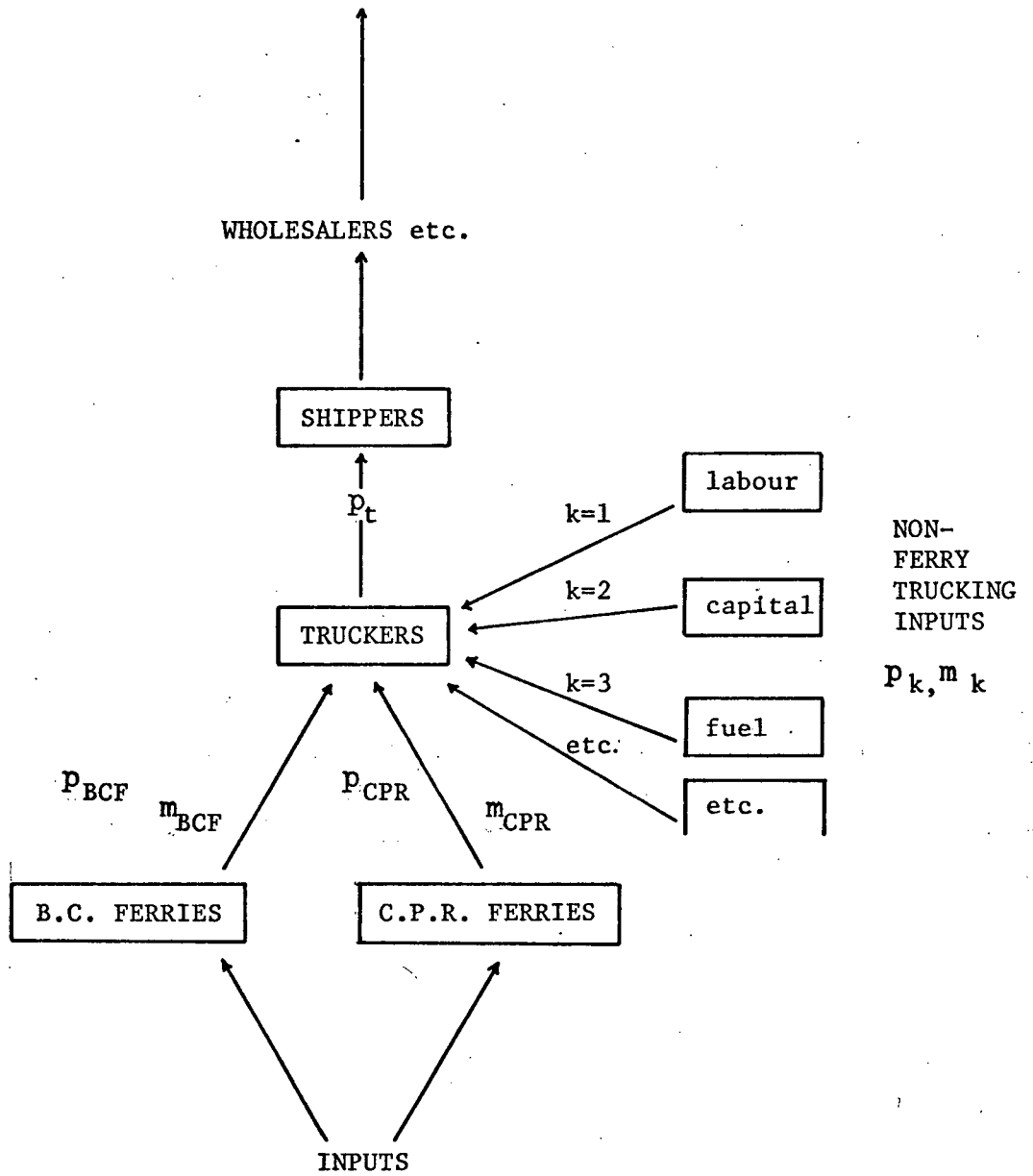
One of the requirements of the model is that it should be useful and applicable. It should use quantities which are either known or easily guessed at. The model must take the present operating environment of the ferry service as given. Those things which are not under the discretion of the public enterprise are not considered.

#### Market relationships in model

Ferry services are an input into Island-mainland trucking services. Trucking services are themselves an input into the transported goods. A diagrammatic summary of market relationships appears in Figure A. The distinction between the public and separate private ferries has been maintained. The shippers are consumers' representatives and are taken to

Figure A

MARKET RELATIONSHIPS  
AS USED IN PRICING MODEL





behave on their behalf. Shippers' willingness to pay for trucking services is assumed to reflect that of the ultimate consumers of the shipped commodities. Concisely, the trucking service is regarded as a final good which uses the intermediate good of ferry service in its production.

The model is constructed by considering, first, the condition for truckers' maximisation of profits and, second, the condition for maximisation of net social benefit. These two conditions are then reconciled to give the pricing rule.

#### Notation

$P_{BCF}$	price charged by the public enterprise, B.C. Ferries, to truckers for one unit of service.
$P_{CPR}$	price charged by private ferry, C.P.R., to truckers for one unit of service
$P_k$	price of $k^{th}$ (non-ferry) input to trucking service, such as labour, fuel, etc.
$P_t$	price charged by truckers to shippers for one unit of service
$Q_{BCF}$	equilibrium output level of B.C. Ferries
$Q_{CPR}$	equilibrium output level of C.P.R. Ferries
$Q_k$	equilibrium use of $k^{th}$ (non-ferry) trucking input
$Q_t$	equilibrium output level of truckers
$m_{BCF}$	marginal cost of B.C. Ferry service (net of taxes)
$m_{CPR}$	marginal cost of C.P.R. Ferry service (net of taxes)
$m_k$	marginal cost of (non-ferry) trucking inputs

Profit maximisation condition for truckers

The truckers are free to choose how much they use the ferry services. Consider the value to a trucker of changing the quantity of public ferry service he purchases. The value of a unit change is the consequent change in the profits of the trucker, i.e., the change in his revenues less the change in the cost of all other inputs which he purchases. Therefore, an increased purchase of one unit of public ferry service is valued at:

$$\frac{d}{dQ_{BCF}} (p_t Q_t - p_{CPR} Q_{CPR} - \sum_k p_k Q_k)$$

This can be re-written as

$$p_t \frac{dQ_t}{dQ_{BCF}} - p_{CPR} \frac{dQ_{CPR}}{dQ_{BCF}} - \sum_k p_k \frac{dQ_k}{dQ_{BCF}} \quad (A)$$

We assume that truckers wield no monopsony power over the ferry operators and other suppliers, and that the trucking industry is competitive,

i.e., that

$$\frac{dp_{CPR}}{dQ_{BCF}} = 0, \quad \frac{dp_{BCF}}{dQ_{BCF}} = 0, \quad \frac{dp_k}{dQ_{BCF}} = 0$$

The expression (A) is the marginal value to a trucker of using additional public ferry service,  $dQ_t$  is the additional output he achieves when he uses an additional input  $dQ_{BCF}$  most favourably.  $dQ_{CPR}$  and  $dQ_k$  are the input savings resulting from the most favourable use of  $dQ_{BCF}$  (i.e.  $\frac{dQ_{CPR}}{dQ_{BCF}}$  is implicitly

negative). Profit maximisation by a trucker requires that the marginal value of his use of the ferry service be set equal to the marginal cost of using it. For the public enterprise, he will set his usage such that

$$p_t \frac{dQ_t}{dQ_{BCF}} - p_{CPR} \frac{dQ_{CPR}}{dQ_{BCF}} - \sum_k p_k \frac{dQ_k}{dQ_{BCF}} = p_{BCF} \quad (B)$$

This equation now describes the condition in which each trucker is maximising his profits.

### Condition for maximising net social benefit

Social benefit is here measured by shippers' willingness to pay. Social costs are measured by the expenditure of the producing enterprises. If an additional unit  $dQ_{BCF}$  is produced at marginal cost  $m_{BCF}$ , the consequent increase in truckers' output will be worth an amount  $p_t dQ_t$  to shippers. The social cost of achieving this social benefit is  $m_{BCF}$  together with the change in other trucking inputs, including private ferries. The latter is given by the expression

$m_{CPR} dQ_{CPR} + \sum_k m_k dQ_k$ . The socially optimum condition occurs when marginal benefit is set equal to marginal cost:

$$p_t \frac{dQ_t}{dQ_{BCF}} = m_{BCF} + m_{CPR} \frac{dQ_{CPR}}{dQ_{BCF}} + \sum_k m_k \frac{dQ_k}{dQ_{BCF}} \quad (C)$$

### Reconciliation of conditions

We require that social optimality (equation (C))

should be consistent with the most profitable behaviour of truckers. This is achieved by combining the two expressions (B) and (C). Subtraction leads to:

$$P_{BCF} = m_{BCF} + (P_{CPR} - m_{CPR}) \frac{dQ_{CPR}}{dQ_{BCF}} + \sum_k (p_k - m_k) \frac{dQ_k}{dQ_{BCF}} \quad (D)$$

This formula indicates that the services of the public enterprise should be priced at something other than marginal cost. It states that, given the market relations of figure A, second best optimal pricing dictates that the pricing of the good supplied by public enterprise should be fixed with reference to (a) the divergence between price and marginal cost of the other suppliers to truckers (the competing ferry and other trucking inputs  $k$ ) and (b) the extent to which the ferry services are substitutes (in the expression  $\frac{dQ_{CPR}}{dQ_{BCF}}$ , which is implicitly negative) and the extent to which  $\frac{dQ_k}{dQ_{BCF}}$  other inputs are used (saved) by using additional public ferry service.

The centre term on the right of (D) tends to increase the excess of  $P_{BCF}$  over  $m_{BCF}$  when the following conditions hold: (i) the ferry services are substitutes, i.e., increasing the supply of public service decreases the equilibrium demand for private ferry services and (ii) the competing services are prices above their marginal (social) cost. Neither of these two seem unreasonable for the case in hand.

The right hand term increases or decreases the excess of  $p_{BCF}$  over  $m_{BCF}$  depending on whatever the inputs  $k$  are increased or reduced in quantity when more public ferry service is supplied (i.e. on whether the inputs  $k$  are complements or substitutes to public ferry service). If, for example, more motor fuel is required to use the public ferry service, this will tend to increase the suggested excess of  $p_{BCF}$  over  $m_{BCF}$  provided that fuel is itself priced above marginal cost. In the absence of any knowledge about the costs involved in the inputs  $k$ , we assume that  $p_k = m_k$  and the right hand term disappears.

### 2:3:3 Problems of interpretation and implementation of pricing model

One of the requirements of the model is that it should use inputs which are practical ones in the sense that they can be estimated using knowledge which might reasonably be expected to be available to government ferry administrators. To what extent has this requirement been fulfilled?

The difficulties fall into two classes. First, conceptual difficulties arise from the interpretation of the variables which are to be found in the model and second, operational problems arise because of the omission of some facts of life.

### Interpretation of model variables

One of the first questions to arise is: What is meant by the output of the ferry system? Specifically, what are the units of output? The unit of output affects the calculation of marginal costs  $m_{BCF}$  and  $m_{CPR}$ . Also (depending on how the output unit is defined) the available methods of changing the defined output capacity of the ferry system are altered. The difficulties arise because of the indivisibilities of ferry operations; it is not possible to send half a ship or for it to travel half a sailing. Capacity cannot be altered to suit fluctuations in demand, since transportation cannot be stockpiled.

Given a service between two terminals its capacity (units as yet undefined) may be increased by making more frequent the sailings between them, or by changing the size of the ships (e.g. stretching or jumboizing), or by increasing the speed of the ships (which allows an increase in frequency). Given, say a service between an island and a mainland, the possibility arises of increasing capacity by changing terminal location. One unit of output which has the desirable property of expressing capacity changes by all these methods is the lift-off capacity (vehicle-trip spaces per unit time between island and mainland). But the lift-off capacity can be changed only in large steps (depending on the time scale considered). The

model requires that marginal costs of ferry operations be specified so that all the conceptual problems of marginal costing occur in the model (see 2:3:1).

The model minimises the problem of choosing a relevant-run marginal cost for pricing purposes. It does not specify whether  $m_{BCF}$  and  $m_{CPR}$  are short or long run marginal costs but merely says that  $p_{BCF}$  should exceed  $m_{BCF}$  to the extent to which  $p_{CPR}$  exceeds  $m_{CPR}$ . Given similar cost structures in the two enterprises, the relation between  $p_{BCF}$  and  $p_{CPR}$  will be maintained irrespective of the chosen run of  $m_{BCF}$  and  $m_{CPR}$ .

The quantity  $dQ_{BCF}$  is an increase in output of the ferry service, but the model does not recognise explicitly that this  $dQ$  may be brought about operationally in several different ways. Again, schedules may be altered to provide more sailings, the physical capacity of a vessel may be altered, route length may be shortened, vessel speed may be increased. All of these measures change the system's capacity. The quantity  $dQ_t$  is the increase in truckers' output (typically measured in vehicle trips per day) resulting from this change  $dQ_{BCF}$  of ferry service. Yet the magnitude  $dQ_t$  varies with the manner in which  $dQ_{BCF}$  is provided. The supply of more frequent sailings may result in economies in truck waiting times and reduce door-to-door truck trip times. It is not clear

that the supply of a larger vessel on the same schedules would have an equivalent effect (unless it is by reducing the probability that the truck fails to board a full vessel). It is conceivable that a change in schedule alone, which would not appear as an increase in capacity in the units chosen for  $dQ_{BCF}$ , would facilitate an increase in output of the trucking industry. One example of this might be the rescheduling of some services at night times, when the demand for drop trailer transportation is relatively high. This problem may be seen as one aspect of the difficulty of choosing a unit of output.

Remarks in a similar vein may be made concerning the term  $dQ_{CPR}$  the quantity of private ferry service which the trucker would be able to save if he used the newly provided quantity  $dQ$  of public ferry service. Again, the  $dQ_{CPR}$  depends on the "nature" of the  $dQ_{BCF}$  as well as on its size.

#### Model omission of facts of life

A number of realities which were either assumed away or not recognised must be mentioned because they make dangerous inroads into the validity of the model.

It was assumed that the trucking industry exerts no monopsony power over the ferry operators, public and private. This may not be true. The existence of some form of agreement between a major trucking firm and B.C.C.S. will be mentioned later (probably involving guaranteed numbers of vehicles in



return for favourable rates). Economic theory cannot accommodate the terms of such agreements if they are not known. In addition, the public ferry system has relinquished much drop trailer traffic to B.C.C.S. because of operating headaches. When the system is affected by agreements such as these, which arise from the difficulties caused by rapid expansion of demand or uncertainty of the future, equilibrium models are severely disadvantaged and one is thrown into uncertainty and unpredictability.

A further point is that the truckers may maximise their profits as assumed but under the constraints imposed by the Public Utilities Commission (Motor Branch). Only the For-Hire truckers are regulated. The privately owned firms are of course not price-regulated when they are used to transport the owner's goods. However, their behaviour will still approximate to what it would be in a competitive market as in the model.

One important inadequacy of the model is that it does not recognise the fact the B. C. Ferries serves more than one transportation market. It assumes, as shown in Figure A, that B. C. Ferries has a single output, which is its service to commercial vehicles. The model cannot encompass the effects of changing B.C. Ferries commercial vehicle services upon other traffic types (e.g. commuters or tourists). If the effects on these other groups are to be included, it must be

as an external influence on the pricing rule of the model.

A further real-world problem is the seeking out of the quantities  $m_{CPR}$  the (marginal) costs of the competing ferry operations. While it is true that a reasonable guess might be made, definitive information may be exceedingly hard to obtain, since it may not be in the operators' interests to reveal it.

#### Usefulness of model: summary

A model, which provides a rule for the determination of the prices charged by a public enterprise in competition with private ones, has been presented, together with a discussion of its limitations and difficulties. It may be that these limitations and difficulties render invalid strict application of the model's pricing rule. But the model does suggest an approach to the problem of price determination. This approach may be modified to accommodate the factors not included in the model.

The model can be interpreted as giving theoretical support to the assertion that a public enterprise should be operated just as a private enterprise when in competition. In the special case where (i) cost structures of the two enterprises are similar and they are equally efficient, (ii) their outputs are perfect substitutes, economic welfare is maximised

if the public enterprise operates just as a private enterprise (i.e. covering fixed and long-term costs in revenues and earning a satisfactory (after tax) return on capital).

This model is useful because it provides a criterion (albeit rather broad and ill-defined) of economic efficiency for examining and comparing alternative commercial vehicle policies. It suggests that for B.C. Ferries economically efficient pricing of commercial vehicle services is achieved by setting prices equal to the marginal cost of providing ferry space plus an increment to cover fixed costs and to make a reasonable return on capital investment. This is the closest approach which can be made to economically efficient pricing in ignorance of the competing private operator's costs.

Certain effects of commercial vehicle policies are external to the model and must be considered separately; these are notably the effects of the policy on other types of B.C. Ferries traffic and the implications for future development (or any of the considerations mentioned in section 2:2:2). These external considerations will therefore be separated when alternative commercial vehicle policies are discussed in chapter 5. Some general examples of these social or political considerations are mentioned in the section immediately following; others will emerge from the discussion of past developments and from the details of present day operations.

## 2.4 Some policy considerations and operational limitations

The following are examples of policy considerations and operational limitations which are not easily included in criteria for economic efficiency but which may be weighed by policymakers in choosing a particular policy.<sup>11</sup>

### Development policies

The desirability of promoting regional unity or decentralisation may affect the selection of rate structures and levels of service. For example, a government policy to develop Vancouver Island as a tourist attraction might be implemented by offering tourist fare discounts on B. C. Ferries. A policy of industrial development might include the reduction of freight rates.

### Redistribution of income

The possibility of using the rate structure to redistribute income in society may lead to its modification. There are arguments on both sides. It could be argued that this redistribution is the function of general public finance

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<sup>11</sup> Some of these considerations are mentioned in: Vickrey, William. "Some implications of marginal cost pricing for public utilities." Amer. Econ. Rev., Supplement, vol 45, (1955), no. 2., pp. 605-20. Also in Munby, Denys (ed.). Transport, Hammondsworth, England, Penguin Books, 1968.

(the taxation department) and that it should not be usurped; the function can be performed more efficiently by the taxation department and there are already too many considerations to be met in setting the rate structure. The opposing argument suggests that if modifications to the rate structure can be shown to have desirable redistributive effects, it will be desirable to modify it to some extent. The regressive nature of prices increases for the necessities of life is well recognised. It could be argued that if the service which B.C. Ferries provides is such a necessity of life (particularly for Island residents) then a fare increase would be regressive.

#### Notions of equity

Popular notions of equity may be considered to be valid in their own right, irrespective of conflict with strict application of economic efficiency. Though theory may call for substantially higher fares at peak times, this could be considered inequitable since (through congestion) the level of service deteriorates at such times. A further example might be the apparent unfairness of a differential between the fares to B.C.-registered vehicles and out-of-province vehicles. Though theory might call for such discrimination, the apparent inequity of the situation could lead to the modification of the application of theory.

### Complexity limitation

The ability of the customer to respond intelligently to the rate structure is a limitation on its complexity. While frequent users (such as trucking companies on B.C. Ferries) can respond to complex rate structures and operating practices, irregular users (such as tourists) cannot be expected to do so. A case in point is provided by a 1972 B.C. Ferries survey which indicated that 70% of passengers receiving a mid week 50% fare reduction were not aware of the fact. How much advertising and publicity can affect user awareness of rates is not clear.

### Administrative effort

The cost of determining, administering and publicising the rates and services is a limitation which declines in importance as the volume and unit of sale become larger. In the case of B.C. Ferries, this limitation is less severe than others mentioned here.

### Prior commitments

Finally, the implementation of measures may be influenced by prior commitments. In the case of British Columbia, for example, the (then) Minister of Highways has stated that there will be no fare increase this year (1973).<sup>12</sup> In addition,

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<sup>12</sup>The Victoria Times, March 7, 1973.

one election promise was the trial of night runs on B.C. Ferries.<sup>13</sup> If such commitments are considered binding, they are a constraint on the services and tariffs which may be chosen.

### Summary of chapter 2

This chapter provides a general framework for the analysis of specific policies on B.C. Ferries. The present system of ferries is an unregulated, mixed public/private system. The chapter showed that the policy variables open to the government in this situation are the prices and service levels of the public carrier. The analyst's task is limited to describing the effects of alternative policies and comparing them on grounds of pure economic efficiency. If other external social and political objectives can be identified, the analyst can usefully describe the implications of alternative policies for these objectives. This chapter presents a model for economically efficient pricing of B.C. Ferries commercial vehicle services which indicates that B.C. Ferries should follow pricing principles similar to those of competitive private commercial-vehicle ferry operators. Finally, the chapter discusses some examples of social and political considerations which may modify the economic optimum.

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<sup>13</sup>The Victorian (Victoria), March 28, 1973

## Appendix to Chapter 2

### A note on the equivalence of price and service levels

In several parts of this thesis, the notions of price and service level are given equal status. The purpose of this appendix is to clarify the reasons for this.

The notion of service level is used here as a "catch-all" term for all the factors (other than dollar price) which determine the equilibrium demand and supply point of the quantity of transportation and which are subject to the discretion of suppliers. It can be thought of as the non-monetary price at which service is demanded or supplied to an individual. Generally, the level of service supplied to consumers increases as service becomes more convenient or pleasant to use (e.g. by increased frequency, better scheduling, more in-transit amenities, etc.). It is important to distinguish this use of the term "level of service" from the rather different and simpler meaning of quantity or volume of service supplied in aggregate. At any given dollar price, an increase in the quantity (e.g. frequency increase or congestion decrease) of transportation supplied increases the level of service perceived by each individual user and encourages, in general, the marginal user to utilise the service.

