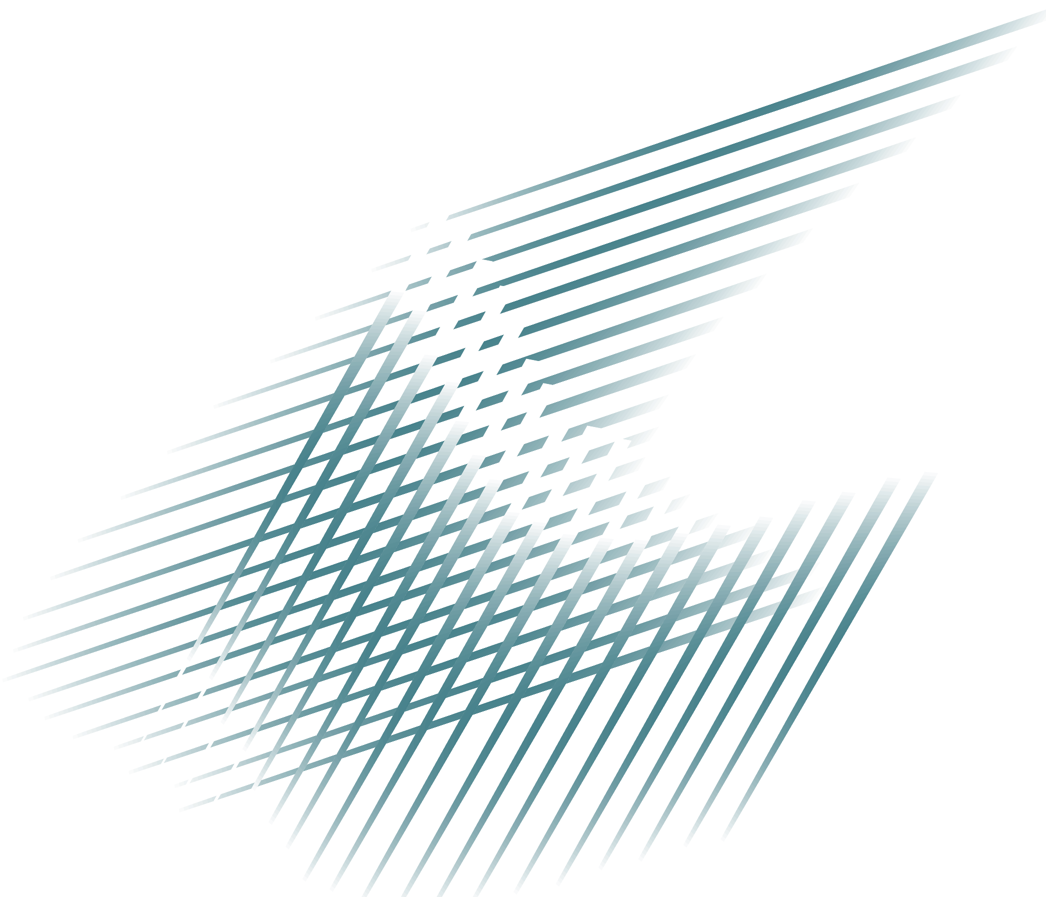
TP 13198E

TRANSPORTATION IN CANADA 1998

ANNUAL REPORT



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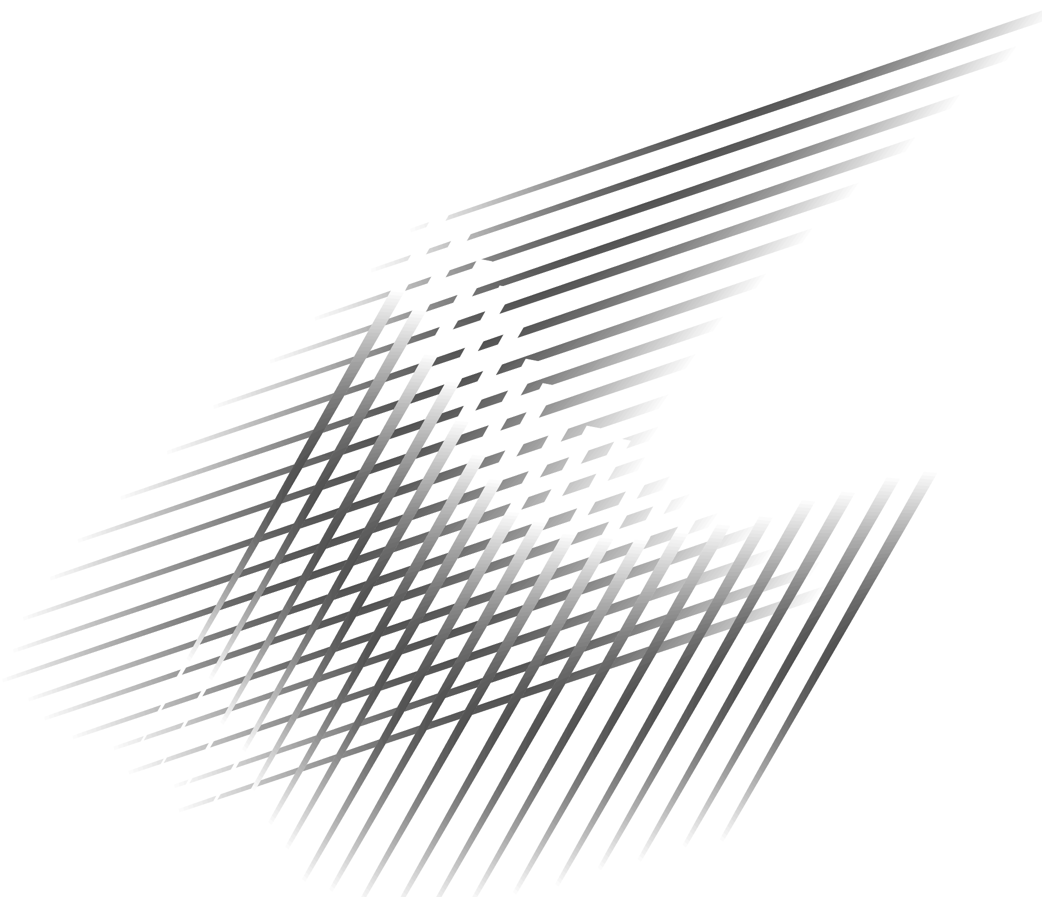

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Cat. No. T1-10/1998E
ISBN 0-662-27586-1

Également disponible en français sous le titre «Les transports au Canada 1998»

Minister of Transport Ministre des Transports

Ottawa, Canada K1A 0N5

28/4/99

His Excellency the Right Honourable Roméo Leblanc, P.C., C.C., C.M.M., C.D.
Governor General of Canada
Rideau Hall
1 Sussex Drive
Ottawa, Ontario
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Excellency:

I am pleased to submit to your attention the 1998 annual report on the state of transportation in Canada. This report responds to the requirements set out in section 52 of the Canada Transportation Act.

The World Economic Forum, an organization which ranks countries in terms of their global competitiveness, has identified Canada's transportation system as the best in the world. While we can take pride in this international recognition, we have to ensure that our transportation system continues to support Canada's global competitiveness, economic productivity, healthy social structures and a sustainable quality of life.

The 1998 annual report provides a unique collection of data and observations on the use of the Canadian transportation system, its performance, its safety, its impact on energy conservation and the environment, and its contribution to the economy and well-being of Canadians. In 1998, transportation continued to support economic growth driven largely by Canada's trade activity. The financial results of transport carriers experienced a slight erosion in 1998, compared to 1997, while improvements in transportation safety and productivity of carriers were continued.

The federal government policy framework continues to emphasize market forces, while ensuring the safety and security of the transportation system through regulation and monitoring of compliance. As Canada prepares to enter the new millennium, it becomes more important for all levels of government to work together with communities, urban and rural, and with all stakeholders, shippers, carriers and consumers, to preserve a transportation system that meets the highest standards in the world.

Yours sincerely,

Hon. David M. Collenette, P.C., M.P.

Canada

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Report Highlights

PART A
THE ECONOMY, PRODUCTIVITY PERFORMANCE AND GOVERNMENT SPENDING

Transportation – The Canadian Economy and Sector Productivity

- In 1998, transportation accounted for 3.9 per cent of Canada's GDP.
- Investment in transportation by governments and businesses averaged $18.8 billion per year between 1993 and 1996.
- The annual growth in domestic transportation demand in 1997 was nine per cent, 3.4 per cent more than the growth in total final domestic demand.
- On an average Canadian household budget of $45,158 in 1998, $6,846 or 15 per cent of the budget was spent on transportation. The car is the dominant source of household transportation expenditures, with an average of $5,959 spent on buying, operating and maintaining it.
- The Canadian economy grew by roughly 2.8 per cent in 1998, investments and exports being the two main drivers of this growth.
- Exports grew, in real terms, by over eight per cent, despite the significant drops in Canada's exports to Japan and other Asian economies struggling with severe financial crises.
- The rate of inflation declined in 1998 in comparison to the already low rate reported in 1997.
- In 1998, transportation's GDP increased by 1.5 per cent, as opposed to the 5.4 per cent increase of 1997. Weaknesses were observed in both rail and marine, a situation caused indirectly by the financial difficulties of Japan and other Asian countries.

- The large Canadian metropolitan areas account for most of the country's strong urban population growth.
- From 1991 to 1997, transportation labour productivity increases reached an annual average of 5.8 per cent and surpassed significantly the productivity performance in the goods (1.4 per cent) and services (1.5 per cent) sectors. Between 1991 and 1997, the transportation sector's "production" increased by 44 per cent while employment increased by only 4.7 per cent.
- Since 1981, transportation's unit costs have increased at a slower pace than the overall rate of inflation. If transportation unit costs had increased at the same rate as inflation from 1981 to 1997, total transportation costs would have been $9.5 billion higher in 1997. More importantly, 85 per cent of the cost savings have been passed on to users through lower prices, or lower price increases. Since 1993, one quarter of the savings have been kept by the transportation carriers to restore their financial health.
- Canada pursued its efforts on the international scene towards the convergence of transportation standards, rules and regulations among countries, participating in the work of various committees of international organizations such as the International Maritime Organization, the International Civil Aviation Organization, the Organization for Economic Co-Operation and Development and the United Nations. Canada was also active in the transportation initiatives tied to NAFTA and APEC, and participated in a Western Hemisphere Transportation Ministerial meeting.

Government Spending

- Total government spending on transportation in 1997/98 amounted to $17 billion. Municipal governments have clearly seen their transportation expenditures increased in the 1990s to a point where their net transport expenditures are almost equal to the ones made by provincial/territorial governments.
- The federal government was proposing to recover 17 per cent of its gross transportation expenditures in 1998/99.
- Total direct federal subsidies, grants and contributions to transportation were to be in the order of $812 million in 1998/99. Air, with 32 per cent, had the largest share, followed by rail, with 30 per cent; highways and bridges, 27 per cent; marine, about ten per cent; and a fraction of one per cent going towards trucking.
- Spending on roads and highways increased in 1997/98, accounting for almost $6 billion of provincial/territorial expenditures on transportation and so did their expenditures on transit. Federal transfers to the provinces/territories in 1997/98 increased, due largely to the Labrador ferry services buyout.
- The percentage of provincial/territorial transportation budgets spent on roads and highways varied, with Prince Edward Island at one extreme, with almost 100 per cent, and the Northwest Territories at the other, with 38 per cent. Transit spending is more significant in Quebec, Ontario and British Columbia than in any other provincial/territorial transportation budget.

PART B
Transportation and Sustainability

Transportation and Safety

- While 1998 was marked with some tragic and high-profile transportation accidents, the overall safety record of Canada's transportation system continued to improve in 1998.
- Canadian-registered aircraft were involved in 384 accidents and 83 fatalities in 1998. Forty per cent of these accidents involved private operators. Of the 162 commercial aviation accidents, 138 were related to air-taxi or aerial-work types of operations. While the number of accidents in 1998 was up slightly from the five year average (378), the number of fatalities was below the corresponding average (87), as was the number of fatal accidents (31 vs 43).
- There were 1,081 railway accidents in 1998, four per cent fewer than in 1997, for an accident rate of 14.2 accidents per million train-miles and 100 fatalities. With respect to the 1998 rail-related accidents, 46 per cent had to do with non main-track derailments and collisions, 26 per cent with crossing accidents, and ten per cent with main-track derailments. Fatalities occurred mostly from accidents at crossings or accidents involving trespassers.
- A total of 546 marine accidents were reported in 1998. Shipping accidents have declined annually by nine per cent, on average, since 1990. A total of 530 vessels were involved in

shipping accidents during the year, eight per cent less than in 1997. The number of fatalities increased to 47, from the 24 reported in 1997, an increase resulting from the 21 lives lost on the Cypriot-registered *MV FLARE* off the East Coast.

- The number of fatalities from motor vehicle accidents was 3,064 in 1997 (the most recent year for which information is available). The data shows no evidence of an increasing proportion of road collisions and fatalities involving commercial vehicles. Private automobiles accounted for 55 per cent of the total fatal collisions involving vehicles. Light duty trucks and vans had the second largest share with 24 per cent.
- There were 436 reportable dangerous goods accidents in 1998, and 12 fatalities. Two of these fatalities were caused by dangerous goods.

Transportation and Environment

- In 1998, federal and provincial/territorial Ministers of Transportation launched a Transportation Table on Climate Change as part of a national process led by Energy and Environment Ministers to develop a climate change strategy in response to the Kyoto Protocol. If ratified, the Kyoto Protocol would require Canada to reduce emissions of greenhouse gases to six per cent below 1990 levels by 2008 - 2012. The Transportation Table is composed of 26 representatives drawn from federal, provincial and municipal governments, transport sector private organizations, environmental groups and other stakeholders in Canada's transport system. The Table is to develop options by mid-1999 to reduce emissions of greenhouse gases from transportation, which is the largest source of Canada's emissions.
- In 1998, among the transportation initiatives to mitigate air quality concerns in Canada. The Minister of the Environment proposed new regulations to reduce the sulphur content in gasoline sold in Canada. There was also the development of Canada-wide standards on particulate matter and ozone; a study on airport air quality with the Aéroports de Montréal and the Montréal Urban Community; vehicle emissions inspection clinics; the International Civil Aviation Organization working group on ground source emissions; and the United Nations Economic Commission for Europe protocols on persistent organic pollutants and heavy metals under the Convention on Long Range Transboundary Air Pollution.
- Amendments to the *Canadian Environment Protection Act* (CEPA) are being proposed in a Bill introduced by the federal Minister of the Environment. For transportation, the amended Act would provide a new authority to control motor vehicle and other engine emissions, to develop a new national emissions mark for engines meeting emissions requirements, and a national fuel mark to show that fuels meet environmental standards.

Transportation and Energy

- Gasoline prices in 1998 were at their lowest levels in about 20 years.
- On the R&D front, a development that has both energy and environmental impacts is the Ballard fuel cell, a zero-emission engine that converts natural gas, methanol, gasoline, or hydrogen fuel into electricity without combustion. Agreements were reached in 1998 with automobile manufacturers that will advance the penetration of fuel cell technology into the market.
- A joint venture between Iogen, an Ottawa-based company, and Petro-Canada, has been created to look after the production of ethanol fuel.

Transportation and Regional Economies

- Prince Edward Island, Manitoba and New Brunswick have the highest provincial share of commercial transportation in Canada. In Ontario and Quebec, commercial transportation's contribution to the Provincial Gross Domestic Product is lower than in Western Canada, due to differences in the relative importance of primary commodities in their total economic activities, differences in population density and in their proximity to major US markets.
- Private transportation makes up the largest segment of total transportation demand in all provinces, being highest in Prince Edward Island, followed by Saskatchewan. The territories have the smallest share of private transportation but the highest share of government expenditures. Higher transportation demand is observed in Eastern and Western Canada.
- Prince Edward Island and Nova Scotia had in 1996 the largest proportion of their total

investment going to transportation, more specifically on road, with Alberta and Saskatchewan at the other end of the scale.

TRANSPORTATION AND EMPLOYMENT

- Full-time jobs directly associated with the provision of transportation services, development and maintenance of infrastructure, government services related to transportation and other associated services accounted for an estimated 6.4 per cent of all jobs in Canada in 1998. This is less than the 6.7 per cent reported in 1995.
- During 1998, the provision of transportation services (air, marine, rail and bus carriers, trucking companies and local services such as taxi and limousine services) made up an estimated 71.6 per cent of all transportation jobs. Associated services, such as marine pilotage and travel operators and tour guides, accounted for 12.6 per cent, while the development and maintenance of infrastructure generated 11.9 per cent. Transport-related jobs in the federal, provincial and municipal governments accounted for the remaining 3.9 per cent.
- The trucking industry was the most important mode in terms of direct full-time jobs, accounting for an estimated 41.1 per cent of all transport-related employment in 1998. The air industry was the second most important, with an estimated 15.1 per cent of all jobs. Bus/urban transit, rail, local services and marine generated 7.9, 6.3, 5.1 and four per cent of all transportation jobs respectively.
- At the end of the first three quarters of 1998, average weekly earnings across all modes, including overtime, was $729. Railway employees averaged $990, compared to $633 by public transit employees. The trucking industry registered a 5.2 per cent increase in average weekly earnings in 1998, compared to a 1.8 per cent increase across all modes. Average weekly earning for air and rail both declined slightly in 1998.
- Fourteen work stoppages in the transportation sector in 1998 led to the loss of 73,170 person-days. Three of the stoppages were in the air industry, leading to the loss of 33,840 person-days (53 per cent of all days lost).

TRANSPORTATION AND TRADE

- With respect to domestic trade, intraprovincial and interprovincial trade have maintained their respective shares of 85 and 15 per cent between 1984 and 1996.
- Domestic trade, in 1996, was 431 million metric tonnes of goods split as follow between the modes: 46 per cent to rail; 42 per cent to for-hire trucking, 11 per cent to marine and one per cent to air.
- Between 1984 and 1996, intraprovincial trade grew, on average, at the annual rate of five per cent. Close to two-thirds of the intraprovincial trade was “service” related in 1996.
- Interprovincial trade grew at the average annual rate of 3.4 per cent between 1984 and 1996 but services in that trade grew at 6.1 per cent while goods experienced a 1.8 per cent annual increase. Ontario and Quebec are the most significant trade partners.
- From 1990 to 1996, international exports grew at an average annual rate of 10.5 per cent, compared to 2.2 per cent for interprovincial trade.
- In the Canada-US trade, the surface modes are the favoured choice. Ontario dominates this trade, accounting for almost two thirds of it in 1997.
- Canadian exports to the US, have grown twice as much as to other countries.

TRANSPORTATION AND TOURISM

- In 1997, tourist spending in Canada totaled $44 billion, 40 per cent of which was on transportation.
- Between 1991 and 1997, tourist spending in Canada grew at the rate of 2.9 per cent, and preliminary information indicates that this trend continued in 1998.
- Tourist spending on transportation in 1997 was broken down as follows: 56 per cent on air, 37 per cent on motor vehicle transportation, three per cent on intercity bus transport and one per cent on rail; the remaining share of tourist transportation expenditures went on water transport, urban transit, taxis and parking.
- Tourism represented 43 per cent of transportation spending by consumers and businesses in 1997.
- Ontario was in 1997 the destination for 35 per cent of total domestic trips, followed by Quebec (21 per cent), Alberta (14 per cent) and British Columbia (11 per cent).
- Canadians used the automobile for 91 per cent of their domestic

travel. Same-day automobile travel accounted for 64 per cent of all trips between Canada and the US.

Transportation and Information Technology

- Information and communication technologies are used in transportation to maximize efficiency of functions such as "scheduling", "routing" and "administration". They are also used to track vehicles, cargo, and to transmit transport-related documents (e.g. manifests, bill of lading, invoices, ...)
- Intelligent Transportation Systems (ITS) are used to track, in real time, congestion, vehicles; to automate reactive-control devices such as traffic lights to control traffic more efficiently, or to automate electronic fare/toll payment.
- In a supply chain environment, information and communication technologies come into play to permit just-in-time processes integrating production, shipping and sales to streamline delivery and eliminate or minimize inventory through interconnected information systems.

PART C Transportation - Infrastructure and Services

Transportation Infrastructure

- In 1998, NAV Canada became a self-funded organization, using its fees to recover all the costs of its services to its customers.
- The airports in London (Ontario) and St. John's (Newfoundland) were transferred in 1998 to Canadian Airports Authorities. The airport in Saskatoon, Saskatchewan was transferred on January 1, 1999. Thirty six projects at 25 airports were approved in 1998 for funding under the Airport Capital Assistance Program, for a total funding of $20.9 million.
- The *Canada Marine Act* received royal assent on June 11, 1998. The Act defines three categories of ports: Canada Ports Authorities; regional and local ports; and remote ports. Part III of the Act establishes the new framework for the management of the St. Lawrence Seaway.
- More than 25 per cent of the Canadian rail network at the end of 1998 was owned and/or operated by regional or shortline railways. Rail rationalization activities of the two major Canadian railways took mostly the form of transfers in 1998. Discontinuances of lines in 1998 translated into a reduction of 0.7 per cent of the rail network.

Industry Structure

- In 1998, eight new railways came into being as a result of transfers of trackage from the two Canadian major rail carriers. While the number of shortline railways within Canada has increased significantly since the passage of the *Canada Transportation Act* (1996), a group of six corporations account for 89 per cent of regional and shortline trackage transferred and 71 per cent of shortline carriers created since then.
- The year 1998, as in previous years, had an important number of mergers and acquisitions both within the domestic trucking industry as well as between Canadian and Americans carriers.
- Within the intercity bus industry, Laidlaw Inc. continued its expansion, purchasing Voyageur Colonial, and buying a minority interest in Penetang Midland Coach Lines Ltd., an Ontario-based provider of scheduled, charter, urban transit and school bus services. Laidlaw Inc. also placed a bid to purchase Greyhound Lines Inc. of Dallas, Texas, a company independent of Greyhound Canada.
- CP Ships, a member of the Canadian Pacific Ltd. Holding, acquired South American operator Ivaran Lines, and purchased Australia New Zealand Direct Lines, the latter acquisition being subject to regulatory approval. Seaspan Coastal Intermodal Company purchased the assets of Canadian Pacific Railways west coast marine transportation business, Coastal Marine Operations.
- Canada's two major air carriers strengthened their international reach in 1998 by becoming partners in major global alliances of airlines - Air Canada with Star Alliance and Canadian Airlines International with oneworld. Two regional affiliates have become independent of their major partner, e.g. Canadian North (Air Northern) and Inter-Canadien.

Freight Transportation

- Rail traffic in 1998 did not reach its 1997 record level, showing a 3.6 per cent decrease.

- For trucking, both the domestic and transborder market generated growth but the growth in the transborder market has been surpassing the one in the domestic market since the beginning of the 1990s. General freight is responsible for a significant proportion of the growth in truck traffic.
- Domestic marine traffic continued to decline as a result of changes in the direction of Canada's international trade. International marine traffic volumes increased, a situation explained by the growth in Canada's exports. The most significant increase was observed in the Canada-US market.
- Air cargo continued to show signs of expansion.

PASSENGER TRANSPORTATION

- Intercity rail passenger traffic increased by one per cent in 1997 while passenger-kilometres decreased marginally.
- The number of passengers using scheduled intercity bus services increased in 1997 and reached 11.3 million.
- In 1998, international cruise ship traffic was up at all Canadian major ports.
- According to preliminary statistics for 1998, domestic and transborder traffic increased.
- The number of registered automobiles continued to increase.

PRICE, PRODUCTIVITY AND FINANCIAL PERFORMANCE

- The transportation sector has achieved significant productivity growth in the 1990s. Productivity growth in the 1986 to 1991 period was in the order of 1.3 per cent per year, a performance to be compared to the 0.2 per cent decline in the productivity performance of the economy as a whole over the same period. After 1991, the productivity of the transport sector reached average increases of 3.2 per cent per year, a performance partly made possible as a result of deregulation and other transportation policy initiatives, as well as the upturn in the economy.
- The benefits of such productivity gains have been shared between employees, shippers/passengers and the transport industry, through higher average wages, lower transportation prices and improved profitability.
- The prices of transportation services have increased less rapidly than the average prices of the economy since 1986. Between 1986 and 1997, GDP prices increased by 2.5 per cent per year; the average annual price change in the air industry was 1.6 per cent; 0.6 per cent for rail freight rates; and 0.3 per cent for trucking average rates. Since 1991, transport prices have actually declined in nominal terms.
- Since 1991, output growth of transport industries (six per cent a year) almost doubled the performance of the economy since it emerged from the recession. This is the opposite of the trend observed in the 1980s when the average growth of transport activity (0.9 per cent) was less than the growth of the economy (2.2 per cent). Growth in the 1990s was particularly strong in trucking with an average annual increase of 9.5 per cent.
- The financial performance of private transport firms improved up until 1998. Their operating margins improved as a result of productivity gains. In 1998, the air industry showed a deterioration in profitability. The freight railway industry continued to show a strong financial performance and its average operating ratio lowered to 77 per cent. Profitability in trucking also improved.
- Public transport firms faced a different situation. VIA Rail 's improved efficiency served to minimise the effect of reduced subsidy levels on user prices. For public transit systems as a whole, the importance of operating subsidies started to decline in 1992, and in 1997 improved productivity could be reported.