For the supplier operating at a given volume of

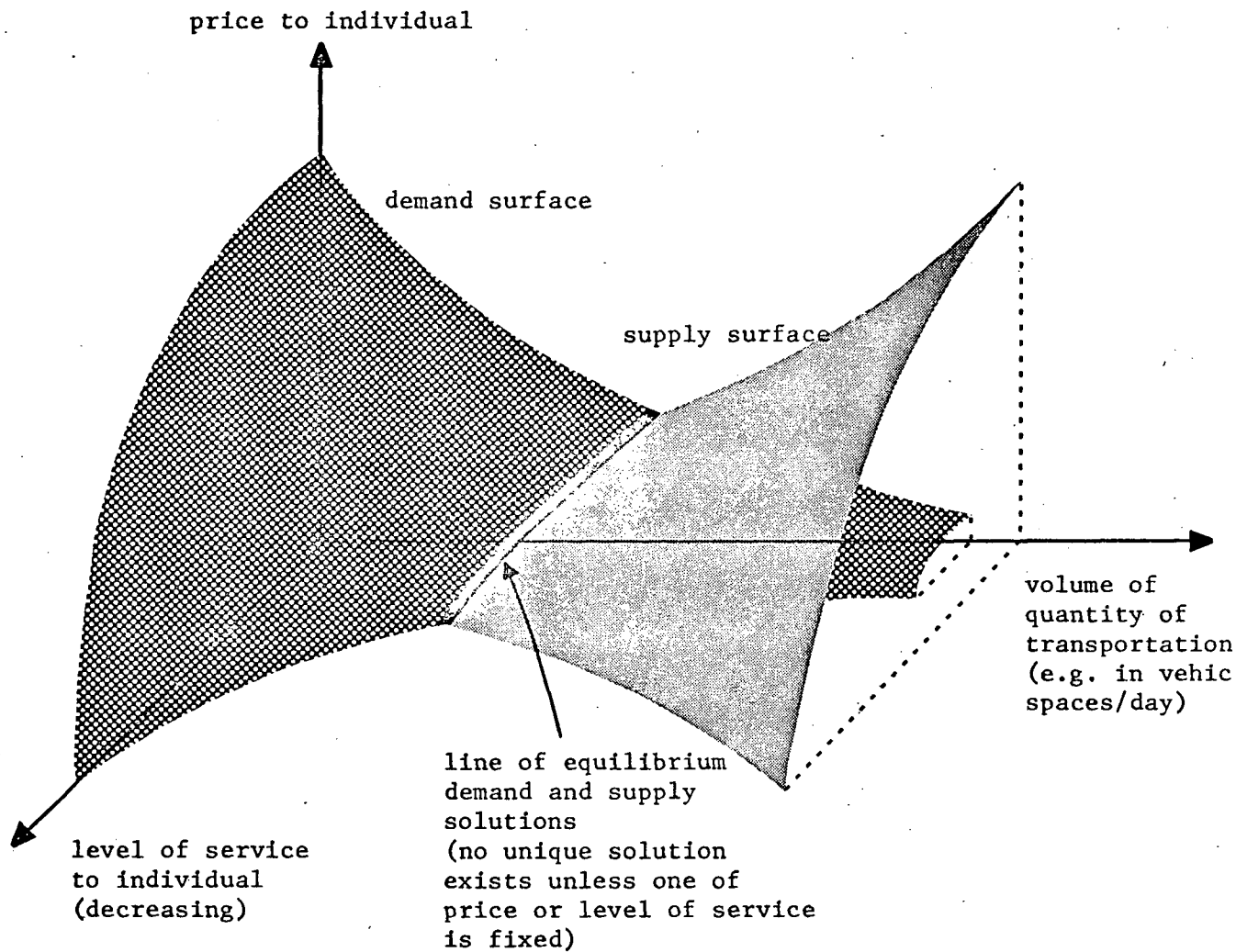


supply, increasing the level of service increases his costs so that he is willing to supply the same volume only at a higher price. On the demand side, individuals are in general willing to pay more for a higher level of service. These interrelations are conveniently presented in graphical form as a three-dimensional supply/demand equation (Figure B). The level of service axis points in the direction of worsening level of service to emphasise the similarity of the effect of increasing the price to the consumer or decreasing the level of service he perceives (i.e. increasing the non-monetary price which is imposed upon him).

It is therefore convenient to regard price and service level as simultaneous determinants of equilibrium volume of transportation. The demand and supply surfaces are seen to intersect at a line; i.e. there is no single point where demand and supply are in equilibrium; there are many equilibrium points. A single supplier (such as a government ferry operator) may therefore choose to fix, say, level of service as a matter of policy and adjust price to control demand. Alternatively, he may choose to fix price as a policy variable and to control demand by adjusting level of service. To try to set both may be inconsistent with the economics of the situation e.g. to set high level of service and low price (lying off the equilibrium line) will require a subsidy.

FIGURE B.

EQUIVALENCE OF PRICE AND SERVICE LEVEL AS POLICY VARIABLES



In summary, it has been argued that it is useful to regard price and service level as co-determinants of equilibrium demand and supply; this approach highlights the significance of both price and service level as parallel policy variables.

CHAPTER 3

A BACKGROUND TO PRESENT FERRY OPERATIONS

### 3:1 Ferry transportation

#### 3:1:1 Introduction: the features of ferry transportation

Literature about ferry operations in the province, or in general, is sparse. This chapter discusses the general characteristics of ferry transportation and presents an historical account of ferry operations in the province. The purpose is to identify themes or trends which are significant to the present. These are outlined in the final section of the chapter.

Sometimes the term "ferry" is used to indicate only the vessel used in ferry service, excluding terminal and ancillary facilities. In this thesis the term will be used more generally to include all facilities of ferry service operation. The term will be used to refer to services by vessels which are (i) regularly scheduled and (ii) short-haul (cross-river or cross-lake) or medium (coastal or island).

Considered this way, ferry transportation has distinct features, differing from other means of transportation in both operating and cost characteristics. The ratio of operating to capital costs of a ferry service is relatively large compared with that of a bridge or tunnel facility (a possible substitute). The differing cost structures favour ferry transportation at lower traffic volumes, while the

bridge/tunnel alternative becomes more attractive at higher throughput. Wages, fuel, maintenance and depreciation are the principal components of ferry operating expense. For bridges and tunnels these items are generally either less (relative to capital cost) or zero.

The physical space available for accommodating traffic (rather than weight capacity) is the limit on ferry capacity. This is reflected in the common practice of charging vehicles by length rather than by weight. Only railways are subject to a space constraint of comparable severity; on other modes it is more often complex combination of the physical size and weight of the transported goods.

A further difference lies in the recovery of capital assets. Highway, rail and ferry modes all carry vehicular traffic. Highway capital investment is almost exclusively a sunk cost (since it cannot be recovered in removal of the facility). For ferries not all capital costs are sunk. The only non-recoverable ferry capital costs are those of the terminal and ancillary facilities; the depreciated value of vessels can normally be recovered by sale or by use on other routes. Ferries, in common with other marine and airborne transportation, possess a versatility which road, rail and pipeline do not. It is acknowledged that this distinction arises partly from the physical nature of the modes and partly from the conventional conception of what is a mode. When local

demand falls, ferries can claim a higher proportion of escapable to inescapable costs than can railways or highways. The right of way is essentially free so that capital costs are relatively insensitive to distances and routes travelled. Only when larger distances or special routes dictate sturdier vessels or additional navigational aids do capital costs increase. This point is laboured because it is significant when ferries and highways, or ferries and railways, are operated and financed under the same authority.

3:1:2 Ferries as an extension of highways or railways

Despite the differences in the characteristics of highways or railways and ferries, it is common (both conceptually and administratively) to regard ferries as an extension of highways or railways. Given two centres of population and the requirement that they be linked, it is a common step to assign responsibility for the linkage to a single authority, whether over land or land and water. The Washington State ferry system is currently run under the Toll Bridge Authority (an agency of the State Highway Commission). The B.C. Government-owned ferries were (until recently) operated under a division of the Department of Highways.<sup>1</sup>

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<sup>1</sup>Past administration of B.C. Ferries was under the following authorities -

1960 to March 1964....B.C. Toll Highways and Bridges  
Authority

March 1964 - Feb. 1968...B.C. Ferry Authority

Feb. 1968 to May 1973...Ferries Division, Dept. of Highways

May 1973 to date.....Department of Transport and Com-  
munications

This "extension" attitude may be seen elsewhere. In New Brunswick there is no user charge, directly applied, for bridges or cross-river ferries. For the East Coast Canadian National Railway ferry services, the net operating profit or deficit is calculated by treating the ferry as a continuous rail link and basing the relevant tariffs on the average rail rate per mile over the whole Atlantic Region. The ferry is deemed to be part of the Canadian National Railway so that tariffs and charges for the water haul are subject to the general regulations of the Railway Act.<sup>2</sup>

### 3:1:3 Ferries as a constitutional requirement

The importance of ferries as communication links is emphasised by their place as constitutional requirements of Canadian confederation, both in early and more recent times. The East Coast ferry services are partly maintained to this day by the Government of Canada under these requirements. Upon the Act of Union with Canada in 1948 the Newfoundland Railway, together with its steamship and other services, became the property of the Government of Canada and the C.N.R. was made

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<sup>2</sup>The Economist Intelligence Unit, Atlantic Provinces Transportation Study, Volume VI, Mainland-Newfoundland services - 1. Queen's Printer, Ottawa, 1967.



responsible for operating and maintaining its services.

A guaranteed ferry service was a condition of the admission of Prince Edward Island into the Union in 1873:

" . . . the Dominion Government shall assume and defray all the charges for the following services  
.....efficient Steam Service for the conveyance of mails and passengers, to be established and maintained between the Island and the mainland of the Dominion, Winter and Summer, thus placing the Island in continuous communication with the Inter-colonial Railway and the railway system of the Dominion. . . ."3

Similarly, upon the admission of British Columbia in 1871:

" . . . the Dominion will provide an efficient mail service, fortnightly, by steam communication between Victoria and San Francisco, and twice a week between Victoria and Olympia, the vessels to be adapted for the conveyance of freight and passengers. . . ."4

Evidently, the importance of ferries as a part of Canadian infrastructure has long been recognized. While air transportation is now an additional means of communication with land-inaccessible communities, it is no substitute for ferry transportation; the potential volume of air-shipped goods

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<sup>3</sup>Order of Her Majesty in Council Admitting Prince Edward Island into the Union, June 26, 1873. Revised Statutes of Canada 1970, Appendix p.291.

<sup>4</sup>Order of Her Majesty in Council Admitting British Columbia into the Union, May 16, 1871. Revised Statutes of Canada 1970, Appendix p.279.

being those of relatively high cost of and low bulk/weight, is small. Technology does not promise any immediate change in this situation. For communities which are inaccessible by land, commerce and survival itself depend upon regular surface transportation services across water, i.e. they depend upon the services of a ferry system.

### 3:2 An Historical Perspective

#### 3:2:1 Pre-1958; before the government initiative

It is only comparatively recently that the Government of British Columbia has participated in the operation of ferries; prior to 1961, the internal water transportation needs of the province had been served entirely by privately operated services. A review of the history of ferry operations in the province and in the U.S. North West yields some interesting contrasts, parallels and precedents for the present British Columbia Ferries.

#### Early history

A system of railway bridges had been envisaged as a solution to the transportation problems of the offshore islands of B.C. as far back as 1867. The Canadian Pacific Railway (the construction of which was a condition of British Columbia's entry into the Union in 1871) was to terminate on Vancouver Island at Esquimalt. A water crossing had been proposed for the north end of Vancouver Island where bridges could be built. This plan did not materialise since the roughness of the province's terrain dictated a more southerly rail route on the mainland. The Island became entirely dependent on ferries for its communication with the mainland.<sup>5</sup>

<sup>5</sup>Cadieux, H. and Griffiths, G. Dogwood Fleet; the story of the British Columbia Ferry Authority from 1958. Nanaimo, Cadieux and Griffiths Ltd., 1967.

### Developments in Washington State

An examination of events directly to the south in the northwest of Washington State reveals developments which were to be followed in British Columbia. The geography of the state poses problems of transportation similar to those found in British Columbia. For some fifty years the transportation of goods and people on Puget Sound was effected by what is affectionately known as the Mosquito Fleet, a varied collection of vessels which maintained regular schedules under conditions of fierce competition. By the 1920's the use of the automobile required changes in ferry operation, for most of the Mosquito Fleet steamers could not accommodate trucks and automobiles, and many of the operators went out of business. The market was dominated by a well-established eastern concern, the Black Ball Line, which operated the Puget Sound Navigation Company and set up a British Columbian subsidiary. Demand for transportation grew rapidly. After the second World War the company's course was stormy; using deteriorating vessels, it was battling against the demands of labour on the one hand, demanding more pay, and those of government, demanding more service, on the other. At one time the owner tried to win a point by shutting down the whole Puget Sound system for eight days. An overwhelming demand arose for the State to take over, and in 1951 the legislature authorised purchase of the Company's interests.<sup>6</sup>

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<sup>6</sup>Wegg, Talbot. "The sweet seagoing buses of Seattle", City, 1971, V.5, no. 3 (May-June) pp.49-51.

The twentieth century in B.C.

The Union Steamship Company of British Columbia, Ltd. served the coast extensively. Union was incorporated in 1889 and was a major carrier in the province until the mid-1950's. Union's stated policy was "to extend so as to take in all B.C. Coast ports."<sup>7</sup> Together with the Black Ball Line and the Canadian Pacific Railway's British Columbia Coast Steamship Service (B.C.C.S.), Union served the needs of the province without major upset until the acceleration of postwar development. The main services to Vancouver Island relied on miniature ocean liners, vessels with operating and cost characteristics which became inadequate under postwar conditions of swelling demand for the transportation of highway vehicles.

The early 1950's saw rapid cargo fleet expansion for the Union Company but several factors eroded the passenger traffic being carried, particularly on longer hauls. Expanding air services, which had secured nearly all the Queen Charlotte Islands passenger traffic, became serious competition. Passengers were obliged to use the airlines when the company's entire coast operations were strike-bound for two months after the breakdown of negotiations with the Seafarer's International

<sup>7</sup>Union Steamship Company Limited. Our Coastal Trips. Vancouver, B.C., Sun Publishing Co., Ltd. 1923, p.32

Union. In late 1956, Black Ball replaced the Union Company on its run to Bowen Island. At the beginning of 1957 the company was still operating ten vessels on regular coast services but was barely able to meet increasing costs. Stiffer competition on main cargo routes, declining passenger revenues and the lack of economical fleet replacements contributed to the company's downfall. Negotiations to increase federal subsidies on Union routes broke down and the decision was made to withdraw from subsidy and discontinue passenger services. Cargo services continued until January 1959 when the assets of the company were sold to its erstwhile competitor, Northland Navigation.<sup>8</sup>

Black Ball and C.P.R. were also experiencing difficulties. A crisis occurred in 1958, when the employees of B.C.C.S. struck for more pay and were joined in sympathy by those of Black Ball. The British Columbia cabinet invoked the Civil Defence Act which allowed the government to take possession of, and use the property and undertakings of, the Black Ball Ferries Ltd., for such periods as might appear to be necessary. Black Ball employees struck again in defiance of

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<sup>8</sup> Rushton, Gerald. The Union Steamship Company of British Columbia. A Short History. in Greene, Ruth. Personality Ships of British Columbia, Marine Tapestry Publications Ltd., West Vancouver, B.C., 1969.

the act and ignored an injunction to return to work. Simultaneously, the Premier announced that the government would establish its own ferry service to Vancouver Island and that work would start forthwith.

"The Government of British Columbia is determined that, in the future, ferry connections between Vancouver Island and the Mainland shall not be subject either to the whim of union policy nor to the indifference of federal agencies."<sup>9</sup>

### 3:2:2 Post-1958: after the government initiative

#### Reasons and immediate effects of entry

Government entry into the ferry business was scheduled for the summer of 1960 when a service from Tsawwassen to Sidney (for Victoria) was planned. Two vessels of the roll-on roll-off type were built in provincial shipyards and terminal facilities were constructed. In an apparent last-ditch attempt to avoid direct competition with the government service Captain Peabody of Black Ball made alternative proposals to the government in January 1960. He offered either to sell his fleet to the government for \$18M or to buy the future government service. The government was interested in neither

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<sup>9</sup>Cadieux H. and Griffiths G. op. cit., p. 10. The Premier's reference to federal agencies presumably arose because C.P.R. was under federal jurisdiction. Federal powers were not used in the 1958 troubles, though the Premier apparently supported federal action.

proposal and commenced its own service as planned. Meanwhile Black Ball continued to operate the Horseshoe Bay - Nanaimo and Horseshoe Bay - Langdale services.<sup>10</sup> The rationale for government entry lay not in Black Ball's operations but in those of the C.P.R. An authoritative government source was quoted:<sup>11</sup>

"We are entering the ferry business only to provide a connection between lower Vancouver Island and the Mainland. We are doing so because of the decline in the C.P.R. service."

The C.P.R. had in 1959 withdrawn its night steamers from the Vancouver-Victoria run and had reduced its winter service. Later, one year after the inception of the first government-operated run, it was abandoned altogether. In October of 1962, C.P.R. further reduced its services when two out of three ships were removed from the Vancouver-Nanaimo run. It was reported that traffic had fallen by one third since the start of the first government service and that the C.P.R. service was losing money. Highways Minister Gagliardi was quoted as saying<sup>12</sup>

"The Premier and I begged the C.P.R. to get into the ferry business with both feet and when they failed to do this we were forced to take steps to improve the Island service."

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<sup>10</sup> The Vancouver Sun, January 22, 1960.

<sup>11</sup> Ibid.

<sup>12</sup> The Vancouver Sun, January 19, 1962.



Government entry into the ferry business materially affected air services between Vancouver and Victoria. The nationalised air carrier (now Air Canada) was then operating an hourly service aboard DC3 aircraft. An upgrading of aircraft to Viscounts (larger capacity reducing the frequency of flights and hence the level of service to the passenger) and the appearance of the Provincial Government in Island-Mainland transportation occurred almost simultaneously. Passenger demand for air service fell and the service was cut back.<sup>13</sup>

#### Early growth by acquisition and construction

The size of the Government fleet was boosted in September 1961 by the acquisition of the Gulf Islands Ferry Company. A family concern, the Company had served the Islands for several years using four small vessels. Reportedly the acquisition (at \$0.24M) was supported by certain Gulf Islands groups seeking improved service levels to the Islands.<sup>14</sup> In the fall of 1961 the government bought out Black Ball Ferries Ltd., paying \$4.6M for five vessels. Premier Bennett was quoted

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<sup>13</sup>At present air services satisfy only a small fraction of passenger demand for Island-Mainland travel. Vancouver - Victoria scheduled airline passenger capacity is about 5% of B.C. Ferries passenger capacity. Pacific Western Airlines operates approximately ten return flights per day between Vancouver and Victoria. Air West maintains a twin-engine seaplane service harbour to harbour.

<sup>14</sup>Cadieaux and Griffiths, op. cit., p. 27

as saying<sup>15</sup>

"It was a good deal. We could not have run a government service economically in competition with Black Ball."

The only remaining Black Ball service in Canadian waters operated across the international boundary between Port Angeles, Washington, and downtown Victoria.

In 1964 and 1965 it was stated government policy to encourage tourist traffic onto the service. A team of five sales experts were employed to promote tourism on the ferry system. The assistant general manager made T.V. tours throughout the U.S. and distributed publicity material.<sup>16</sup> It is not clear whether tourist traffic was promoted to utilise the system or whether the system was expanded to meet the growth of tourism. Premier Bennett said that the B.C. ferry service was an integral part of the province's mushrooming tourist industry and that<sup>17</sup>

"Tourism is all profit. Tourist dollars come into B.C. and we are required to give nothing in return. We don't have to supply jobs or teachers, pay hospital bills (etc.) for tourists."

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<sup>15</sup> The Vancouver Sun, January 19, 1962

<sup>16</sup> The British Columbian, May 12, 1964.

<sup>17</sup> The Vancouver Province, August 26, 1965.

In either case, plans were announced for a rapid expansion of the fleet by construction, a total of 17 ships being planned by 1963. At this time the federal government was operating a shipbuilding subsidy programme (intended to eliminate the differential between domestic and foreign prices). The level of the subsidy was up to 40% of cost depending on Canadian content. When Premier Bennett was asked how long the government fleet would continue to expand he replied that it would expand as long as Ottawa provided shipbuilding subsidies (purchase and construction of ships and facilities were financed by bond issues of the B.C. Toll Highways and Bridges Authority).<sup>18</sup> It appeared axiomatic that the province needed additional fleet capacity. The implication was that the federal subsidy was an opportunity not to be missed. Premier Bennett said:<sup>19</sup>

"Why shouldn't we build more ferries? It's a good deal to get these ships at these prices."

#### Growth from 1966

In 1966, the available federal shipbuilding subsidy was cut to 25% and would eventually fall to 17%.<sup>20</sup> In addition,

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<sup>18</sup>The Vancouver Sun, January 19, 1962.

<sup>19</sup>Ibid.

<sup>20</sup>The Vancouver Sun, November 1, 1966.

the price of new vessels was rising in reflection of increasing material and labour costs. The federal government imposed full duty on foreign materials and equipment for shipbuilding.<sup>21</sup> In consequence the price which the provincial government would have to pay for newly built vessels became prohibitive. Between 1964 and 1966, tenders for essentially identical vessels differed by 33%;<sup>22</sup> the price increase to the provincial government was even more substantial in light of the falling federal shipbuilding subsidy. Since the construction of the last new vessel in 1966 no new vessels have been added to the fleet, nor are there any known plans for construction at the time of writing (Summer, 1973).