1

INTRODUCTION

The 1998 annual report on the state of transportation in Canada brings together, under one cover, a unique collection of data and observations on the use of the Canadian transportation system, its performance, its safety, its impact on energy consumption and the environment, and its contribution to the economy and the well-being of Canadians.

The requirement to prepare an annual report on the state of transportation in Canada began with the passage of the *Canada Transportation Act* (1996). The Act specifies in section 52 that:

"Each year the Minister shall, before the end of May, lay before Parliament a report briefly reviewing the state of transportation in Canada in respect of the preceding year, including:

(a) the financial viability of each mode of transportation and its contribution to the Canadian economy and the development of the regions;

(b) the extent to which carriers and modes of transportation were provided resources, facilities and services at public expenses;

(c) the extent to which carriers and modes of transportation received compensation, indirectly or directly, for the resources, facilities and services that were required to be provided as an imposed public duty; and

(d) any other transportation matters the Minister considers appropriate."

This third annual report submitted by the Minister of Transport brings together the most current information on the state of Canada's transportation system. As with the previous two reports, the coverage of transportation is deliberately as comprehensive and as broad as possible. While jurisdictional considerations are not neglected, they are not used to delineate the scope of the report. Data availability, however, imposes clear limitations. As much as possible, 1998 information is reported. And when it was not available, the most current year accessible is used.

The picture of transportation presented in this report covers freight and passenger transportation, facilities and services as well as some pertinent economic, safety, energy and environmental dimensions and to a limited extent, transportation vehicles. Nevertheless, the picture is imperfect because of information gaps. For instance, it is difficult to measure the increasing importance in the global economy of critical transportation features such as “speed” and “reliability”, to mention only two.

The Annual Report, where possible, allows for comparisons with previous years’ reports. But when more recent information than the one reported in earlier reports is not available, the report is silent. The reader is invited to go to previous year’s reports to get the information.

This year’s report is divided into three parts. The two chapters of Part A provide a context for the whole report. A review of the year 1998, with an emphasis on the Canadian economy, draws attention to the relationship between Canada’s economic performance and transportation. It is followed by a comparison of the productivity performance of the economy and the transportation sector and an overview of international transportation-related initiatives in 1998. The last chapter of Part A provides an overview of government spending and revenues tied to transportation.

Part B looks at transportation from a sustainability perspective. Eight chapters cover key subjects related to sustainability – safety, environment, energy, regional economies, employment, trade, tourism, and information and communication technology.

Part C, the last part of the report, examines specific elements of the Canadian transportation system. A chapter on the transportation infrastructure precedes one on the industry structure of the different modes of transportation. Then two chapters examine transportation activities, differentiating between freight and passenger transportation. The last chapter presents an overview by mode of prices, productivity and financial results.

While there is an undeniable continuity with the previous two reports, the content of this year’s report is structured differently and expanded slightly. Purposely, the report will evolve from one year to another to properly address current issues and developments. To meet all of the Act’s reporting requirements fully is more than a question of data availability. It is also one of pushing the conceptual knowledge barriers and developing analytical tools to arrive at measuring all the dimensions of transportation in an integrated and inter-related way. It is with this objective in mind that a research work plan is being pursued to address some of the key information gaps in the coming years. With the successful completion of a pilot program to test a new Canadian Vehicle Survey, described in the 1997 Annual Report, full implementation of this survey will be launched in 1999. The survey will address some important information gaps as it will provide activity data (vehicles-kilometres, passenger-kilometres and tonne-kilometres) by type of vehicle, users, trips, commodities, road type and time.

This report is based to a large extent on data coming from sources external to the Department. When the data originated from a mandated data-gathering organization such as Statistics Canada, the validity and reliability of the data was assumed, and therefore not challenged. Otherwise, conscious efforts of validation were undertaken.

PART A

THE ECONOMY, PRODUCTIVITY PERFORMANCE AND GOVERNMENT SPENDING

Transportation enables goods and passengers to be carried between and within production and consumption centres. Transportation creates internal economies for many sectors and fosters external economies for all sectors. Therefore, transportation plays an important, if not vital, role in the productivity performance of an economy. But the need for improved transportation goes beyond purely economic considerations. Organized human activities would not be possible without transportation. As a result, transportation has always been a concern to government and has given rise to public expenditures.

PART A – THE ECONOMY, PRODUCTIVITY PERFORMANCE AND GOVERNMENT SPENDING

2

TRANSPORTATION – THE CANADIAN ECONOMY AND SECTOR PRODUCTIVITY

In 1998, the Canadian economy kept on course throughout financial twists and turns while transportation services inched forward.

In Canada, transportation is critically important, supporting all socio-economic activities. Every good or service Canadians produce or consume relies, somehow, on the transportation system.

This chapter gives an overview of the state of Canada's transportation sector and the role transportation plays in the Canadian economy. The chapter begins by looking at how important transportation is to the economy, then turns to a review of 1998 and an examination of Canada's economic performance to put into perspective what happened in transportation this year. This chapter also examines the demand and supply of transportation to determine what was influencing the use of different modes of transport. The chapter looks at recent key demographic trends and their impact on transportation. It then turns to a comparison of the productivity performance of the economy and the transportation sector, before presenting an overview of Canadian participation in international transportation – related initiatives in 1998.

THE IMPORTANCE OF TRANSPORTATION

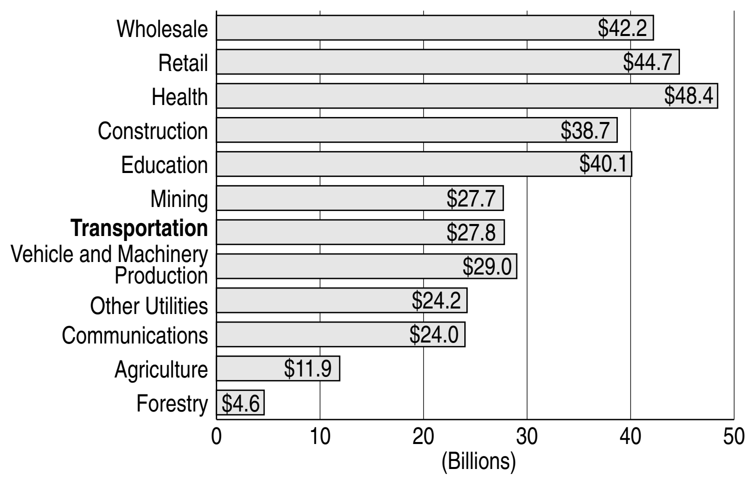
There are many ways to measure the importance of transportation to the Canadian economy. This chapter will examine several, providing a solid overview of transportation's importance in the economy.

TRANSPORTATION IN THE GDP

In 1998, transportation's Gross Domestic Product (GDP) totalled $27.8 billion, accounting for 3.9 per cent of Canada's total GDP.

FIGURE 2-1
TRANSPORTATION COMPARED TO OTHER SECTORS IN CANADA

(1998 Gross Domestic Product expressed in billions of 1992 dollars)



Source: Statistics Canada, Cat. 15-001

TABLE 2-1
GROSS DOMESTIC PRODUCT PRICES AND INCOME

	1998 (Level)	*1997 – 1998 (Real % change)*	*1991 – 1998 (AAPC)*[1]
GDP (billions of dollars)			
Total	**718**	**2.8**	**2.6**
Goods Industries	236	2.0	2.7
Services Industries	482	3.1	2.6
Transport	**27.8**	**1.5**	**3.5**
Trucking	11.0	4.1	7.7
Rail	4.0	-2.4	1.4
Air	4.3	3.9	5.6
Marine	1.9	-2.9	-1.6
Other[2]	6.6	0.1	-0.2
Income[3]	16,495	0.9	-0.3
Population (millions)	30.3	1.0	1.1
Prices[4] - Total economy	**107.0**	**-0.4**	**1.2**
Transport	**99.8**	**-0.2**	**-0.1**

Note: GDP is at factor cost and in billions of 1992 dollars.
All per cent changes are in real terms.
1 AAPC = Average annual per cent change.
2 Includes urban transit, taxis, inter-urban and other transport activities.
3 Personal Real Disposable Income per Capita, in 1992 dollars.
4 Year 1992=100.0; Implicit price index of GDP used for the economy. Transport prices are estimates of Transport Canada.

Source: Transport Canada; Statistics Canada, Cat. 13-001; 15-001; 62-001 and 91-002

Figure 2-1 shows transportation's contribution to total GDP, compared with other sectors. Although transportation is not as important as wholesaling, retailing, health, construction or education, it does surpass mining, communications, other utilities, agriculture, and forestry.

INVESTMENT

Transportation's economic importance can be assessed in terms of how much investment is devoted to it by both governments and businesses. Governments invest in transportation infrastructure, such as roads and ports, and in machinery and equipment, such as cars and trucks. Businesses tend to concentrate their transport investment in machinery and equipment. Because transportation assets have a long life, investments are for the long term. It is, therefore, more appropriate to analyze investment over a long period of time, as opposed to a yearly analysis.

Table 2-2 compares investment in transportation to total investment in the economy (less residential construction as it is considered a non-productive investment) from 1993 to 1996.

Over this period, investment in transportation averaged $18,767 million per year, almost one-fifth of total investment in the economy. Transportation equipment accounts for 13.3 per cent and infrastructure for 6.7 per cent of total investment in the Canadian economy. Notably, road accounts for over 87 per cent of transportation investment. All other modes of transport accounted for less than one per cent of total investment each.

AGGREGATE DOMESTIC SPENDING

The importance of transportation can also be measured from a consumption perspective, or the "aggregate domestic spending on transportation." This totals spending on transportation investment and goods and services.

Table 2-3 shows the total transportation demand in 1991 and 1997.

Table 2-3 shows that the major items are, in order of expenditure: private transportation sales; for-hire carrier services; and government expenditures on transportation, such as infrastructure and subsidies.

Transportation is playing a stronger role in the economy, due to the fact that the aggregate spending approach takes into account "for-hire" activity as well as "in-house" transportation. In 1997, the most recent year for which information is available, domestic demand for transportation amounted to $142.2 million, or 17.1 per cent of Canada's total final domestic demand. Annual growth in 1997 in transportation domestic demand was nine per cent, exceeding growth in final domestic demand by 3.4 per cent. If government expenses are netted out of transportation-related indirect taxes and fees, transportation domestic demand represents only 15.5 per cent of total domestic demand in Canada, while its yearly growth was 9.4 per cent.

TABLE 2-2
INVESTMENT IN TRANSPORTATION
1993 – 1996

(millions of current $)

	1993	*1994*	*1995*	*1996*	*Average*	*Per Cent*
Total Investment	**85,803**	**93,356**	**96,353**	**101,095**	**94,152**	**100.0**
Government – Construction	12,325	13,559	14,456	14,819	13,790	14.6
Government – Machinery	3,491	3,508	3,332	4,452	3,696	3.9
Business – Construction	30,162	32,962	32,213	35,437	32,694	34.7
Business – Machinery equipment	39,825	43,327	46,352	46,387	43,973	46.7
Total Transport	**15,155**	**18,754**	**19,716**	**21,441**	**18,767**	**19.9**
Equipment	9,651	12,342	12,876	15,120	12,497	13.3
Infrastructure	5,504	6,412	6,840	6,321	6,269	6.7
Road	**13,321**	**16,375**	**17,454**	**18,738**	**16,472**	**17.5**
Equipment (e.g. cars)	8,493	11,033	11,632	13464	11,156	11.8
Roads and Bridges	4,828	5,342	5,822	5,275	5,317	5.6
Rail	**761**	**866**	**845**	**1,018**	**873**	**0.9**
Equipment (e.g. locomotives)	401	379	356	507	411	0.4
Rail Track and Roadbeds	360	487	489	511	462	0.5
Marine	**510**	**678**	**719**	**818**	**681**	**0.7**
Equipment (e.g. ships)	267	186	274	364	273	0.3
Marine engineering construction	243	492	445	447	407	0.4
Air	**563**	**835**	**698**	**830**	**732**	**0.8**
Equipment (e.g. aircraft)	490	744	614	743	648	0.7
Runways incl. lighting	73	91	84	87	84	0.1

Source: Statistics Canada Cat. 61-223

TABLE 2-3
TOTAL TRANSPORT DEMAND
1991 and 1997

(Millions of current dollars)

	1991 Billions of $	1991 Per cent Share	1997 Billions of $	1997 Per cent Share	Annual Growth in 1997
(A) Final domestic demand	**693.1**	**100.0**	**832.4**	**100.0**	**5.6**
(B) Total transport domestic demand (Items 1+2+3)	**108.5**	**15.7**	**142.1**	**17.1**	**9.0**
(C) Total less indirect taxes and fees (Items 1+2+5)	**98.5**	**14.2**	**129.3**	**15.3**	**9.4**
1) For-hire carriers	**26.9**	**3.9**	**36.9**	**4.4**	**10.5**
Air	7.8	1.1	12.1	1.5	13.6
Rail	5.3	0.8	7.0	0.8	9.8
Water	2.3	0.3	3.4	0.4	-0.8
Truck	8.0	1.2	14.1	1.7	11.4
2) Private transport sales	**64.4**	**9.3**	**88.3**	**10.6**	**9.8**
Retail vehicle dealers (new and used)	36.9	5.3	58.3	7.0	11.7
Gasoline service stations	14.0	2.0	16.3	2.0	1.0
Retail vehicle parts and repair shops	10.8	1.6	13.7	1.6	13.1
3) Government expenditures	**17.1**	**2.5**	**17.0**	**2.0**	**1.9**
Road construction and maintenance	10.9	1.6	11.2	1.4	2.2
Urban transit subsidies	2.4	0.3	2.7	0.3	3.0
Other subsidies and administration	3.9	0.6	3.7	0.3	0.4
4) Total indirect taxes and fees	**10.0**	**1.4**	**12.9**	**1.5**	**4.3**
Fuel taxes	7.7	1.1	9.9	1.2	3.0
Licence fees	2.3	0.3	2.9	0.4	8.9
5) Government expenses less indirect taxes and fees	**7.1**	**1.0**	**4.1**	**0.5**	**-4.8**

Source: Statistics Canada, Special tabulation from the Income and Expenditures Accounts Division; Several annual reports of transportation companies; Transport Canada

Household Budget

Another interesting yardstick for measuring the importance of transportation to the economy is how much the average household spends on transportation. The average 1998 household budget is $45,158, with $6,846 or 15 per cent spent on transportation. In comparison, the average household spent 13.5 per cent on food, 32 per cent on housing and furnishings, 10.4 per cent on education and 4.2 per cent on health care.

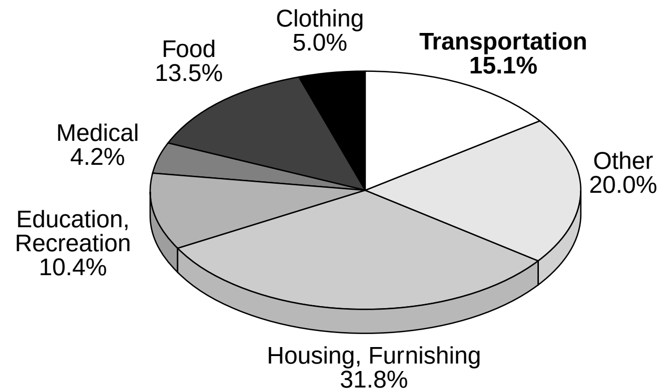
Figure 2-2 shows the average household expenditures in 1998.

Table 2-4 breaks down household spending on transportation, clearly showing the car is the dominant expenditure. In fact, 87 per cent, or $5,959, of the $6,846 was spent buying, operating and maintaining the automobile. The same household spent $887 or 13 per cent on public transportation, mostly on air transportation, which accounted for over 80 per cent of public transport household spending.

Canadians' spending on transportation ranks fourth compared with eight major Organization for Economic Co-Operation and Development (OECD) countries. From 1990 to 1996, Canadians spent an average of 15.8 per cent of total spending on transportation. The United Kingdom, at 16.8 per cent, and Japan, at 11.3 per cent, are the highest and lowest spenders, respectively, among the eight countries.

Figure 2-3 shows consumer expenditures on transportation for eight major OECD countries, average between 1990 and 1996.

FIGURE 2-2
HOUSEHOLD EXPENDITURES BY MAJOR FUNCTION
1998



Source: Statistics Canada, Special tabulation for the Income and Expenditures Accounts Division; Transport Canada

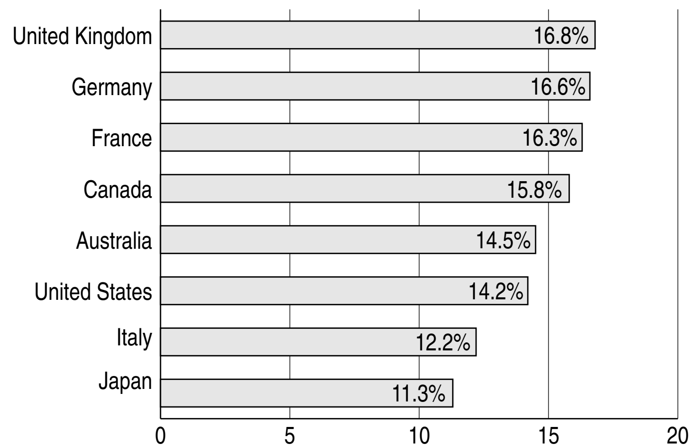
TABLE 2-4
SPENDING ON TRANSPORTATION PER HOUSEHOLD

Item	*$ per Household*	*Per cent*
Vehicle purchase	**3,214**	**46.9**
New cars and trucks	2,266	33.1
Used cars and trucks	659	9.6
Bicycles and motorcycles	207	3.0
Boats	82	1.2
Fuel	**1,240**	**18.1**
Insurance	**330**	**4.8**
Other vehicle operating expenses	**839**	**12.3**
Repairs and maintenance	445	6.5
Parts and accessories	394	5.8
Other	**336**	**4.9**
Motor vehicle rental/lease	68	1.0
Parking	62	0.9
Driving lessons	206	3.0
Urban public transportation	**175**	**2.6**
Transit	134	2.0
Taxi	41	0.6
Intercity public transportation	**712**	**10.4**
Air	617	9.0
Rail	14	0.2
Intercity bus	53	0.8
Ferry and water transportation	28	0.4
TOTAL	**$6,846**	**100.0%**

Source: Statistics Canada, Special tabulation for the Income and Expenditures Accounts Division; Transport Canada

FIGURE 2-3
CONSUMER EXPENDITURES ON TRANSPORTATION* AS A SHARE OF TOTAL CONSUMPTION

(Selected major OECD countries — Average 1990-1996)



* Includes Communications

Source: OECD, Annual National Accounts – 1984-1996, (Statview, 1998)

IN SUMMARY

Transportation's role in the economy, and what it means to Canadians, goes beyond how much is produced or spent. All Canadians use some sort of transportation in their daily lives. Likewise, most economic activities depend on transportation in some way. Consequently, the well-being of the transportation sector is tied to that of the other sectors.

Because transportation plays a strategic role in the economy, its contribution to economic development cannot be overestimated. Many events in 1998 affected both passenger and freight transportation demand. Major influences include the strong performance of the US economy, the Asian crisis, the sliding Canadian dollar and the lower oil prices. This section presents a quick overview of these events.

A REVIEW OF 1998

In general, the well-being of the transportation sector is tied to socio-economic activity. Accordingly, transportation supply must adjust to demand. Freight transportation demand is driven by the production and consumption of goods and services, while passenger transportation demand is tied to economic and socio-demographic considerations.

ECONOMIC GROWTH: IMPORTS AND EXPORTS

In 1998, the Canadian economy grew by about 2.8 per cent, less than originally forecast. The economy grew strongly early in the year, tailed off in the second and third quarters, and ended off strongly. The slower growth in relation to the one observed in 1997 was mostly due to developments in Asia that adversely affected the demand for Canadian commodities.

The major driving forces of economic growth came from investments and exports. The rate of growth of the economy in 1998 is similar to the average of the last seven years, as shown in Table 2-1, but far from the exceptional performance of 1997 when GDP, driven by goods production, increased by four per cent. The economy continued to experience low prices and improving government balances.

Total exports increased in real terms by over eight per cent. Imports increased by almost seven per cent. Net exports, i.e. exports minus imports, accounted for almost one quarter of the economy's growth in 1998.

The increase in exports is due to Canada's trade with the US, which continued to grow, thanks to the eight years of strong US economic expansion and a lower Canadian dollar.[1] Increases were prevalent in all major categories, with merchandise exports growing by almost nine per cent. Energy products are the sole exception, due to plummeting prices. Despite the strike-related shutdown at General Motors facilities in Canada, automotive exports increased by over eight per cent. Imports of US goods, more than half of which are machinery and equipment and automotive products, increased by almost six per cent.

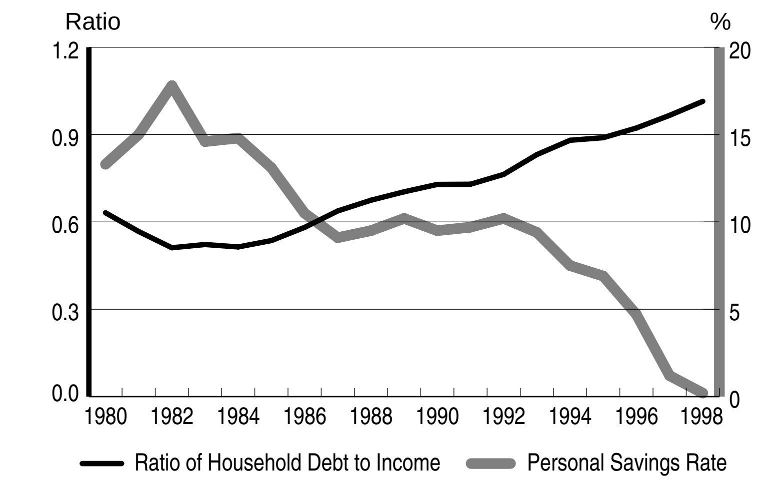
Exports dropped to Japan and other Asian economies, which are struggling with severe financial crises. While most of Canada's exports to the US are finished goods, those to other countries are mostly resources. For this reason, the overall share of higher value-added products in total exports has increased.

1 In September 1998, the Canadian dollar reached the lowest ever recorded level, at 64.1¢ US.

In Canada's trade with Japan, its most important Asian trade partner, Canada's exports dropped, in value terms, by more than 25 per cent. Almost three-quarters of Canada's exports to Japan are from the primary sectors. Imports from Japan increased by over 15 per cent, with 90 per cent of imports being machinery and equipment, automotive products and consumer goods.

Western Europe, another important world region for Canada's trade, posted an economic growth of 2.8 per cent in 1998.

FIGURE 2-4
PERSONAL DEBT* AND SAVINGS RATE
1980 – 1998



* Consumers Credit and Mortgages
Source: Statistics Canada

Effects on Transportation Activity

While trade between Canada and other Asian countries in financial crisis is relatively small—about nine per cent of Canadian exports (before the crisis)—lower exports to Asia caused a decrease in rail, shipping, and port activities.

The lower Canadian dollar enticed more US tourists into Canada, boosting domestic transport activities. Canadians found it more expensive to buy foreign goods and services, causing Canada's trade surplus to rise.

However, the lower Canadian dollar had an adverse effect on Canadian carriers' expenses. Imports of parts and vehicles cost them more as did all their other purchases outside the country in the context of their international operations (crew expenditures, fuel, food, etc.).

The oil market was soft, as were other commodities, the result of a slowdown in world output originating in Asia. Oil prices tumbled from $18 US per barrel at the start of 1998 to less than $13 US by the end of the year. As can be expected, transportation costs went down.

Domestic goods production, the main propeller of freight, increased by only two per cent, while services increased by 4.2 per cent.

Real disposable income, the major factor affecting travel, increased by 1.4 per cent, the first increase in about 10 years. A major factor in the determination of passenger transportation, personal disposable income per capita increased marginally, by 0.9 per cent. Although the first increase in 10 years, it was not enough to bolster consumption. Consumer confidence was eroded by the depreciating Canadian dollar, the battered equity market and the further deterioration in household finances. Canadian consumers' level of debt reached an all-time high.

Figure 2-4 shows Canadians' personal debt and savings rate from 1980 to 1998.

A slowdown in goods production – two per cent growth compared with almost five per cent last year – was noticeable across most major industry groups, affecting freight transportation. Almost the entire primary sector, particularly logging, forestry and mining activities, was hard hit by low world prices and weak global demand.

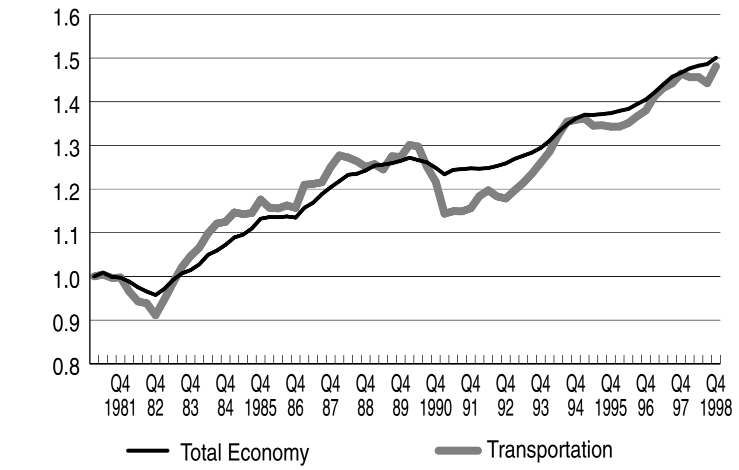
Manufacturing GDP increased by four per cent, compared to last year's growth of 6.5 per cent. Excluding motor vehicle sales, growth in consumer demand has waned steadily, consistent with falling consumer confidence.

Despite some activity in non-residential construction, housing construction dropped by 1.6 per cent, causing the construction industry to stay at last year's level of activity.

Total government balance in Canada remained in a surplus situation for the second consecutive year. Moreover, the federal government outperformed

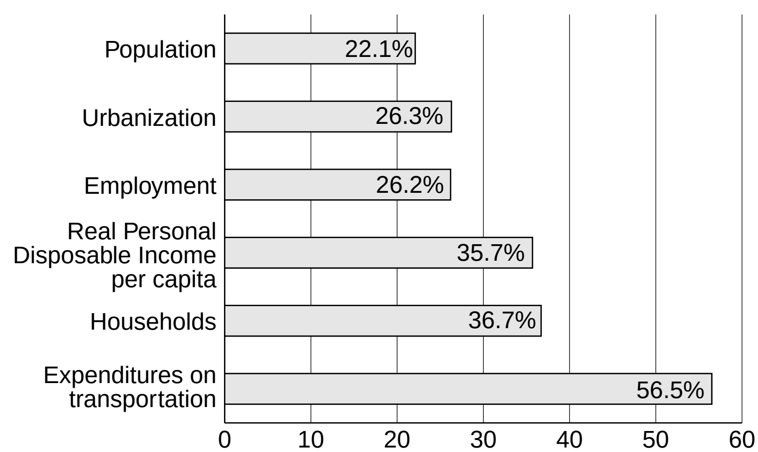
FIGURE 2-5
TRANSPORTATION AND ECONOMIC ACTIVITY
SEASONALLY ADJUSTED QUARTERLY GDP, 1981 – 1998

(Index, 1Q of 1998 = 100)



Source: *Statistics Canada, Cat. 13-001, 15-201 and 31-001*

FIGURE 2-6
CHANGES IN CONSUMERS EXPENDITURES ON TRANSPORTATION AND FACTORS AFFECTING ITS DEMAND, 1961 – 1998



Source: *Statistics Canada, Cat. 13-001, 15-201 and 31-001, 91-213XPB and Statistics Canada Year Book*

its fiscal objectives for 1997/98, achieving the first surplus in 28 years.

Figure 2-5 gives a picture of transportation and economic activity from 1981 to 1998.

Overall inflation in 1998 dropped by 0.4 per cent. The Asian flu, together with the Latin American crisis and the collapse of the Russian ruble, resulted in lower prices for a wide range of goods and services – oil, nickel, newsprint, lumber, aluminum, etc. The low commodity prices tended to offset the impact of a low dollar on import prices and kept inflation at the bottom end of the Bank of Canada target.

Provincial Summary

Dependence on Asian markets caused British Columbia to slip into a recession and see a net outflow of people to other provinces. The collapse in oil prices slowed growth in Alberta, driven mostly by non-residential investment. Saskatchewan and Manitoba experienced decelerating economic growth, due to the collapse of farm incomes and poor prices for natural resources. In fact, across the Prairies in general, consumer confidence was hard hit by the financial turmoil abroad.

The Ontario economy was well served by a strong domestic demand in the province, boosted by broadly based employment gains and tax cuts. In Quebec, non-residential spending bolstered the economy, mostly due to Hydro-Québec's post ice-storm rebuilding efforts and key business investment projects.

Atlantic Canada benefited from large projects: the energy sector investments in New Brunswick (Sable Island natural gas pipeline) and Nova Scotia (Cohasset/Panuke offshore oil project, Sable Island Offshore Energy Project); the aftermath of the Confederation Bridge in Prince Edward Island; and oil production from the Hibernia project in Newfoundland.

Transportation Activity Overview

In 1998, transportation GDP increased by a slim 1.5 per cent, compared with 5.4 per cent in 1997. Weakness was most evident in rail and marine (Table 2-1) considering that these modes increased by over eight and two per cent respectively in 1997.

Rail activity dropped by 2.4 per cent and marine transportation by almost three per cent. Trucking increased by 4.1 per cent. Air transportation increased by 3.9 per cent, compared with over 11 per cent the previous year. Urban transportation posted a 1.8 per cent increase, while interurban and other transportation grew by over five per cent.

KEY SOCIO-DEMOGRAPHIC TRENDS

From 1981 to 1998, consumers increased spending on transportation by 56.5 per cent. This increase is due in part to population growth, which increased 22.1 per cent. It is also due to Canada's demography, such as urbanization and household formation, which influences passenger transportation expenditures.

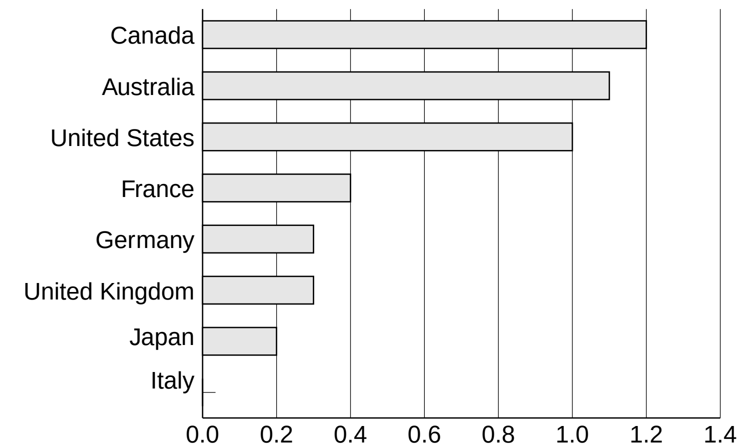
Urbanization defines and influences the mobility of persons. Between 1981 and 1998, the urban population increased by 26.3 per cent, mostly in the larger metropolitan areas, namely Vancouver, Toronto, Calgary and Ottawa-Hull. For example, Vancouver increased by 56 per cent between 1981 and 1998. Most of that growth is centred in suburban areas, with a resulting shift in transportation needs.

Figure 2-6 shows changes in consumer expenditures on transportation and in other factors affecting its demand from 1981 to 1998.

Employment grew by 26.2 per cent (3.3 million jobs), resulting in more commuting and traveling. The number of households increased by 36.7 per cent, higher than population growth. Consequently the number of persons per household has diminished, while the amount of travel required for shopping, recreation, etc., has increased.

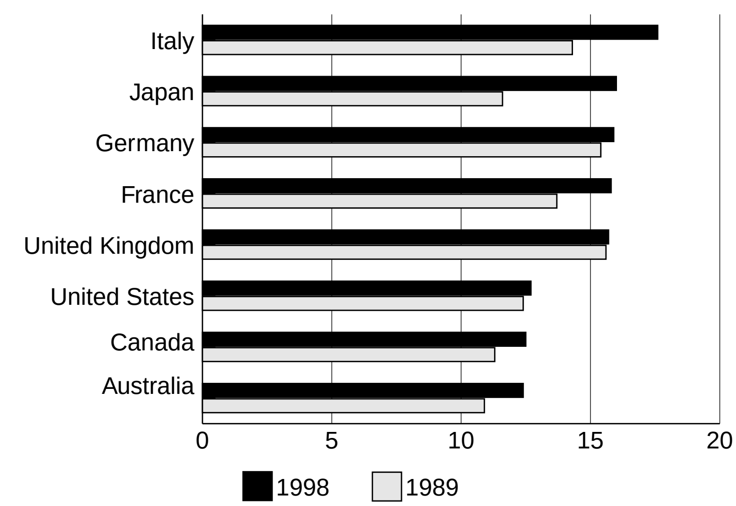
Canada's 22 per cent population increase since 1981 is significant, when compared with many industrial countries. The changing composition of the population, however, has more impact on transportation needs than the actual numbers.

FIGURE 2-7
AVERAGE ANNUAL POPULATION GROWTH
SELECTED MAJOR OECD COUNTRIES, 1980 – 1998



Source: U.S. Census Bureau – The 1998 Statistical Abstract of the United States, Table 1343

FIGURE 2-8
PROPORTION OF PERSONS 65+
SELECTED MAJOR OECD COUNTRIES, 1989 and 1998



Source: U.S. Census Bureau – The 1998 Statistical Abstract of the United States, Table 1344

Figure 2-7 illustrates the average annual population growth in major OECD countries from 1980 to 1998.

Survey results demonstrate that transportation needs vary with age, as does the type of transportation. For this reason, an aging population and "early retirees" are critical factors impacting on transportation needs.

Figure 2-8 shows the proportion of persons 65 and over in major OECD countries in 1989 and 1998.

PRODUCTIVITY PERFORMANCE OF THE ECONOMY AND TRANSPORTATION

To understand the evaluation of a sector's productivity performance, the overall performance of the economy must be considered. This section, however, excludes the government sector and limits its scope to the business sector, broadly subdivided between goods and services.

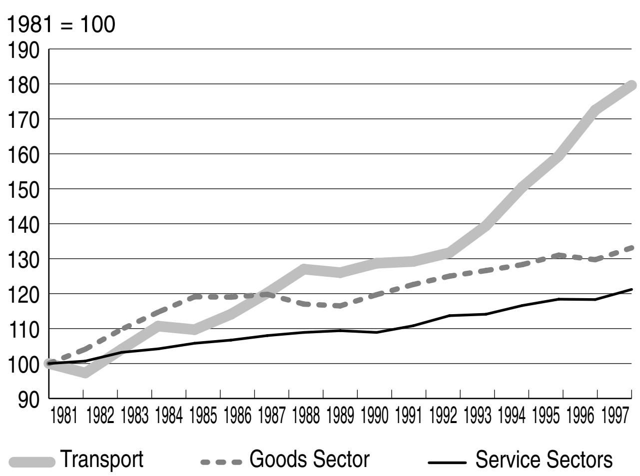
Productivity indicators reported in this section consider changes over time, maintaining that the performance of a sector relative to the economy as a whole can best be assessed over a period long enough for the sector to distinguish its productivity growth from that of other sectors. Figure 2-9 compares the performance of the transportation sector to the economy as a whole from 1981 to 1997.

Since 1981, labour[2] productivity growth in the transportation sector has averaged 3.7 per cent per year, compared with 1.8 per cent in the goods sector and 1.2 per cent in the service sector. From 1981 to 1986, the transportation sector outperformed the rest of the economy by a small margin. From 1991 to 1997, the transportation sector performed particularly well, when the sector's labour productivity increased by 5.6 per cent per year.

While some of the recent productivity growth in the transportation sector was driven by the upturn of the economy since 1991, labour productivity gains in other sectors under similar economic circumstances were not as impressive. For example, increases were only 1.4 per cent per year in the goods sector and 1.5 per cent in the service sector. Transportation regulatory reforms that were initiated in the late 1980s and that matured in the 1990s, fostered an environment conducive to such productivity gains.

In simple terms, higher labour productivity can mean, for example, that fewer employees may be required to produce the same level of output. Between 1981 and 1991,

FIGURE 2-9
LABOUR PRODUCTIVITY (OUTPUT PER EMPLOYEE)
1981 – 1997



Source: Transport Canada based on Statistics Canada and Informetrica data

TABLE 2-5
TRANSPORTATION LABOUR INDICATORS
1981 – 1997

Employees	*1981*	*1986*	*1991*	*1997*
Transport (000)	251.4	237.1	222.2	236.0
Economy (000)	8,061	8,553	9,114	9,977
Average Cost Per Employee	*1981*	*1986*	*1991*	*1996*
Transport ($ thousand)	26.5	35.8	42.5	47.6
Economy ($ thousand)	20.5	26.4	34.2	38.3
Unit Cost Change	*1981-86*	*1986-91*	*1991-97*	*1981-97*
Transport (AAG in %)	3.8	1.4	(2.8)	0.5
Economy (AAG in %)	3.7	5.0	0.5	2.9

Sources: Transport Canada based on Statistics Canada files

2 For convenience, comparisons between transportation and the economy are limited to labour productivity. The rest of the chapter will deal with both labour and total factor productivity.

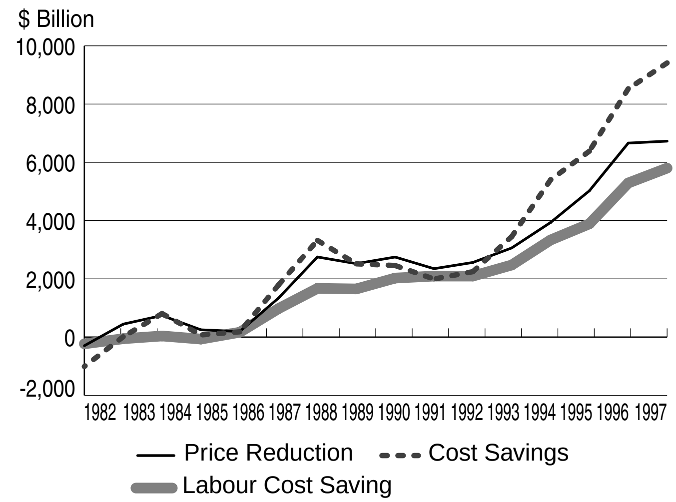
output increased by nine per cent in the transportation sector, while employment fell by 12 per cent. After 1991, transportation activity was stimulated by economic recovery and lower transportation prices (-0.6 per cent). During that period, output grew by 42 per cent while employment increased by only 6.2 per cent.

Table 2-5 shows transportation labour indicators in more detail between 1981 and 1997.

Robust productivity growth explains, in part, the transportation sector's higher salary levels compared with other sectors in the economy. These could perhaps be a product of the former regulatory environment, but they have also been supported by strong productivity performance. In 1997, the average labour cost in the transportation sector exceeded those in the economy by 21 per cent.

Unit labour costs for each unit of goods or services produced are a good measure of productivity's net effect on a firm's labour costs. From 1981 to 1997, unit labour costs in the economy as a whole increased by 57 per cent. In the transportation sector, however, they grew by nine per cent and were actually lower in 1997 than they were in 1986. In fact, if unit labour costs in the transportation sector had increased at the same pace they did for the economy as a whole, labour costs in the transportation sector would have been $5.8 billion higher in 1997.

FIGURE 2-10
COST AND PRICE CHANGES IN TRANSPORT RELATIVE TO THE ECONOMY



Source: Transport Canada based on Statistics Canada and Informetrica data

Productivity and Price Performance

When markets are competitive and efficient, productivity gains can be returned, in part or whole, to users in the form of lower prices. To evaluate the performance of the transportation sector, changes in transportation unit cost and prices are compared with the same changes in the general economy. When transportation costs and prices increase less rapidly than those in the economy, the net effect is considered a cost saving or a price reduction.[3]

Figure 2-10 illustrates the cumulative effect of cost savings and price reduction since 1981.

In most years since 1981, transportation unit costs have increased less rapidly than in the economy as a whole. By 1997, total costs in the transportation sector were $9.3 billion lower than they would have been if they had increased at the same pace as the economy between 1981 and 1997. About 66 per cent of the savings came from the reduction in labour costs.

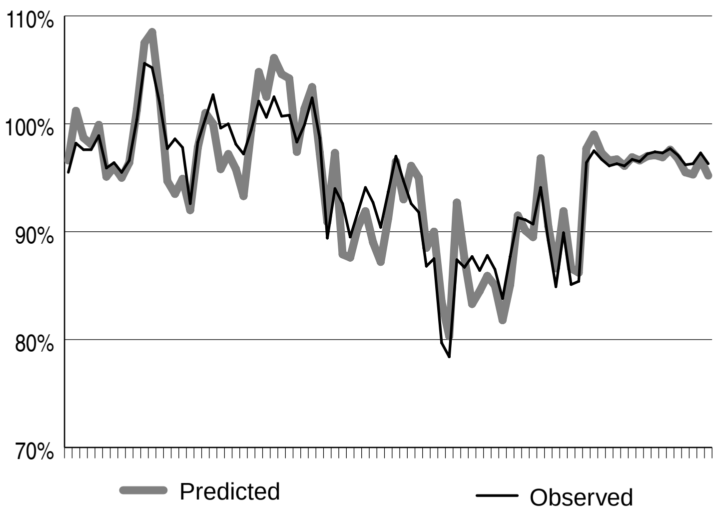
Approximately 86 per cent of the cost savings were returned to users. From 1989 to 1992, price reductions were equal to or larger than cost reductions. Over the same period, users received price reductions greater than cost savings by a ten per cent margin. Since 1993, however, more than 23 per cent of the savings have not been transferred to transportation users. Instead, these savings have been used to restore the financial health of the industry.

Productivity Performance and Financial Returns

A firm's financial situation is a function, among other things, of its ability to harmonise the evolution of its unit costs with the price changes of its products and services. Firms whose prices are falling more rapidly (or increasing less rapidly) than their unit costs see their financial situation

3 Savings are measured by the difference between actual carrier cost/revenues and the cost/revenues that would have accrued to them had transportation prices/costs grown at the same pace as in the economy between 1982 and 1997.

FIGURE 2-11
OBSERVED AND PREDICTED OPERATING RATIOS AMONG THE AIR, RAIL AND TRUCKING INDUSTRIES



Source: *Transport Canada based on Statistics Canada and Informetrica data*

deteriorate, a situation that cannot go on for long.

The relationships between economic and financial performance indicators were tested for major rail freight carriers (CN and CP), selected air transportation firms (Air Canada and Canadian Airlines International) and the trucking industry from 1981 to 1997. Firms' financial returns, as measured by their operating ratio, were related to the price of their services sold and the cost of their factors of production. A productivity variable was then introduced to assess the role played by productivity gains in neutralising factor cost increases. The asset turnover rate was also included to take into consideration the impact of changes in capitalisation.

Figure 2-11 shows that the observed operating ratios of transportation industries are close to those estimated from the relationship between financial returns and output prices, factor costs and productivity. As expected, this suggests a close relationship between economic and financial performance indicators, despite a diverse group of industries, two recessions and major regulatory changes. In addition, it demonstrates that lower prices are sustainable if price changes are aligned with productivity gains. Otherwise, the financial performance of firms is affected.

Transportation and International Initiatives in 1998

As trade is liberalized around the globe, trading partners are pursuing international initiatives to increase access to markets. For Canada, it has meant working on harmonization. Canada is a regular participant in international transport-related initiatives that are coordinating the convergence of standards, rules, and regulations among many countries.

Given the increasingly complex demands on transportation, high universal standards in each mode are important to safety and the environment, as well as to fair and equitable competition. Even though change is constant and rapid, Canadians expect transportation activities to be carried out with limited risks and without hindering the process of change.

In 1998, Canada worked on transportation issues within a number of international organizations, including:

- *International Maritime Organization (IMO);*
- *International Civil Aviation Organization (ICAO);*
- *Organization for Economic Co-Operation and Development (OECD)*; and
- the *United Nations (UN).*

Canada also worked on transportation issues through the North American Free Trade Agreement (NAFTA), the Asia Pacific Economic Cooperation (APEC) and a Western Hemisphere Transportation Ministerial meeting.

IMO

In 1998, Canada contributed to the IMO in four areas: marine safety, environmental protection, legal, and facilitation. The subjects discussed included:

- developing a uniform set of internal and external criteria for maritime administration;
- amending survey guidelines;
- reviewing a report on casualty analysis to find ways to avoid accidents in the future;
- simplifying the International Convention for the Prevention of Pollution from Ships;
- revising hazard profiles for noxious liquids carried in bulk on ships;
- reviewing guidelines for venting systems of ships carrying dangerous chemicals in bulk;
- drafting a standard for a dangerous goods manifest (a list on dangerous goods in transit, being loaded to or discharged from a ship) for ports;
- setting performance standards for electronic chart display and information systems;
- creating a ship reporting system for: the Strait of Dover/Pas de Calais, one of the busiest shipping areas; off the northeastern coast and off the southeastern coast of the United States to protect the endangered northern right whale; and the Strait of Istanbul, the Strait of Canakkale and the Sea of Marmara;
- drafting a code that sets out minimum recommended standards for shipowners' responsibilities in maritime claims;
- establishing liability for pollution damage caused by bunkers;
- establishing responsibility for wreck removal;
- making an international, uniform law for offshore mobile craft regarding collisions, salvage, arrest, limitation of liability and pollution liability; and
- setting interim guidelines for ports state control to establish compliance with the International Safety Management (ISM) code (applicable to passenger ships, oil and chemical tankers, bulk carriers, gas carriers and cargo high-speed craft of 500 gross tonnage and above).

Port State Control Ministerial Conference

Canada hosted the First Joint Ministerial Conference on Port State Control,[4] with 30 ministers or their representatives from Europe and the Pacific Rim in attendance.

At the event, Canada emphasized the need to "tighten the net" on substandard shipping. The conference attendees recommended that enforcement measures be increased and that procedures for inspecting, detaining and reporting substandard vessels be harmonized.

The recommendation includes working within the IMO to develop criteria that bind flag states and ship registries to upholding standards of quality; and rigorously applying port state control standards to ensure compliance with the ISM Code.

ICAO

In 1998, Canadian experts contributed to ICAO Panels of Experts and Working Group meetings that oversee the Standards and Recommended Practices (SARPs) and Procedures for Air Navigation Services (PANS). Many of the Canadian Aviation Regulations and Standards are derived from the SARPs and PANS. Canada's work in these meetings helps ensure safe, efficient air travel.

Canada participated in the ICAO Continuing Airworthiness Panel of Experts, which is reviewing standards on the airworthiness of aircraft, and was a member of a major ICAO Study Group, studying the delineation between aircraft operational and airworthiness requirements.

Universal Safety Oversight and Technical Cooperation

In 1998, Canada volunteered to be audited through ICAO's Universal Safety Oversight Audit Program, which audits compliance with the safety-related SARPs. Canada is a strong supporter of the program.

The conclusions of the interim audit report are that:

- Canada's regulatory system is almost fully compliant with ICAO standards;
- Canada's implementation system is efficient and is a good example for others to follow; and
- the differences between the Canadian Aviation Regulations and the ICAO standards are minor and do not have an impact on aviation safety.

Through ICAO's Technical Cooperation Program, which enhanced civil aviation in the developing world, Canadian experts helped a number of countries, including the

4 Port states enforce rigid control measures to ensure that foreign flag vessels entering their waters are in compliance with strict safety and anti-pollution standards established by various international marine treaties.

Philippines, Bahrain, Sri Lanka, Saudi Arabia, the United Arab Emirates, Indonesia, Nepal and Suriname.

In addition, Canadian experts helped provide Cabin Safety Inspector training to South Africa and Jamaica.

Environmental Protection

Again in 1998, Canada participated in ICAO initiatives on environmental protection and was a member of the ICAO Committee on Aviation Environmental Protection (CAEP). CAEP develops policy guidance on environmental matters to find solutions to noise and emissions problems and is recognized through the United Nations' Kyoto Protocol as the forum for pursing the limitation or reduction of "greenhouse gases" resulting from aviation fuels. In 1998, CAEP recommended an average reduction of 16 per cent in the levels of nitrogen oxides (NO_x) that aircraft engines can emit. Canada contributes annually to CAEP working groups on both aircraft noise and engine emissions problems.

Aerodromes and Airports

In 1998, Canada acted as vice-chair for the annual International Bird Strike Committee meeting, which looks at how to control birds that interfere with the safety of aircraft during landing and take off. Canada has considerable know-how in airport wildlife control, and Canadian experts were asked to participate in ICAO-sponsored Regional Workshops on Bird Strike Hazards around the world. In addition, ICAO asked Canada to help revise its Bird Strike Hazard Guidelines.

Canada took a lead role in an ICAO international working group that is developing an International Runway Friction Index (IRFI). When runways are wet, airport control sends information on runway friction to a pilot deciding whether or not to land or take off. Currently, that reference information is not standard around the world, and a common index would help reduce any confusion. In 1998, the working group conducted tests in North Bay, Ontario, using a Falcon 20 jet aircraft and a DASH-8 turbo-prop aircraft.