Other methods of expansion were sought. The bridge alternative to ferry transportation has been considered in recent times. In 1967, Tamco Engineering Ltd. was hired to do a feasibility study of an ambitious scheme to connect many of the Gulf Islands by a system of floating bridges which would permit a shorter crosswater ferry route from Galiano Island to Tsawwassen or Steveston. The estimated cost was \$90M and it was estimated that the ferry service would continue without addition of further vessels until 1985. An alternative purchase

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<sup>21</sup>The Vancouver Province, December 1, 1966.

<sup>22</sup>Ibid.

of a dozen new vessels for rapid expansion of the fleet would cost an estimated \$65M.<sup>23</sup>

Neither plan was taken up and other methods of increasing the system's capacity were adopted. Head-level ramps were installed on the car decks of some vessels adding 15% to the vehicle space. This alteration cost approximately \$0.7M per vessel in the period 1969-72 compared with an initial construction cost of \$3.5M (unsubsidised) in the early sixties. Used vessels were purchased from Eastern Canada.<sup>24,25</sup> A major structural change in vessels, called "stretching" or "Jumboizing", was tried in 1969 and has been reported to be highly successful from an engineering point of view.<sup>26</sup> This involves increasing the ship's capacity by some 40% by the insertion of a midships section at a cost of approximately \$2.5M per vessel at early 1970s prices.

A bridge proposal similar to that of Tamco was approved in March, 1973. The plan is to connect another Gulf Island, Gabriola with a bridge to Vancouver Island near Nanaimo. A new ferry terminal is to be built on Gabriola and another on

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<sup>23</sup>The Vancouver Province, September 4, 1971

<sup>24</sup>The Vancouver Sun, May 11, 1967.

<sup>25</sup>The Vancouver Province, September 14, 1971.

<sup>26</sup>The Vancouver Province, July 27, 1971.

the mainland at Steveston or Iona Island. This would utilise the shortest cross-water route between the lower mainland and the lower part of Vancouver Island. Published estimates indicate that the capital cost of the new construction (at \$40M) is justifiable by virtue of savings in fleet expansion which would otherwise be necessary.<sup>27</sup>

#### Effects on private investment

The Provincial Government's presence in the ferry business was cited as the reason for the cancellation of private investment in ferry services. In the summer of 1962, Coast Ferries Ltd. (a small private company) abandoned plans to build a Comox-Powell River ferry, even though a test run had indicated that such a service was a commercial proposition. Captain O.H. New said that the scheme was withdrawn after he had failed to obtain a firm commitment from the Government promising not to expropriate the ferry service if it started making money.<sup>28, 29</sup>

In March, 1964, it was announced that two companies had cancelled plans for new ships because of the government's proposed ferry between Vancouver Island and Prince Rupert.

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<sup>27</sup>The Vancouver Sun, March 21, 1973.

<sup>28</sup>Comox District Free Press, October 31, 1962.

<sup>29</sup>Nanaimo Daily Press, November 9, 1962.

Northland Navigation scrapped plans for a new ship to be used between Vancouver and Prince Rupert for which it was preparing to call tenders. Captain J.C. Terry was reported as saying

"If the government is going into the ferry business, we can't compete."

In addition, Alaska Cruise lines was reported to have cancelled a shipbuilding contract for a new northern ship.<sup>30</sup> The implication that government presence was discouraging private investment is discussed in a subsequent section.

#### Freight traffic and C.P.R.

The summer peak of tourist demand began to exceed capacity in 1966. Premier Bennett announced that in the following summer (1967) drop trailers would be severely restricted on government ferries to make space for more cars. This restriction has continued in every summer to the present. Finally, as of May 15, 1973, drop trailers were totally banned on the major Island-mainland routes. Live (i.e. with driver) trucks were still accommodated with no restriction except that commercial vehicles could not occupy more than 30% vehicle deck space for a sailing at full capacity. An examination of traffic data

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<sup>30</sup>The Victoria Daily Colonist, March 21, 1966.

reveals that growth of commercial traffic over the years parallels that of total traffic, roughly the same proportion of trucks to total traffic being maintained (see section 4:3).

In 1967 it became clear that the C.P.R. services were to be an important supplement to government services. C.P.R. began to take the drop trailers which the government service could no longer accommodate. Truck traffic was increasingly directed towards the C.P.R. with the consent, approval and even encouragement of the government authorities.<sup>31</sup> An agreement was made between Johnston Terminals Ltd. (a major provincial trucking company) and the C.P.R., the terms of which have not been published, which encouraged the C.P.R. to add a freight barge to its services.<sup>32</sup>

C.P.R.'s freight services were significantly expanded in the spring of 1973 with the addition of the 70-vehicle Carrier Princess to the B.C.C.S. fleet. Bids had been called from B.C. shipyards in January, 1972<sup>33</sup> for a new vessel which was launched in February, 1973<sup>34, 35</sup> C.P.R. intends to use the vessel principally for freight vehicle transportation, though

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<sup>31</sup>Personal interviews with Mr. Ken Stratford and Mr. Richard Halliburton, Traffic Department, B.C. Ferries.

<sup>32</sup>Personal interview with Mr. Irvin Froese, V.P. Transportation Services, Johnston Terminals Ltd.

<sup>33</sup>The Vancouver Sun, January 15, 1972

<sup>34</sup>Christened (perhaps significantly) by the wife of the Minister of Highways, the minister then responsible for B.C. Ferries.

<sup>35</sup>The Victoria Daily Colonist, February 21, 1973.



private automobiles and passengers are to be accommodated on available space.<sup>36,37</sup> The route and scheduling (between downtown Vancouver and Swartz Bay around the clock, three return trips per day) recall the overnight steamship services of the C.P.R. which were abandoned in 1959. The operation of the Carrier Princess is the first overnight service for non-commercial traffic between Island and Mainland since that date.

#### Plans for Night Ferries

It appears that the Provincial Government has experienced some difficulty in instituting a late-night service of government vessels although the provision of such a service has been the stated policy of past and present administrations. In May, 1972 the greater Victoria Chamber of Commerce completed an investigation into the need to establish a late-night ferry and prepared a brief to the Government. Premier Bennett announced that a trial late ferry service would be implemented.<sup>38</sup> However a provincial election intervened in August, 1972. The new government announced that a trial operation of night ferries would be undertaken in the Spring of 1973. The experiment did not materialise, the stated reason being a lack of manpower at the second-officer level.<sup>39</sup> Lack of union

<sup>36</sup>Personal interview, with Mr. Ron K. Gamey, Manager, Analysis and Planning, Canadian Pacific Rail Ltd., Vancouver.

<sup>37</sup>The Victoria Times, March 16, 1973.

<sup>38</sup>The Victorian, March 28, 1973.

<sup>39</sup>The Vancouver Sun, January 31, 1973.

cooperation has also been mentioned.<sup>40</sup> The Greater Victoria Chamber of Commerce has stated that the night run of the C.P.R.'s Carrier Princess was not what they had in mind for a late night service;<sup>41</sup> the crossing takes three hours, starting at 1:30 a.m. from Vancouver, with no sleeping accommodation. At the time of writing it is not clear whether or not the night service will be instituted by B.C. Ferries and whether or not it will accommodate commercial vehicles. This is significant because night freight operations are presently the exclusive domain of private carriers.

### 3.2.3 Observations on past developments

This section contains observations on the developments described in the past two sections. The intention is to highlight trends and important issues relevant to this thesis.

#### History of private operation

Private ferry operations served the needs of the province and the State of Washington until the middle of the twentieth century. This is in contrast to the relatively early intervention of governments in the rail and highway modes.

<sup>40</sup> Personal Interview with Mr. K. Stratford.

<sup>41</sup> The Victoria Times, March 24, 1973

One of the reasons for this may be the flexibility of marine operations which lends itself to private ownership. In particular it may reflect the recoverability of capital costs (by sale or other transference of vessels) in times of falling demand.

### Common ailments

There are certain common ailments which have afflicted ferry operations down the years. All services must wrestle with the conflicting demands of rising costs (both in labour and equipment) and the demands of the public or their elected representatives for better service at low prices. These problems are not unique to ferry operations.

### Renewals

A particularly common problem faced by ferry operators is the lack of economical fleet replacements. As vessels become dilapidated or obsolete, the acquisition of newer ships results in severe financial strains (the vessel input into a ferry service is a "lumpy" or indivisible one).

Past developments provide the evidence for this. Black Ball dominated the Washington State system when its competitors had not the financial resources to invest in vessels appropriate to the automobile age. The demise of Union Steamships has been attributed to the lack of economical fleet

replacements. The C.P.R.'s decision not to commit itself to the ferry business (at about the time of government entry) was made at the critical time when heavy new investment would have been necessary to replace ageing vessels.

There are several possible explanations of the problem. One explanation is that the price for service has been set too low to cover the cost of renewals (i.e. revenues have not covered depreciation expense or have covered historic cost depreciation but not replacement value). In British Columbia Ferries there is no provision for depreciation in the accounting system; capital indebtedness of \$40M was written off by the government in 1967. The implication that renewals are not being provided for through pricing in B.C. Ferries is discussed in the section on financial data.

#### Political and economic importance of services

Ferry services are vital to the economy and are politically delicate. Government bodies have shown themselves to be sensitive to the disruption of ferry services (the immediate cause of which is usually strike action by labour). This sensitivity has shown itself in the sudden changes in the status of ferry services which have occurred during these troubles. The State of Washington took over Black Ball (The Puget Sound Navigation Company) after the disruption of 1951; the government of British Columbia entered the ferry business

catalysed by the labour troubles of the private operators in 1958; in 1968, labour strife in the B.C. Ferries appears to have played some part in the change of status from Crown Corporation to Division of the Department of Highways.

#### Administration of ferries

In the past the administration of ferry services has been given to a body primarily concerned with the rail and highway modes. This was an administrative convenience arising from (a) the relatively small system investment of ferries compared with highways and railways so that ferries became appended to these other modes, and (b) advantages of intermodal coordination afforded by a unified administration. However, the merging of control occurred despite distinct differences in operating and cost characteristics.

In the future this trend may be reversed. B.C. boasts the largest ferry system of its kind in the world. It is of increasing significance relative to the highway system (data in 4:4:1 shows that gross provincial spending on ferries is increasing as a proportion of highway expenditure). The ferry system will cease to be an appendix to the highway system and will be regarded more as an equal transportation partner. The planning and budgeting functions will be separated from those of highways at a higher administrative level than previously.<sup>42</sup>

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<sup>42</sup>This change has already begun. A May, 1973 cabinet reshuffle in B.C. removed ferry responsibility from the Department of Highways and gave it to a newly created Department of Transport and Communications.

### Government ferry policy

It is difficult to extract any concise statement of government policy in the operation of B.C. Ferries from past developments. The implied position is that Island-mainland transportation should be provided at low prices (the overall level of rates has not changed since the inception of the service) and that capacity should be provided for whatever demand materialises.

There is little evidence that long term planning has played a role in shaping the ferry system which exists today. The service to be supplied in a given year was based on a projection of demand from the previous year. The recognition of long-term effects in ferry services (e.g. that better services in the short term result in heavier demand in the long term) is not apparent. It is hard to reconcile the early promotion of summer tourism followed by the limitation of commercial traffic. One possible interpretation is that federal shipbuilding subsidies contributed to overinvestment and excess capacity which was conveniently utilised by encouraging tourism. This situation might not have arisen if policy objectives had been clearly defined.

### Public/private competition

Government ferry services can have a significant effect on the profitability and the very existence of private

services. In the early sixties, when government operations were undergoing rapid growth, there is evidence that private investment in facilities was discouraged by the government's presence. Private operators stated that this was the reason for withdrawal. The opposite effect can occur, as witnessed by the purchase of a new vessel by C.P.R. to serve a market which, in a sense, it has been given by the government. It cannot be assessed how many private operators would have come forward in the absence of the government. Whether the loss of private investment amounts to a real cost of government entry depends on several factors, notably whether the private resources were as profitably employed elsewhere as they would have been in a private ferry service. If expertise is counted as a resource, it seems doubtful that all of it is transferrable to other investments.

#### Role of Canadian Pacific Rail

The role of the C.P.R. is one of increasing importance in the ferry system of B.C. A convincing interpretation of the C.P.R.'s strategy down the years is provided from the following newspaper editorial, entitled "C.P.R. comes to rescue?": <sup>43</sup>

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<sup>43</sup>The Kelowna Courier, March 31, 1973

"It's ironic that the C.P.R. is going to provide a late-night ferry service that the government is so reluctant to put into operation. This is the company that seemed unable to keep up with the times which moved the Social Credit administration of the day into entering business with the B.C. Ferry Authority.

The C.P.R.'s B.C. Coast Steamship Service wasn't coping with the needs in the operation of its handsome fleet of "princess" ships carrying passengers and cars between Vancouver, Victoria and Seattle. For one thing, the ships were overly elaborate with insufficient capacity, and facilities on board and ashore were lacking in the handling of increasing traffic - particularly between Vancouver Island and the mainland. For another, the small ocean-liner-type "princesses" were costly to build as well as to maintain and operate. But no moves were made towards less expensive vessels and shorter routes.

It was almost as though the company was determined to get out of the passenger service and concentrate on what is probably the more lucrative freight business. And this is what it was able to do with the then premier, W.A.C. Bennett, starting a government service . . . which the N.D.P. has inherited."

### Summary of Chapter 3

This chapter reviewed the background to present ferry operations in British Columbia. First the chapter discussed some general characteristics of ferries and then presented an historical account of operations in the province.

Certain general themes emerged from the review. Two of these should be highlighted for future reference in the analysis of policies. One is the political and economic importance of continuous ferry services and the resulting pressure for government control. This is shown both by the



constitutional significance of ferries and by the rapid action of the authorities when ferry services were threatened. The other is the potential severity of the effects of government competition on private enterprise. The additional risk faced by private enterprise accounts for some observed inhibition of investment in the past. These two issues will recur when specific policies are analysed.

CHAPTER 4

A CURRENT PICTURE OF FERRY OPERATIONS IN BRITISH COLUMBIA

#### 4.1 Introduction and data limitations

This chapter presents detailed contemporary operating and financial data about B.C. Ferries and privately operated ferries. The data is analysed in a form suitable for the examination of present policies and the alternatives in the following chapter.

The following general limitations arose in obtaining and utilising raw data (most of which is from unpublished sources).

##### Non-continuous data

A change in the method of data collection by the government ferry operators in 1971 rendered the sets of data on each side of that date incompatible. This change was concomittant with a shift to charging commercial vehicles by length rather than by weight. An experienced ticket agent was consulted to help reconcile the data.<sup>1</sup>

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<sup>1</sup>Data contained in the Annual Reports of the Minister of Highways classed each vehicle as (a) automobile, truck, mobile home/camper, or bus. Data contained in Half Monthly loading statistics (post-November 1971) classed vehicles as (b) passenger autos, trucks, motorcycles/drop trailers, tow trailers, buses, over 6'6" (panel trucks, campers or mobile homes), or under 6'6". The classification of trucks in (a) included some smaller non-commercial freight vehicles (e.g. panel trucks). Consequently almost twice as many vehicles were classed as trucks in (a) as in (b). In the following material, each reference to trucks is indicated as referring to (a) the pre-November 1971 classification or (b) the post-November 1971 classification.

### Aggregated data

The problem of separating aggregated classifications of data was encountered. One particular difficulty arose from the practice of accumulating traffic data by a count of cash register entries, coded by traffic type, at the ferry terminal. In this case two categories of traffic (motorcycles and drop trailers) received the same code and became indistinguishable. This difficulty was resolved again by referring to the judgment of an experienced ticket agent.

### Limited government financial data

Only limited access to financial data was granted by the Minister of Highways. Financial information was restricted to cost and revenue data by ferry route, broken down into vessel and terminal costs over a three year period. The Minister was unable to disclose the details of costs included in each category on the grounds that detailed examination of day-to-day operating costs is a costly and time consuming process which should be reserved for the auditors of the Legislature.<sup>2</sup>

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<sup>2</sup>Personal communication with the Minister of Highways, the Rt. Hon. Robert M. Strachan, dated May 14, 1973.

Limited private ferry data

The unwillingness of private operators to divulge data in a way which may not be in their interest was cited in the first chapter. In particular, the principal private ferry operator, C.P.R., was unwilling to release traffic and financial data which were not already public knowledge. This situation is accepted because it would probably be faced by any transportation economist advising the Provincial Government on ferry matters.

## 4.2 Characteristics of traffic

### 4.2.1 The routes of interest

#### Relation to government system

Government ferry routes 1 and 2 are of approximately equal size. Together they account for two-thirds of the traffic carried by the entire government system of a dozen routes. There are other direct government ferry connections between Vancouver Island and the Mainland but Routes 1 and 2 carry by far the major proportion (about 97%) of the government-carried traffic. Exhibit 3 illustrates their importance both in terms of total and commercial traffic carried. In the following material, routes 1 and 2 are aggregated. This is done without significant loss of detail because of their similarity. Other government routes are ignored. This is justified by the predominance of routes 1 and 2 in the government system and because other routes serve smaller and separate transportation markets.

#### Relation to private carriers

The public carrier is dominant in the ferry system. This is illustrated by Exhibit 4 which shows the capacity of the major carriers of highway vehicles in the Summer of 1973. The measure used for comparison of the carriers is called the daily lift-off capacity.<sup>3</sup> This is a measure of the maximum

<sup>3</sup>The lift-off capacity on a route is calculated as follows:  
Daily lift-off capacity in autos/day=(number of vessels on route)x(average vessel deck capacity in passenger auto spaces)  
x(number of round trips per vessel per day)x(2 sailings per

## B.C. GOVERNMENT FERRIES - ROUTES OF INTEREST

Thousands of Vehicles Carried in  
F. Y. ending March 31, 1972.

			All Vehicle Types		Trucks <sup>2</sup> Only	
Direct	Routes <sup>1</sup> of Interest Comox - Powell River Kelsey Bay - P. Rupert	Route 1	942	36%	98	27%
Vancouver		Route 2	702	27%	105	28%
Island						
Mainland						
Govt.			45	2%	7	2%
Ferry						
Routes			11	-	.4	-
Other govt.		Saltwater routes	897	35%	159	43%
TOTALS <sup>3</sup>			2597	100%	369	100%

NOTES:

1. Route 1 is Tsawwassen-Swartz Bay (for Victoria); Route 2 is Horseshoe Bay - Departure Bay (Nanaimo).
2. Categorisation of trucks as for pre-November 1971; includes some non-commercial heavy or large vehicles, excluding mobile homes.
3. Figures may not add due to rounding.
4. Percentages less than 1% denoted by " - ".

Source: Province of B. C., Annual Report of Minister of Highways for the Fiscal Year Ending March 31, 1972.

# EXHIBIT 4 -83- PUBLIC VS. PRIVATE FERRY CAPACITY

between lower Vancouver Island and the Mainland

(highway vehicles only)

Summer 1973

Carrier and Route	Traffic Type	Scheduled daily liftoff capacity	
		Automobiles/day <sup>1</sup>	%
<u>GOVERNMENT FERRIES</u>			
Route 1	All Vehicles	6500	
Route 2	All Vehicles	<u>5500</u>	
Subtotal		12,000	81%
<u>CANADIAN PACIFIC B.C.C.S.</u>			
Vancouver - Victoria (barge)	Commercial	400	
do. (new vessel)	All Vehicle <sup>2</sup>	1000	
Vancouver - Nanaimo (barge)	Commercial	200	
do.	All Vehicles	<u>1000</u>	
Subtotal		2,600	17.5%
<u>TILBURY ISLAND TERMINALS LTD.</u>			
Tilbury Island - Vancouver Is.	Commercial	200	1.5%
TOTAL		<u>14,800</u>	<u>100%</u>

## NOTES:

1. All capacities expressed in automobiles, as a common unit. For vessels carrying only commercial vehicles, capacity was calculated using 1 commercial vehicle = 3 automobiles.

2. Commercial preferred.

Sources: Vessel capacities, schedules and traffic types obtained from personal interviews with Mr. R. Halliburton, B. C. Ferries; Mr. J. Yates, B.C.C.S.; Mr. S. Prokop, T.I.T.L.



number of vehicles which can be transported over a given route in one day using the assigned vessels operating on schedule. Both directions of the route are counted. The government fleet on Routes 1 and 2 has more than four times the lift-off capacity of B.C.C.S. (after the inauguration of the Carrier Princess service which increased B.C.C.S.'s lift-off capacity by some 60%). The recent entrant into the market, T.I.T.L., is dwarfed by both the former carriers.

Note that the lift-off capacity does not reflect differences in the traffic composition, peaking and utilisation of each service. Compositional differences might be expected from the fact that government ferry operators have been discouraging commercial traffic since 1967 in the summer season (whereas B.C.C.S. and T.I.T.L. are currently actively soliciting in this market). Precise factual information about the split of commercial traffic between the carriers is not easily obtained in view of the reluctance of B.C.C.S. to disclose traffic data. It is possible to make educated guesses with the aid of the opinions of those in the industry and of the limited amount of hard data available. The commercial vehicle split in Exhibit 5 should be interpreted with this in mind. B.C.C.S. makes a substantial contribution to the transportation of commercial vehicles (particularly drop trailers). B.C.C.S. services are a useful, and even essential, supplement to government services (especially in view of data below showing

## COMMERCIAL VEHICLE SPLIT BETWEEN CARRIERS

on lower Vancouver Island-mainland routes

Carrier	Vehicle Type	Estimated Average Daily Commercial Units Carried in Spring, 1973		
B.C. Ferries Routes 1 & 2 <sup>1</sup>	live trucks	220	224	48%
	drops	4		
Canadian Pacific B.C.C.S.	live trucks	50 <sup>2</sup>	230	49%
	drops	180 <sup>3</sup>		
T.I.T.L.	drops		15 <sup>4</sup>	3%

Total Number of units transported per day	469	100%
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**NOTES:**

1. Post-November 1971 classification of trucks.
2. Obtained by taking 5% of capacity assuming similarity of B.C. Ferries Traffic composition.
3. Assessed from discussions with Mr. S. Prokop, T.I.T.L., and from a physical survey taken by E.H.Rimes (see below)
4. May be subject to fluctuation since this represents the initial market capture of T.I.T.L.