In addition, Canada took the lead in the ICAO Study Group on Frangibility of Aids, establishing criteria for the frangibility[5] of approach light towers and signs. A tower or sign that collapses easily will only cause minimal damage to the aircraft, ensuring greater protection for passengers. In 1998, the group held field testing in Blainville, Quebec, and Canada is now developing an international standard based on that work.

Civil Aviation Medicine

In 1998, Transport Canada's Physicians of Civil Aviation Medicine (CAM) attended meetings, presented papers and were elected to office on a number of international organizations. These include the Aerospace Medical Association (USA), Airline Medical Directors Association, Civil Aviation Medical Association (USA) and International Academy of Aviation and Space Medicine. CAM plays a pivotal role in the creation and harmonization of International Aviation Medical Standards.

International Harmonization of Aviation Regulations and Standards

Outside of ICAO, Canada worked with the US and Mexico to discuss aviation issues related to the North American Free Trade Agreement (NAFTA), harmonization issues on a regional scale, and Year 2000 computer concerns.

Canada also participated in the US Federal Aviation Administration's Aviation Rulemaking Advisory Committee (ARAC), which looks at aircraft operations, such as de-icing issues, and aircraft certification, such as facilitating the import and export of aircraft and aeronautical products.

In addition, Canada entered into many bilateral agreements with foreign countries on issues related to the maintenance and the certification of aircraft. Currently, Canada is working on maintenance agreements with Israel and Japan, a certification agreement with the Joint Airport Authorities of Europe and a renewal of past agreements with the US.

United Nations

Canada actively participated in the European regulation-making activity on motor vehicle safety and emissions control. This activity is managed by a committee of the United Nations organization, composed of government and industry experts representing mainly European countries but also others, including the US, Australia and Japan. Beside technical matters considered, the Committee, with the participation of Canada, developed a UN agreement, the Global Agreement, to facilitate

5 To be frangible is to be breakable, i.e., if hit by an aircraft, how easily will the approach light tower or sign collapse.

international harmonization of regulations. Canada intends to sign the agreement.

United Nations Committee of Experts on the Transport of Dangerous Goods

One of 22 voting members, Canada participated in the United Nations Committee of Experts on the Transport of Dangerous Goods. Between import and export, Canada sees some 27 million shipments of dangerous goods per year. Almost 15 per cent of goods will cause harm, if accidentally released.

Every other year, the committee publishes a set of recommendations. In 1997/98, the committee focused on establishing performance criteria for containment, as well as updating the list of dangerous goods.

In addition, Canada contributed to another United Nations initiative to increase harmonization across international programs, such as the World Health Organization, on infectious substances.

OECD

In 1998, Canada continued its participation in the OECD 1998 2000 Road Transport and Intermodal Linkages Research (RTR) Program, which promotes co-operation on key transportation challenges, particularly in road transportation. The program influences the infrastructure policy, road safety, infrastructure investment criteria and transportation-related environmental issues of its 28 member countries.

As chair of the Steering Committee of the RTR Program, Canada plays a driving role in the program's direction. In addition, Canada is participating in all three of the RTR Program's focus areas: sustainable multimodal transportation strategies; economic performance, transportation infrastructure and management; and transportation safety and environment. Notably, under sustainable multimodal transportation strategies, members aim to improve the efficiency of domestic and international multimodal transportation. Under transportation safety and environment, members look to improve the safety and reduce the enviromental impact of roads, in order to lower the resulting costs.

Canada also continued work on two OECD databases. In particular, Canada is the lead on the *International Road Research Documentation (IRRD)*, a quadrilingual (English, French, German and Spanish) worldwide database comprising more than 300,000 scientific references on road transport.

NAFTA

In 1998, Canada continued work on The Land Transportation Standards Subcommittee (LTSS), created as a result of NAFTA. The LTSS examines the compatibility of standards for truck, bus and rail transportation, and the transport of hazardous materials between the US, Canada and Mexico.

In 1998, the LTSS worked on:

- exchanging motor carrier safety data in order to implement, in a timely and effective manner, the compatibility of motor carriers;
- training Mexican federal officers to enforce the Commercial Vehicle Safety Alliance (CVSA) inspection standards;
- exchanging information on commercial vehicle emissions testing programs;
- addressing barriers and discrepancies currently affecting international trucking operations, and establishing a technical task force to see if vehicle stability and control performance criteria could be established to pursue compatibility in vehicle weights and dimensions; and
- developing dangerous goods transportation regulations and amending the emergency response guidebook to reflect changes to national and international regulations.

Canada participated in the Transportation Consultative Group (TCG), which addresses issues not specifically assigned to the LTSS. The group is working on cross-border facilitation, rail operations, electronic data interchange, application and exchange of information on advanced technologies and maritime and port facilities. In 1998, the group addressed:

- ways to establish insurance coverage for motor carriers engaged in cross-border operations, such as sharing insurance information on individual companies, setting up a system of mutual co-operation and exchanging information on licensing and registration requirements;
- setting up a facilitation agreement in order to discuss motor carrier operating requirements;
- completing the US-Canada bilateral report on railroad operating practices;
- setting up a trilateral technical working group to review regulations on rail safety;
- discussing an automated data interchange system;
- establishing a five-year co-operation plan to further work in transportation technologies; and

- creating a detailed work plan to deal with maritime and port policy, operational and safety issues.

APEC

In 1998, Canada participated in APEC's Transportation Working Group (TPT-WG). The TPT-WG supports regional economic growth by promoting an efficient, safe and regionally integrated transportation system. Since its creation in 1989, APEC has become the main forum for promoting open trade, investment and technical co-operation in the Asia-Pacific region. Advancing the APEC trade and investment agenda is a key priority for Canada as a trading nation in the this region.

Through participation in TPT-WG sub-groups, Canada:

- chaired the Maritime Safety Experts Group, which identified safety issues and problems in the region and is currently developing recommendations;
- co-chaired the Intermodal Task Force, which continued to develop an integrated transportation system, using the results of the TPT-WG Congestion Points Study;
- sat on the Special Interest Group on Intelligent Transportation Systems (ITS), which developed a report on a Framework of Standards for ITS;
- participated in the Electronic Commerce initiative, which completed an electronic commercial messages project and a TPT-WG Web site;
- participated in the Road Safety Experts Group, which identified 12 major road transportation safety problems for future studies. The studies are to focus on each problem and seek solutions from all APEC member economies;
- participated in the Air Services Group, which developed a report that prioritizes options for more competitive air services; and
- worked on the Maritime Initiative, which drafted a mission statement as the first step in promoting an efficient, safe and competitive operating environment for maritime transport.

Western Hemisphere Transportation Ministerial Meeting

In 1998, Canada participated in a Western Hemisphere Transportation Ministerial Meeting, a follow-up to the 1996 Second Summit of the Heads of Government. Participants, including transport ministers and private sector stakeholders, discussed transportation privatization and financing mechanisms; enhancing transportation safety and security; and linking information networks and transportation technology.

At the meeting, transport ministers affirmed the broad transportation objectives of the Ministerial. They also restated their intent to work together to solidify their "commitment to developing an integrated Western Hemisphere transportation system that supports the vision for increased economic and social development, trade, tourism, and co-operation among countries of the region in the 21st century, and the equitable participation and sharing of benefits among member states from integrated transportation systems."

The broad objectives include working on intermodalism; increasing transportation safety and security; preventing transportation-related disasters and environmental incidents; establishing transportation information networks; and improving co-operation on new transportation technologies. To this end, Canada will work with other countries to develop a Hemispheric Transportation Statistics System to meet transport planning and investment needs.

3

GOVERNMENT SPENDING ON TRANSPORTATION

Government spending on transportation in 1997/98 went back to its 1995/96 level, due to a one time federal compensatory payment and a small increase in local government spending, which together, more than offset provincial/territorial reductions.

Traditionally, the role of government in transportation has encompassed three basic functions: production and subsidization of transportation services; economic and safety regulation; and the provision of infrastructure. Until the NTA (1987), and MVTA (1987), all transportation modes were subjected to some form of economic regulation, and included subsidized Crown corporations.

Over the past decade, however, government involvement in transportation, in particular at the federal level, has evolved from subsidizer, economic and safety regulator, and operator to safety regulator, landlord and policy maker. Most of the economic functions performed by government in transportation have now been transferred to the private sector, where market forces enable resource allocations based upon market needs. In sectors where such a transition was neither viable nor feasible, increased cost recovery from transportation users has been undertaken or envisioned.

This chapter reviews the transportation expenditures and revenues of all three levels of government – federal, provincial/territorial and municipal – during this decade of transition.

It reviews expenditures and, where possible, revenues, according to transportation mode and jurisdiction. It also looks at federal transportation expenditures of departments and agencies, and federal subsidies, grants and contributions to transportation.

Dollar amounts are for the year specified and are not adjusted for inflation.

TABLE 3-1
GOVERNMENTS' NET EXPENDITURES ON TRANSPORTATION

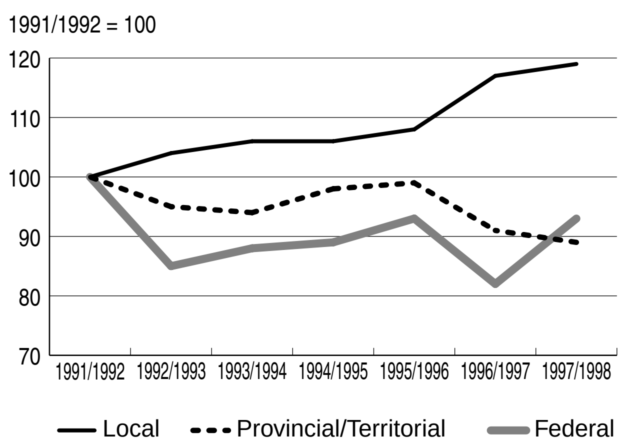
(Millions of dollars)

	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98
Federal	3,633	3,109	3,213	3,234	3,481	2,942	3,248
Provincial/Territorial	7,871	7,438	7,340	7,642	7,762	7,136	6,979
Local[1]	5,650	5,862	5,994	5,982	6,131	6,608	6,702
Total	**17,154**	**16,409**	**16,547**	**16,858**	**17,373**	**16,687**	**16,929**
Dollars per capita	610	575	572	576	587	557	560

1. Calendar year basis.

Source: *Main Estimates of the Government of Canada; Transport Canada, Finance Directorate; The Canadian Transportation Agency; internal reports from various federal agencies and departments; provincial/territorial departments of Transportation; Statistics Canada, Public Institutions Division, unpublished data*

FIGURE 3-1
GOVERNMENTS' NET EXPENDITURES ON TRANSPORTATION BY LEVEL, 1991/92 – 1997/98



Source: *Main Estimates of the Government of Canada; Transport Canada, Finance Directorate; The Canadian Transportation Agency; internal reports from several agencies and federal departments; provincial/territorial departments of Transportation; Statistics Canada, Public Institutions Division, unpublished data*

Government Transportation Expenditures and Revenues

Total Transportation Expenditures by Level of Government

When transportation budgets are voted, transportation revenues, such as Transport Canada revenues from airport fees and leases, are typically taken into account: the departmental budget is reduced by an amount equal to revenues. When revenues are no longer available but the obligations remain, the budget is typically augmented. This accounting process, most prevalent federally, is called "vote-netting."

Table 3-1 shows net transportation expenditures by level of government for the fiscal years 1991/92 to 1997/98 as well as total per capita transport expenditures.

From 1991/92 to 1997/98, total government net expenditures on transportation ranged from $16.4 billion in 1992/93 to $17.3 billion in 1995/96, with expenditures at approximately $17 billion in 1997/98 — a trend similar to that of total economic activity.

While there is no identifiable pattern in federal or provincial/territorial spending levels, municipal expenditures show a clear upward trend. From 1991/92 to 1997/98, local net expenditures on transportation increased by an annual average of almost three per cent, compared with decreases of 1.5 per cent federally and almost two per cent for the provinces/territories.

Compared with 1996/97, net expenditures on transportation by all levels of governments in 1997/98 increased by over $242 million, or 1.5 per cent. Both the federal and local governments showed an increase, the largest being federally at almost 12 per cent. Compared with 1991/92, however, all subsequent years showed a decrease in transportation expenditures for the federal and provincial/territorial governments.

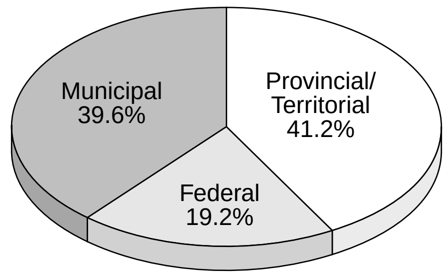
Figure 3-1 shows the trends in net transportation expenditures by government level from 1991/92 to 1997/98.

Provincial/territorial expenditures are the highest, due to road/highway responsibilities, followed closely by local government spending. Federal expenditures on transportation are the lowest.

Figure 3-2 compares the distribution of net expenditures on transportation among the three levels of government for 1997/98.

FIGURE 3-2
DISTRIBUTION OF GOVERNMENTS' NET EXPENDITURES ON TRANSPORTATION, 1997/98

1997/98



Source: Main Estimates of the Government of Canada; Transport Canada, Finance Directorate; The Canadian Transportation Agency; internal reports from several agencies and federal departments; provincial/territorial departments of Transportation; Statistics Canada, Public Institutions Division, unpublished data.

Revenues by Level of Government

Revenues Credited to Transport Canada

Government revenues collected from a transportation activity, use of a transportation facility or a transportation service are classified into one of two categories: (1) revenues credited to a government entity; or (2) revenues, such as those raised from fuel taxes, used to finance general government activities as opposed to transportation activities. Revenues in (2) are deposited in the government Consolidated Revenue Fund.

Revenues in 1998/99, which may include cost recoveries credited to the budget, are forecast to be $388 million. These revenues originate primarily from airport fees and leases totalling $266 million. Other fees and recoveries yielded $46 million, while marine fees accounted for $24 million — their approximate annual average for the past seven years. Also included are revenues emanating from Canadian Coast Guard Services.

TABLE 3-2
REVENUES CREDITED TO FEDERAL DEPARTMENTS' BUDGET

(Millions of dollars)

	1991/92	*1992/93*	*1993/94*	*1994/95*	*1995/96*	*1996/97*	*1997/98*	*1998/99*[1]
Air transportation tax[2]	486	498	530	589	683	-	-	-
Airport fees/leases[3]	479	380	290	302	367	324	149	266
Air navigation fees[4]	32	37	45	39	71	179	-	-
Marine fees	9	28	28	23	21	26	25	24
Other fees and recoveries[5]	42	40	36	49	57	58	56	46
Total Transport Canada	**1,048**	**983**	**929**	**1,002**	**1,199**	**587**	**230**	**336**
Canadian Coast Guard								
Fisheries and Oceans	**-**	**-**	**-**	**-**	**12**	**27**	**37**	**52**
GRAND TOTAL	**1,048**	**983**	**929**	**1,002**	**1,211**	**614**	**267**	**388**
Total as a per cent of federal government gross transportation expenditures								
	22.4	24.0	22.4	23.7	26.5	17.3	7.5	17.0

1 Forecast as of January 31, 1999 of full fiscal-year actual expenditures.
2 Since 1996/97, the Air Transportation Tax, formerly netted against the Transport Canada budget, has been credited to the government Consolidated Revenue Fund. In 1996/97 and 1997/98, the tax amounted to $737.2 and $741.8 million respectively; the forecast for 1998/99 is $284.5 million.
3 Payments received for airport fees and leases are partially based on previous year's air traffic. The decrease in 1997/98 is due primarily to a federal settlement paid in connection with a breach of contract in the development and management of Pearson International Airport.
4 The air navigation system was privatized as Nav Canada on November 1, 1996.
5 Includes inter- and intra-departmental transfers for services, and various regulatory, licence and administrative fees.

Source: Main Estimates, Government of Canada, Part III; Transport Canada, Finance Directorate; Department of Fisheries and Oceans

The Air Transportation Tax (ATT), which was used to finance air navigation services, was formerly a major source of revenues credited to Transport Canada's budget. Since 1996/97, however, ATT revenues have been credited to the Consolidated Revenue Fund. The proceeds were transferred to NAV Canada, a private not-for-profit corporation that inherited responsibility for all civil air navigation services, while it was phasing in user charges. In November 1997, the ATT was reduced by half as NAV Canada introduced its first phase of user charges, and was dropped completely on November 1, 1998, when the organization implemented its second phase of user charges, allowing it to achieve full cost recovery.

Table 3-2 shows transport revenues credited to Transport Canada from 1991/92 to 1998/99.

Non-Credited Government Revenues

Federal and provincial/territorial government revenues collected from transport users that were not

TABLE 3-3
GOVERNMENTS' REVENUES FROM TRANSPORTATION NOT CREDITED TO TRANSPORTATION BUDGETS

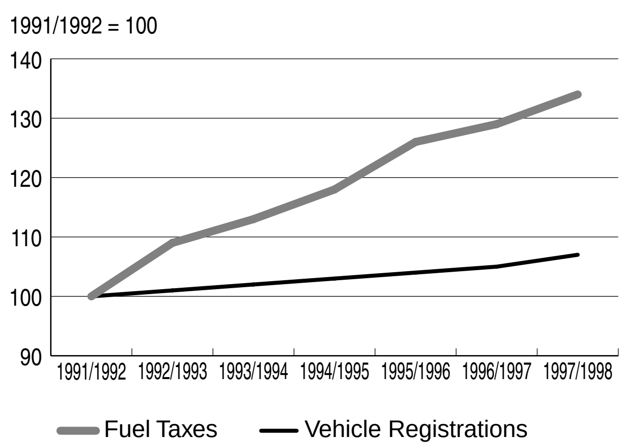
(Millions of dollars)

	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98
Federal fuel taxes	3,158	3,226	3,312	3,427	3,895	4,053	4,185
Provincial/Territorial							
Fuel taxes[1]	4,390	4,988	5,183	5,440	5,529	5,621	5,762
Licence fees	2,263	2,345	2,504	2,574	2,522	2,706	2,949
Total	**9,811**	**10,559**	**10,999**	**11,441**	**11,946**	**12,381**	**12,896**

1 Only transport-use tax revenues are identified here. Amounts therefore exclude provincial/territorial sales tax revenues. In the case of provinces/territories where sales taxes are levied but not specifically on fuel, an amount equal to the sales taxes has been deducted. The assumption is that part of the fuel taxes replaces provincial sales taxes. In 1997 and 1998, for example, $695 million and $723 million, respectively, have been deducted from fuel-tax revenues.

Source: Transport Canada; Fisheries and Oceans; provincial/territorial departments of Transportation

FIGURE 3-3
TOTAL GOVERNMENT REVENUES FROM FUEL TAXES AND NUMBER OF MOTOR VEHICLE REGISTRATIONS, 1991/92 – 1997/98



Source: Transport Canada; provincial/territorial departments of transportation; Statistics Canada, Cat. 53-219

credited to transportation budgets have increased at an average annual rate of 4.7 per cent over the past six years. In 1997/98, revenues totalled $12.9 billion, an increase of 4.3 per cent over 1996/97. These revenues are generated primarily by motor vehicle use: fuel taxes collected independently by the federal government and the provinces/territories, as well as permit and licence fees collected by the provinces/territories. In addition, the Canadian Coast Guard has introduced cost recovery measures that generate a relatively small amount of revenue. Fuel taxes are the primary source of revenue, having generated, on average, 78 per cent of government transportation revenues from 1991/92 to 1997/98.

Table 3-3 shows the non-credited government revenues from transportation from 1991/92 to 1997/98.

Fuel-tax revenues have also grown at a faster rate than revenues from licence and permit fees. From 1991/92 to 1997/98, fuel-tax revenues increased by 32 per cent while licence and permit fees rose by 30 per cent. Motor vehicle registrations increased by 6.1 per cent. Except for Prince Edward Island, however, federal and provincial/territorial tax rates on road gasoline have not changed since 1996, suggesting that the increase in fuel-tax revenues is due to growing fuel consumption. This can be explained by several factors: economic growth that generated a 27 per cent increase in the transport component of the Gross Domestic Product; growing use of vans and four-wheel-drive vehicles with lower fuel efficiency than automobiles; and growing use of personal vehicles in general, due to lower fuel prices.

Figure 3-3 compares the growth rates of fuel-tax revenues and motor vehicle registrations from 1991/92 to 1997/98.

GROSS FEDERAL EXPENDITURES ON TRANSPORTATION

Federal Expenditures

Federal expenditures on transportation, which are made up of operational and capital expenditures, subsidies, grants and contributions, include the entire budgets of Transport Canada, the Grain Transportation Agency for 1993/94 and 1994/95, the Canadian Transportation Agency, the Transportation Safety Board (TSB) of Canada, the Aviation Safety Board (subsequently part of the TSB) and the Civil Aviation Tribunal. Also included are operational and capital expenditures on transportation by other federal departments, including Fisheries and Oceans, Public Works and Government Services Canada, Parks Canada, the National Capital Commission, Agriculture and Agri-Food Canada, and Indian Affairs and Northern Development.

For the 1998/99 fiscal year, gross spending by the federal government on transportation was projected to be $2.3 billion, before revenues are credited to the budget. This represents a decrease of more than 50 per cent in seven years: gross expenditures by Transport Canada have declined 56 per cent to approximately $1.4 billion, while expenditures by other federal transportation agencies have declined 42 per cent to approximately $0.9 billion.

Compared with 1997/98, gross expenditures by Transport Canada decreased by almost 40 per cent, while those by agencies dipped almost 25 per cent. The Transport Canada decrease is due primarily to a one-time $347.6 million payment made in 1997/98 to the province of Newfoundland to take over Labrador ferry services (see Table 3-11), and to reduced payments made to NAV Canada. These latter payments are forecast to be $216 million in 1998/99, down from $686 million in 1997/98, with NAV Canada implementing its full cost-recovery fee structure (see Table 3-12).

In 1998/99, gross expenditures on transportation by Transport Canada and related agencies are forecast to reach their lowest levels, and represent their smallest share of the federal budget, since 1991/92.

Table 3-4 shows the federal government's gross expenditures on transportation from 1991/92 to 1998/99.

TABLE 3-4
FEDERAL GOVERNMENT GROSS EXPENDITURES ON TRANSPORTATION

(Millions of dollars)

	1991/92	1992/93	1993/94	1994/95[1]	1995/96[2]	1996/97	1997/98	1998/99[3]
Transport Canada	3,202	2,984	3,096	2,977	3,448	2,501	2,428	1,415
Other[4]	1,479	1,108	1,046	1,259	1,244	1,055	1,087	864
Total	**4,681**	**4,092**	**4,142**	**4,236**	**4,692**	**3,556**	**3,515**	**2,279**
Total transport expenditures as % of total federal expenditures								
	2.9	**2.5**	**2.4**	**2.5**	**2.6**	**2.1**	**2.4**	**1.4**

1 Transport Canada expenditures include $1,101 million for reducing the value of assets on the Accounts of Canada relating to the sale of the Canadian National Railway Company.
2 Starting in 1995/96, Canadian Coast Guard transportation operations are included under "Other."
3 Forecast as of January 31, 1999, of full fiscal-year actual expenditures.
4 Includes the Grain Transportation Agency for 1993/94 and 1994/95, the Canadian Transportation Agency, the Transportation Safety Board of Canada, the Aviation Safety Board, the Civil Aviation Tribunal, as well as transportation expenditures by other federal departments including Fisheries and Oceans, Public Works and Government Services Canada, Parks Canada, the National Capital Commission, Agriculture and Agri-Food Canada, Finance Canada, and Indian Affairs and Northern Development (estimate for 98/99 N/A).

Source: Main Estimates of the Government of Canada; Transport Canada, Finance Directorate; internal reports from federal agencies and departments (see note 4)

TABLE 3-5
TRANSPORT CANADA GROSS SPENDING ON TRANSPORTATION

(Millions of dollars)

	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99[1]
Operating and EBP[2]	1,756	1,686	1,677	1,687	2,319	1,155	541	522
Capital	533	499	588	501	297	273	106	81
Grants & Contributions[3]	913	799	831	789	832	1,073	1,781	812
Total	**3,202**	**2,984**	**3,096**	**2,977**	**3,448**	**2,501**	**2,428**	**1,415**

1 Forecast as of January 31, 1999, of full fiscal-year actual expenditures.
2 Employee Benefit Plan.
3 Includes transfers to Crown corporations, a $348 million transfer to the province of Newfoundland for termination of ferry services in 1997/98, and transition-period payments of $686 million in 1997/98 and $216 million in 1998/99 to Nav Canada.

Source: Transport Canada, Finance Directorate

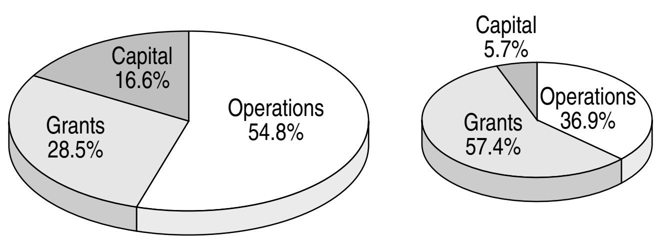
For Transport Canada, the decrease in expenditures can be attributed to divestiture and commercialization in the transport infrastructure, and to the transfer of Canadian Coast Guard operations to the Department of Fisheries and Oceans.