### Sources:

1. Personal interviews with Mr. S. Prokop, General Manager, T.I.T.L.
2. Rimes, Edward H., An Examination of Transportation Trends on Vancouver Is. Graduating essay for B. Comm., University of B.C., 1972. Unpublished.

that peak period government operations are at full capacity).

#### 4:2:2 Characteristics of commercial vehicles

Commercial vehicle demand for Island-Mainland transit falls into two distinct categories: live trucks and drop trailers. Live trucks are those which are accompanied by a driver on the ferry. They commonly carry perishables and livestock but also the full range of freight goods including bulk products. The demand comprises many separate truckers, both private and common carriers. Many use the ferry services only a few times per week. The regular and frequent service of the government ferries is attractive to this traffic; the daytime availability and relatively short duration of sailing minimise the driver's idle time. B.C. Ferries guarantee commercial vehicle space provided that (a) the vehicle is in the loading area 30 minutes before sailing time and (b) commercial vehicles do not occupy more than one third of the deck space on a full capacity sailing. This regulation is regarded as a concession to truckers under present traffic conditions but at peak periods congestion delays and uncertainties can be a significant cost to the truckers. In contrast B.C.C.S. operates a reservation system for all vehicles so that a space is guaranteed but for live trucks the service is somewhat infrequent and not always punctual. Only two daytime sailings are available aboard the Princess of Vancouver (the figure is

doubling with the introduction of the new vessel). Night ferrying of live trucks is rare by virtue of high wage costs. A further disadvantage of B.C.C.S. for live trucks is the relatively long voyage times. B.C.C.S. routes are longer and are served by slower vessels than those of the government.

Drop trailers are commercial units which are detachable from the tractor unit. The time consuming process of loading these trailers onto a vessel has led to severe restriction on the government's fast loading fleet. Turn-around for the government's roll-on roll-off vessels is 20-25 minutes. In this time some 200 vehicles are removed and replaced by 200 others (i.e. one vehicle is transferred every 3 seconds). When drop trailers are carried a unit can be loaded in a period of only 1 or 2 minutes; this is because of the logistical problem of hitching, unhitching and removing the tractor from the vessel. Tractor utilisation is improved if trailers are dropped at a temporary storage point at the trucker's leisure to await a sailing. One tractor is then used to load all waiting trailers. The lack of storage space near B.C. Ferries Terminals destroys much of the advantage inherent in the concept of drop trailers (even in the absence of restrictive regulations). Both the private operators provide a storage area close to the terminal to accommodate trailers before and after sailing. It is common practice to drop the

trailers during the day for night ferrying. This enables the trucker to provide his customer with next-day delivery.

The result is that private carriers specialise in the transportation of drop trailers and the government carrier in live trucks. It is not true to say that there is fierce competition for the transportation of live trucks (or indeed non-commercial vehicles) between public and private enterprise. The reason for the carrier specialisations lies in the interplay of historical accident and the divergent characteristics and requirements of traffic types.

#### 4:2:3 Traffic composition and peaking

The composition of traffic carried by B.C. government ferries may be examined in different ways; Exhibit 6 shows that the principal component of traffic averaged over the year is the passenger automobile followed by the truck (as defined pre-November 1971). Mobile homes and trailers are next in rank followed by buses (charter and scheduled aggregated). Passenger traffic (including drivers), vehicle passengers and walk-on ferry passengers averaged 2.8 persons per vehicle carried (for fiscal 1972 on Routes 1 and 2). Vessel capacity is designed to accommodate 6 passengers for each vehicle so that, invariably, vehicle deck space is full before passenger accommodation is saturated.

## B.C. GOVERNMENT FERRIES - TRAFFIC COMPOSITION

Routes 1 and 2 combined

	Thousands of vehicles carried in F. Y. ending March 31, 1972 <sup>2</sup>	
Passenger Automobiles	1294	79%
Trucks <sup>1</sup>	203	12%
Mobile Homes and Trailers	119	7%
Buses	<u>28</u>	<u>2%</u>
TOTAL	1644	100%

NOTES:

1. Pre-November 1971 classification of vehicles, includes some non-commercial vehicles in truck category.
2. It should be noted that the percentage figures are averages over the seasons and conceal differences in peaking in the traffic categories.

Source: Province of B. C., Annual Report of Minister of Highways for the fiscal year ending March 31, 1972.

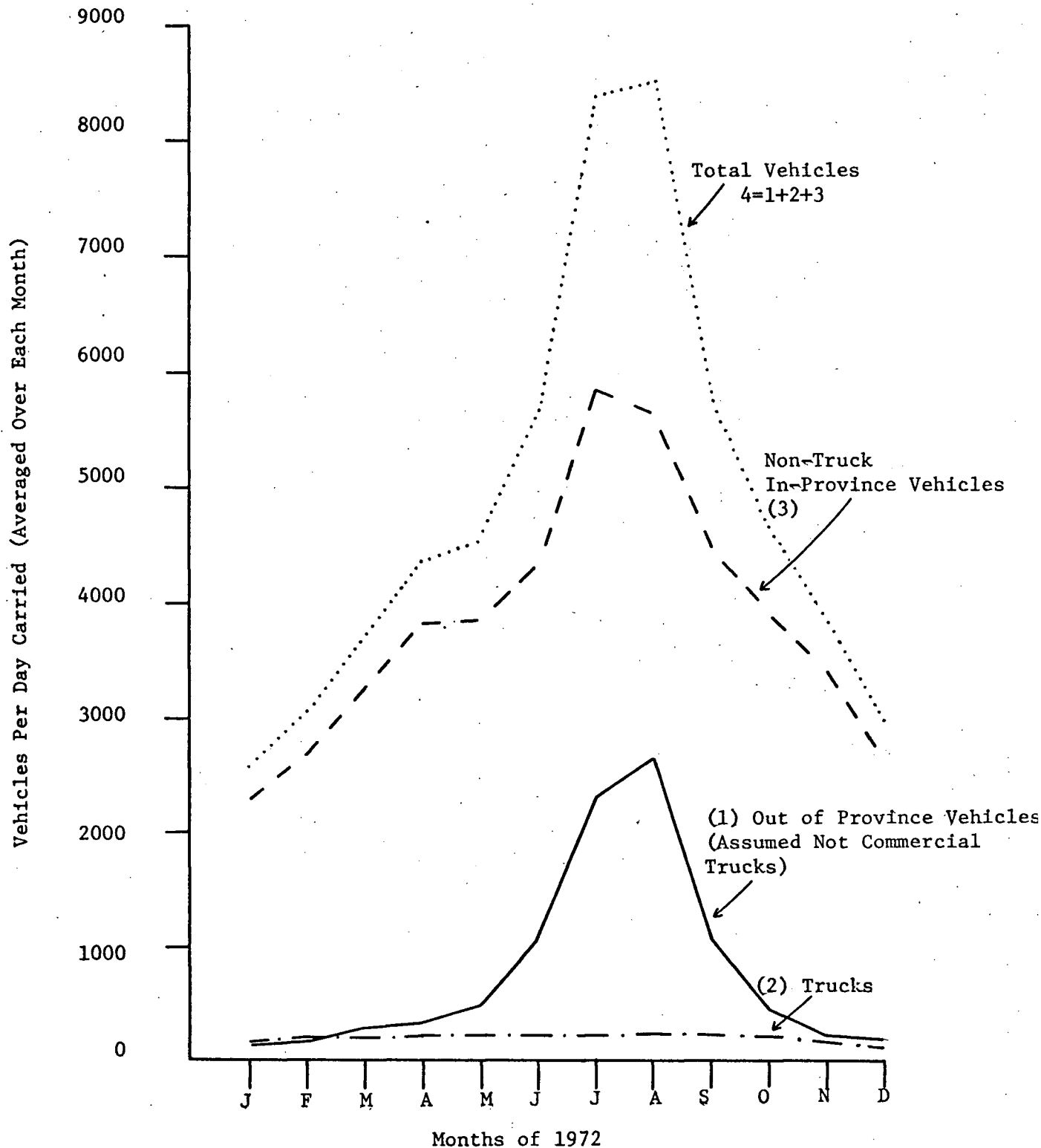
Annual average traffic composition figures conceal a divergence in the seasonal peaking characteristics of the components. By dividing the traffic into (1) out-of-province vehicles, (2) trucks, (3) other vehicles (i.e. in-province, non-truck) the contrast in the peaking properties becomes apparent.<sup>4</sup> Exhibit 7 presents daily demand served by traffic type by month in absolute numbers of vehicles. Exhibit 8 and 9 are derived from the same data. Exhibit 8 shows the relative peaking of traffic types by normalising the peaks of Exhibit 7 to a constant area of 100%. Note that out-of-province traffic displays the sharpest peak (attributable to heavy summer tourist traffic together with a small normally resident population of extra-provincially registered vehicles). Truck traffic is notably the most uniform across the seasons whereas other vehicles from within the province show intermediate peaking. This latter category is an aggregation of regular non-seasonal ferry users (commuters and Island residents) with a more sharply peaked provincial tourist component. Exhibit 9 shows the changing traffic composition by month.

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<sup>4</sup>This assumes a negligible number of trucks were out-of-province (determined by licence plate): justified by (i) increasing use of Vancouver as a transshipment point (see 4:3:2) and (ii) the economical trucking radius of up to 400 miles falling inside the province for Canadian traffic. Purdy, H.L. Transportation and Public Policy in Canada Faculty of Commerce and Business Administration, University of B.C., Vancouver. 1971.

# EXHIBIT 7 -91- SEASONALITY OF TRAFFIC BY TYPE<sup>1</sup>

Routes 1 and 2



## NOTES:

1. Post-November 1971 Classification of Traffic Types

Source: Half monthly loading data, Tsawwassen and Horseshoe Bay Terminals, 1972.

Out of Province Motor Vehicle Loadings, 1972.

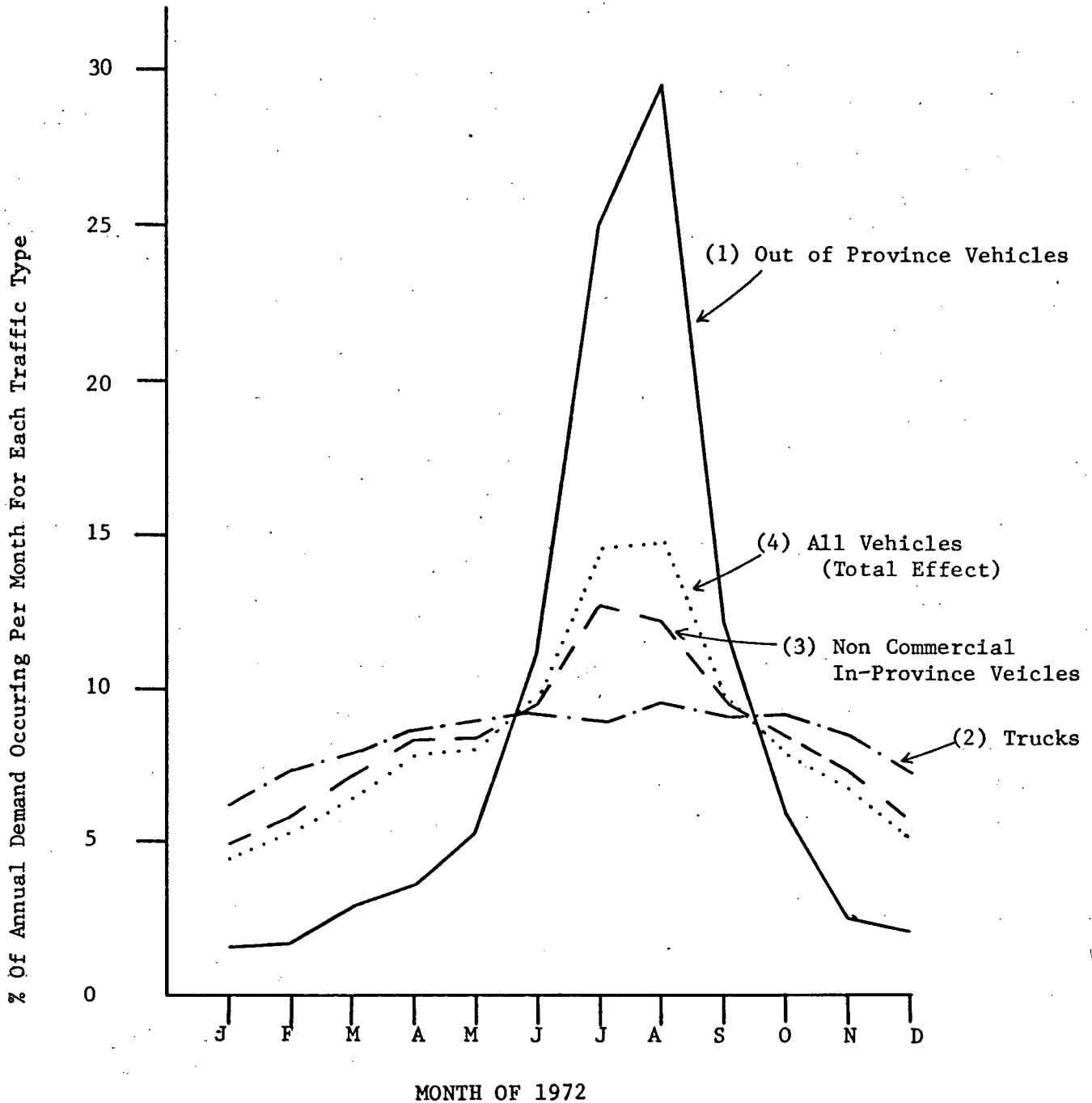
Traffic Department, B. C. Ferries



RELATIVE SEASONAL PEAKING BY TRAFFIC TYPE<sup>1</sup>

(Normalized Demand Curves to Area Beneath=100%)

Routes 1 &amp; 2 Combined



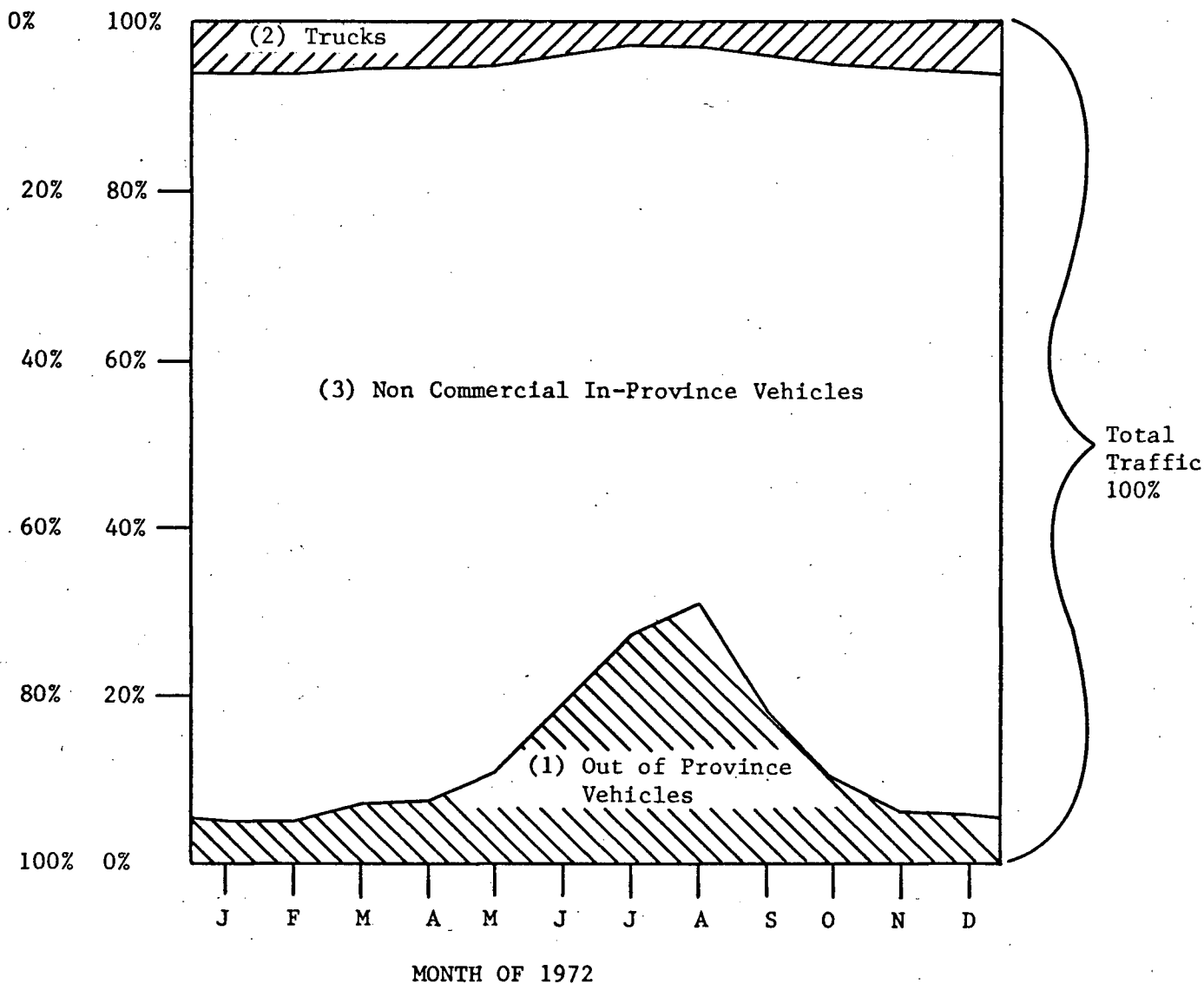
Note: Post - November 1971 Classification of Traffic Types.

Sources:

1. Half Monthly Loading Data 1972 and
2. Out of Province Loadings 1972, B.C. Ferries Traffic Dept.

# EXHIBIT 9 -93- SEASONAL TRAFFIC COMPOSITION

ROUTES 1 & 2 COMBINED



## NOTE:

1. Percentage calculated on vehicles numbers, not on space occupied.
2. Post-November 1971 Classification of Trucks.

Source: Half-monthly Loading Data, Out of Province Loadings, 1972.  
B. C. Ferries Traffic Department.

The summer depression in truck traffic derives from the peaking of the other two components and not from any absolute reduction in truckers' demand. At the height of summer more than 30% of all vehicles are out-of-province.

#### 4:2:4 Capacity utilisation

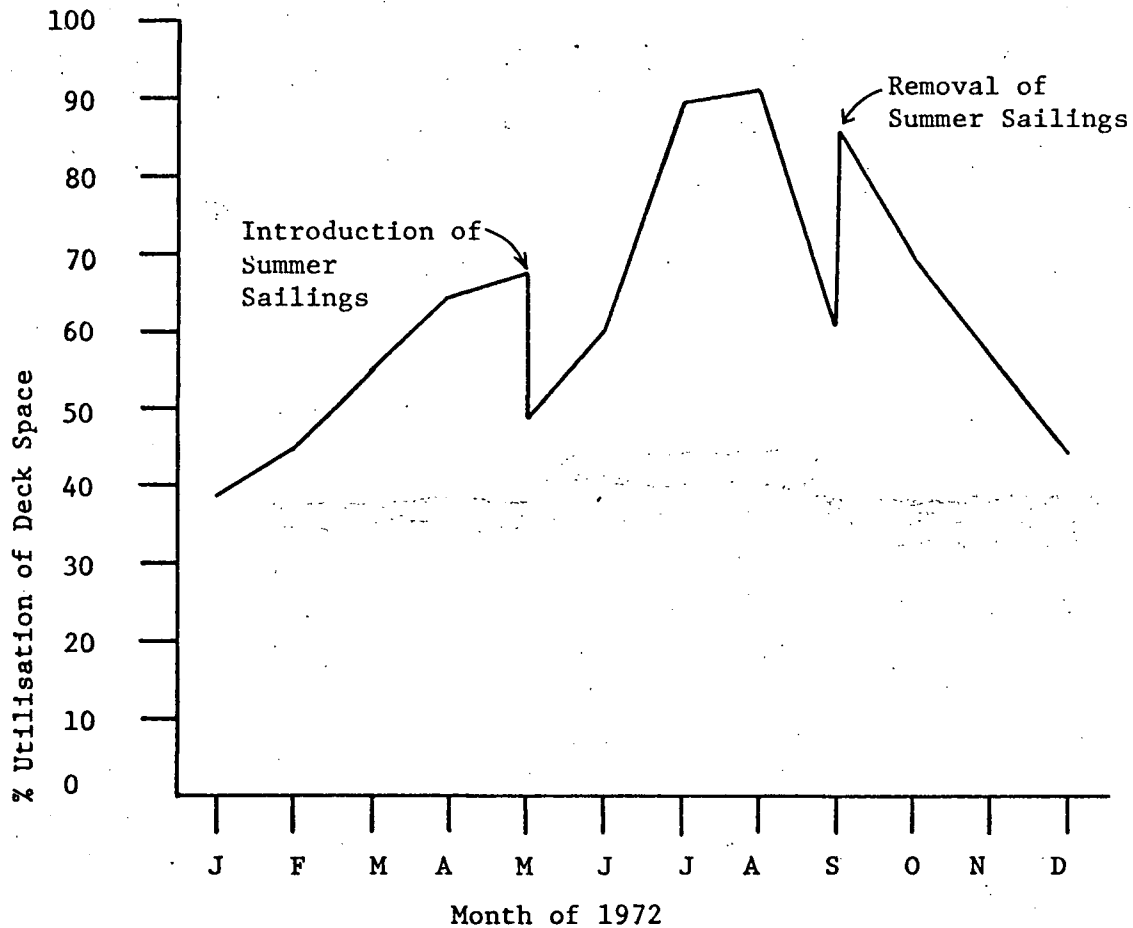
Exhibit 10 displays the utilisation of (scheduled) vehicle deck space by month.<sup>5</sup> Sharp discontinuities in May and September arise from the changes between the winter and more frequent summer sailing schedules. Utilisation of vessel space is 90% in the peak months of July and August. This figure falls to 40% in the off-season. It is important to note that the graph shows utilisation averaged across all sailings in an entire month and does not reflect the utilisation on particularly heavy or light sailing in each month or the frequency of such deviations from the average. Capacity is 100% utilised on summer holiday weekends when lineups of several hours are common. Usually additional unscheduled late runs are operated to clear the day's backlog.

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<sup>5</sup>For space utilisation calculation, equivalents were used; 1 passenger auto = 1.0 spaces, 1 mobile home/camper trailer = 1.5 spaces, 1 bus/truck = 3 spaces. An overall numbers-to-spaces conversion factor was obtained by weighting equivalents by numerical importance of traffic types. The value of 1.19 spaces per vehicle varied less than 1% over 4 years with no trend. The factor is insensitive to compositional changes due to the ballast effort of 80% passenger autos in weighting. The simple conversion factor is adequate for the purposes at hand.

## B.C. GOVERNMENT FERRIES - CAPACITY UTILIZATION

Routes 1 and 2

NOTES:

1. Utilised space calculated using vehicle numbers to spaces conversion factor of 1.2.
2. Available space calculated using scheduled sailings only and excluding additional late runs operated to remove backlogs.

Source: Half monthly vehicles loading data 1972, B. C. Ferries,  
Traffic Dept.  
Personal interviews with Mr. R. Halliburton

#### 4.3 Identification and projection of traffic trends

##### 4.3.1 Growth in B.C. Ferries traffic

Overall growth in B.C. Ferries traffic averaged 11.3% over the past four years. Growth was not uniform across components (see Exhibit 11). Mobile home and camper traffic increased at a phenomenal 30% p.a. Since this fast growing component is highly seasonal, total traffic will in future show a slightly sharper peaking.<sup>6</sup> Truck traffic growth parallels that of all traffic. The uniformity of annual increases across the years is shown by Exhibit 12. Again, mobile homes are of increasing importance relative to other components (note the ratio scale which shows steady annual percentage growth as linear).

A simple projection of traffic can be made under the assumption of exponential growth (i.e. an assumption of constant annual percentage growth). Exhibit 13 illustrates the method.<sup>7</sup> Projected demand versus projected capacity is

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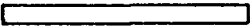


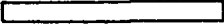
<sup>6</sup>Though peak shape will change through the growth of highly seasonal leisure traffic, this is ignored here. Taking the extreme assumption that all mobile home traffic occurs in summer, the minimum to maximum ratio of the total traffic peak will decline from 30% by less than 2% p.a.

<sup>7</sup>The linearity of historical points on Exhibit 13 is a measure of the validity of the exponential growth assumption. This "eyeballing" approach is quite sufficient for the purposes here, though the data could have supported a more sophisticated analysis.

## B.C. GOVERNMENT FERRIES-TRAFFIC GROWTH

## Routes 1 and 2

Average annual traffic component growth rates over the four fiscal years ending 1969 - 72.

Component <sup>1</sup>	Annual % Growth Rate	
Automobiles	10.3	
Trucks	12.6	
Mobile Homes/ Camper Trailers	30.0	
Buses	2.3	
All traffic (net effect)	11.3	

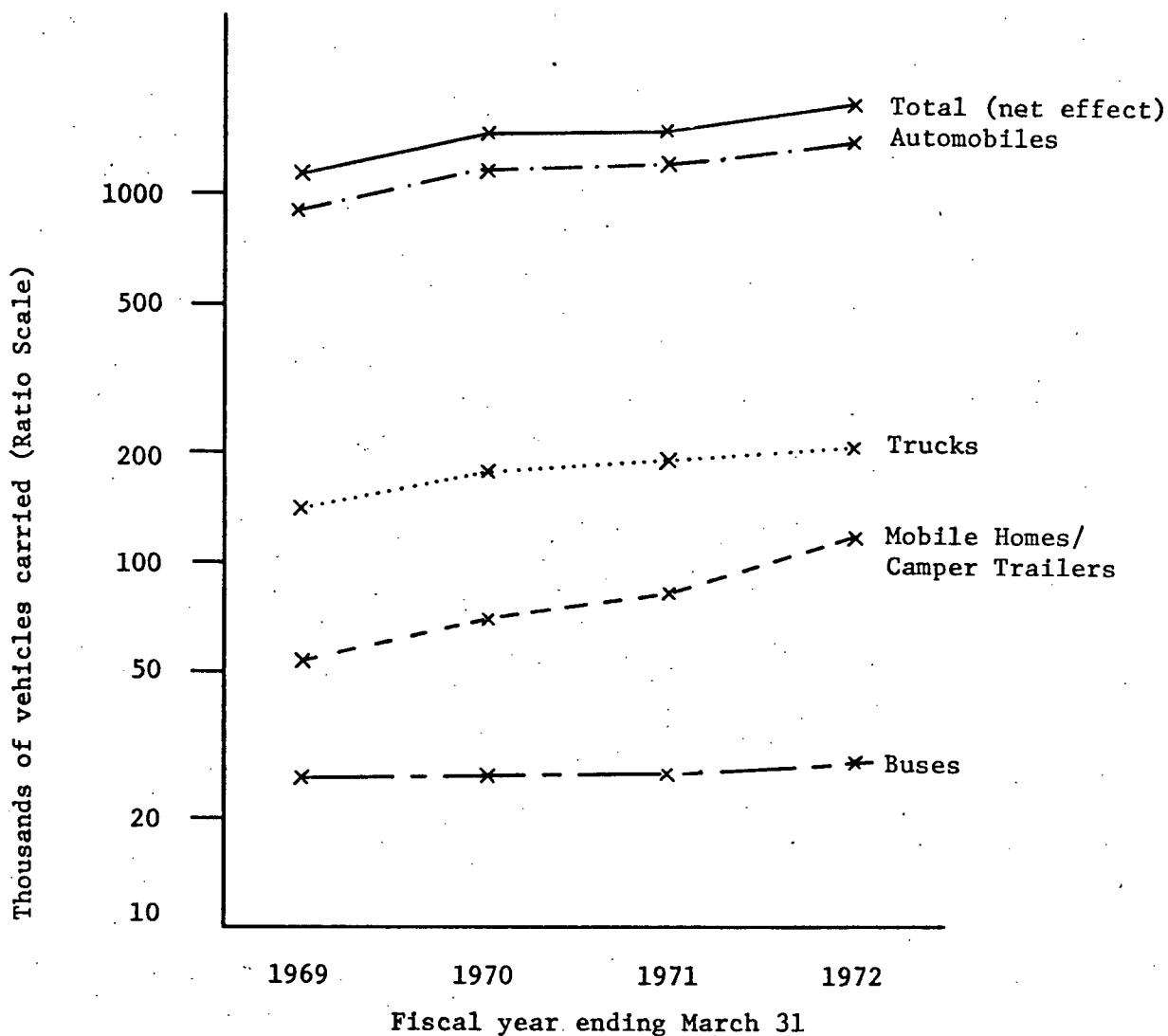
NOTES:

1. Traffic categorisation as for pre-November 1971.

Source: Province of British Columbia, Minister of Highways Annual Reports for the fiscal years ending March 31, 1969 - 1972.

## B.C. GOVERNMENT FERRIES-TRAFFIC GROWTH BY TYPE BY YEAR

Routes 1 and 2

NOTES:

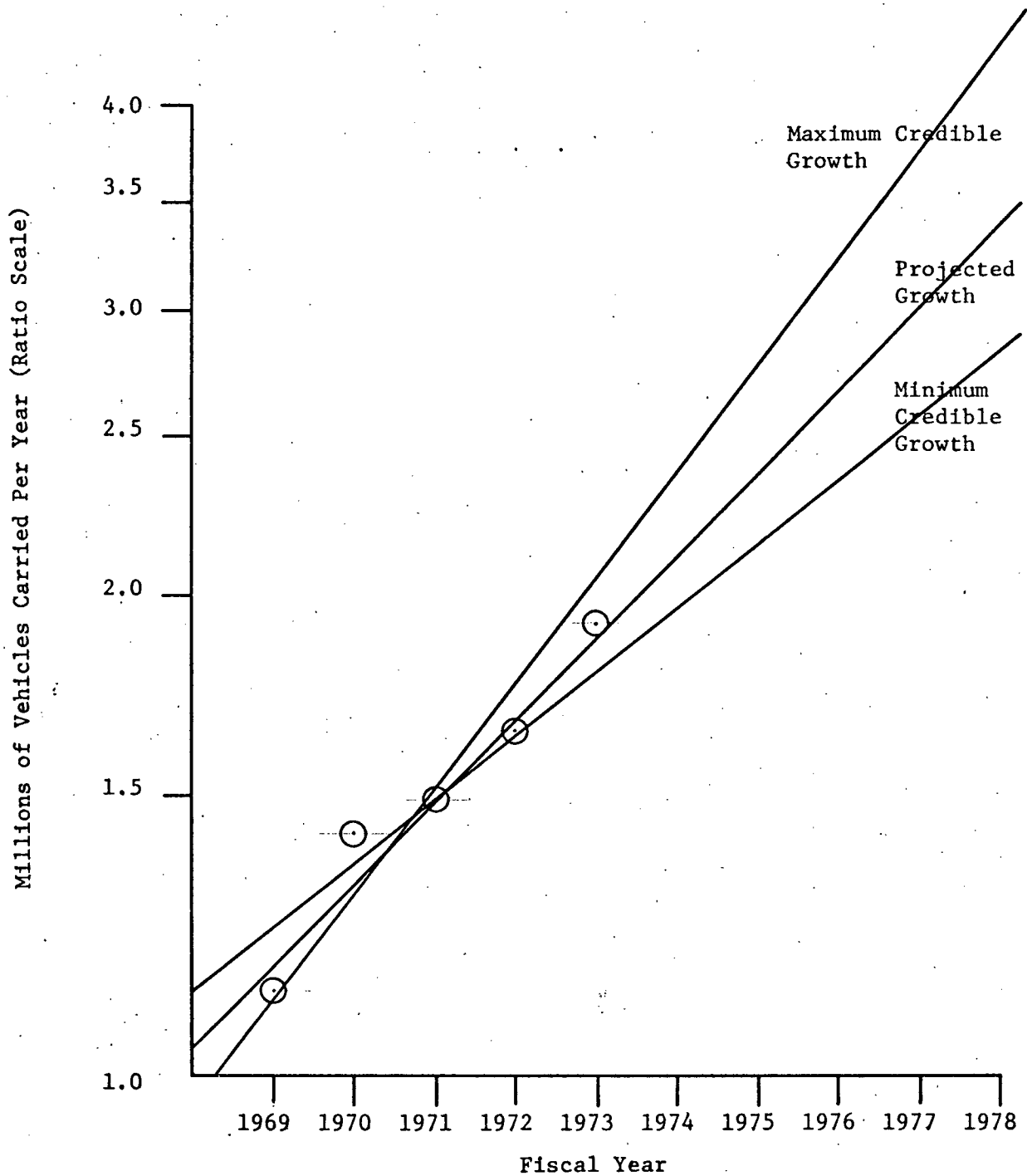
1. Traffic categorisation as for pre-November, 1971.

Source: Province of British Columbia, Minister of Highways Annual Reports for the fiscal years ending March 31, 1969 through 1972.

EXHIBIT 13 -99-  
METHOD OF TRAFFIC PROJECTION

Routes 1 and 2

Under Exponential Growth Hypothesis



Sources: Province of B.C., Minister of Highways Annual Reports for the fiscal years ending March 31 1969 through 1972. Half - monthly loading data, 1972, B.C. Ferries Traffic Dept.



shown in Exhibit 14. Assumptions are that (i) traffic growth is exponential, (ii) the 1972 seasonal peak shape is substantially maintained for all years, and (iii) the new C.P.R. vessel Carrier Princess captures no B.C. Ferries Traffic (this unrealistic assumption is relaxed in Exhibit 15). The following points should be noted:

(a) Historical peak season excess capacity of about 10% is an effective minimum if past service levels to the user are to be maintained in future.<sup>8</sup>

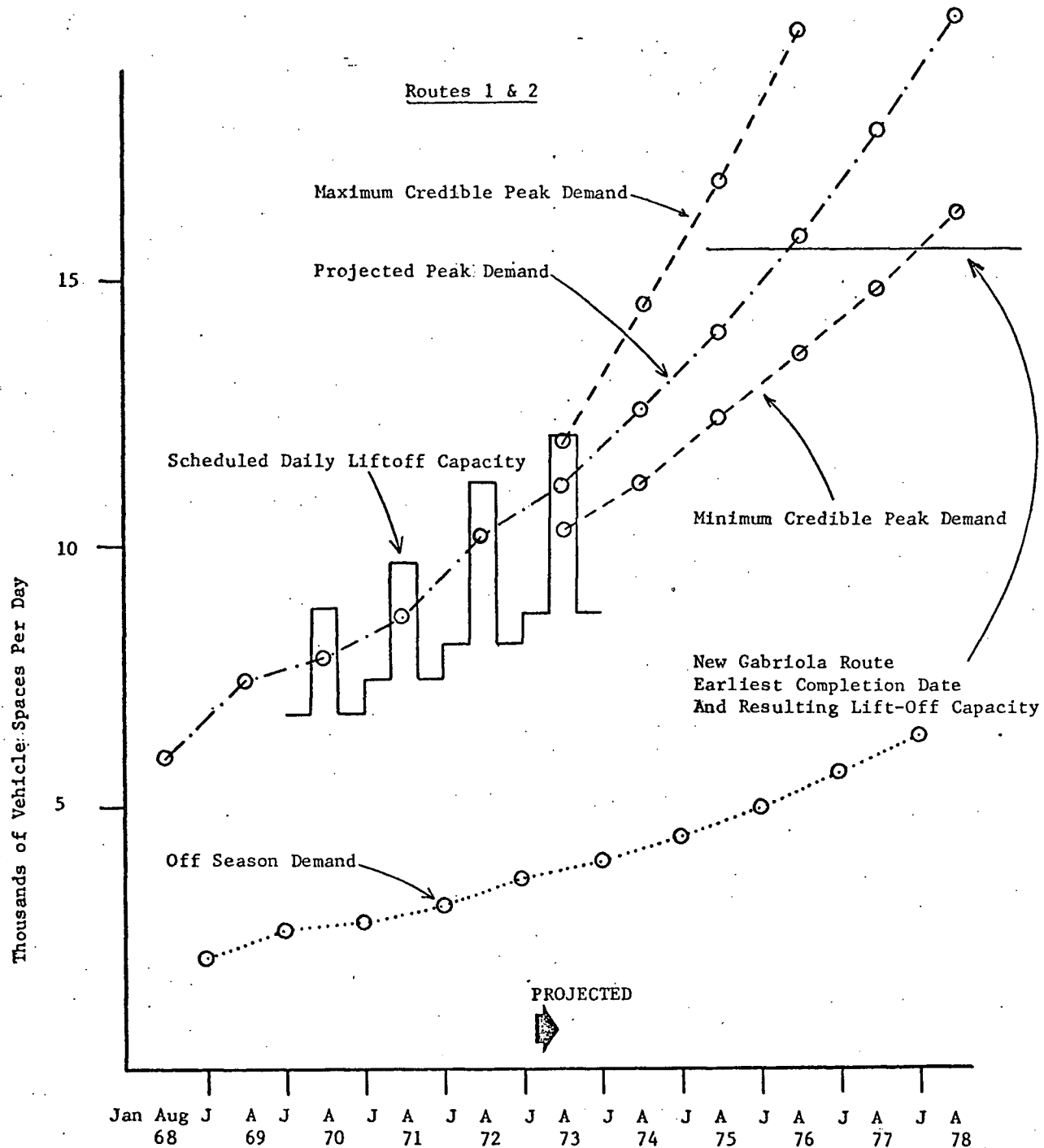
(b) Maximum and minimum credible demand lines are drawn. The accuracy of trend projection and the improbability of large deviations, ceteris paribus, can be assessed subjectively from Exhibit 13.

(c) Given that the earliest possible completion date for the new Gabriola run is Summer, 1975, some additional capacity is necessary to maintain 1973 peak service levels into 1974. If the Carrier Princess has no effect, approximately 1500 vehicles spaces/day of additional lift-off capacity will be required. This is equivalent to an additional stretched vessel operating on either route 1 or route 2 (current construction cost about \$10M).

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<sup>8</sup> This 10% excess capacity (90% space utilisation) is nominal in the sense that it depends directly on the chosen conversion factor of 1.20 spaces per vehicle. If 1.26 spaces per vehicle were used the figure would be 5%.

EXHIBIT 14 -101-  
PROJECTED DEMAND VS CAPACITY  
For B.C. Government Ferries



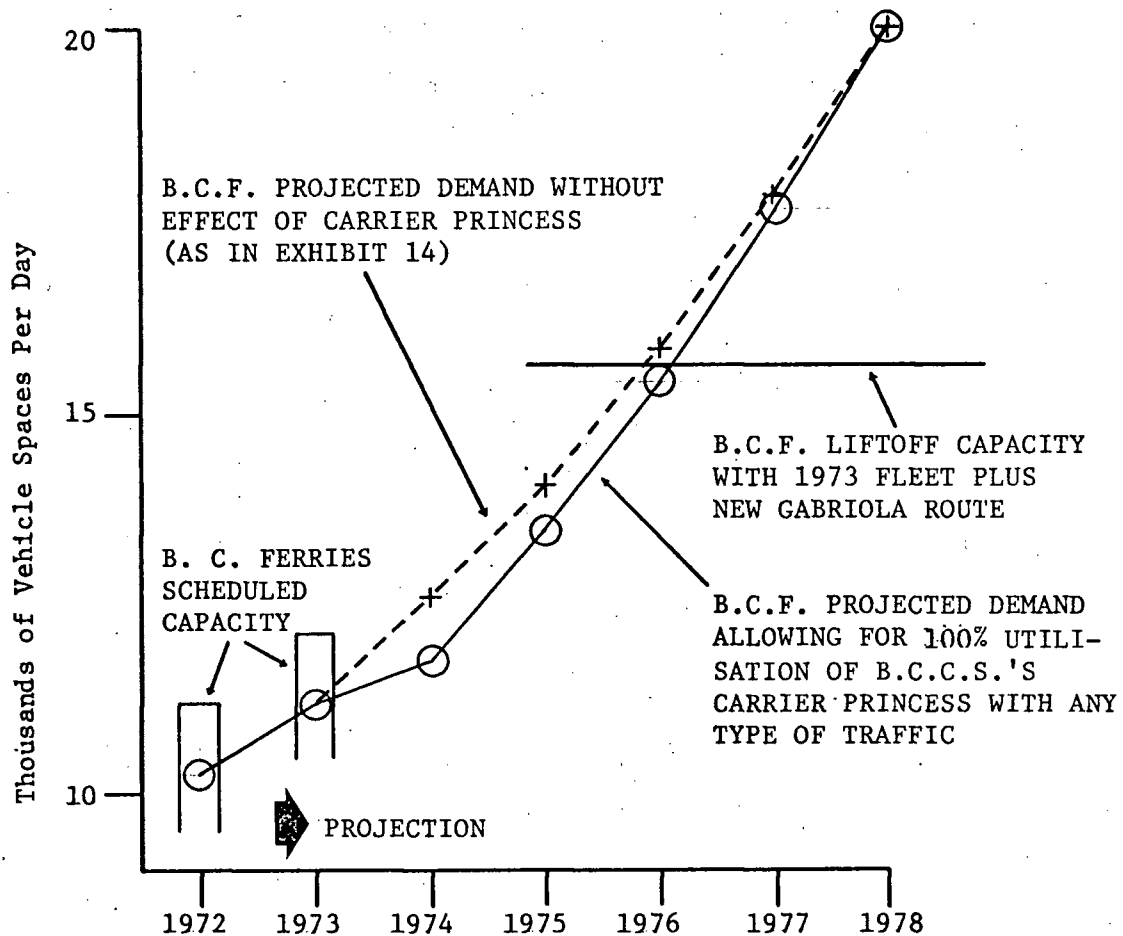
Source: Half Monthly Loading Statistics, 1972.

B.C. Ferries sailing schedules 1970-73.

Province of B.C., Minister of Highways Annual Reports for the fiscal years ending 1969-1972.