For the other agencies, the decreases are essentially attributable to years of program reductions in grants, contributions and subsidies, and in some cases full termination of programs such as the *Western Grain Transportation Act (WGTA)* and the Atlantic Region Freight Assistance (ARFA) program. The Canadian Coast Guard accounts for by far the largest share of transportation expenditures among other agencies.

Transport Canada Expenditures

Transport Canada expenditures for 1998/99 are projected to drop by more than 40 per cent from the previous year. This difference is attributable to one-year grants and contributions in 1997/98 that inflated spending disproportionately.

FIGURE 3-4
DISTRIBUTION OF TRANSPORT CANADA'S GROSS SPENDING ON TRANSPORTATION



Source: *Transport Canada, Finance Directorate*

TABLE 3-6
TRANSPORT CANADA'S LEVEL OF COST RECOVERY

(Millions of dollars)

	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97[1]	1997/98	1998/99[2]
Total revenues	1,048	983	929	1,002	1,199	587	230	336
Total expenditures	3,202	2,984	3,096	2,977	3,448	2,501	2,428	1,415
Net expenditures	2,154	2,001	2,167	1,975	2,249	1,914	2,198	1,079
Cost recovery (%)	**32.7**	**32.9**	**30.0**	**33.7**	**34.8**	**23.5**	**9.5**	**23.7**

1 Since 1996/97, the Air Transportation Tax, formerly netted against the Transport Canada budget, has been credited to the government Consolidated Revenue Fund. In 1996/97 and 1997/98, the tax amounted to $737.2 and $741.8 million, respectively; the forecast for 1998/99 is $284.5 million.
2 Forecast as of January 31, 1999, of full fiscal-year actual expenditures.

Source: *Transport Canada, Finance Directorate*

Table 3-5 shows Transport Canada's gross expenditures on transportation from 1991/92 to 1998/99.

When compared with Transport Canada expenditures in 1991/92, projected expenditures for 1998/99 represent a decline of more than 50 per cent. The largest budget reductions are in operating expenditures, a decrease attributable to the commercialization of airports and other divestiture initiatives. In the 1997/98 expenditures, there was still a contribution to NAV Canada as well as a one time grant to Marine Atlantic Ltd. operating expenditures, which accounted for almost 55 per cent of the Transport Canada budget in 1991/92, but now comprises approximately 37 per cent of the budget.

The relative importance of grants and contributions has more than doubled since 1991/92, while their actual levels have remained fairly stable.

Figure 3-4 compares the distribution of Transport Canada's gross expenditures on transportation in 1991/92 with projections for 1998/99.

Transport Canada Cost Recovery

Up until 1995/96, Transport Canada was recovering approximately one-third of its expenditures. The cost recovery level is now approximately one quarter. During the past three years, large grants and contributions were provided, such as those for the Labrador ferry service buyout and payments to NAV Canada. In addition, a major revenue source, the Air Transportation Tax, was no longer allocated to Transport Canada.

Table 3-6 shows Transport Canada's level of cost recovery from 1991/92 to 1998/99.

Federal Subsidies to Transportation

To facilitate transportation and related services across Canada, the federal government employs three mechanisms. First, it sets transportation policies, and safety rules and regulations, to ensure efficient and safe transportation. Second, it fulfils statutory obligations to provide transportation services, such as by directly subsidizing transportation entities. Third, it provides facilities and services through its own operations, which are funded by departmental or agency budgets.

Direct Federal Subsidies

Until recently, direct federal subsidies, grants and contributions to Crown corporations, agencies and other entities accounted for much of federal expenditures on transportation. During the past several decades, tens of billions of dollars were spent on the Canadian transportation system, with $8 billion expended during the past six years. Some payments are tied to constitutional obligations, such as subsidies for ferry services, and, consequently, have been in effect for quite a large number of years.

Recently, market forces have played a prominent role in subsidization by stimulating policy changes that have reduced subsidies, such as those to VIA Rail, or eliminating others, such as those for the transport of grain from western Canada under the WGTA and for the ARFA program.

Some subsidies are still being paid, however, such as those to ferry services and to smaller airports to assist with capital expenditures. Additionally, in exchange for an annual subsidy of $41.9 million a year (in 1992 dollars), the federal government signed an agreement with Strait Crossing Development Inc. to finance, build and operate the Confederation Bridge, linking the provinces of Prince Edward Island and New Brunswick, for 35 years beginning in 1997/98. Payments for the first two years were made by Public Works and Government Services Canada and are reflected in “Other” in Table 3-4, while subsequent annual payments will be made by Transport Canada. The agreement contains an escalation rate tied to the consumer price index.

Table 3-7 compares direct federal subsidies by transportation mode from 1993/94 to 1998/99.

Total direct federal subsidies, grants and contributions will be $812 million in 1998/99, a decrease of 25 per cent from 1996/97. The largest share is currently distributed to air transportation, a situation that will change with the end of grants and contributions to NAV Canada. Rail had previously received the largest share, with two-thirds in 1993/94, but will receive less than one-third in 1998/99.

Figure 3-5 compares the distribution of subsidies by mode in 1993/94 with those in 1998/99.

TABLE 3-7
DIRECT FEDERAL SUBSIDIES, GRANTS AND CONTRIBUTIONS BY MODE

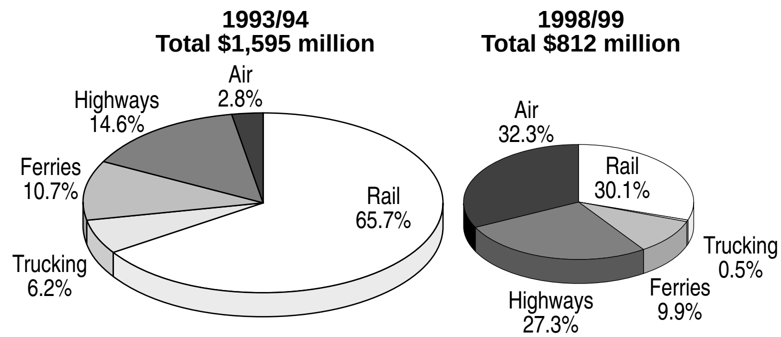
(Millions of dollars)

	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99[1]
Rail	1,044.7	1,015.2	567.2	280.6	257.0	244.2
Highways and bridges	232.5	243.4	284.9	317.1	294.0	221.1
Trucking	97.5	98.5	39.5	3.9	4.5	4.0
Ferries and marine facilities	170.9	183.5	166.9	148.1	479.7	80.4
Air	44.1	25.4	35.5	327.0	732.4	261.8
Other[2]	5.7	3.8	4.5	3.4	13.5	.4
Total	**1,595.4**	**1,569.8**	**1,098.5**	**1,080.1**	**1,781.1**	**811.9**

1 Forecast as of January 31, 1999, of full fiscal-year actual expenditures.
2 Includes $13.3 million in 1997/98 for withdrawal of the Royal Canadian Mounted Police from international airports.

Source: Transport Canada, Finance Directorate.

FIGURE 3-5
DISTRIBUTION OF TOTAL DIRECT FEDERAL SUBSIDIES, GRANTS AND CONTRIBUTIONS BY MODE



Source: Transport Canada, Finance Directorate

Rail

Rail has undergone the greatest drop in subsidies of all transportation modes in Canada, with total rail subsidies in 1998/99 representing only 30 per cent of total direct federal subsidies for transportation. The ratio of these subsidies to total rail revenues has decreased from about 15 per cent in 1993/94 to less than four per cent in 1997/98.

VIA Rail receives the majority of rail subsidies, grants and contributions, with 80 per cent in 1998/99. The level of subsidies provided to VIA Rail, however, has been cut by more than 40 per cent during the past six years. Subsidies for transporting grain under the WGTA and for supporting general freight transportation in the Atlantic provinces and eastern Quebec under the ARFA program, meanwhile, were terminated in 1995/96. In its peak year of 1994/95, the WGTA accounted for approximately 64 per cent of rail subsidies and more than 40 per cent of transportation subsidies.

Table 3-8 shows all direct federal subsidies for passenger and freight rail transportation from 1993/94 to 1998/99.

TABLE 3-8
FEDERAL SUBSIDIES, GRANTS AND CONTRIBUTIONS
RAIL

(Millions of dollars)

	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99[1]
Freight	**683.3**	**696.1**	**248.1**	**24.9**	**26.6**	**29.5**
WGTA	633.0	644.0	209.8	-	-	-
ARFA	9.4	9.3	2.2	-	-	-
Branch lines	15.3	17.4	9.7	-	-	-
Hopper cars	17.8	19.1	18.2	17.1	19.0	21.0
Other	7.8	6.3	8.2	7.8	7.6	8.5
Passenger	**351.8**	**311.1**	**310.9**	**248.2**	**222.9**	**207.5**
VIA Rail	342.7	301.0	301.0	235.8	216.2	200.5
Non-VIA	8.9	9.9	9.7	12.2	6.5	6.5
Other	.2	.2	.2	.2	.2	.5
Grade Crossings	**9.6**	**8.0**	**8.2**	**7.4**	**7.5**	**7.2**
Total – Rail	**1,044.7**	**1,015.2**	**567.2**	**280.5**	**257.0**	**244.2**

1 Forecast as of January 31rst 1999 of full fiscal-year actual expenditures.

Source: Transport Canada, Finance Directorate

TABLE 3-9
FEDERAL SUBSIDIES, GRANTS AND CONTRIBUTIONS
HIGHWAYS AND BRIDGES

(Millions of dollars)

	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99[1]
Highway Agreements	193.5	209.8	207.7	214.4	166.9	129.6
Transition re ARFA	-	-	48.7	74.8	101.5	67.8
Other	3.3	1.0	-	-	-	
Total - Highways	**196.8**	**210.8**	**256.4**	**289.2**	**268.4**	**197.4**
Montreal bridges[2]	35.7	32.6	28.5	27.9	25.6	23.7
Total - Highways and Bridges	**232.5**	**243.4**	**284.9**	**317.1**	**294.0**	**221.1**

1 Forecast as of January 31rst 1999 of full fiscal-year actual expenditures.
2 Jacques Cartier and Champlain Bridges Inc.

Source: Transport Canada, Finance Directorate

TABLE 3-10
FEDERAL SUBSIDIES, GRANTS AND CONTRIBUTIONS
TRUCKING

(Millions of dollars)

	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99[1]
ARFA	96.2	97.8	35.4	-	-	
National Safety Code	-	-	3.7	3.9	4.5	4.0
Other[2]	1.3	0.7	0.4	-	-	
Total - trucking	**97.5**	**98.5**	**39.5**	**3.9**	**4.5**	**4.0**

1 Forecast as of January 31, 1999 of full fiscal-year actual expenditures.
2 Grants to associations and institutes.

Source: Transport Canada, Finance Directorate

Highways and Bridges

During the past few decades, federal subsidies for highways and bridges have primarily taken the form of contributions under bilateral cost-sharing agreements with individual provinces, territories and, occasionally, municipalities. These subsidies are forecast to be $221 million in 1998/99, down from $294 million the previous year. About 60 per cent of subsidies for highways and bridges are typically allocated to highway agreements.

When the ARFA program, administered by the Canadian Transportation Agency, was terminated on June 30, 1996, $326 million was made available to the Atlantic provinces and eastern Quebec, an amount provided over six years primarily to fund road upgrading. To date, almost $300 million has been allocated.

In 1998/99, subsidies for highways and bridges are forecast to account for close to one third of all federal government direct subsidies.

Table 3-9 shows the breakdown of federal subsidies to highways and bridges from 1993/94 to 1998/99.

Trucking

Since the ARFA program was terminated in 1995/96, subsidies to trucking activity have been minimal. From 1996/97 to present, the only contribution to this mode has been to the provinces and territories for the implementation of the National Safety Code. Payments to trucking have averaged about $4 million per year, which make subsidies to trucking in 1998/99 represent less than 0.5 per cent of total federal transportation subsidies and contributions.

Table 3-10 shows total federal subsidies to trucking from 1993/94 to 1998/99.

Marine

Federal subsidies for ferries and marine facilities in 1998/99 will be approximately $80 million, the lowest of any year. Two events in that fiscal year are responsible for this. One, the completion of the Confederation Bridge means that ferry services, and thus the annual $60 million subsidy for them, are no longer required. Second, the annual subsidy paid to Marine Atlantic Ltd. for providing other services required before the Confederation Bridge (about $60 million a year) stopped.

Transport Canada continues to subsidize ferry services operated by Marine Atlantic Inc. between the provinces of Newfoundland and Nova Scotia. This subsidy will be $26.8 million in 1998/99 and is one of Transport Canada's remaining constitutional obligation to provide transportation services to specific regions across Canada. Marine Atlantic also received a one-time compensatory payment in 1997/98. The department had been subsidizing services in regions that could not be serviced without the carriers incurring a loss. Although not considered to be constitutional obligations, subsidies such as the WGTA were considered to be in the public interest and were referred to as "imposed public duties." All such payments to carriers have been eliminated.

In 1998/99, subsidies to marine will represent about 10 per cent of total direct federal subsidies to transportation, the same percentage as in 1993/94.

Table 3-11 shows federal subsidies to the marine sector from 1993/94 to 1998/99.

TABLE 3-11
FEDERAL SUBSIDIES, GRANTS AND CONTRIBUTIONS
MARINE

(Millions of dollars)

	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99[1]
Marine facilities and services						
Pilotage authorities	7.3	4.3	5.1	-	-	
Canartic Marine Inc.	2.7	-	-	-	-	
Canada Ports Corp.	.7	.9	1.9	2.5	0.7	10.4
St. Lawrence Seaway Authority	-	-	-	-	-	
Port Divestiture Fund	-	-	-	0.1	1.5	1.2
Other[2]	1.5	1.8	10.1	-	4.2	7.5
Sub-total	**12.2**	**7.0**	**17.1**	**2.6**	**6.4**	**19.1**
Ferries						
Marine Atlantic Inc.	129.3	112.4	100.0	97.2	91.3	29.1
Nfld. South Coast ferries	-	31.0	19.0	5.0	-	-
New Brunswick Manan ferry	-	-	-	13.0	-	-
BC ferries	18.4	22.8	21.3	21.8	21.9	22.0
Bay of Fundy Ferry Services	-	-	-	-	3.3	3.2
Other East Coast ferries	11.0	10.3	9.5	8.5	9.2	7.0
Labrador ferry services buyout	-	-	-	-	347.6	-
Sub-total	**158.7**	**176.5**	**149.8**	**145.5**	**473.3**	**61.3**
Total - Marine and Ferries	**170.9**	**183.5**	**166.9**	**148.1**	**479.7**	**80.4**

1 Forecast as of January 31, 1999, of full fiscal-year actual expenditures.
2 In 1995/96, this item includes a grant of $10 million to Newfoundland for the operation of ports.

Source: Transport Canada, Finance Directorate

Air

Federal direct subsidies and contributions to air activities, forecast to be $262 million for 1998/99, represent almost one third of total federal subsidies and contributions to transportation. They are divided among NAV Canada, airports and aviation.

Federal contributions to NAV Canada have accounted for approximately 90 per cent of subsidies and contributions to the air sector in the past three years. The federal contribution to NAV Canada is a temporary transfer of the Air Transportation Tax revenues. The transfer is staged with NAV Canada's implementation of full cost recovery from air navigation fees.

Canada's 26 major airports, owned by Transport Canada, comprise the National Airport System (NAS). The operation and full financial responsibility for many NAS airports, however, has been transferred to local authorities under the National Airports Policy of 1994. NAS airports not yet transferred are still operated by Transport Canada, but costs tied to their operations (Table 3-13) are not reported here as a subsidy.

Transport Canada is also transferring both ownership and operational responsibility for local and small airports to local authorities. These airports will continue to receive subsidies for a certain number of years. To date, total subsidies to airports have ranged from $25 million in 1994 to $46 million in 1998/99.

Aviation subsidies, which have not exceeded $1 million annually since 1993/94, include contributions to the International Civil Aviation Organization and

TABLE 3-12
FEDERAL SUBSIDIES, GRANTS AND CONTRIBUTIONS
AIR

(Millions of dollars)

Airports	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99[1]
Non-NAS[2] airport operations	14.2	12.0	7.5	4.7	3.3	2.7
Local airports	14.6	8.0	10.0	.8	.2	-
Non-NAS airports under NAP[3]	-	-	11.5	16.3	16.7	10.0
Airport Capital Assistance Prog.	-	-	1.7	9.4	21.2	31.0
Other[4]	14.3	4.9	4.5	3.9	4.8	1.9
Total Airports	**43.1**	**24.9**	**35.2**	**35.1**	**46.2**	**45.6**
Aviation	**1.0**	**.5**	**.3**	**.2**	**.4**	**.4**
Nav Canada	**-**	**-**	**-**	**291.7**	**685.8**	**215.8**
Total Air	**44.1**	**25.4**	**35.5**	**327.0**	**732.4**	**261.8**

1 Forecast as of January 31, 1999, of full fiscal-year actual expenditures.
2 National Airports System
3 National Airports Program
4 Includes a subsidy of $13.3 million to other airports in 1993/94.

Source: Transport Canada, Finance Directorate

TABLE 3-13
FEDERAL EXPENDITURES
ON TRANSPORT FACILITIES AND SERVICES

(Millions of dollars)

	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99[1]
Airports operations (NAS[2] and non-NAS)						
Operating expenditures	244.5	245.3	238.3	255.2	123.0	91.1
Capital expenditures	135.8	146.0	135.7	123.4	54.5	40.8
Total gross expenditures	380.3	391.3	374.0	378.6	177.5	131.9
Less revenues	(291.3)	(303.3)	(367.9)	(324.6)	(149.6)	(265.6)
Airports operations Net expenditures	**89.0**	**88.0**	**6.1**	**54.0**	**27.9**	**(133.7)**
Air navigation system	**128.2**	**96.1**	**29.6**	**363.7**	**N/A**	**N/A**
Harbours and ports						
Operating expenditures	28.5	30.1	33.6	28.5	27.4	23.2
Capital expenditures	23.8	23.1	11.3	11.9	1.9	4.9
Total gross expenditures	52.3	53.2	44.9	40.4	29.3	28.1
Less revenues	(13.1)	(12.9)	(17.1)	(20.3)	(20.7)	(15.9)
Harbours and ports Net expenditures	**39.2**	**40.3**	**27.8**	**20.1**	**8.6**	**12.2**
Marine safety						
Operating expenditures	N/A	N/A	31.8	32.5	32.6	30.8
Capital expenditures	N/A	N/A	1.3	1.1	.2	1.5
Total gross expenditures	N/A	N/A	33.1	33.6	32.8	32.3
Less revenues	N/A	N/A	(3.8)	(5.4)	(7.8)	(8.1)
Marine safety Net expenditures	**37.7**	**36.4**	**29.3**	**28.2**	**26.8**	**24.2**
Coast Guard services[3]						
Total gross expenditures	588.8	530.8	533.4	540.2	522.8	523.5
Less revenues	N/A	N/A	(11.5)	(27.3)	(37.3)	(52.4)
Coast Guard services Net expenditures	**588.8**	**530.8**	**521.9**	**512.9**	**485.5**	**471.1**
Total	**882.9**	**791.6**	**619.7**	**978.9**	**547.0**	**373.8**

1 Forecast as of January 31, 1999, of full fiscal-year actual expenditures.
2 National Airports System.
3 Includes expenditures on marine navigation systems, icebreaking and Arctic operations, search and rescue and fleet management. For years prior to 1995/96, Coast Guard expenditures are included in Transport Canada figures. Marine safety is an expenditure unaccounted for in previous annual reports.

Source: Transport Canada, Finance Directorate and the federal Department of Fisheries and Oceans

amounts owed under other international agreements for air navigation and airways.

Table 3-12 shows federal subsidies to the air sector from 1993/94 to 1998/99.

Facilities and Services Provided at Federal Expense

In addition to directly subsidizing transportation services, the federal government provides transportation facilities and services through federal operations that are funded by various departments and agencies. These include airports, harbour and port operations, marine safety programs, and services rendered by the Canadian Coast Guard (now part of the Department of Fisheries and Oceans).

Expenditures on these facilities and services have been declining, as Transport Canada and Fisheries and Oceans reduce their operational responsibilities in the transportation system. The 1998/99 forecast of $374 million is well under half the expenditure total of five years ago. Additionally, revenues from airport operations in 1998/99 will, for the first time, exceed total gross annual expenditures.

Table 3-13 shows gross and net federal spending on transportation facilities and services from 1993/94 to 1998/99.

PROVINCIAL/TERRITORIAL EXPENDITURES ON TRANSPORTATION

In 1997/98, provincial and territorial gross spending on transportation totalled approximately $7.6 billion. This represents an increase of 2.5 per cent from the previous year, compared with a decrease of eight per cent from 1995/96 to 1996/97. Capital and operating expenditures, which include salaries, each accounted for approximately 35 per cent of gross spending, while transfers accounted for 30 per cent.

Spending on roads and highways accounts for the vast majority of provincial/territorial expenditures on transport, amounting to almost $6 billion in 1997/98, up three per cent from the previous year. Spending increased to $1.3 billion on transit, and to $96 million on marine transportation. Expenditures on rail and air decreased. Multimodal spending, which includes spending on more than one sector and on general administration, increased to $172 million.

Table 3-14 shows provincial/territorial spending on transportation by mode from 1991/92 to 1997/98.

Federal transfers to the provinces/territories in 1997/98 almost doubled to $638 million, increasing the share of these transfers in total gross provincial/territorial spending on transportation to eight per cent, compared with four per cent the previous year. Approximately 99 per cent of these transfers were for roads and highways. Included was $348 million to Newfoundland for the Labrador ferry services buyout, an amount that, if excluded from calculations, means there was a ten per cent drop in federal transfer payments to provinces.

In 1997/98, provincial/territorial gross expenditures on transportation accounted for less than 5 per cent of their total expenditures. Total transportation spending net of federal transfers dropped by almost two per cent to $7 billion in 1997/98.

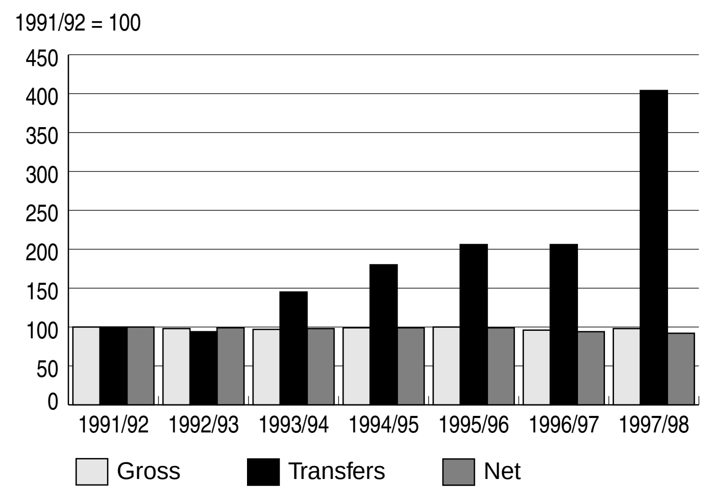
TABLE 3-14
PROVINCIAL/TERRITORIAL GOVERNMENT EXPENDITURES ON TRANSPORTATION BY MODE

(Millions of dollars)

	1991/92	*1992/93*	*1993/94*	*1994/95*	*1995/96*	*1996/97*	*1997/98*
Air	117	99	91	89	105	102	78
Water	169	143	126	130	99	87	96
Rail	16	16	22	19	27	11	2
Roads and Highways	6,144	5,885	5,906	6,185	6,376	5,802	5,977
Transit	1,369	1,213	1,215	1,308	1,287	1,275	1,294
Multimodal	210	208	208	190	193	159	172
Total Gross Transportation Expenditures	**8,025**	**7,564**	**7,568**	**7,921**	**8,087**	**7,436**	**7,619**
Less federal transfers	(154)	(126)	(228)	(279)	(325)	(301)	(638)
Total Net Transportation Expenditures	**7,871**	**7,438**	**7,340**	**7,642**	**7,762**	**7,135**	**6,979**
Gross Transportation Expenditures as % of Total Local Government Expenditures	**5.4%**	**4.9%**	**4.9%**	**5.0%**	**5.0%**	**4.7%**	**4.8%**

Source: Provincial/territorial departments of transport; Transport Canada

FIGURE 3-6
PROVINCIAL/TERRITORIAL GOVERNMENTS' TRANSPORTATION GROSS AND NET EXPENDITURES AND FEDERAL TRANSFERS
1991/92 – 1997/98



Source: Provincial/territorial departments of transport; Transport Canada

TABLE 3-15
PROVINCIAL/TERRITORIAL TRANSPORTATION EXPENDITURES BY JURISDICTION
1991/92

(Millions of dollars)

	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Yk.	N.W.T.
Air	11.1	0.0	0.0	0.0	31.8	24.8	7.3	2.3	4.8	11.6	3.3	20.5
Water	13.5	0.0	7.2	10.3	37.3	31.0	1.1	1.2	1.3	55.8	0.0	10.1
Rail	0.0	0.0	0.0	0.6	2.6	0.0	0.0	0.0	1.0	11.5	0.0	0.0
Roads and Highways	162.8	76.4	279.3	321.3	1,008.8	2,028.1	219.4	249.0	656.2	1,047.8	45.1	49.4
Transit	0.0	0.0	4.9	0.0	483.2	609.8	21.2	0.6	20.9	227.9	0.0	0.0
Multimodal	0.0	0.2	0.3	0.0	106.9	38.6	5.4	0.0	55.5	0.0	0.0	3.0
Gross Transportation Expenditures	**187.4**	**76.6**	**291.8**	**332.2**	**1,670.6**	**2,732.3**	**254.4**	**253.1**	**739.7**	**1,354.7**	**48.4**	**82.9**
less federal transfers	(70.0)	(4.0)	(8.8)	(19.7)	(7.6)	(0.5)	(3.7)	(0.5)	(3.0)	(18.8)	(14.3)	(2.6)
Net Transportation Expenditures	**117.4**	**72.6**	**283.0**	**312.5**	**1,663.0**	**2,731.8**	**250.7**	**252.6**	**736.7**	**1,335.9**	**34.1**	**80.3**
Gross Transportation Expenditures as a % of Total Provincial Government Expenditures	**6.0%**	**9.9%**	**5.9%**	**7.5%**	**4.3%**	**4.8%**	**3.7%**	**5.2%**	**5.1%**	**7.1%**	**12.7%**	**7.2%**
Provincial Share of Gross Transportation Expenditures	**2.3%**	**1.0%**	**3.6%**	**4.1%**	**20.8%**	**34.1%**	**3.2%**	**3.2%**	**9.2%**	**16.9%**	**0.6%**	**1.0%**

Source: Provincial/territorial departments of Transport, Transport Canada

TABLE 3-16
PROVINCIAL/TERRITORIAL TRANSPORTATION EXPENDITURES BY JURISDICTION
1997/98

(Millions of dollars)

	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Yk.	N.W.T.
Air	8.7	0.0	0.0	0.0	3.7	7.5	8.3	2.5	1.8	1.7	5.6	38.0
Water	13.5	0.0	4.6	13.5	39.1	9.2	0.0	1.7	1.6	4.7	0.0	8.0
Rail	0.0	0.0	0.0	0.5	0.1	0.0	0.0	1.2	0.0	0.0	0.0	0.0
Roads and Highways	165.6	75.8	204.8	381.0	1,175.5	1,971.3	240.9	233.3	617.6	822.9	54.8	33.6
Transit	0.0	0.0	0.0	0.0	248.5	736.5	17.9	2.2	0.0	288.6	0.0	0.0
Multimodal	0.0	0.3	0.0	0.0	80.7	57.6	1.3	0.0	23.3	0.0	0.0	8.5
Gross Transportation Expenditures	**187.7**	**76.1**	**209.4**	**395.0**	**1,547.6**	**2,782.1**	**268.4**	**240.8**	**644.3**	**1,117.9**	**60.4**	**88.0**
less federal transfers	(412.2)	(10.6)	(46.0)	(70.0)	(24.3)	(35.5)	(0.2)	(16.2)	(0.6)	(6.2)	(14.8)	(1.5)
Net Transportation Expenditures	**-224.5**	**65.5**	**163.4**	**325.0**	**1,523.3**	**2,746.6**	**268.2**	**224.6**	**643.7**	**1,111.7**	**45.6**	**86.6**
Gross Transportation Expenditures as a % of Total Provincial Government Expenditures	**5.5%**	**10.1%**	**3.1%**	**9.0%**	**3.8%**	**4.6%**	**3.8%**	**4.7%**	**4.3%**	**4.6%**	**13.7%**	**6.7%**
Provincial Share of Gross Transportation Expenditures	**2.5%**	**1.0%**	**2.7%**	**5.2%**	**20.3%**	**36.5%**	**3.5%**	**3.2%**	**8.5%**	**14.7%**	**0.8%**	**1.2%**

Source: Provincial/territorial departments of Transport, Transport Canada

Figure 3-6 illustrates the stability of provincial/territorial gross and net expenditures on transportation, and the relative increase in federal transfers, from 1991/92 to 1997/98.

While transportation spending as a percentage of total budgets averaged almost 5 per cent across Canada, percentages in individual provinces and territories ranged from 14 per cent in the Yukon to three per cent in Nova Scotia.

In terms of share of total gross provincial/territorial expenditures on transportation, Ontario and Quebec accounted for more than 57 per cent in 1997/98, while British Columbia and Alberta accounted for 23 percent. The distribution by jurisdiction is generally unchanged from 1991/92.

Tables 3-15 and 3-16 show transportation expenditures by mode and province/territory for 1991/92 and 1997/98 respectively.

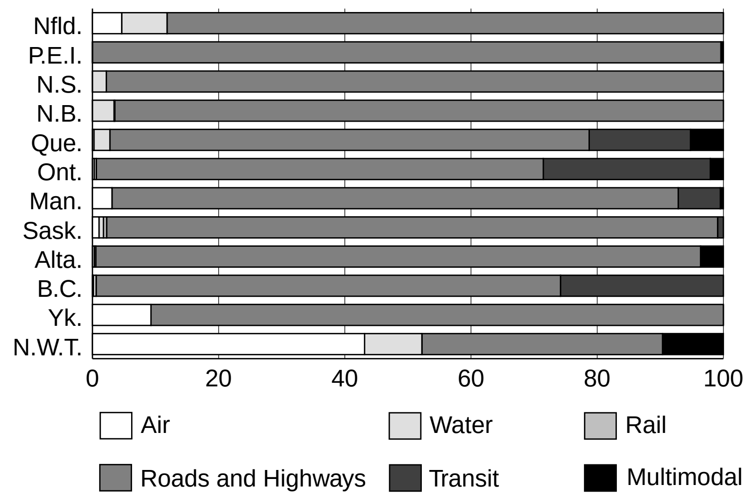
Expenditure Variances Among Provinces/Territories

Spending on roads and highways accounts for the majority of provincial/territorial expenditures on transportation, although other modes are important for some provinces. The percentage of transportation budgets spent on roads and highways ranged from almost 100 per cent in Prince Edward Island to 38 per cent in the Northwest Territories.

Transit spending is important for Quebec, where it accounts for 16 per cent of the transportation budget, and in Ontario and British Columbia, where it accounts for 26 per cent in each province.

Remoteness makes spending on air transportation important in the territories: it accounts for 43 per cent of transportation expenditures in the Northwest Territories, and nine per cent in the Yukon Territory.

FIGURE 3-7
GROSS TRANSPORTATION EXPENDITURES BY PROVINCE/TERRITORY AND BY MODE, 1997/98



Source: Provincial/territorial departments of transport

Spending on water transportation accounted for seven per cent of transportation spending in Newfoundland and nine per cent in the Northwest Territories. There was also spending on water transportation in Nova Scotia, New Brunswick, Quebec and British Columbia.

Figure 3-7 shows the relative importance of gross transportation expenditures by mode in each jurisdiction, in 1997/98.

LOCAL GOVERNMENT EXPENDITURES ON TRANSPORTATION

In 1997, gross transportation expenditures by Canadian municipalities amounted to $8 billion, declining for the second consecutive year after having peaked in 1995. Net expenditures (i.e. gross minus transfer payments) were $6.7 billion, continuing their increase as federal and provincial transfers declined. Transportation spending accounted for approximately 20 per cent of total municipal expenditures, a level essentially unchanged since 1991.

Expenditures on roads and streets in 1997 were $6.3 billion, down 1.8 per cent from 1996, while expenditures on transit were $1.6 billion, up 1.5 per cent from the previous year. Spending on roads and streets accounted for approximately 78 per cent of total gross expenditures on transportation. Spending on other transport areas, including wharves and airports, dropped to $109 million.

Table 3-17 shows local government expenditures on transportation from 1991 to 1997.

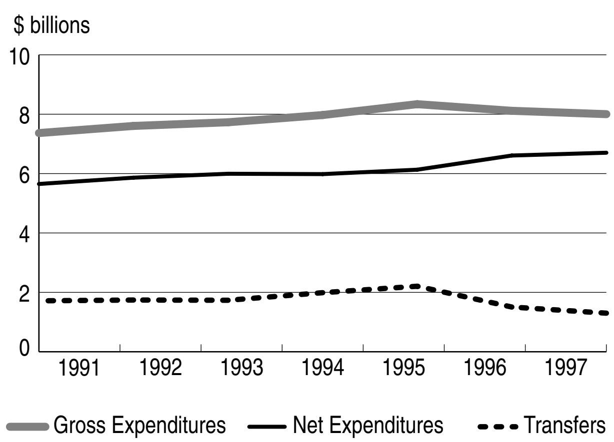
TABLE 3-17
LOCAL GOVERNMENT EXPENDITURES ON TRANSPORTATION

(Millions of dollars)

	1991	1992	1993	1994	1995	1996	1997
Gross Expenditures	**7,365**	**7,604**	**7,728**	**7,971**	**8,337**	**8,114**	**8,001**
Roads and Streets	5,967	5,950	6,084	6,334	6,623	6,375	6,256
Public Transit	1,297	1,558	1,534	1,535	1,580	1,613	1,636
Other Transportation	101	96	110	102	134	126	109
Less Transfers	**(1,715)**	**(1,742)**	**(1,734)**	**(1,989)**	**(2,206)**	**(1,506)**	**(1,299)**
Provincial	1,695	1,715	1,708	1,904	2,040	1,375	1,195
Federal	20	27	26	85	166	131	104
Net Expenditures	**5,650**	**5,862**	**5,994**	**5,982**	**6,131**	**6,608**	**6,702**
Gross Transportation Expenditures as % of Total Local Government Expenditures	**20.1%**	**19.8%**	**19.7%**	**20.0%**	**20.2%**	**20.7%**	**20.4%**

Source: Statistics Canada, Public Institutions Division

FIGURE 3-8
LOCAL GOVERNMENT TRANSPORTATION GROSS AND NET EXPENDITURES AND PROVINCIAL TRANSFERS



Source: Statistics Canada, Public Institutions Division

Provincial/Federal Transfers to Local Governments

In 1997, local governments received $1.2 billion in transfers for transportation from the provinces, representing 92 per cent of total federal/provincial transportation transfers to municipalities. These transportation transfers to municipalities, in turn, represented 18 per cent of all transfers received by local governments — 16 per cent of provincial transfers and 23 per cent of federal transfers.

Compared with the 1991 net transportation budget, the cumulative increase to 1997 amounts to some $3.4 billion compared with cumulative drops of $3.3 and $2.8 billion for the federal and provincial/territorial governments, respectively.

From 1995 to 1997, transportation transfers to local governments fell $900 million, or 41 per cent. Transfers covered 16 per cent of gross transportation expenditures by municipalities in 1997, compared with 25 per cent in 1995. The decline is primarily attributable to the phasing out of the Canada Infrastructure Works Program, in which costs were shared equally between provincial, federal and local governments.

Figure 3-8 compares the evolution of municipal expenditures with transfers received from 1991 to 1997.

PART B

TRANSPORTATION AND SUSTAINABILITY

Transportation is confronted with the challenges of overcoming the country's size and landscape – i.e. taking people and goods where they have to go, safely, swiftly and efficiently. These challenges involve helping Canada's economy to remain competitive, making the appropriate decisions about the future of Canadian transportation as well as working toward sustainability in the transport sector. In air, surface and marine transportation, steps have been taken to modernize transportation in Canada, moving toward greater efficiency, fewer subsidies and greater say for those who use the system. The objective of a safe, secure and accessible transportation system – in which all modes compete through market forces – and the objective of protecting the physical environment, together, are shaping sustainable transportation. This part of the report reviews a number of matters of importance to sustainable transportation: first, safety, environment and energy; then a review of the role of transportation in regional economies, employment, trade and tourism; and, finally, an overview of the impact of information and communication technology on transportation.

PART B – TRANSPORTATION AND SUSTAINABILITY

4

TRANSPORTATION AND SAFETY

Canada's transportation system safety record improved in 1998, despite some well-covered tragic accidents.

The safety and security of Canada's transportation system continues to be a top priority for the federal government. This commitment is reflected in all of Transport Canada's activities.

The department's focus is on developing practical safety programs and effective regulations, and ensuring that these regulations are followed. In particular, the department regulates, monitors and evaluates safety-related issues in the following areas: aeronautics and airports; air and marine navigation; marine shipping facilities; commercial shipping; new motor vehicle standards; extra-provincial commercial motor vehicles and railways and canals connecting provinces with each other or with the United States.

Responsibility for transportation safety in Canada involves many stakeholders, including the federal, provincial, territorial and municipal governments; industry; and non-governmental organizations. Transport Canada works closely with industry and other federal government departments, such as the Transportation Safety Board, to maintain nationwide safety.

This chapter describes several areas of transportation safety, such as, transportation occurrence statistics for all modes, including international comparisons; transportation of dangerous goods initiatives; and federal, provincial and municipal government safety initiatives, as well as international contributions to safety.

TRANSPORTATION OCCURRENCES

In general, 1998 was a year of mixed success. It was marked with some tragic and high-profile occurrences, ranging from the sinking of the Cypriot bulk carrier, *MV Flare*, in January 1998 with 21 fatalities, to the crash of Swissair Flight 111 with 229 fatalities. This crash was the single worst aviation accident in the world in 1998. Although it happened on Canadian

TABLE 4-1
TRANSPORTATION OCCURRENCES BY MODE
1998 vs. FIVE-YEAR AVERAGE

	Aviation	Marine	Rail	Road*
Accidents				
Most Recent Year	384	487	1,081	635,412
Five Year Average	378	668	1,188	682,287
Fatalities				
Most Recent Year	83	47	100	3,064
Five Year Average	87	33	114	3,361
Incidents				
Most Recent Year	778	158	439	N/A
Five Year Average	641	186	443	N/A

* Road accidents are for 1996 (the most recent statistics available) and for the 1991 - 1995 period; road fatalities are for 1997; and all other modes are for the 1993-1997 period.

Source: Transportation Safety Board

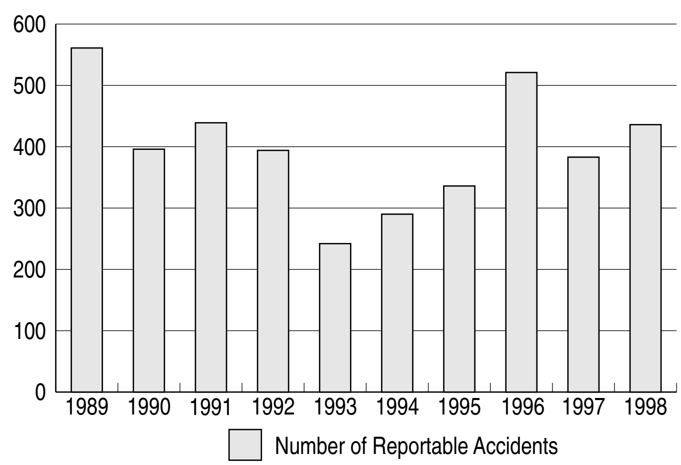
TABLE 4-2
ACCIDENT RATES IN TRANSPORTATION
1998 vs. FIVE-YEAR AVERAGE

	Accident Rate			
	Aviation	Marine	Rail	Road*
Most Recent Year	9.6	4.3	14.2	N/A
Five Year Average	10.0	4.5	15.2	N/A

* Road accidents are for 1996 (the most recent statistics available) and for the 1991 - 1995 period; road fatalities are for 1997; and all other modes are for the 1993-1997 period.
Aviation: Canadian registered aircraft only. (Per 100,000 hours flown.)
Marine: Canadian - flag vessels only, commercial accident rate. (Per 1,000 commercial vessel trips).
Rail: Includes all railways in Canada operating under Federal jurisdiction. (Per million train-miles).

Source: Transportation Safety Board

FIGURE 4-1
REPORTABLE ACCIDENTS INVOLVING
DANGEROUS GOODS, 1989 – 1998



Note: For 1993 and 1994 the apparent drop is mostly due to a change in processing of information; the figures for 1998 are only estimates.

Source: Transport Canada, Dangerous Goods Accident Information System

territory, it will not appear in Canada's transportation system safety record because the aircraft was not Canadian-registered or operated by a Canadian carrier.

Despite these tragic accidents, Canada's overall safety record continued to improve in 1998. The number of accidents in the marine, rail and road modes declined from both the previous year and their respective five-year averages. In the case of air, the number of accidents involving Canadian-registered aircraft was up from 1997 levels, the accident total was in line with the five-year average.

Table 4-1 compares transportation occurrences by mode with the five-year average.

These comparisons can be misleading as they do not take into account the specifics of each mode, nor do they reflect the level of activity or exposure to risk associated with each particular mode.

The number of road accidents in 1996 was approximately seven per cent lower than the average of the previous five years, while the number of road fatalities in 1997 was almost nine per cent lower than the five-year average.

Aviation and marine fatalities rose in 1998 as a result of a few tragic accidents but declined in the rail mode. While aviation fatalities were up, the number of fatal aviation accidents in 1998 fell significantly to 31 from the 1997 level of 36 and the comparable five-year average (43).

The accident rate, which takes into account the level of activity in each mode, also shows a general downward trend in 1998. The levels of activity suggest the accident rates in the marine, rail and aviation modes were below the corresponding averages for the previous five years. In aviation, for example, the accident rate per 100,000 flying hours, while up slightly from 1997, was well below the five-year average, and significantly below that of the past 10 years.

Table 4-2 presents accident rates by mode for the most recent year and the five-year average.

Marine accident rates indicate a continuing downward trend, with shipping accidents involving Canadian commercial vessels per 1,000 trips down to 4.3 in 1998 from 4.5 for the 1993-1997 five year average. This is attributed, in part, to a continuing decrease in marine activity. For rail, the 1998 rate fell to 14.2 accidents per million train-miles, down from the 1993-1997 average of 15.2 accidents.

Figure 4-1 shows the number of transportation of dangerous goods reportable accidents for the period 1989 to 1998.

TABLE 4-3
ACCIDENTS IN RAIL TRANSPORTATION
1989 – 1998

	Number of Accidents		*Accident Rate**		
Year	*Pre-TSB Criteria*	*Post-TSB Criteria*	*Pre-TSB Criteria*	*Post-TSB Criteria*	*Fatalities*
1989		927		12.4	142
1990		903		13.2	103
1991		990		13.3	124
1992	932	969	12.5	13.0	137
1993	868	1,025	11.4	13.4	116
1994	926	1,212	11.2	14.7	112
1995	906	1,276	11.6	16.4	120
1996	1,004	1,305	13.3	17.3	117
1997	828	1,121	10.6	14.3	107
1998	688	1,081	9.0	14.2	100
1993-1997 Average	**906**	**1188**	**11.6**	**15.2**	**114**

* Number of accidents per million train-miles.

Source: Transportation Safety Board

RAIL

Domestic Operations

Prior to August 1992, railway occurrences such as main-track derailments, non main-track collisions and derailments, and crossing accidents had a different reporting criteria. This is a contributing factor to the increase in rail occurrences after 1992 as illustrated in Table 4-3.

The statistics presented in this section include all railways under federal jurisdiction. In 1998, a total of 1,081 railway accidents were reported, down four per cent from 1997 levels and nine per cent below the annual average between 1993 and 1997. This represents an accident rate of 14.2 accidents per million train-miles, on an estimated base of 76.3 million train-miles. This rate was consistent with that of 1997, and lower than the annual average rate of 15.2 between 1993 and 1997.

Of total rail-related accidents reported in 1998, non main-track derailments and collisions accounted for 46 per cent; crossing accidents 26 per cent, and main-track derailments ten per cent.

Table 4-3 provides a summary of rail accidents for the period 1989 – 1998.

There were 100 rail fatalities in 1998 – the lowest number of fatalities for the 10-year reference period, and less than the 5-year average of 114. Historically, most rail fatalities result from accidents at crossings or accidents involving trespassers. As these two areas are of particular concern to the federal government, it has initiated several programs to address these issues.

Railway crossing accidents by province from 1989 to 1998 are presented in Table 4-4.

The 277 total crossing accidents reported in 1998 represent the lowest number of accidents since 1989, down 10 per cent from 1997 and 24 per cent below the five-year average. Accidents at automated protected crossings remained constant at 48 per cent.

Fatal crossing accidents, as a proportion of total accidents, increased to 15 per cent in 1998, up from the five-year average of 10 per cent. Crossing accidents involving passenger trains, however, have remained relatively constant for the last two years and are down 15 per cent over the last five years.

Table 4-5 summarizes the number of rail trespasser accidents by province.

The 80 accidents involving rail trespassers in 1998 represents a decline of 18 per cent from 1997. Compared with the previous 5-year average, these accidents have declined by one-quarter. Ontario accounted for 44 per cent of all trespasser accidents. Fatal accidents made up 69 per cent of total trespasser accidents, a

TABLE 4-4
CROSSING ACCIDENTS BY PROVINCE
1989 – 1998

Province	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*
Accidents *										
Newfoundland / Prince Edward Island / Nova Scotia (167)	8	9	3	14	10	6	5	8	5	3
New Brunswick (316)	14	8	7	16	14	12	12	6	5	2
Quebec (2,478)	105	59	62	61	58	78	58	61	49	48
Ontario (5,229)	136	138	132	135	117	107	122	92	75	67
Manitoba (3,038)	45	24	44	28	34	29	33	46	31	33
Saskatchewan (6,437)	41	52	56	53	36	42	44	49	32	39
Alberta (3,705)	78	60	64	49	65	71	66	71	70	56
British Columbia (1,039)	42	36	39	30	45	45	40	33	40	29
Canada (22,424)	**469**	**386**	**407**	**386**	**379**	**390**	**380**	**366**	**307**	**277**
Crossing Fatal Accidents	69	43	52	55	40	45	39	40	28	41
Passenger Train Related Accidents	64	29	37	43	38	37	26	40	28	29

* Figures in brackets denote estimated number of public crossings in each province as of January 1999. The Canadian total includes the Northwest Territories.

Source: Transportation Safety Board

TABLE 4-5
RAIL TRESPASSER ACCIDENTS BY PROVINCE
1989 – 1998

Province	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*
Accidents										
Newfoundland / Prince Edward Island / Nova Scotia	2	3	1	1	3	1	1	4	0	2
New Brunswick	3	1	0	0	4	0	6	3	0	0
Quebec	9	9	12	20	19	27	27	32	16	14
Ontario	30	27	51	44	45	40	40	54	47	35
Manitoba	4	5	0	3	3	7	13	1	4	5
Saskatchewan	7	5	4	3	8	3	3	3	4	2
Alberta	13	17	9	13	6	12	13	9	7	9
British Columbia	19	16	16	14	15	9	9	22	20	13
Canada	**87**	**83**	**93**	**98**	**103**	**99**	**112**	**128**	**98**	**80**
Trespasser Fatal Accidents	45	48	56	55	56	54	63	66	68	55
Passenger Train Related Accidents	18	17	19	26	25	20	23	28	25	27

Source: Transportation Safety Board

decrease of 10 per cent from the 1993 to 1997 average. Passenger trains were involved in one-third of the 1998 accidents, up from the 1997 level.

In order to improve the level of rail safety in Canada, the program Direction 2006 addresses specifically these crossing and trespasser types of accidents, with the goal to reduce grade crossing accidents and trespasser fatalities by 50 per cent by the year 2006. Public awareness and education programs, monitoring and enforcement, safety programs and research will be the focus.

International Comparisons

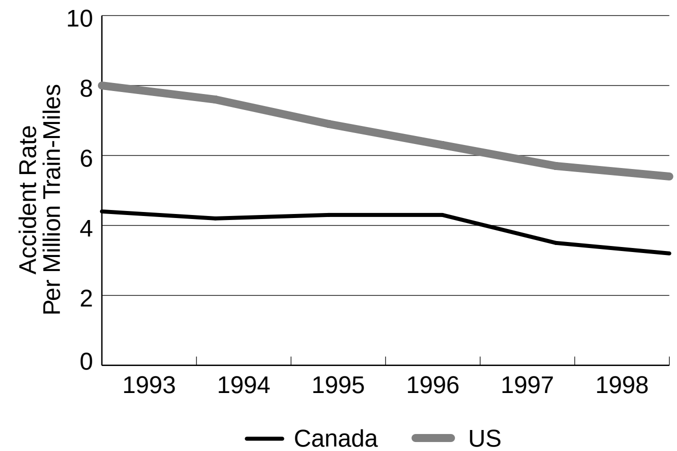
Figure 4-2 provides a comparison of crossing accidents in Canada and the US between 1993 and 1998.