# B.C. FERRIES PROJECTED PEAK TRAFFIC showing maximum effect of Carrier Princess

## VANCOUVER ISLAND - MAINLAND ROUTES



### NOTES:

1. Projection assumes that B.C.C.S. capacity is fully utilised by first accommodating natural growth of existing B.C.C.S. traffic and then capturing B.C. Ferries traffic of any type to fill available space.
2. Effect of Carrier Princess assumed to be zero in peak 1973. In fact the vessel was operational by May 1973 (percent utilisation unknown)

### Sources:

1. Half monthly loading statistics 1972, B.C. Ferries Traffic Dept.

(d) 1975 requirements could be satisfied with the 1973 fleet and the new Gabriola route in operation. 1976 requirements could be met if an additional vessel (as in 1974) were used.

Exhibit 15 is similar to Exhibit 14 except it is assumed that the Carrier Princess is fully utilised by (i) accommodating the natural growth in present C.P.R. Traffic and (ii) capturing B.C. Ferries Traffic of any type to fill all remaining space. The points to be noted are:

(e) The carrier Princess has a notable short term effect on B.C. Ferries demand. If the vessel is 100% utilised, B.C. Ferries require only an additional 500 spaces/day of lift-off capacity for 1974. An additional small vessel operating supplementary runs on Routes 1 and 2 can supply this.

(f) In the longer term, the Carrier Princess has less effect. As the vessel accommodates the natural growth of C.P.R. traffic (see later discussion), B.C. Ferries is relieved of less of its traffic. The effect of the Carrier Princess disappears by 1976/7.

(g) B.C. Ferries annual traffic growth in the late seventies amounts to 2200 spaces/day, which can be supplied with the annual addition of a stretched vessel on the short Gabriola route.

(h) If completion of terminals for the new route is delayed until the summer of 1977, approximately 5000 spaces/day in addition to the 1973 fleet capacity will be required to serve the peak season of 1976. This is equivalent to three additional stretched vessels operating on Routes 1 and 2 (in 1972 there were eight vessels operating on these routes).

It should be emphasised that the foregoing assumes present trends will continue and current policies (of supplying whatever demand materialises at present price and service levels) are maintained. The discussion has ignored the possibility of a radical change in ferry policy. Alternative policies regarding commercial vehicles are discussed in the final chapter, including the possibility of a total ban of commercial vehicles on B.C. Ferries.

#### 4.3.2 Commercial Traffic Trends

Two trends in the freight market between Vancouver Island and the Mainland are of particular significance to the operations of B.C. Ferries. One is a shift away from the use of rail to the use of road vehicles and the other is the overall growth in the volume of freight. The shift from rail to road arises from the pressure to make more efficient use of transportation facilities. The overall growth parallels the expansion of the Island economy.

### Shift from rail to road

Until the 1960's and 1970's, commercial activity associated with the Island was dominated by the forest products industry. In recent years the significance of the Island as a major regional market for consumer goods has emerged. Historically, rail was established as the primary mode for the carriage of outbound forest products and of inbound intermediate requirements (such as chemicals). Rail barges were used to access the Island rail network. In contrast, the more recent transportation of consumer goods and general freight was dominated by highway trucks which provided essential flexibility of origin and destination points in the Island highway system.

A 1971 survey<sup>9</sup> indicated that, on a number of loads basis, inbound traffic moved 72% by highway vehicle and 28% by rail. Outbound traffic was predominately rail except in the case of lumber and (seasonally) fish.

Both rail and highway modes exhibit backhaul problems, but in opposing directions. Exhibit 16 shows the situation for For-Hire Trucking serving the Victoria commercial area. Revenues derived from outbound traffic were only 35% of those generated by inbound traffic in 1970; on a tonnage basis, outbound traffic was 67% of inbound. This difference reflects the higher value/weight ratio of inbound goods and directional

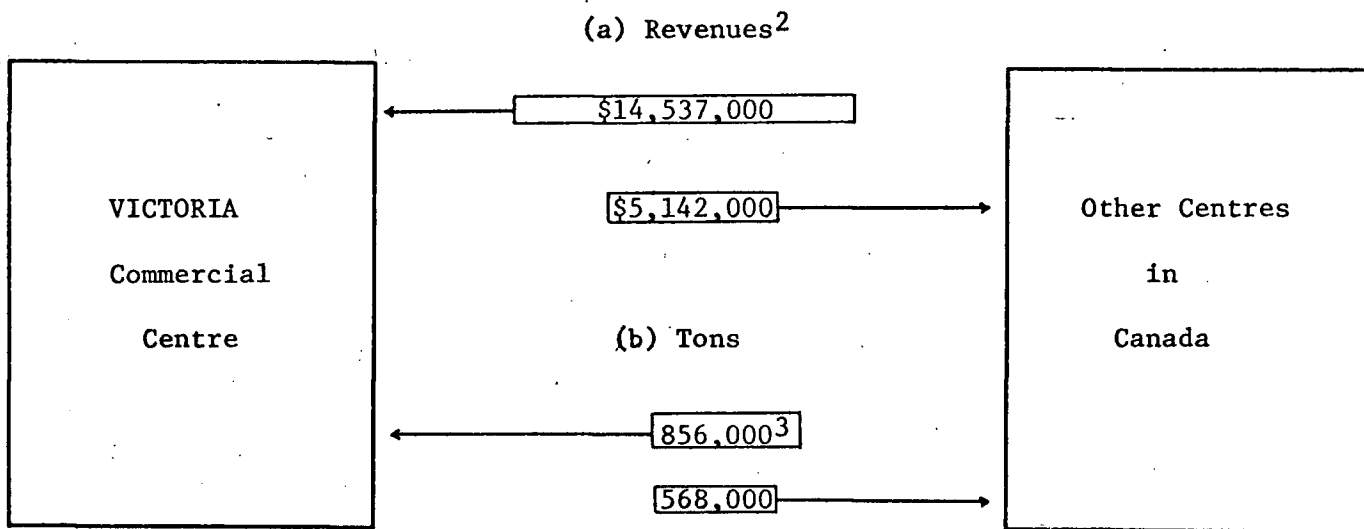
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<sup>9</sup>Rimes, Edward H. An examination of transportation trends on Vancouver Island. A graduating essay for the degree of B. Comm., University of British Columbia, 1972. Unpublished.

EXHIBIT 16 -106-  
TRUCKING BACKHAUL IMBALANCE

For - Hire Trucking

Commodity Flows



NOTES:

1. Size of Victoria commercial area undefined.
2. Revenue and tonnage figures include only for-hire trucking only, and exclude private operations.
3. Quoted standard deviation 20-29%.  
Standard deviation for other figures less than 10%.

Source: Statistics Canada Catalogue 53-224 Annual. For-hire trucking survey, 1970. Tables 4,5.

differentials in trucking rates. An outbound/inbound backhaul ratio of 1/3 for trucking seems a reasonable estimate on a number of loads basis, while an opposing 6/1 has been cited for rail cars.<sup>10</sup>

Though the move to a single mode is an obvious solution to the twin backhaul problems, this has been hampered by the differences in origins/destinations and handling and equipment requirements in the two transportation markets. Nevertheless the versatility of the highway mode (versus rail difficulties such as yard tie-ups and route inflexibility) has prompted a general shift away from rail towards road transport. The highway and ferry accessibility of most Island points has led to a tendency to regard Vancouver Island as a highway pick up and delivery area centred on Vancouver. Undoubtedly, rail will continue to be used by already rail-oriented industry. But the tendency is for Island goods to be transferred by truck to Vancouver for transshipment onto the mainland rail network. Inbound rail shipments tend to follow the reverse path.

A precedent has been set by Doman Industries Ltd., a Duncan-based lumber and transport company regarded as a local leader in the industry. Doman uses drop trailers to

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<sup>10</sup> Ibid.



transport forest products from the Island and does heavy hauling on a charter basis throughout the West (including Island-bound haulage). Doman's approach ameliorates the twin backhaul problems; indeed Mr. Herb Doman has been quoted as saying that high equipment utilisation and operating efficiencies have been the key to his Company's success.<sup>11</sup>

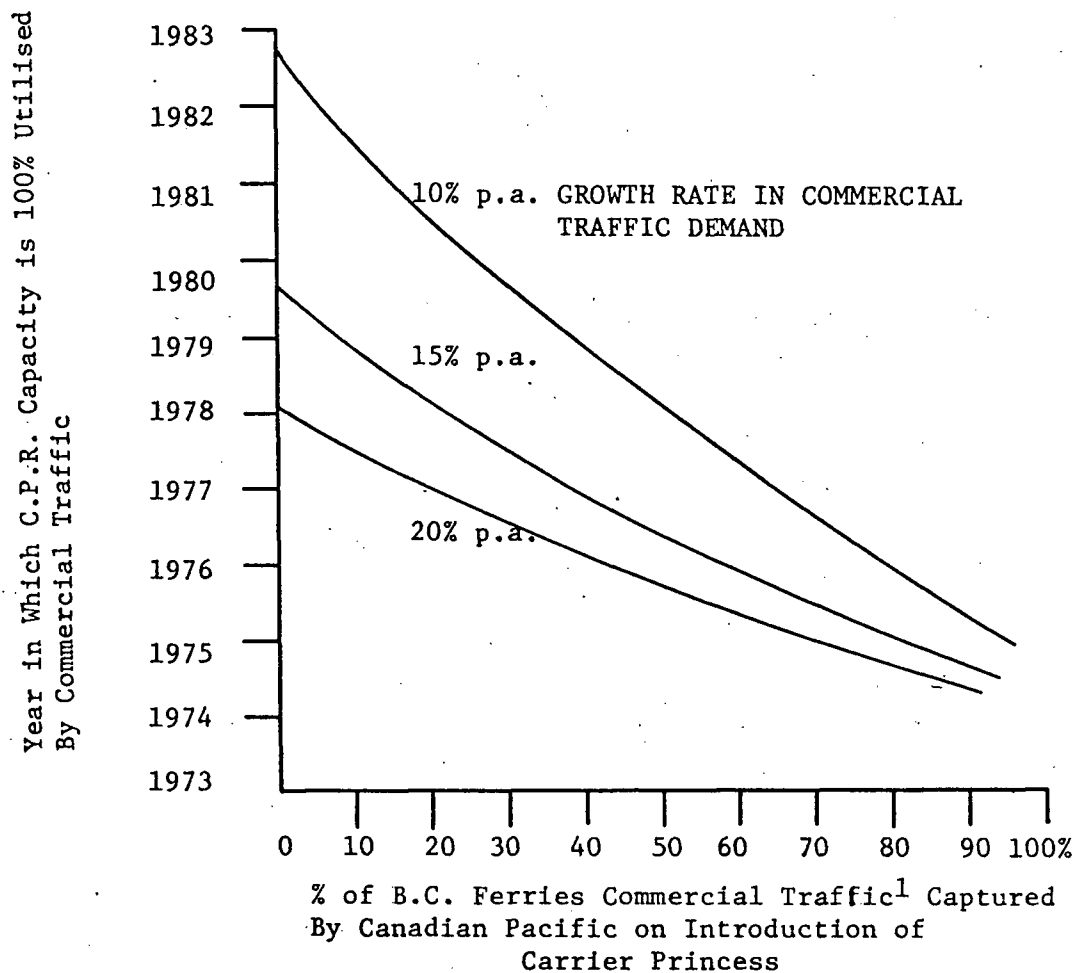
#### 4.3.3 Growth in C.P.R. Traffic

Time series C.P.R. Traffic data is not available but growth estimates can be made. B.C. Ferries' live truck Traffic is growing at 12.6% p.a. (Exhibit 11). The trend from rail cars to drop trailers suggests that the trailer market is expanding faster than the overall freight market. C.P.R. freight traffic growth will therefore be between, say, 10% and 20% p.a., probably about 15% p.a. This growth will fully utilise C.P.R. freight capacity (including the new vessel) in a few years, especially when capture of live truck traffic from B.C. Ferries is considered. Exhibit 17 shows the relationship between the year of C.P.R.'s freight saturation and the percentage capture of B.C. Ferries live truck traffic for different freight growth rates. Assumptions are that (i) 1973 C.P.R. vessels are maintained in service and no new vessels are added (ii) the C.P.R.'s Princess of Vancouver continues

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<sup>11</sup>The Vancouver Sun, April 7, 1973.

## PROJECTED FREIGHT SATURATION OF C.P.R. CAPACITY

NOTE:

1. Post-November 1971 Classification of Trucks

Source: See Exhibits 4, 5.

in the mixed commercial/non commercial service. These assumptions conform with known C.P.R. plans. Points to note are:

(a) Exhibit 17 refers to C.P.R.'s utilisation entirely with commercial traffic (except for the Princess of Vancouver). Of course C.P.R. intends to maximise utilisation by attracting non-commercial traffic from B.C. Ferries in the meantime.

(b) C.P.R. capacity will be saturated with commercial traffic in the late seventies (probably about 1977 if freight grows at 15% and C.P.R. captures 40% of B.C. Ferries' live truck traffic).

Again it should be emphasised that these results are predicated on the continuation of past trends and present policies. They represent the consequences of the implementation of all known present plans.

#### Future effect of T.I.T.L.

The presence of Tilbury Island Terminals Ltd. has been ignored though it is potentially important. In the past T.I.T.L. has supplied only a small fraction of mainland-Island transportation (exhibit 4) but the company has plans to expand its share of the drop trailer market and general bulk freight market.<sup>12</sup> If planned capacity of 150 commercial units per day

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<sup>12</sup>Personal interview, with Mr. Stan Prokop, General Manager T.I.T.L.

(using converted C.N.R. barges) were used solely for drop trailers, this would be a substantial contribution to the total freight capacity in B.C. (equivalent to half the lift-off capacity of the Carrier Princess). These trailers would be taken from the C.P.R. which would attempt to fill capacity with B.C. Ferries non-commercial traffic. However, T.I.T.L.'s policy is not to specialise in vehicular traffic but to diversify into general freight (including lime rock, lumber and steel).<sup>13</sup> If half T.I.T.L. capacity were utilised by trailers (amounting to 25% of the projected 1974 trailer market), the ultimate maximum relief for B.C. Ferries would be 250 spaces per day. This is a small effect in the context of total traffic demand; it is equivalent to two months' growth in the overall B.C. Ferries' traffic expansion of 1500 spaces per day per year (see Exhibits 14, 15).

The future role of T.I.T.L. is unclear. The company's potential effect is large in the commercial vehicle market but relatively small in the entire vehicle transportation market. But it is clear that B.C. Ferries freight policy can affect a relatively small operation (such as T.I.T.L.) even more dramatically than the C.P.R. The potential of T.I.T.L. cannot be discounted, particularly in view of the company's

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<sup>13</sup>Ibid.

connection with the C.N.R.<sup>14</sup> (which could play a supporting role to the company and is a potential source of capital for expansion).

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<sup>14</sup>T.I.T.L. was established in close association with the C.N.R. and is contracted to operate C.N.R.'s rail barges.

#### 4:4 Financial, revenue, cost and pricing data

##### 4:4:1 Finance

Until 1968 the government fleet was a crown corporation, able to issue its own bonds to finance capital assets. A form of provincial subsidy was payable to the corporation from its inception by the legal provision for the payment of up to  $2\frac{1}{2}\%$  p.a. of capital indebtedness; this was paid into a reserve account together with revenue in excess of operating expenditure.<sup>15</sup> The reserve account was used to pay the capital indebtedness of the fleet and for the "construction or reconstruction of its property and works".<sup>16</sup> The fleet was explicitly exempted from taxation<sup>17</sup> and no formal provision for depreciation was made. The fleet was deemed not to be a utility within the interpretation of the Public Utilities Act.<sup>18</sup> In 1966 the B.C. Ferry Authority Act Amendment Act allowed the Minister of Finance to pay off the total outstanding capital indebtedness of the Authority. Since the reserve account had accumulated to \$10.0M (\$5.4M  $2\frac{1}{2}\%$  subsidy credits plus \$4.6M operating credits) but capital indebtedness was \$51.2M, a Debt Liquidation Grant of \$41.2M was paid directly to the

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<sup>15</sup>Revised Statutes of British Columbia, c.280, s.16.

<sup>16</sup>Ibid., s.17.

<sup>17</sup>Ibid., s.40.

<sup>18</sup>Ibid., s.37.

Authority from the provincial exchequer.<sup>19</sup>

Evidently in the early years revenues were insufficient to recover capital costs. Had depreciation (at 5%, straight line basis) been charged, it would have accumulated to \$10.9M by 1966.<sup>20</sup> In fact, revenues contributed only \$4.6M to capital assets over these years (for comparison, ferry revenue was \$16.2M in fiscal 1966). Further, the 1966 undepreciated capital asset figure of \$51.2M may be undervalued because of (i) terminal access roads and loading ramps charged to highway expenditure and (ii) the federal shipbuilding subsidy.<sup>21</sup>

In 1968, when the assets of the B.C. Ferry Authority were transferred to the Department of Highways, their book value was zero (because of the Debt Liquidation Grant) and no depreciation was charged. When structural alterations (such as installing head level ramps and stretching) were made these were similarly non-depreciating. Funds were disbursed from the Department of Highways budget and revenues were paid directly into the Consolidated Revenue Fund of the government. Gross expenditure on ferries became an increasingly important part

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<sup>19</sup>The British Columbia Ferry Authority, Annual Reports for the Fiscal Years Ending March 31, 1966, 1967.

<sup>20</sup>Estimated from statements of accumulated capital expenditure found in The Vancouver Province, May 30, 1963; May 28, 1964; July 31, 1965.

<sup>21</sup>\$6.4M in 1962/3 plus \$2.1M in 1966, totalling \$8.5M paid to provincial shipbuilders. The Vancouver Sun, October 6, 1962 and The Vancouver Province, May 30, 1963.

of the budget of the Department of Highways. This is shown by Exhibit 18 (only aggregated costs, capital plus operating, were available).

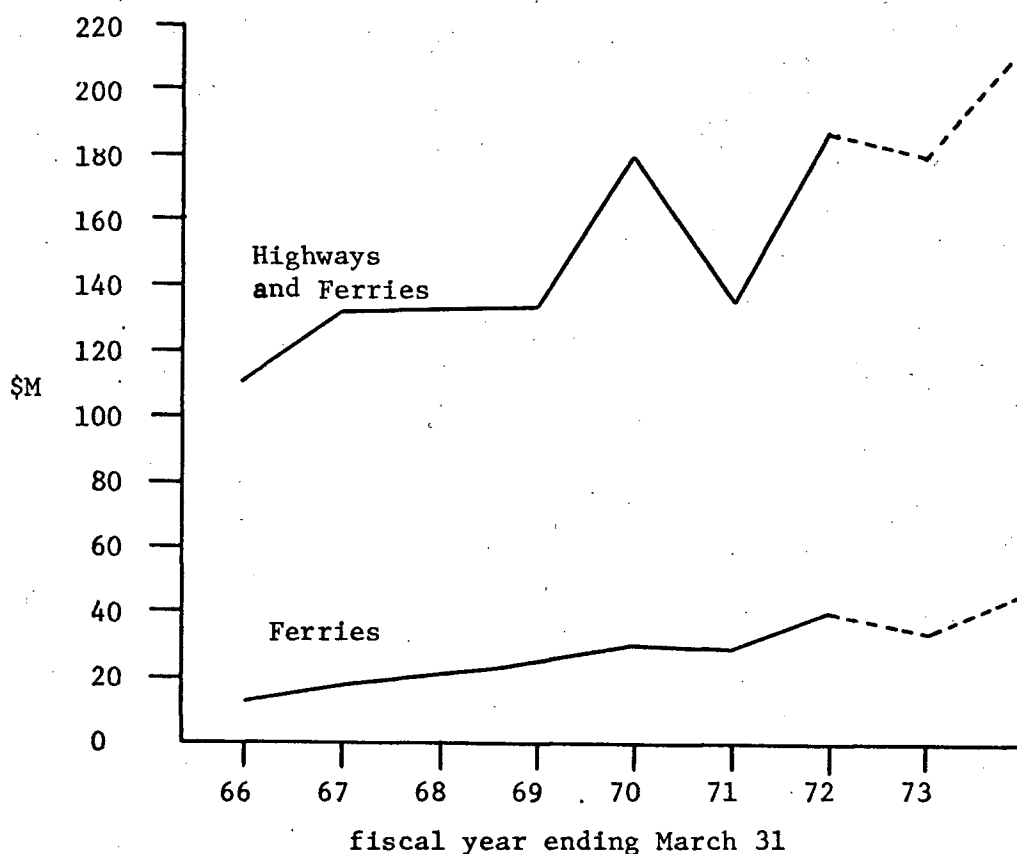
#### 4:4:2 Revenues and costs

Statements of income and expenditure for B.C. Ferries for 1970-1972 appear in Exhibit 19. These show that operations on routes 1 and 2 consistently cover operating costs (though other routes do not). Note that depreciation or wear and tear (beyond normal maintenance) is not included as an expense. A rough estimate shows this would cancel the operating surpluses on routes 1 and 2. When allocated administrative overheads are included routes 1 and 2 make a net loss. Exhibit 20 shows estimated net losses for each year. Revenues and costs per unit output (i.e. per unit of lift-off capacity) are also estimated. These indicate that the increases in net loss from 1970 to 1971 was caused by rising unit costs rather than falling revenue or utilisation.

Terminal operating costs are only 19% of total operating costs. This implies that operating costs rise almost proportionately to the number of sailings. Ferry services are labour intensive; salaries form 72% of operating expenses (55% if depreciation and overhead are included). 1972 revenue was



## B.C. GOVERNMENT SPENDING ON HIGHWAYS AND FERRIES



Fiscal year ending 19-	Gross highways expenditure (inc. ferries) \$M (a)	Ferries expenditure \$M	Percent ferries of gross highways expenditure
66	110.5	14.9	13.5%
67	130.2	18.5	14.2%
68	131.6	20.5 (b)	15.6%
69	133.7	22.5	16.8%
70	174.5	29.7	17.0%
71	135.0	28.7	21.2%
72	188.6	39.2	20.7%
73	179.3	34.5	19.3%
74	212.8	46.5	21.9%

(a) From sources (1) and (2) for pre-1968; source (1) for 1969-72; source (3) for 1973-74.