Both countries have been able to reduce the rate of rail crossing accidents. The accident rate in Canada, while relatively stable for the initial three years of the reference period, has declined since 1996. Over the same period, the rate in the US has also shown a steady decline. On average, Canada's railway crossing accident rate per million train-miles has been 20 per cent lower than that of the US.

Figure 4-3 shows crossing and trespasser fatalities.

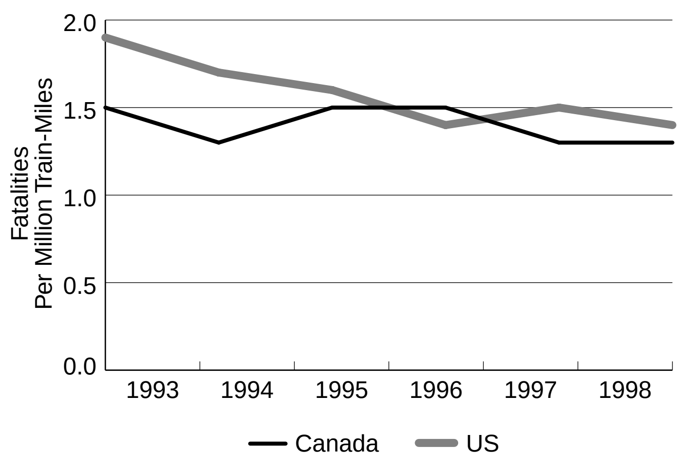
These fatalities account for most of the rail-related fatalities in Canada. While the fatality rate has remained relatively constant over the last two years, fatalities declined in 1998.

FIGURE 4-2
RAIL CROSSING ACCIDENTS
CANADA vs. US, 1993 – 1998



Source: Canadian Data - Transportation Safety Board; U.S. Data - United States Department of Transportation

FIGURE 4-3
NUMBER OF CROSSING AND TRESPASSER FATALITIES
CANADA vs. US, 1993 – 1998



Source: Canadian Data - Transportation Safety Board; U.S. Data - United States Department of Transportation

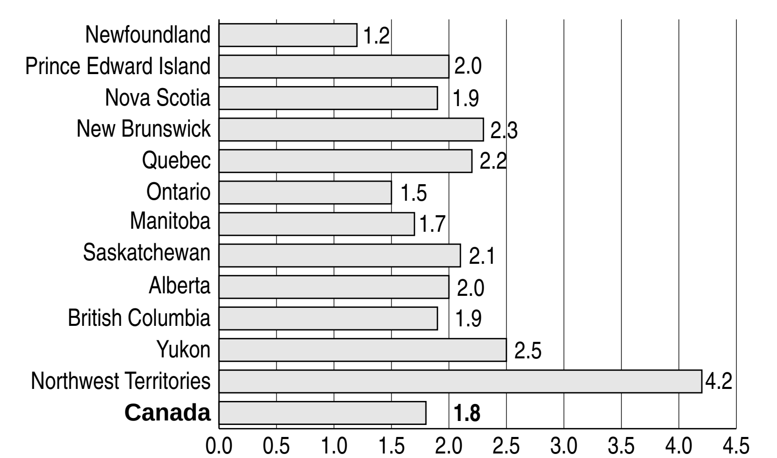
TABLE 4-6 TOTAL ROAD CASUALTY COLLISIONS AND PERSONS INJURED OR KILLED, 1992 – 1996			
Year	*Casualty Collisions*	*Persons Killed*	*Persons Injured*
1992	172,713	3,500	249,821
1993	171,205	3,614	247,582
1994	169,502	3,260	244,975
1995	166,950	3,347	241,800
1996	158,973	3,082	230,885
1997	152,689	3,064	221,186
92 - 96 Avg.	167,869	3,361	243,013
% Chg. 97/Avg.	-9.0	-8.8	-9.0
% Chg. 97/96	-4.0	-0.6	-4.2

Source: 1997 Canadian Motor Vehicle Traffic Collision Statistics

TABLE 4-7 ROAD FATALITIES BY CATEGORIES OF ROAD USERS 1992 – 1997						
Year	*Drivers*	*Passengers*	*Pedestrians*	*Bicyclists*	*Motorcyclists*	*Other*
1992	1752	969	444	75	186	74
1993	1806	962	479	81	213	73
1994	1646	860	427	85	163	79
1995	1674	936	415	64	165	93
1996	1534	833	462	59	128	66
1997	1569	822	403	67	120	83
92-'96 Avg.	1682	912	445	73	171	77

Source: 1997 Canadian Motor Vehicle Traffic Collision Statistics

FIGURE 4-4
ANNUAL AVERAGE NUMBER OF FATALITIES PER 10,000 MOTOR VEHICLES REGISTERED BY PROVINCE, 1995 – 1997



Source: 1997 Canadian Motor Vehicle Traffic Collision Statistics

ROAD

The most recent annual data on Motor Vehicle is 1997 for fatalities, injuries and casualty collisions and 1996 for property damage only (PDO) collisions.

Domestic Operations

Canada's road safety record has been steadily improving over the last several years. In 1997, there were 3,064 fatalities from motor vehicle accidents, the lowest total in 41 years (statistics have been recorded since 1945). The number of road-related fatalities was down 0.6 per cent from 1996 and down 2.1 per cent from the annual average between 1992 and 1996.

Table 4-6 illustrates the total number of road-related casualty collisions, fatalities and injuries.

Casualty collisions include both fatalities and injuries. There has also been a general downward trend in casualty collisions, with numbers down four per cent from 1996, and nine per cent from the annual average between 1992 and 1996. Fatalities also declined in 1997 to 0.6 per cent below the 1996 figure and nine per cent below the average between 1992 and 1996 annual average.

Table 4-7 shows road fatalities classified by six major categories of road users.

Virtually all categories contributed to an overall downward trend in fatalities between 1992 and 1997. Drivers are the single largest category of road fatalities. In 1997, they made up 51.2 per cent of total road fatalities, while pedestrians accounted for 13.2 per cent.

Road fatality rates by province are presented in Figure 4-4.

The highest fatality rates over the three-year period from 1995 to 1997 were in the Northwest Territories and the Yukon, reflecting the low number of vehicles registered and the more difficult highway conditions. Newfoundland and Ontario had the lowest fatality rates during this period.

Figure 4-5 shows the percentage of road collisions and fatalities involving commercial vehicles.

From 1989 to 1996, collisions involving commercial vehicles accounted for eight per cent of all road collisions and roughly 18.2 per cent of road fatalities.

Table 4-8 provides a breakdown of commercial and other vehicles involved in fatal collisions by type of vehicle.

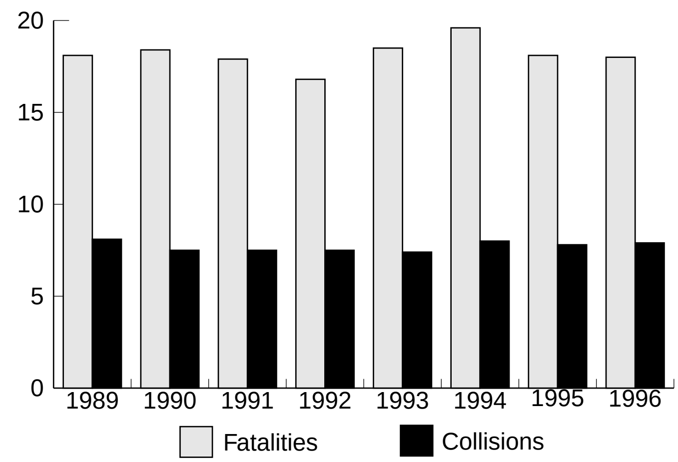
Statistics on fatal motor vehicle collisions by type of vehicle are presented in Table 4-9.

In 1996, the private automobile accounted for 55 per cent of the total fatal collisions by vehicle. This share is down slightly from 1992, when the automobile accounted for 58 per cent. Light duty trucks and vans had the second largest share of fatal collisions by vehicle in 1996, with 24 per cent.

International Comparisons

As a result of its successes in improving motor vehicle safety, Canada ranks as one of the top Organization for Economic Co-operation and Development (OECD) countries.

FIGURE 4-5
PERCENTAGE OF ROAD COLLISIONS AND FATALITIES INVOLVING COMMERCIAL VEHICLES, 1989 – 1996



Source: 1997 Canadian Motor Vehicle Traffic Collision Statistics

TABLE 4-8
COMMERCIAL VEHICLES AND OTHER VEHICLES* INVOLVED IN FATAL TRAFFIC COLLISIONS BY VEHICLE TYPE 1992 – 1996

Vehicle Type	*1992*	*1993*	*1994*	*1995*	*1996*
Commercial					
Bus	46	37	43	31	39
Trucks >=4,536 kgs.	184	212	197	163	167
Tractor-Trailers	295	343	328	346	294
Total Commercial Vehicles	**525**	**592**	**568**	**540**	**500**
Other Vehicles Involved with Commercial Vehicles	507	599	574	533	458
Total Vehicles Involved in Collisions Involving Commercial Vehicles	1032	1191	1142	1073	958
All Other Vehicles Involved in Collisions	3862	3933	3590	3606	3438
Total All Vehicles	**4894**	**5124**	**4732**	**4679**	**4396**

Note: Table shows the number of commercial vehicles and other vehicles involved in a fatal collision involving a commercial vehicle, as well as other vehicles involved in fatal collisions.

Source: 1997 Canadian Motor Vehicle Traffic Collision Statistics

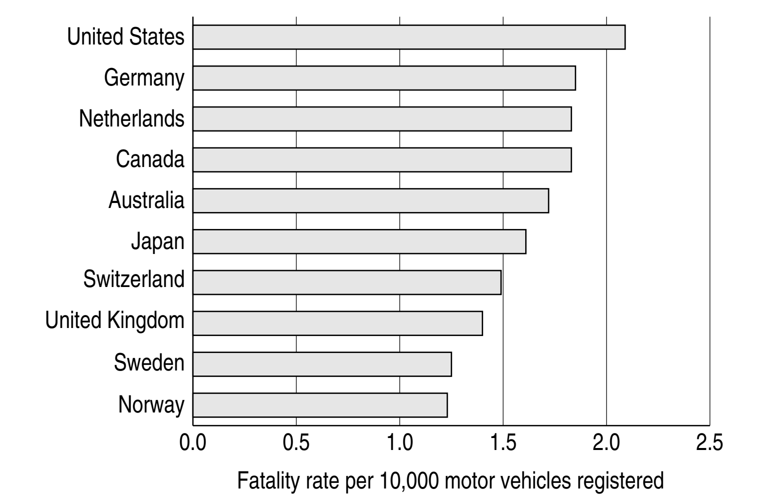
TABLE 4-9
VEHICLES INVOLVED IN FATAL COLLISIONS BY VEHICLE TYPE
1992 – 1996

Vehicle Type	*1992*	*1993*	*1994*	*1995*	*1996*
Automobile	2819	2866	2605	2583	2431
Light Duty Trucks and Vans	1026	1147	1083	1077	1037
Truck:					
Tractor Trailer	295	343	328	346	294
Truck >4536 kgs.	184	212	197	163	167
Other	27	23	23	25	15
Bus					
School	21	12	16	10	12
Intercity	4	1	7	5	7
Transit	12	10	11	6	7
Bus Unspecified	9	14	9	10	13
Motorcycle*	189	217	164	170	141
Bicycle	87	85	91	70	63
Farm Equipment	39	31	32	36	37
Snow Equipment	44	56	39	64	50
Train / Streetcar	26	19	20	11	16
Motorhome	28	18	32	24	28
ATV	9	10	13	4	8
Other	75	60	62	75	70
Total	**4894**	**5124**	**4732**	**4679**	**4396**

* Motorcycle includes moped

Source: Transport Canada, Road Safety

FIGURE 4-6
MOTOR VEHICLE FATALITY RATES AMONG OECD COUNTRIES
AVERAGE FOR THE PERIOD 1994 – 1996



Source: International Road Traffic Accident Database, OECD

Figure 4-6 compares the fatality rates per 10,000 motor vehicles registered among some member countries of the OECD between 1994 and 1996.

Vehicle ownership rates are considered to be an indicator of motor vehicle activity and exposure to risk. Canada's vehicle ownership rate was 57.5 per 100 inhabitants in 1996, compared with the US, which has the highest among OECD countries with 76. Higher ownership rates in Canada and in the US indicate a greater degree of reliance on this mode of transportation and a higher exposure to risk for travellers.

MARINE

Domestic Operations

The marine industry reported a total of 546 marine accidents in 1998 – a 23-year low. Shipping accidents were down to 487 or nine per cent below the 1997 level and approximately 27 per cent less than the average between 1993 and 1997. On average, shipping accidents have declined by nine per cent per year since 1990. In addition to shipping accidents, there were 59 accidents aboard ship, a figure consistent with recent years.

The most common type of shipping accident was groundings with 127 or 26 per cent of the year's total. Strikings were the second most frequent type of accident, accounting for 17 per cent. Virtually all types of accidents declined in 1998. The one exception was collisions which represented three per cent of total accidents

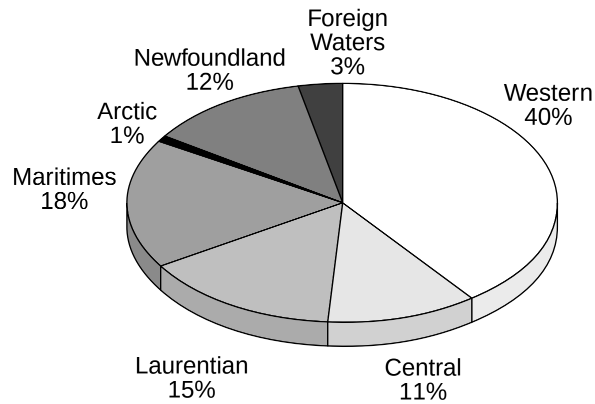
There were 530 vessels involved in shipping accidents during the year, an 8 per cent decrease from 1997 levels and a 28 per cent reduction over the five-year average. Fishing vessels represented the largest portion of vessels involved in shipping accidents, accounting for 48 per cent of the total, down from 56 per cent the previous year. The number of accidents involving the commercial category increased with the exception of barges. Ferry and passenger vessels involved in accidents, for example, increased from 30 to 45, while the number of tanker accidents was up to 18 from 13 in 1997. The 1998 accident level, in both cases, was comparable to their respective five-year averages.

Non-fishing vessels involved in shipping accidents rose to 198 in 1998 from 176 in 1997. Conversely, the number of fishing vessels involved in accidents fell to 245 from 309 in 1997. Accidents involving foreign-flag vessels in Canadian waters totalled 87 in 1998 compared with 90 the previous year. Of this total, the vast majority – 91 per cent – were non-fishing vessels.

There were 46 vessels lost in 1998, a figure substantially below the 1997 total of 60 and the five-year average of 76. The Western Region alone reported half of these losses. Small fishing vessels accounted for the largest proportion of vessels lost in Canada, 40 in 1998.

The number of marine-related fatalities increased to 47 in 1998 from 24 in 1997. This increase can be attributed, in large part, to the 21 lives lost on the Cypriot-registered *MV FLARE* off Canada's east coast. Of the total fatalities in 1998, 38 were the result of shipping accidents, while the remainder were the result of accidents aboard ship.

FIGURE 4-7
SHIPPING ACCIDENTS
1998



Source: *Transportation Safety Board*

TABLE 4-10
MARINE OCCURRENCES
1989 – 1998

Year	*Shipping Accidents*	*Accidents Aboard Ship*	*Fatalities*	*Incidents*	*Injuries*
1989	1013	96	90	207	148
1990	1056	69	57	180	118
1991	904	46	42	183	56
1992	840	69	29	205	137
1993	710	67	35	218	102
1994	797	67	40	228	81
1995	695	56	39	199	82
1996	605	58	25	124	71
1997	533	58	24	155	82
1998	487	59	47	158	70
1993-1997 Average	**668**	**61**	**33**	**186**	**84**

Source: *Transportation Safety Board, as of Jan. 11, 1999*

The 158 shipping incidents in 1998 were consistent with 1997 levels yet down 15 per cent from the five-year average. The most common incidents reported were related to engine, rudder or propeller problems. The greatest reduction in recent years has been in the number of close-quarters situations reported, occurrences where the vessel is involved in a risk of collision, represented 23 per cent of the total in 1998, well below the five-year average of 32 per cent.

Marine occurrences from 1989 to 1998 are summarized in Table 4-10.

The decline in marine accidents is in line with an estimated decline in overall shipping activity in Canada, particularly with respect to fishing. Activity by vessel type

TABLE 4-11
ACCIDENTS INVOLVING CANADIAN-REGISTERED AIRCRAFT
1989 – 1998

Type of Aircraft	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*
Aeroplanes Involved										
Airliners	11	3	11	7	15	6	7	6	9	15
Commuter Aircraft	8	13	7	9	10	9	15	7	14	9
Air Taxi/Aerial Work	164	149	137	129	118	113	138	108	119	138
Private/State	225	250	223	240	223	174	155	153	153	154
Helicopters Involved	59	70	64	34	52	63	68	56	56	56
Other Aircraft*	19	14	14	17	8	21	12	12	10	16
Total	**482**	**498**	**453**	**435**	**422**	**380**	**390**	**342**	**356**	**384**
FATAL ACCIDENTS										
Aeroplanes Involved										
Airliners	5	0	3	0	3	0	1	1	0	0
Commuter Aircraft	1	2	1	1	0	3	1	1	1	1
Air Taxi/Aerial Work	10	13	17	9	16	12	22	12	10	9
Private/State	35	21	35	29	26	15	20	20	18	14
Helicopters Involved	8	8	7	3	3	3	11	7	8	6
Other Aircraft*	1	3	2	4	0	0	0	3	0	2
Total	**60**	**47**	**64**	**47**	**48**	**33**	**52**	**43**	**36**	**31**

*Other Aircraft include gliders, balloons and gyrocopters.
Note: The number of aircraft involved may not sum to the number of accidents as some accidents involve multiple aircraft.

Source: Transportation Safety Board

indicates an estimated decline of nine per cent in the number of fishing-vessel trips (vessels greater than 15 gross registered tonnes) in 1998 over 1997. Commercial vessel activity is estimated to have declined by six per cent in 1998.

Regional Overview

Canada is divided into six marine accident reporting regions. Accidents occurring in foreign waters involving Canadian vessels are also captured as part of the regular statistical occurrence reporting (Figure 4-7).

Typically, the Western Region has reported the largest portion of shipping accidents. In 1998, the region had 40 per cent of total accidents or 194. This is up slightly from the 183 accidents in 1997, but well below the region's five-year average of 240. Fishing vessels made up 66 per cent of the total number of vessels involved (211).

The Maritime Region reported 86 accidents, a decrease from 107 in 1997. Of the 94 vessels involved, 60 were fishing vessels. The Newfoundland Region showed the largest single decrease in the number of shipping accidents in 1998, reporting 59, well below the 105 of the previous year. The decrease is largely due to the drop in the number of fishing vessels involved in accidents to 49 from 84 in 1997.

Shipping accidents in the Laurentian Region were up to 72 in 1998 from 64 in 1997. Of the 81 vessels involved, 46 were in the cargo, oil / bulk / ore carrier (OBO), or tanker category. There were 56 accidents in the Central Region, unchanged from the previous year, but down dramatically from the five-year average of 76. Accidents in the Arctic (4) remained virtually unchanged from the previous year.

Port State Control

In Canada, there were 1,186 inspections carried out in 1998 under the two Memoranda of Understanding[1] (MOU) on Port State Control, to which Canada is a signatory. The Port State Control initiative enables Transport Canada to inspect foreign ships entering Canadian ports to determine compliance with international maritime conventions for enhancing the safety of life at sea and protecting the marine environment.

Vessels from 65 different flags of registry were inspected in 1998. Almost half or 581 were found to have defects, with 25 per cent serious enough to require the vessels to be detained. The majority of vessels inspected were bulk carriers, accounting for 43 per cent of the total. Of those, 20 per cent were detained. The

1 The Paris MOU requires signatories (countries in the European region) to inspect 25 per cent of the vessels entering their ports. Tokyo MOU members (countries in the Asia-Pacific region) are working toward an inspection rate of 50 per cent of vessels entering their ports.

TABLE 4-12 ACCIDENTS INVOLVING CANADIAN-REGISTERED AIRCRAFT BY REGION 1989 – 1998										
Transport Canada Region	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*
Accidents										
Atlantic	26	32	23	24	23	23	22	18	21	20
Quebec	76	97	83	89	76	70	78	39	62	43
Ontario	115	121	100	104	119	84	74	72	84	107
Prairie & Northern	162	135	142	113	108	109	130	122	108	132
Pacific	89	108	93	93	88	82	72	83	72	69
Outside Canada	14	5	12	12	8	12	14	8	12	17
Total	**482**	**498**	**453**	**435**	**422**	**380**	**390**	**342**	**356**	**384**

Note: The number of aircraft involved may not sum to the number of accidents as some accidents involve multiple aircraft.

Source: Transportation Safety Board

largest number of vessels detained by country flag were of Cypriot registry. Of the 91 Cypriot vessels inspected, 27 were detained, representing 19 per cent of the total number of vessels detained.

Recreational Boating

Drownings from recreational boating in 1996 – the most current year for which data is available – totalled 156. This figure is comparable to the 1995 total of 153, and slightly above the average of 146 between 1991 and 1995. The largest proportion of drownings were associated with fishing, which accounted for 33 per cent, followed by power boating with 19 per cent. Drownings by type of boat indicate that small open powerboats and canoes had the greatest numbers with 29 per cent and 24 per cent, respectively. Ontario reported the largest percentage of drownings with 32 per cent, followed by Quebec with 21 per cent.

There were 20 non-drowning boating fatalities in 1996, compared with 15 in 1995. Of these, 14 involved collision or trauma and 6 were the result of immersion hypothermia. Half of the fatalities for both these accident types occurred in British Columbia.

AVIATION

Domestic Operations

The following section deals with transportation occurrences involving Canadian-registered aircraft. It does not extend to occurrences involving foreign aircraft, accidents involving ultra-light or advanced ultra-light aircraft.

In 1998, there were 384 accidents involving Canadian-registered aircraft. While this represents an eight per cent increase over 1997, it is only above by 1.6 per cent over the average between 1993 and 1997.

Table 4-11 shows the number of accidents and fatal accidents by type of aircraft from 1989 to 1998.

Over this 10-year period, accidents for most aircraft types declined significantly, most notably in the private/state category. Nevertheless, this category still had the largest portion of accidents involving Canadian-registered aircraft. In 1998, accidents involving private operators accounted for 40 per cent of the total number of accidents, virtually unchanged from 42 per cent in 1997. The private/state category accounted for a 45 per cent share of all fatal accidents in 1998, although the number of such accidents (14) was less than one-half the level it held ten years earlier (35).

Airliners include commercial aircraft that have a maximum take-off weight of greater than 8,618 kilograms, or that are authorized to carry more than 20 passengers. In 1998, airliners were involved in 15 accidents, up from an average of 8 between 1993 and 1997. None of these accidents resulted in fatalities, and all were relatively minor in nature. Regional or larger commuter aircraft are those having a maximum take-off weight of less than 8,618 kilograms or having from 10 to 19 seats. Accidents involving these aircraft were well below 1997 levels and the five-year average. There were no fatal accidents involving airliner operations in 1998, while there was one involving a commuter aircraft (fatal accident at Mirabel).

Most commercial accidents involve the air taxi or aerial work category. In 1998, of the 162 commercial aviation accidents, 138 or 85 per cent, involved the air taxi or aerial work category. This represents a jump of 19 per cent from 1997, and is approximately 16 per cent higher than the five-year average. The

TABLE 4-13
FATALITIES INVOLVING CANADIAN-REGISTERED AIRCRAFT BY REGION
1989 – 1998

Transport Canada Region	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*
Atlantic	2	0	5	0	2	2	6	6	2	5
Quebec	25	21	17	8	22	20	9	12	18	27
Ontario	48	21	12	16	23	16	31	12	10	9
Prairie & Northern	21	12	32	17	25	11	26	12	17	20
Pacific	39	25	29	32	25	23	32	20	22	12
Outside Canada	20	12	278	7	5	8	3	8	8	10
Total	**155**	**91**	**373**	**80**	**102**	**80**	**107**	**70**	**77**	**83**

Source: Transportation Safety Board

flight training, test/demonstration and aerial application categories also registered significant year-over-year increases.

Regional Overview

Table 4-12 summarizes air accidents by region between 1989 and 1998.

While the number of air accidents rose in 1998, there has been a downward trend in all regions over the 10-year period. In 1998, the Prairie and Northern region accounted for more than one-third or 34 per cent of all accidents involving Canadian-registered aircraft, followed by Ontario with 28 per cent, and the Pacific with 18 per cent. The largest single year-over-year (1998 – 1997) increases occurred in the Ontario and Prairie / Northern regions. Accidents in the Quebec region in 1998 were down significantly (31 per cent).