(b) Highways expenditure alone for 1968 \$M111.1; ferry expenditures not available for 1968. Author's estimate by linear interpolation.

Sources: (1) Minister of Highways Annual Reports  
 (2) B. C. Ferry Authority Financial Statements  
 (3) Budget Speech (estimates), March 9, 1973.

## EXHIBIT 19

## B.C. FERRIES

## Statements of Income and Expenditure - FY's ending 1970, 71, 72

All figures in Thousands of dollars

	ROUTE 1			ROUTE 2			ROUTES 1 + 2			OTHER ROUTES			TOTALS		
	70	71	72	70	71	72	70	71	72	70	71	72	70	71	72
<u>VESSEL COSTS</u>															
Salaries + Wages	3639	4721	5285	3557	4232	4916	7196	8953	10174	3181	3793	4065	10377	12743	14239
Operating	1431	1716	1665	1479	1091	1666	2910	2807	3331	1974	2195	3543	4884	5002	6874
Catering	1228	1417	1515	1040	1086	1042	2268	2503	2557	175	195	434	2443	2698	2991
Deas	189		205	189		205	378		410	251		409	629		819
TOTAL VESSEL	6486	7853	8632	6264	6409	7829	12750	14262	16461	5583	6181	8462	18333	20443	24943
<u>TERMINAL COSTS</u>															
Salaries + Wages	948	1090	1201	650	726	804	1598	1816	2005	357	439	548	1955	2255	2553
Operating	478	573	707	451	306	341	929	879	1048	554	608	960	1483	1487	2008
TOTAL TERMINAL	1427	1663	1908	1100	1032	1146	2527	2695	3054	911	1047	1507	3438	3742	4561
Total Vessel + Ter.	7913	9516	10540	7364	7441	8974	15277	16957	19514	6495	7228	9970	21772	24185	29484
Revenue for Period	10974	11338	12925	8088	8381	9246	19062	19719	22171	5472	5843	6681	24534	25562	29032
Net Gain (Loss)	3061	1822	2385	723	940	271	3784	2762	2656	(1021)	(1385)	(3107)	2763	1377	(451)

## NOTES:

1. Methods of allocating costs between routes using the same terminal unspecified.
2. Items under vessel operating and terminal operating costs unspecified.
3. Deas means maintenance at Deas dock.
4. Figures may not add due to rounding.

## SOURCES:

1. Province of B.C., Minister of Highways Annual Report for the Fiscal Year ending March 31, 1972.
2. Personal Communication with the Rt. Hon. Robert M. Strachan, Minister of Highways.

General Admin. Insurance	1689	2585	1240
Deas	663	1517	2614
Total operating	24124	28287	33338
Capital Cost	5594	410	5847
Total Costs	29718	28696	39186
Revenue	24534	25562	29032
Net Gain (Loss)	(5184)	(3134)	(10153)

EXHIBIT 20 -118-  
B.C. FERRIES ROUTES 1&2 REVENUE AND COST DATA

(Revised to include depreciation and overhead)

	Fiscal year ending March 31		
	1970	1971	1972
<u>Revised Income and Expenditure Statement</u>			
	Thousands of Dollars		
Total Vessel and Terminal Operating Costs <sup>1</sup>	15,277	16,957	19,514
Depreciation <sup>2</sup>	2,800	2,800	2,800
Allocated Administrative Overhead <sup>3</sup>	<u>1,452</u>	<u>2,584</u>	<u>2,428</u>
Total Expenditure	19,559	22,341	24,742
Less Revenues	<u>19,062</u>	<u>19,719</u>	<u>22,171</u>
Net Loss	<u>497</u>	<u>2,622</u>	<u>2,571</u>

Unit Costs and Revenues

Cost per vehicle space provided	\$11.52	\$12.53	\$12.54
Revenues     "     "     "	\$11.23	\$11.06	\$11.24

Notes:

1. From Exhibit 19.
2. 8 vessels at \$7M each depreciated at 5% p.a., straight line basis.
3. Allocated on basis of vehicle numbers carried.

Source: Exhibit 19

derived 43% from passengers<sup>22</sup>, 33% from passenger automobiles, 16% from commercial vehicles, and 8% from other traffic categories.<sup>23, 24</sup>

#### 4.4.3 Pricing

Both B.C. Ferries and C.P.R.'s B.C.C.S. have complex rate structures. B.C. Ferries publishes a 64-page tariff<sup>25</sup> which gives rules and regulations and specifies rates for all routes for automobiles, trucks, trailers, mobile homes, pickup and panel trucks, buses, ambulances, hearses, taxis, and passengers (including special rates for mid-week travel, organised parties, clergy and the blind). There are provisions for oversize penalties and bulk discounts (termed "scrip"). The B.C.C.S. publishes an 8-page tariff.<sup>26</sup> Only Island-mainland commercial vehicle tariffs are of direct interest and they are displayed in Exhibit 21. (T.I.T.L. rates are set by agreement with the customer and are not as yet published). The following points are noteworthy:

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<sup>22</sup>On board catering costs and revenues netted out by assuming they are equal.

<sup>23</sup>Post-November 1971 classification of traffic.

<sup>24</sup>Estimated from Exhibit 19 together with Half-monthly Loading Statistics 1972, B.C. Ferries Traffic Department.

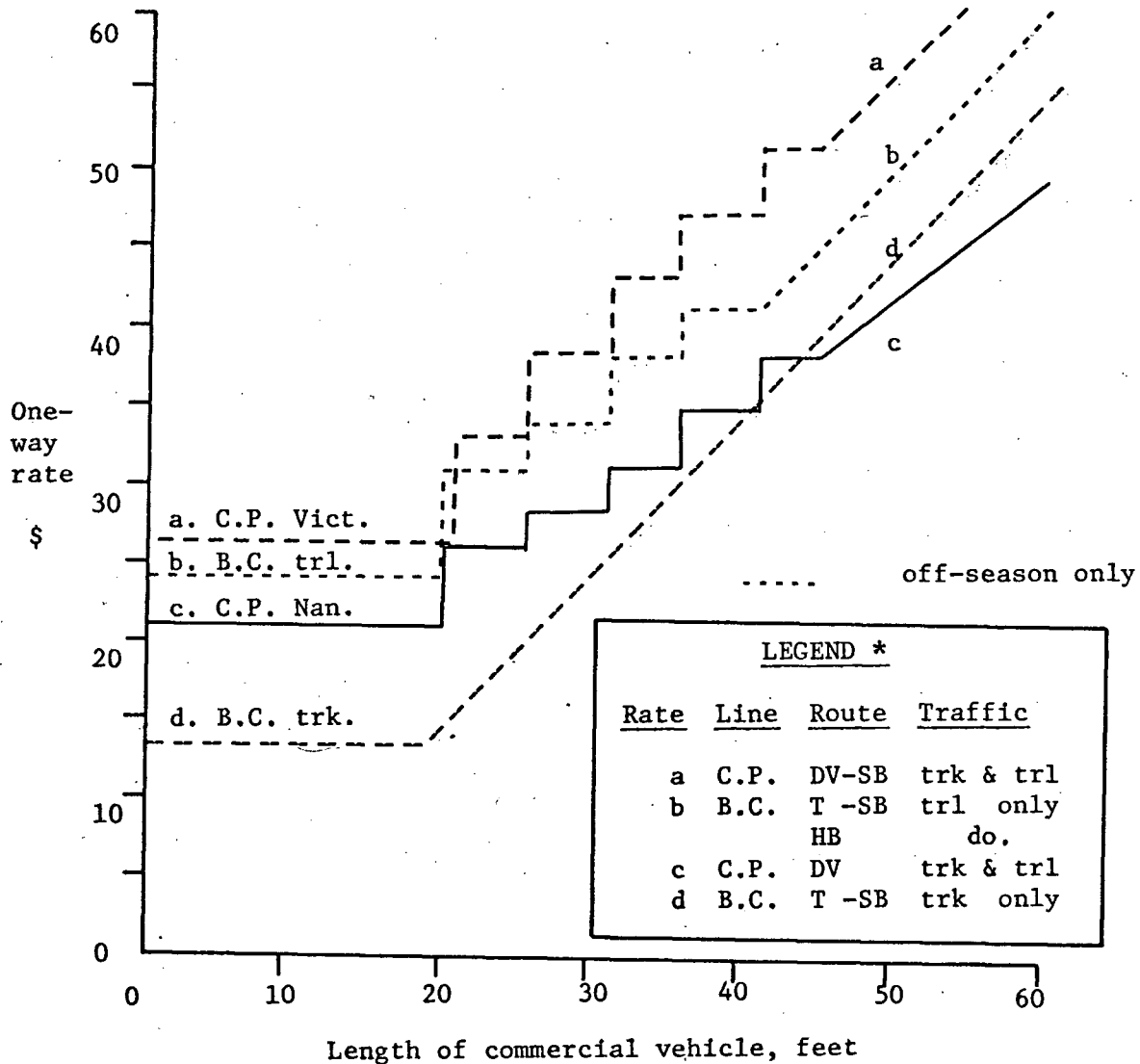
<sup>25</sup>Ferries Division-B.C. Ferries, Passenger and Ferry Tariff No. 1, made by order in Council, effective October 21, 1971.

<sup>26</sup>Canadian Pacific Railway Ltd., British Columbia Coast Steamship Service, Tariff No. 4, effective July 1, 1972.

EXHIBIT 21 -120-  
FREIGHT RATE STRUCTURES  
B.C. AND C.P. FERRIES

FREIGHT RATE STRUCTURES

B.C. AND C.P. FERRIES



\*Abbreviations used:

C.P.	Canadian Pacific Rail Service
B.C.	B.C. Ferries Government Service
DW	Downtown Vancouver, C.P. Terminal
SB	Swartz Bay Terminal, Victoria
HB	Horseshoe Bay Terminal, Vancouver
N	Nanaimo
T	Tsawwassen Terminal
trk	truck
trl	trailer

- Sources:
- (1) Province of B.C., Ferries Division, B.C. Ferries Passenger and Ferry Tariff No. 1, made by Order in Council effective October 21, 1971
  - (2) Canadian Pacific Railway Ltd. British Columbia Coast Steamship Service Tariff No. 4 effective July 1, 1972.

(a) Both carriers charge by vehicle length and rate discontinuities for drop trailers occur at the same vehicle lengths. B.C.C.S. has charged by length for some time but B.C. Ferries adopted this method more recently (October 21, 1971). The manager of Analysis and Planning, C.P.R. Ltd., Vancouver, felt that the government was the "rate-leader" in ferry services, establishing price levels which private enterprise was left to follow.<sup>27</sup> The similarity of rate structures indicates that more than just cost considerations have played a part in pricing.

(b) B.C. Ferries charges the same rate irrespective of route but distinguishes between drop trailers and trucks. The drop trailer tariff is of course inoperative in summer when trailers are banned. B.C. Ferries drop trailer tariff is considerably higher than its live truck tariff. Drop trailers are therefore relatively discouraged from using the service (on B.C.C.S. they are charged identically). This is consistent with past B.C. Ferries policy towards drop trailers.

(c) B.C.C.S. charges the same for trailers or trucks but distinguishes between routes. Unlike B.C. Ferries' vehicle rates, those of B.C.C.S. include the driver. Therefore \$2 (\$1 midweek) should be added to B.C. Ferries' live truck rates

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<sup>27</sup>Personal Interview, Mr. R.K. Gamey, Manager Analysis and Planning, C.P.R. Ltd., Vancouver.

for inter-carrier comparisons. The rate difference between B.C.C.S. routes probably partly arises because of the disparity in sea mileage (45 vs 40 miles).

(d) The two carriers' rates are comparable for live trucks on services to Nanaimo (most live trucks lie in the 25 to 45 foot range). But truckers face costs in addition to the ferry tariff. A downtown to downtown journey requires a dozen miles more road haulage using the B.C. Ferries service. On the other hand, voyage time is an hour less. A reservation system does not operate on B.C. Ferries as it does on B.C.C.S.

(e) B.C. Ferries charges less for live trucks on the Victoria run (about \$13 less). For the trucker this must be set against the line-haul cost difference in reaching (or leaving) the mainland ferry terminal (Tsawwassen is 20 miles south of Vancouver). The  $1\frac{1}{2}$ -hour difference in voyage time is also an important factor.

(f) Both carriers provide for bulk discount. C.P.R. reserves the right to enter any special contracts with truckers, allowing them discounts for trips in excess of a stated number. B.C. Ferries operates the "scrip" scheme, allowing a 10% 20% or 30% discount depending on the frequency of use of the service.

The degree to which these tariffs are cost-based is difficult to assess. First, no cost data is available from B.C.C.S. Second, there is the problem of cost allocation between

passengers and vehicles (terminal cost allocation between routes had already been performed on some unknown basis in the raw financial data). Three points may nevertheless be made on the B.C. Ferries tariff:

(i) On routes 1 and 2 aggregated revenue approximately covers operating and administrative expenses. It does not recover capital costs.

(ii) There is price discrimination in favour of passenger automobiles in the sense that they pay less per lane-foot of deck space than do commercial vehicles (an auto of 15 feet is charged \$5 whereas a 40-foot commercial vehicle is charged approximately \$40). This pricing policy implies that the government feels some obligation to serve passenger autos at relatively low prices. As we previously observed, the implied position is that Island-mainland transportation should be provided at low prices (the overall level of rates has not changed since the inception of the service) and that capacity should be provided for whatever demand materialises.

(iii) Revenues from commercial vehicles cover costs and even contribute to a return on investment. When the effects of passengers are included, revenue from commercial vehicles is some 20% greater (on a per foot basis) than for passenger cars.<sup>28</sup>

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<sup>28</sup>Based on gain of one truck and driver fare and loss of three cars' fares (approx. three occupants per car).



Yet, as mentioned, aggregated revenues from all traffic do not recover depreciation expense (which amounts to some 10% of operating expense). Commercial vehicles contribute this depreciation and more, which can be considered as a return on capital.<sup>29</sup>

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<sup>29</sup>Being approximately equal to the depreciation expense, the excess amounts to about 5% before-tax return on vessel capital cost.

CHAPTER 5

ANALYSIS OF POLICIES

### 5:1 Introduction: objectives

The objective of this chapter is to examine and compare some possible commercial vehicle policies for B.C. Ferries. This requires a synthesis of analytical and factual material from preceding chapters.

Three alternative commercial vehicle policies are examined. The policies are (A) continuation of present policy (which gives B.C. Ferries 50% of the commercial vehicle market), (B) a total ban on commercial vehicles and (C) a reduction in the number of commercial vehicles carried to give a substantially smaller market fraction. A possible fourth policy, that of increasing the number of commercial vehicles carried by B.C. Ferries, is not considered. The rationale for such a policy would presumably lie in maintaining price/service levels to commercial vehicles in the face of a decline in private services. There is no evidence of such a decline; indeed private operators, as has been shown, are currently upgrading their services. Also the apparent policy of the government is to concentrate on maintaining price/service levels to passenger automobiles. Therefore, neglecting the possibility of a radical change in government policy, this fourth alternative is dismissed as unrealistic.

These policies can be implemented by adjusting price or service level or both. Price and service level of the public

carrier were identified as the available policy variables in chapter 2 and their effects in the unregulated, mixed public/private ferry system were described in general terms. The appendix to chapter 2 emphasised the equivalence of the two variables in implementing policies.

The optimal pricing model of chapter 2 suggested that economic efficiency in commercial vehicle operations is achieved when the public carrier (in competition with a private carrier) prices its services in excess of the marginal cost of providing a ferry space. The excess should be equal to the excess of the private carrier's price over its (the private carrier's) marginal cost. When the private operator's costs are not known, the pricing rule for economic efficiency calls for the public carrier to price its services to cover both fixed and variable costs and to earn a reasonable return on capital.

The discussion of pricing in chapter 4 showed that (on the available information) commercial vehicles are presently charged a rate which does indeed cover all costs and contributes a return on capital investment. That is, on the available information, present commercial vehicle policy approximates to economic efficiency in commercial vehicle operations. The conclusion is that a move away from present policies (e.g. policies B and C) is likely to be a move away from economic efficiency in commercial vehicle operations.

Why then examine these other policies? Chapter 2 suggested that economic efficiency was not the only criterion by which policies are judged; there are certain considerations which are external to economic efficiency. Chapter 3 identified three issues which seem to be particularly significant in ferry operations. These are (a) the political and economic importance of continuous ferry operations which is the rationale for some government control in the system, (b) the policy for long term development of the ferry system (i.e. public versus private), particularly in view of the potentially severe effect of the government's participation on the level of private investment and (c) the policies towards other traffic types, particularly the apparent policy of the past in which passenger autos are served at relatively low prices and capacity is expanded to meet any demand which materialises.

This suggests that part of the analyst's task is to examine alternative policies specifically for these identified social and political considerations. Therefore each of the policies A, B and C is examined for the following specific efforts (conveniently classed as short and long term):

(i) Short term effects: does the policy approach economic efficiency as per the pricing model of chapter 2? What are the effects on competing ferries, on customers (all traffic types) and on B.C. Ferries itself?

(ii) Long term effects: How will investment in ferries, public and private, be effected? What are the strategic implications for government control and influence in the ferry system? To what extent can any given level of service be assured in the future?

## 5:2 Three commercial vehicle policies

### 5:2:1 Policy A: Continuation of present policies

#### Effects on B.C. Ferries and C.P.R.

Present B.C. Ferries policy guarantees live trucks or ferry space if the truck arrives thirty minutes before sailing, provided that trucks do not occupy more than one third of dock space on a full sailing. Live truck rates are comparable to those of C.P.R. on Route 2, but are somewhat lower than the competing service for Route 1.

The pricing model of chapter 2 indicates that present commercial vehicle policies are close to economic efficiency, (since ferry space is priced approximately at the level recommended by the model). However, the model says nothing about other effects of the policy, notably the effects on other types of traffic and the strategic implications for government influence in the ferry system.

The Carrier Princess (operating downtown Vancouver to Swartz Bay, for Victoria) offers poor service levels to live trucks, compared with B.C. Ferries Route 1. The voyage time is longer (the extra dead time being a significant cost to truckers) and sailings less frequent (three round trips per day, one of them at night, compared with B.C. Ferries 16 daytime round trips). C.P.R. terminal locations offer no distinct

advantage to live trucks over those of B.C. Ferries. In addition, C.P.R. rates are substantially higher for live trucks. Therefore, unless C.P.R. can offer truckers better terms, it will capture only a small fraction of B.C. Ferries commercial traffic.

B.C.C.S. may nevertheless attract other traffic (e.g. recreational vehicles) particularly at peak times when line-ups of several hours occur on B.C. Ferries. In the past B.C.C.S. has not been eager to handle highly seasonal traffic but will probably be willing to do so if it can be made profitable, i.e. if traffic will bear the charges necessary to cover the costs of excess winter capacity. This would probably require higher rates than those of B.C. Ferries. The situation is similar to that of trucking, i.e. recreational traffic will move to C.P.R. if the price/service level combination favours C.P.R. but current B.C. Ferries pricing policy appears to militate against this.

The need for continued expansion of government capacity will be slowed but not arrested by the introduction of extra C.P.R. capacity in the Carrier Princess. C.P.R.'s aim is to maximise utilisation of the new vessel by capturing traffic of any type (preferably trucks) from B.C. Ferries. The relief afforded to B.C. Ferries depends on C.P.R.'s



success,<sup>1</sup> which is not guaranteed by continuing present policies.<sup>2</sup>

Effect on truckers of continuing present policies

Truckers are partially protected from summer congestion by the guarantee of a space if arrival is 30 minutes before sailing (provided trucks do not occupy more than one third of deck space).<sup>3</sup> If some live trucks do choose to use the Carrier Princess, this presumably will arise from a cost saving. Therefore, trucking costs will be little affected if present policies are continued (and may even fall slightly on average).

Long term effects of policy A

Private investment will occur as private ferries expand capacity to meet the growth in their own share of the market, but it is unlikely that any private operator will be able to match the price/service level offered to live trucks

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<sup>1</sup>Exhibit 15 shows the magnitude of this effect. The Carrier Princess has a lift off capacity of about 1,000 spaces per day. B.C. Ferries peak demand is growing at about 1,500 spaces per day per year. The Carrier Princess therefore could accommodate the equivalent of 8 months' growth.

<sup>2</sup>This suggests that in making the decision to invest in the Carrier Princess, the C.P.R. was hopeful or expectant of a change in government policy.

<sup>3</sup>On average in the summer season trucks occupy only 9% of deck space so that trucks are rarely turned away.

by B.C. Ferries. C.P.R. will probably invest in a new vessel for drop trailers in the late seventies. (See Exhibit 17, showing that present C.P.R. capacity will be saturated at about this time). Of course, this depends on the impact of other operators (e.g. T.I.T.L.) in the drop trailer market.

The government will maintain its position as "rate-leader" in the commercial vehicle market by continuing present policies. Although destructive competition between private carriers for drop trailers cannot be prevented, minimum levels of service can be maintained and price levels can be influenced.

Summary of effects of policy A (present policy)

If present policies are continued, traffic will shift to utilise the C.P.R.'s Carrier Princess but the magnitude of the shift depends on whether B.C.C.S.'s rate structure is adjusted to attract the traffic. Not very many live trucks can be expected to use the Carrier Princess but it may be possible to attract non-commercial summer traffic because of heavy congestion on B.C. Ferries. Trucking costs will change little. The C.P.R. will probably invest in an additional vessel by 1980 to accommodate growth in the drop trailer market. Other private ferry operators may enter the market to compete for drop trailers but live trucks will continue to use B.C. Ferries. By maintaining substantial representation in the market, the government will retain its position of influence on prices and

services offered to commercial vehicles.

5:2:2 Policy B: Total ban on commercial vehicles

A total ban of commercial vehicles on B.C. Ferries will guarantee more space for other traffic. Commercial vehicles (principally live trucks) will be obliged to use private ferries. Some members of the public have called for such a ban.<sup>4</sup> They suggest that it will alleviate present congestion and will slow the growth of B.C. Ferries capacity requirements.

A ban on commercial vehicles would be a move away from economic efficiency for ferrying commercial vehicles, according to the pricing model of chapter 2. This is to be weighed against possibly beneficial effects on other traffic types in light of the immediate capacity problems of B.C. Ferries, and against other factors (below).

Effects of ban on B.C. Ferries

Operating difficulties on B.C. Ferries will be relieved and fleet utilisation might be increased. Quoting an officer of the Traffic Department, "Trucks and cars simply do not mix".<sup>5</sup> Head-level ramp capacity cannot be used with more

<sup>4</sup>The Vancouver Sun, May 3, 1973.

<sup>5</sup>Personal interview with Mr. K. Stratford, Traffic Department B.C. Ferries.

than a few trucks on board. The tall trucks require the overhead space partially occupied by the ramps. Generally, loading and unloading procedures are simpler in the absence of trucks.

More space for other traffic is guaranteed.<sup>6</sup> In the summer peak trucks<sup>7</sup> occupy 9% of vehicle deck space and 18% in winter (averaged over the year, 13%).<sup>8,9</sup> Releasing space will relieve congestion immediately but this relief will continue only if the resulting excess capacity is maintained by further expansion to match growth. Alternatively, the excess capacity can be used as a greething space to postpone the expansion of capacity. The effective postponement period afforded by banning trucks is about six months.<sup>10</sup>

B.C. Ferries revenues will fall and costs will remain roughly the same. Since trucks presently cross-subsidise other traffic, their removal will cause revenues to fall even

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<sup>6</sup>Note the word "guaranteed". More space for traffic might in any case appear as C.P.R. captures traffic of all types from B.C. Ferries in order to fill excess capacity from the introduction of the Carrier Princess. See Exhibits 15 and 17. The ban would in effect guarantee about 100% capture of B.C. Ferries Truck Traffic (in the absence of any other carrier with substantial excess capacity).

<sup>7</sup>Post-November 1971 classification of trucks.

<sup>8</sup>Half-monthly Loading Statistics, Traffic Department, B.C. Ferries. See Exhibits 7, 8, 9.

<sup>9</sup>A year-round ban will make B.C. Ferries seasonal peak relatively sharper. Since truck traffic is the least seasonal, its removal increases the ratio of overall summer/winter demand from 3.33 to 3.45 in terms of vehicle numbers (or from 3.14 to 3.45 in terms of spaces). However, if the ban is for summer only, the effect is to reduce the relative sharpness from 3.33 to 3.24 in terms of vehicle numbers.

<sup>10</sup>At peak season, a ban saves 750 spaces per day (250 trucks per day) under a growth rate of demand of 1,500 spaces per day per year.

if other traffic utilises the released space (assuming no price revision). At one extreme, suppose that all released truck spaces are utilised by cars with a typical number of occupants (this will occur from one peak season to the next if the ban is used to postpone investment). Annual revenues<sup>11</sup> will fall by less than 3% (revenues on each released space falling by 20%).<sup>12</sup> Passenger traffic will be 12% higher than it otherwise would be and passenger accommodation will be better utilised than at present.<sup>13</sup> Costs will change little; ticketing costs will increase slightly since the number of vehicles will increase and passenger costs will increase marginally. At the other extreme if excess capacity resulting from the ban is maintained to provide a better level of service, annual revenues will fall by 16%. This will prompt a general review of rates. There will be some saving in administrative costs for commercial vehicles but this is negligible.

#### Short term effects on private ferry operators

Truck traffic will increase immediately on C.P.R. ferry services. If B.C.C.S. captures all banned truck traffic, its commercial vehicle traffic will increase by 100% and will

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<sup>11</sup> Assuming a year-round ban unless otherwise stated.

<sup>12</sup> Based on loss of one truck and driver fare, gain of 3 cars' fares (approximately three occupants per car).

<sup>13</sup> Based on 2.9 occupants per car (historical average), 1.0 occupants per truck and 3.0 cars per truck space. Walk-on passengers are ignored (no available data distinguishes between vehicular and walk-on passengers).

comprise 50% drop trailers and 50% live trucks. Present C.P.R. capacity will be saturated with commercial vehicles by 1974/5 (refer to Exhibit 17). If past C.P.R. policies continue, plans will be initiated for fleet expansion and upgrading of commercial vehicle services. Probably a new vessel will be constructed by 1976.

The immediate effects of the ban on other existing and potential private ferry operators are unclear. Depending upon the success of C.P.R. to provide comprehensive service to live trucks and drop trailers, the effect will be either (i) beneficial to other operators by spillover of drop trailers (or live trucks), possibly encouraging new entrants into the market (e.g. by diversification of existing companies such as Seaspan International) or (ii) harmful by virtue of a possible C.P.R. monopoly in the commercial vehicle market. If the ban is made at short notice, it is unlikely that C.P.R. will be able to mobilise to dominate the market immediately and therefore some traffic will go to T.I.T.L.

If the B.C. Ferries ban is effective for the peak season only, the effects on private operators will be complex. Smoothing of B.C. Ferries demand will be achieved at the expense of creating an artificial summer peaking of demand for private ferry services. Private operators' share of the market will then oscillate from 100% to 50% season by season. The extra costs

associated with peaking will be recovered by either higher year-round prices or peak pricing.

#### Effects on trucking industry

Trucking costs will rise in the short term, and prices to the shipper will follow (neglecting any change in ferry rates themselves). The level of service provided by private operators will be inferior (at least at first) to that provided by B.C. Ferries. Voyage times will increase for truckers and sailings will be less frequent. Costs will change depending on the relative locations of truck origins and destinations and ferry terminals but a minimum average cost increase for live trucks of \$15 per vehicle per trip is a reasonable estimate.<sup>14</sup> This will be approximately a 10-20% cost increase between origin and destination.<sup>15</sup>

The trend towards drop trailers and away from live trucks will be encouraged. Since (under the circumstances described) drop trailers have a cost advantage over live trucks, they will be increasingly used for Island-mainland traffic.

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<sup>14</sup>Based on vehicle standing cost of \$15 per hour (including vehicle costs and driver wage) and moving cost of \$20 per hour. Personal interview with Mr. D.R. MacDonald, Traffic Manager, Trimac Limited, Calgary.

<sup>15</sup>Using an average of 2 hours' moving time, 2 hours' standing time and \$40 ferry fare for each trip, a total cost of \$110 per trip.

Long term effects of ban

In the long term, a permanent government ban on commercial vehicles will result in substantial private investment in ferry facilities. The live truck traffic presently carried by B.C. Ferries is relatively non-seasonal and therefore more attractive to private operators than other traffic types. The C.P.R. has the competitive advantage of being a large established carrier with substantial resources of investment capital. Probably the C.P.R. will attempt to monopolise the entire commercial vehicle market. The location of C.P.R. terminals is favourable for the northerly Nanaimo route but the route to Swartz Bay (for Victoria) from downtown Vancouver is long and time-consuming for live trucks. Private operators with a more southerly mainland terminal are better placed to serve Victoria and are nearer the centre of industrial location (note the position of Tilbury Island). It is here that other private operators can be expected to appear.<sup>16</sup>

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<sup>16</sup>After time of writing, a significant development was reported in The Vancouver Sun, August 14, 1973. A \$60M seaport has been proposed at Tilbury Island, initially accommodating three deep sea vessels and acting as an assembly and distribution point for B.C., Western Canada and the U.S. The Canadian Construction Consortium Ltd. asked Delta Council for approval in principle of the development on August 13, but council voted against giving approval in principle until it receives professional advice on the feasibility of the development.



In leaving the commercial vehicle market, the provincial government abandons the ability to control prices and service levels for commercial traffic, in particular it cannot assure minimum service levels, though of course the possibility of re-entry remains. It is difficult to assess the likelihood of excessive prices, rate wars between private carriers or a decline of services below acceptable levels.<sup>17</sup>

This uncertainty itself is a reason for maintaining some government control capability. Regulation by legal means has been ruled out as a viable instrument of control because of jurisdictional difficulties. The only recourse in these circumstances is revival of government commercial vehicle services (or the threat) to compete with private services.

#### Implementation of policy B

A ban on commercial vehicles can be implemented in several ways. A gradual introduction can be achieved, for example, by first banning certain types of trucks (e.g. very long ones), or by successively raising prices until all trucks choose to use private ferries. An "overnight" ban, with ample notice, could also be used without preliminary steps.

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<sup>17</sup>The reader is referred to the discussion of the controlling effects of government presence in the market described in section 2:1:3 under the headings "Price level effects on competition" and "Service level effects on competition."

### Summary of effects of ban

A ban of commercial vehicles on B.C. Ferries will guarantee a shift of traffic to C.P.R. which might occur in any case (though to a smaller extent). The ban will therefore help to alleviate congestion on B.C. Ferries and/or postpone the need for more capacity. But these effects are small because commercial vehicles occupy only a small proportion of ferry space and because traffic is growing rapidly. A general review of B.C. Ferries rates will be required because of loss of revenue. The C.P.R. can be expected to specialise more heavily in commercial traffic and to invest in extra capacity in the near future. A ban in the summer peak only will transfer a peak load to private operators. Trucking costs will rise (for live trucks) as a direct result of the ban since private operators cannot supply a level of service equivalent to that of the government fleet. In relinquishing its presence in the commercial traffic market the government also abandons an opportunity of influencing the ferry system. The commercial vehicle market may be monopolised by the C.P.R. or alternatively other private operators may flourish, depending whether the C.P.R. mobilises its resources to dominate the market.

### 5:2:3 Policy C: Accepting only a few commercial vehicles

A reduction in the number of commercial vehicles carried by B.C. Ferries (e.g. reduction of market share from

50% to 15%) is designed to retain many of the possible benefits of a complete ban while maintaining government representation in the market as a control measure. It can be implemented by increasing prices, decreasing service levels, or both; i.e. it is a move away from the economic efficiency of present policies for ferrying commercial vehicles (as shown by the pricing model).

#### Effects of policy C and B.C. Ferries

The effects of policy C (e.g. a 70% reduction of trucks) will be similar to, though not as extreme as, policy B (a 100% reduction). Loading and unloading procedures will be simpler than at present. About 7% more deck space could be released at peak times. Revenues will fall unless a general rate revision occurs.

#### Effects of policy C on private ferries

Again, the C.P.R. will receive most diverted traffic. If B.C. Ferries continues policy C for a few years, present C.P.R. capacity will be saturated with commercial traffic by 1975/6 and plans for additional capacity will be initiated in the near future. The future of other private operators is not clear and depends on whether C.P.R. upgrades its services sufficiently to satisfy the live truck market.

#### Effects of policy C on truckers

The effect of policy C will be a general increase in

trucking costs. This will arise either from the ferry fare increase involved in the policy or from the lower level of service. The cost increase will be of the same order of magnitude as for policy B (10%-20%). Again, the trend from live trucks to drop trailers will be reinforced.

#### Long term effects of policy C

The major difference between policies B and C lies in the degree of government control in the system by retaining a presence in the commercial vehicle market; the provincial government maintains the flexibility to influence price and service levels according to its policy. Commercial vehicle rates can be prevented from rising above competitive levels and minimum service levels can be maintained. However, the possibility of destructive competition between private carriers is not removed. Any advantage of policy C over policy B lies in the extent to which services are guaranteed rather than in control of competition between carriers and its effects on the level of private investment. Indeed the vestigial government presence in policy C may itself be a long term discouragement to private investment (in the early sixties, the very presence of the government accounted for at least one private operator's decision not to enter the ferry business).

### Implementation of policy C

The present market share can be reduced in several ways. A simple price rise will divert live trucks to private ferries. A reduction in service level (e.g. by restricting the number of sailings open to truckers) will have the same effect. The problem is to decide how much to raise price or reduce service level to obtain the target market fraction. A stepwise change in prices (maintaining current service levels) can be used. Only a small number of changes (e.g. two) should be made, otherwise the truckers might not respond intelligently to the rates. Alternatively, trucks can be banned at peak times and permitted to use only less congested sailings. Other possibilities are to withdraw the guarantee of a space if the truck arrives 30 minutes before sailing, or to institute a limited space reservation system. A subsequent pricing adjustment can be made to correct to the desired demand.

### Summary of effects of policy C

A reduction of the commercial vehicle market share of B.C. Ferries can be achieved by increasing prices, reducing service levels to commercial vehicles, or both. It will reinforce a shift to the C.P.R. and will therefore help to alleviate congestion on B.C. Ferries. But the effect is small because trucks occupy a small fraction of B.C. Ferries and because traffic is growing rapidly. The C.P.R. will probably invest in

a new vessel in the next few years. Costs will rise for live trucks, but this will be controllable to some extent because of the government's presence. The risk of complete disruption of commercial vehicle services (e.g. by strike action) is reduced. Private capital investment in ferries by other potential operators may be inhibited by continued government presence in the commercial vehicle market.

### 5:3 Comparison of alternative policies

Three major areas of difference between policies A, B, and C have emerged. These are (a) in the economic efficiency of each model as indicated by the pricing model of chapter 2, (b) the implications of each policy for other traffic types and for the future capacity requirements of B.C. Ferries and (c) the implications of each policy for government influence and future private investment in the ferry system. These are discussed in turn.

#### (a) Economic efficiency in commercial vehicle operations

Present commercial vehicle policy (policy A) approximates to economic efficiency because present pricing policy is close to that recommended by the model of chapter 2, i.e., the indications are that present policy allocates resources for the transportation of goods between Vancouver Island and the mainland in a fairly efficient fashion. Policies B and C involve different levels of service and price (higher price and lower service level) for commercial vehicles and therefore appear to be less economically efficient.

Policies B and C involve substantially increased trucking costs. There are real resource costs involved in forcing live trucks to use longer ferry routes and less convenient schedules. This is not because B.C. Ferry trucking

rates are subsidised since trucks appear to pay their costs. It is essentially because the location of the C.P.R. route makes it less efficient for transporting live trucks than B.C. Ferries route 1 (between the mainland and the Victoria area).<sup>18</sup>

(b) Implications for other traffic types and fleet expansion

If policies towards other, non-commercial, traffic are continued, the policies A, B and C lead to different requirements for increasing B.C. Ferries' capacity. If the policy of serving all non-commercial demand which appears (at relatively low prices) is continued, there is an immediate problem in serving the summer peaks of demand in 1974 and 1975 or until the new Gabriola route is constructed. If the capital investment required is to be minimised, then all existing ferry facilities, including privately owned facilities, must be utilised. Chapter 4 showed in detail the effects of utilising excess C.P.R. capacity on B.C. Ferries' demand. Policy A does not guarantee that C.P.R. capacity will be utilised. Policies B and C take positive steps to ensure its utilisation.

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<sup>18</sup> An average additional real resource cost of \$15 per live truck trip for Victoria services would total \$0.5M. per year. This contrasts with the capital cost lump sum saving of \$0.25M. (\$5M. at 8% for 6 months) afforded by postponement of investment in ferry capacity. This calculation is not sufficient in itself; a benefit-cost study would also count other benefits and costs, notably time savings for non-commercial traffic associated with the ban.



(c) Government influence in the system

The continuation of present policies allows the government to exert some control over prices and services in the system. This is also seen in policy C. A ban on commercial vehicles (policy B) eliminates this capability. The policies can only be judged in the light of the value placed on this control capability by the government. This value as a matter of government policy is not known.

While control is enhanced with government participation, private investment is discouraged. If it is the long term policy to encourage private investment, this is best done by adopting policy B (the ban), or by declaring that it is to be adopted in the future. At present there is little evidence to indicate whether a multi-carrier private system would emerge, or whether a monopolist would take over the market. But it is apparent that the market would be served if the government were to withdraw.

CHAPTER 6

CONCLUSION

## 6.1 Review of thesis

The rationale for this thesis lies in the current state of flux in ferry operations in British Columbia, particularly in ferry operations between Vancouver Island and the mainland. Freight traffic is expanding rapidly and there is a growing emphasis on the use of highway trucks as opposed to rail cars. Vancouver is used increasingly as an assembly and distribution point for Island goods. Non-commercial traffic is also expanding, notably summer recreational traffic. Privately owned ferry services have been upgraded as a consequence of the pressure on B.C. Ferries. This state of flux calls for an examination of the present government ferry policy and the alternatives.

In British Columbia, the government participates with private enterprise in the operation of the ferry system. The arrangement is an unregulated, mixed public/private system. In this arrangement the policy variables open to the government are the prices and services of the public carrier, B.C. Ferries. The thesis examines the effects of these variables on the entire system of ferries, and proposes objectives and criteria in setting these variables.

The primary objective of the thesis is to examine and compare alternative commercial vehicle policies. This objective is approached first by identifying the analyst's role in policy-making. The analyst's task is to analyse the policy alternatives

in terms of economic efficiency and to explore their implications for identified social or political objectives which are important but external to the objective of economic efficiency. These other objectives can then be weighed by the policy-maker.

The objective of economic efficiency indicates that pricing of B.C. Ferries commercial vehicle services should cover all costs and make a reasonable return on capital invested, including an allowance for the equivalent of income taxes. This behaviour is the same as that which would be practised by a competitive private enterprise. Other pricing behaviour of B.C. Ferries would lead to a distortion of the optimal allocation of resources. However, there are public policy objectives and considerations which transcend pure economic efficiency objectives. These other objectives and considerations appear from a discussion of past developments in ferry operations in the province. They are principally (i) the economic and political importance of continuous ferry operations in the province which provides a rationale for some element of government control in the system, (ii) the policy objectives for the long term development of the ferry system, whether public or private, in light of the potentially severe effect of government participation on private competition; and (iii) the importance of serving non-commercial vehicles, since the government's present policy seems to be to carry these vehicles at present price and

service levels at less than cost.

A subsidiary objective of the thesis is to assemble a body of information about ferry operations in B.C. which may be useful to future researchers. This is accomplished by reviewing the history of ferry operations in the Northwest and by analysing the current operating and financial situation of B.C. Ferries.

The final analysis shows that present policy in commercial vehicle operations is apparently close to that which is dictated by pure efficiency considerations; but other considerations, above, may dominate in the policy decision. Other possible policies considered are total withdrawal from the commercial vehicle market, and partial withdrawal. The effects of these policies differ in several ways. The fewer commercial vehicles carried, the greater the relief to B.C. Ferries' pressing capacity requirements and non-commercial vehicles are more easily accommodated. But the potential relief is not very great. If trucks are transferred to private ferries, the level of government control and influence over commercial vehicle ferry operations is reduced. This can be weighed against the political and economic importance of government control. As government influence declines, there is a corresponding encouragement to private operators to invest in ferry facilities to serve the commercial vehicle market.

In summary, the objective of analysing alternative policies is accomplished by bringing together the terms of reference provided by chapter 2, the background of ferry operations in chapter 3 and the detailed data of chapter 4. The thesis confines itself to an examination of commercial vehicle policies but necessarily touches related topics. Some of these merit greater attention than can be given in this thesis. These "suggestions for future research" are outlined in the following section.

## 6.2 Suggestions for future research

Alternative policies towards non-commercial vehicles, especially tourist and commuter groups, could be usefully investigated. This thesis showed that recreational vehicles form the fastest growing traffic component. One policy alternative is to charge regular users as at present but to charge tourists a peak season premium (the groups could be distinguished by allowing bulk purchase of tickets with discount which irregular users would not find attractive). This would help to recover the costs associated with summer peaking. Alternatively the feasibility of a reservation system could be investigated, possibly with privileges for island residents. However, the Minister of Highways has said in parliament that any attempt to give preference to Island or mainland residents would "give B.C. a bad name" among tourists.<sup>1</sup>

At the present time it is unclear whether late or night-runs will be instituted on B.C. Ferries. A useful topic would be to examine policy alternatives for operating rules and rates on these ferries (night time labour costs which form the major proportion of ferry operating expense will make night runs considerably more expensive than daytime runs).

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<sup>1</sup>The Victoria Daily Colonist, March 16, 1973 and Alberni Valley Times, March 20, 1973.

General research to identify factors which determine the demand for travel would assist in predicting traffic and suggest methods of influencing it. For example, there is some evidence to show that potential travellers are strongly inhibited if they know before making plans that services are heavily congested; on a holiday weekend in May, 1973, B.C. Ferries sponsored radio bulletins throughout the weekend advising motorists that there would be no extra sailings on any ferry run (because of labour difficulties).<sup>2</sup> The result on Routes 1 and 2 was that traffic was considerably less than expected, and was even less than on a normal weekend. This suggests that if motorists can be informed of the likely length of queues for a given sailing they will adjust their plans accordingly. For example, a taped telephone message could inform inquirers of the estimated latest times they should arrive at a ferry terminal to board the sailing. This is an intriguing management science problem because of the feedback effect of the telephone service itself on the length of the line-ups.

There is a general need for data on all ferry users to assist in policymaking. Origin-destination data for all types of vehicles will assist, among other things, in predicting

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<sup>2</sup>The Vancouver Sun, May 22, 1973.



demand for the new Gabriola route. It will also assist in the design of highway access to the new terminals and the design of a minimum-cost system of Island-mainland transportation.

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