Table 4-13 shows air fatalities by region from 1989 to 1998.

Although air fatalities were up eight per cent in 1998, compared with the previous five-year average, they were down (almost five per cent). The Quebec region had the highest number of fatalities in 1998, with 27, followed by the Prairie and Northern region with 20 and the Pacific with 12. The high number of fatalities in the Quebec region was largely attributable to two major accidents, one at Mirabel and the other at Baie Comeau.

Some of the fatal accidents involved smaller commercial aircraft such as air taxi or aerial work operations. Air taxi / aerial work category includes those aircraft used by a Canadian operator for an on-hire basis that does neither an airliner or air commuter aircraft. It includes such specialty services as aerial photography, and aerial application.

Serious injuries resulting from accidents were also down from 1997 and remained below the five-year average.

In 1998, the number of reported incidents involving either Canadian or foreign-registered aircraft increased by 13 per cent over 1997 and by 21 per cent over the average between 1993 and 1997. Declared emergencies, engine failures and smoke or fire incidents were also up, while incidents involving loss of separation, collisions and risk of collision declined. Loss of separation refers to an occurrence in which less than the authorized minimum separation or distance between two aircraft was not assured. The category includes collision (with terrain, with an object, with another aircraft, etc.) risk of collision as well as loss of separation.

The increase in incidents was due, in part, to an increase in the level of aviation activity in 1998 (up four per cent over 1997), and to the heightened sensitivity created from high-profile occurrences such as the Swissair accident. Transport Canada is conducting a detailed examination of smoke or fire incidents to determine whether any safety deficiencies exist.

International Comparisons

Table 4-14 provides a comparison of the proportion of fatal air accidents for Canada and the US. Over the period 1993 - 1998, the rates tended to be highly similar.

Comparing the safety records of the US and Canada is difficult both in terms of identifying the basis for comparison and having a consistent and appropriate level of detail. This is primarily due to the ways in which they classify and record their respective data and information, the fundamental differences of the two countries' air transport systems – Canada's largely linear network and the US's hubbing system. Both countries are currently active members of an international panel and forums to establish a common taxonomy and systems for interpreting aviation related information.

In 1996, Transport Canada introduced a change in the classification system for commercial aircraft, moving away from the carrier level system associated with the size of the operator to one that classifies according to the primary purpose for which the aircraft is registered. The US also introduced its own changes, which took effect in March 1997. These changes reclassified aircraft carrying between 10 and 29 passengers, which had been previously classified under Part 135, to be included under Part 121. The immediate effect of this change was to drastically reduce the total number of hours flown in the Part 135 scheduled service category and increase the number of hours flown in the Part 121 scheduled services.

From a safety perspective, the US had a successful year. According to the preliminary US aviation accident statistics report for 1998, there were no passenger fatalities for American-registered scheduled airlines flying under both Part 121 and Part 135 (less than 10 seats. Although there have been years in which there were no fatalities under Part 121, there has never been a year in which there were no Part 135 fatalities.

TRANSPORTATION OF DANGEROUS GOODS

Every year over 27 million dangerous goods shipments are transported across Canada. Most of these shipments include goods that directly influence and improve the lifestyle that Canadians have come to expect and enjoy. The Transport of Dangerous Goods (TDG) program promotes public safety during the transportation of goods that can threaten public safety when involved in an accidental release.

TABLE 4-14
PROPORTION OF FATAL AVIATION ACCIDENTS
CANADA – US, 1993 – 1997

	1993	*1994*	*1995*	*1996*	*1997*	*1998*	*1993-1997 Average*
Canada	0.0400	0.2000	0.0909	0.1538	0.0435	0.0417	0.1056
US	0.0435	0.1739	0.0833	0.1316	0.0816	0.0208	0.1028

Note: Figures pertain to Airliner and commuter aircraft only, CAR's definitions. Aircraft with 10 or more seats.

Sources: Canada Transportation Safety Board; US National Transportation Safety Board

TDG accidents are called "reportable" if they meet the reporting requirements defined in TDG program regulations. Very few TDG accidents are caused by the dangerous goods themselves. In 1998, there was one reportable TDG accident directly caused by dangerous goods. No fatalities, injuries or damage to the environment resulted from this accident.

Table 4-15 compares reportable accidents involving dangerous goods by mode of transport.

In 1998, there were 436 reportable dangerous goods accidents. In-transit accidents in Table 4-15 include those that occurred during actual transport, while handling accidents are those that took place at facilities. Many handling accidents occur in warehouses while the goods are being handled prior to loading or unloading. Between 1988 and 1998, more reportable dangerous goods accidents occurred at the handling stage than while they were being transported.

The number of deaths related to dangerous goods is low.

Table 4-16 summarizes the number of deaths, as well as the number and severity of injuries caused by the dangerous goods at reportable accidents.

Table 4-17 gives the total number of deaths and injuries which occurred at reportable transportation of dangerous goods accidents. In many cases, the deaths and injuries are caused by the accident itself (e.g. a collision), not by the goods.

In Tables 4-16 and 4-17, minor injuries refer to those injuries that require first-aid treatment, moderate injuries require emergency hospital treatment, and major injuries require overnight hospitalization.

TABLE 4-15
REPORTABLE ACCIDENTS INVOLVING DANGEROUS GOODS BY MODE OF TRANSPORT, 1988 – 1998

	------------------ *In Transit* ------------------				*Not in*	
Year	*Road*	*Rail*	*Air*	**Marine*	*Transit*	*Total*
1988	155	11	0	1	323	490
1989	192	29	3	3	334	561
1990	183	17	2	0	194	396
1991	155	27	4	2	251	439
1992	140	25	0	1	228	394
1993	103	25	1	0	113	242
1994	114	30	1	0	145	290
1995	109	19	3	0	205	336
1996	239	35	9	1	237	521
1997	166	16	6	1	194	383
Average	*156*	*23*	*3*	*1*	*222*	*405*
1998	**184**	**14**	**4**	**0**	**234**	**436**

* The TDG program does not cover dangerous goods transported in bulk on ships or by pipeline.

Source: Transport Canada, Dangerous Goods Accident Information System

TABLE 4-16
DEATHS AND INJURIES CAUSED BY DANGEROUS GOODS AT REPORTABLE ACCIDENTS, 1988 – 1998

	Deaths due to	----------- *Injuries due to Dangerous Goods* -----------			
Year	*Dangerous Goods*	*Major*	*Moderate*	*Minor*	*Totals*
1988	6	-	-	-	65
1989	3	21	50	13	84
1990	0	8	42	0	50
1991	1	9	9	21	39
1992	0	3	3	34	40
1993	18[1]	1	2	14	17
1994	0	0	3	29	32
1995	0	3	58[2]	2	63
1996	1	2	10	16	28
1997	2	15	14	4	33
Average	*3.1*	*6.9*	*21.2*	*14.8*	*45.1*
1998	**2**	**1**	**19**	**8**	**28**

1 All 18 deaths are from the same bus-truck collision, Lac Bouchette (Québec).
2 Thirty one employees were exposed to a carbon disulphide release in Ottawa (Ontario).

Source: Transport Canada, Dangerous Goods Accident Information System

1998 Contributions to Transportation Safety

Federal Safety Initiatives

The following section provides an overview of federal transportation safety initiatives undertaken in all modes in 1998. These activities are primarily focused on safety inspection and monitoring of compliance with safety legislation and regulations; safety enforcement; research and development; and public safety awareness education programs.

While initiatives related to transportation infrastructure improvements, such as widening of roads, also contribute to safety, they are excluded in this report.

Provincial and municipal governments and non-governmental organizations, also play a key role in contributing to the safety of the transportation system. Given the prevailing trend toward partnerships and alternative service delivery, their role has become increasingly important. This report recognizes the important role these organizations play in transportation safety; however, it gives only an overview of provincial and municipal governments' safety initiatives and does not address contributions by industry and non-governmental organizations.

Rail

The *Railway Safety Act* gives the federal government authority to regulate rail safety. Through a regulatory framework, it gives railway companies greater flexibility to manage their operations safely and efficiently and provides for protection of public safety at railway crossings. The Act also covers the enforcement of regulations, standards and procedures for safe railway operations for inter-provincial and cross-border railways, and specific intra-provincial rail lines.

Amendments to the *Railway Safety Act* were tabled in Parliament in November 1998, and are expected to be proclaimed in early 1999. The product of extensive consultations with stakeholders in the rail sector - railway companies and provinces these amendments will allow Transport Canada to make more use of the overall safety management systems of railways and to audit them to ensure full compliance with regulations.

TABLE 4-17
TOTAL DEATHS AND INJURIES AT REPORTABLE DANGEROUS GOODS ACCIDENTS
1988 – 1998

Year	*Deaths All Causes*	*Injuries Major*	*Injuries Moderate*	*Injuries Minor*	*Injuries Totals*
1988	20	-	-	-	109
1989	17	39	51	17	107
1990	15	21	70	15	106
1991	14	33	27	35	95
1992	8	16	15	47	78
1993	31[1]	9	16	24	49
1994	13	8	20	34	62
1995	7	27	66[2]	13	106
1996	9	16	37	23	76
1997	15	50	73	11	134[3]
Average	*14.9*	*24.3*	*41.7*	*24.3*	*92.2*
1998	**12**	**34**	**39**	**11**	**84**

1 20 deaths(2 not due to dangerous goods) resulted from one bus-truck collision, Lac Bouchette, Québec.
2 31 employees were exposed to a carbon disulphide release in Ottawa, Ontario.
3 27 passengers injured in one bus-truck collision in Fox Creek, Alberta.

Source: Transport Canada, Dangerous Goods Accident Information System

In addition, these amendments will enhance the department's compliance activities and ensure national consistency through a comprehensive railway safety monitoring program, which will replace the current inspection-based approach. The department is also reviewing operations, equipment and engineering programs to reflect proposed legislative and regulatory requirements, and safety performance standards.

In 1997/98, Transport Canada continued work on a number of safety initiatives, including increasing safety at railway crossings through more stringent visibility standards; reducing trespassing on railway tracks through a variety of measures, such as fencing and educational awareness activities; and enhancing passenger safety requirements on trains through on-board safety announcements. The department is also establishing a permanent consultative committee of departmental officials and rail safety stakeholders and developing a national rail safety training program for railway safety inspectors.

The department rigorously monitored rail safety, reviewed industry safety performance data, and systematically identified and resolved railway safety issues during the year. The department's compliance monitoring activities also included ensuring safe construction and maintenance standards were met by railway companies, municipalities and land owners for railway equipment, grade crossings and right-of-way access control.

Transport Canada contributed approximately $7.5 million in 1997/98 toward safety improvements at grade crossings, including the installation of automatic warning devices at railway grade crossings.

The Minister of Transport announced a $250,000 contribution in 1998 to the Railway Association of Canada to support the rail safety program *Direction 2006*. Begun in 1995, this 10-year program is a partnership between all levels of government, law enforcement agencies, safety organizations, and railway companies and unions. The program's objective is to reduce grade crossing collisions and trespassing incidents by 50 per cent by 2006. The federal contribution to this program will support a variety of immediate activities that will help attain this goal.

In addition, the department also continued to support Operation Lifesaver, a joint education program with the Railway Association of Canada, to educate and promote public awareness of safety programs and the dangers of railway crossings and trespassing. The department contributes $200,000 annually to this program.

Road

Transport Canada carries out federal responsibility for road safety under the *Motor Vehicle Safety Act* by developing national standards for motor vehicle safety, fuel emissions, and enforcing these standards. In addition, the *Motor Vehicle Transport Act* gives the department responsibility for regulating the safe operation of extra-provincial motor carriers.The department maintains a national oversight role while delegating implementation responsibilities to the provinces and territories.

Federal programs to improve overall road safety are focused on regulatory standards development and compliance, public awareness and education, research and accident investigation. Transport Canada will continue to play a leadership role in supporting Road Safety Vision 2001, a comprehensive road safety program developed to make Canada's roads the safest in the world.

Launched in 1997, Road Safety Vision 2001 commits federal, provincial and territorial governments, through the Canadian Council of Motor Transport Administrators (CCMTA) to work on a number of safety priorities to help Canada achieve the best road safety record among industrialized countries. These priorities include: raising public awareness of road safety issues; improving communication, coordination and collaboration among road safety agencies; developing more efficient enforcement to deal with problem areas, such as impaired driving, repeat offenders and high-risk drivers; and improving the collection and quality of data to ensure road-safety programs are practical and cost effective.

Transport Canada is taking the lead to coordinate this initiative and is also participating in several program-specific initiatives with the provinces, industry and other stakeholders.

Improving and broadening the level of protection afforded to all vehicle occupants by air bag systems remains a high priority for Transport Canada. As part of the effort, Transport Canada and the U.S. National Highway Traffic Safety Administration initiated a major co-operative research program to develop testing procedures to promote the development of advanced air bag technology. Priority is currently being given to children and people of small stature to ensure their protection requirements are addressed in safety regulations.

The department is also continuing to ensure that vehicles comply with applicable Canada Motor Vehicle Safety Standards and that manufacturers and importers take the proper remedial action when they become aware of safety-related defects or non-compliance situations in their products. The number of Transport Canada investigations have increased significantly over the past few years, as have safety-related recalls by vehicle manufacturers and importers. The department also monitors the safety performance of new motor vehicle tires and child restraint systems by conducting compliance testing, audit inspections and defect investigations. These activities contribute significantly to reducing the number of unsafe vehicles on Canadian roads.

In response to safety concerns, Transport Canada is continuing to monitor air bag performance. Transport Canada successfully launched an air bag deactivation program in 1998 for motorists who, despite taking all available precautions, deemed themselves to be at risk with air bags in their vehicles. The program, which was developed in close consultation with the provinces, vehicle manufacturers, importers, dealers and the US government, continues to serve Canadians well.

By the end of 1998, Transport Canada had processed 1,738 requests for deactivation or air bag on/off switch installations. Follow-up from dealers and repair facilities indicate that during the year, 137 on/off switches were installed and 86 air bag systems were deactivated in Canadian vehicles.

Transport Canada is also actively engaged in research to improve the level of protection for passengers during side impact crashes. The department has initiated a major crash testing program to identify the most appropriate combination of crash test dummy and moving barrier design for assessing side impact protection. As part of this program, the department reconstructs actual collisions, which were originally investigated by its Collision Investigation Teams, to compare the responses of different dummy designs with the actual injury experience of occupants.

In 1998, the department reviewed police collision reports and photographs of approximately 200 fatal collisions involving heavy vehicles to gain a better understanding of their cause. In addition, it initiated a crash test program to determine the level of performance required by rear under-ride guards to prevent passenger vehicles from sliding under the rear of large trailers (Figure 4-8).

Results of a 1998 departmental survey indicate that 89 per cent of light duty vehicle occupants wear seat-belts. Since 1989, increased seat-belt use in Canada has saved an estimated 3,400 lives, avoided 77,000 injuries and saved over $6 billion in social and health costs.

Under the *Motor Vehicle Transport Act (MVTA)*, the federal government has authority over the safety of buses and trucks operating across provincial and national borders. Since 1988, the federal government, provinces and industry have cooperated in the development of motor carrier safety standards, called the National Safety Code (NSC), to ensure safe operation of commercial vehicles. NSC standards are administered and enforced by the provinces and territories. Since 1989, the federal government has contributed about $4 million annually toward implementing the Code. By 1999/2000, the federal contribution will have totaled approximately $44 million.

Starting in 1999, the provinces and territories will begin implementing a new performance-based NSC Standard 14, which will determine a safety rating for every carrier. Success of this new standard will depend on current and accurate data sharing amongst provinces as well as the US and Mexico, to support proper carrier safety management. The federal government is proposing to amend the *MVTA* to incorporate the new standard, as well as to encourage consistent standards application.

Transport Canada's regulation, research, compliance, information and accident investigation programs have collectively contributed to a significant reduction in Canada's fatality rate over the past 20 years. In 1997, the fatality rate per 10,000 registered motor vehicles was 1.74, down from 2.65 in 1986, and 4.2 in 1977.

FIGURE 4-8
CRASH TEST EVALUATION PERFORMANCE OF POTENTIAL REAR UNDER RIDE GUARD

Source: Transport Canada

Marine

The *Canada Shipping Act (CSA)* governs marine safety in Canada and provides Transport Canada with the authority to establish and administer marine regulations. The department also holds the primary responsibility for all issues related to ship safety, protection of the marine environment, and marine pilotage to ensure the safety of life at sea, prevention of injury or loss of life, and avoidance of damage to property and the environment.

Transport Canada also shares responsibility for marine safety and environmental protection with the Department of Fisheries and Oceans (DFO), which regulates pleasure craft, promotes boating safety, and coordinates search-and-rescue operations and national emergency preparedness and response.

Transport Canada is in the midst of modernizing the *Canada Shipping Act*. The first set of reforms were completed in 1998. The second track of reforms are currently being drafted in a Bill that is expected to be introduced in Parliament in 1999. These amendments will complete the overhaul of the Act to promote a safe, technologically advanced and efficient marine industry.

The modernized Act provides a statutory framework for the shipping industry, which covers the registration of ships, certification of officers, provision of safety equipment, regulation of working conditions for ship crew, and construction and navigation safety. It also incorporates several important provisions that relate to compliance of domestic and foreign ships with international maritime conventions to enhance the safety of life at sea and protect the marine environment. The Port State Control program, for example, enables Transport Canada to inspect foreign ships entering Canadian ports to determine compliance with these conventions.

In addition, the International Safety Management Code, as part of the Safety of Life at Sea (SOLAS) convention, became compulsory in 1998 for certain Canadian-registered ships engaged in international voyages and foreign-registered ships entering Canadian ports. It deals with safety and pollution prevention management by marine companies for both vessel and shore-side operations.

The new Act also incorporates amendments to regulate small passenger and fishing vessels, and special purpose ships. These vessels have been identified as high risk for accidents or incidents by the Transportation Safety Board. In the future, more inspections will be required to ensure compliance with regulations to achieve the highest possible level of safety.

In 1997/98, the department introduced marine security regulations that cover pre-board screening of persons and goods to ensure the security of passengers and crew aboard cruise ships boarding in Canada.

Aviation

Under the authority of the *Aeronautics Act*, the federal government is responsible for establishing and administering regulations for the safe conduct of civil aviation within Canada.

Canada's civil aviation transportation system is operated by NAV Canada and local airport authorities. The federal government's role, however, is to monitor and regulate the safety and security of aerodromes and airports, the licensing and training of personnel, the airworthiness of aircraft, the safety and security of commercial air services, and the air navigation system, including operating and flight rules.

The safety of air taxi operations, (helicopters and airplanes in commercial air service, excluding jets, which carry nine or fewer passengers) is monitored by a joint industry/government task force on an ad hoc basis. Its role is to determine where safety deficiencies exist and recommend ways to reduce accidents. The task force released a report in 1998 containing 71 recommendations to improve the safety of the air taxi operations. The recommendations were accepted and an implementation plan developed.

Transport Canada's ability to monitor the lease, charter and interchange of aircraft to ensure their safe operation was improved through a 1997 amendment to the *Convention on International Civil Aviation*. It allows the department to better address any potential liability or safety problems that might arise from the significant increase in these activities due to globalization of air transportation services.

The department promoted safety within the aviation community by conducting safety awareness seminars; developing videos and publications; supporting research and development initiatives related to aviation safety; working proactively with the recreational aviation community through the Canadian Sport Aviation Council; improving collection and analysis of aviation safety data; and developing safety indicators to identify and respond to system deficiencies.

To promote safety in commercial aviation operations, Transport Canada focused on improving regulations and monitoring compliance. NAV Canada's air navigation operations, for example, are closely inspected and audited by the department to ensure compliance with technical safety standards and regulations in the *Canadian Aviation Regulations*.

A 1997/98 audit of 35 per cent of air traffic service facilities confirmed close compliance with these standards and regulations. A system-wide audit of instrument landing systems and facility power systems at NAV Canada sites over the same period identified some minor deviations from technical standards, which were immediately addressed by the corporation.

Multimodal

In 1998, Transport Canada launched two multimodal safety initiatives, the strategic safety plan and the performance measurement framework, to increase the efficiency, effectiveness and accountability of safety programs, service quality and client/public satisfaction.

The goal of the strategic safety plan, which applies to all modes of transportation, is to protect life, health, property and the environment; and to increase public confidence in the safety and security of the transportation system. The goal of the performance measurement framework is to measure results achieved over the years by collecting, analyzing and evaluating relevant multimodal safety data.

In response to public, industry and stakeholder requests, the department has been reducing and simplifying its regulatory activities, and completing research and development work that will contribute to improved standards and regulations in all modes of transportation.

The department is committed to reform its regulations to simplify regulatory activities; improve and modernize the regulatory structure; and regulate smarter by pursuing regulatory alternatives, as well as alternatives to regulations, wherever applicable, without compromising safety.

As part of its regulatory reform initiative, the department has initiated the application of additional or alternative compliance tools specific to safety and security programs. In addition, the department is planning to introduce legislation in 1999 that will create a Canadian Transportation Tribunal to deal with transportation safety contravention issues.

Research and Development

Transport Canada's 1998 research and development program focused on safety and security issues, as well as broad federal priorities such as energy efficiency, environmental protection, competitiveness and accessibility. The research and development projects were undertaken in partnership with industry.

The 1998 fiscal year was an especially active one for the research program, with a number of safety-related improvements in all modes. Some of the highlights of the year included improved safety standards and guidelines for aircraft operations in winter, and improved flight data monitoring worldwide; improved safety, regulation and compliance for surface transportation operations; improved safety standards for rail containment systems for transportation of dangerous goods, and improved methods of inspection for railway track and equipment; improved winter performance for electric vehicles.

Transportation of Dangerous Goods

The Transport Dangerous Goods (TDG) Directorate is responsible for the development of regulations, information and guidance on the transportation of dangerous goods. The Directorate also coordinates the Canadian TDG program, which is jointly administered by Transport Canada and all provincial and territorial governments. The program has two main objectives: preventing accidental releases of dangerous goods during transportation (or related activities) and mitigating the consequences of those accidents that do occur.

In 1998, TDG regulations were amended to provide new standards to improve the integrity of means of containment for rail tank cars. Similar TDG amendments for highway carriers will be completed in 1999. These amendments are expected to help reduce accidental releases through superior design and an increased ability to detect critical defects, as well as through added protection against punctures and fire impingement.

The TDG regulations were also rewritten in plain language and submitted for legal review. They will be easier to understand for the shippers, handlers, carriers and other industry personnel who have to comply with them. The new version will also provide even more harmonization between the modes of transport and between the federal and provincial requirements.

The TDG Directorate operates the Canadian Transport Emergency Centre or CANUTEC, which provides a 24-hour-a-day chemical and regulatory information service. CANUTEC advisors are professional chemists or chemical engineers experienced in interpreting scientific and technical information in order to provide advice in emergency situations involving dangerous goods during transportation.

The centre receives approximately 30,000 calls per year, the majority being non-urgent requests for information. Approximately 10 per cent of the calls, however, are of an urgent nature. Many are from people facing threats to public safety, such as police and fire-fighters at the scene of a transportation accident, concerned parents whose children have ingested cleaning compounds, or employers whose staff have been exposed to chemicals.

Security and Emergency Preparedness

Transport Canada continued its phased withdrawal of RCMP services from international airports in 1998 to shift the cost of policing and aviation security services from government to aerodrome operators. To ensure safety compliance, Transport Canada will continue to set the regulatory requirements for policing and security services, and monitor aerodrome operators.

Another major milestone for the department was the transfer of ownership and responsibility for acquisition and maintenance of security screening equipment at Canadian airports to the Air Transport Security Corporation, a not-for-profit company acting on behalf of the air carriers. This initiative is consistent with the department's efforts to shift its role from operator to regulator, and to redirect costs to users. Mandatory equipment performance standards, to ensure detection of threatening objects, were introduced at the time of transfer to ensure the continuity of effective screening.

The department started discussions with the Canadian aviation industry concerning the acquisition and installation of leading-edge explosives detection systems at Canada's international airports. It is currently refining a phased implementation strategy for the detection systems, based on threat and risk assessment. The new systems, for which the aviation industry will be financially and operationally responsible, will ensure that Canada is able to counter changing criminal capabilities and maintain its status as a world leader in aviation security.

In the event of year 2000 transportation contingencies, the department has developed an extensive work plan to ensure that the safety and security of the national transportation system is maintained, and that mission-critical business functions and employee safety are not compromised. The department has started processes to ensure that contingency plans are tested and that emergency response teams are ready to implement them if necessary. Coordination of departmental contingency planning with the National Contingency Planning Group (under the auspices of the Department of National Defence) is ongoing.

The first full year of implementation of the department's marine transportation security regulations for cruise ships and cruise ship facilities was successfully completed in 1998. Security inspections of major cruise ships and their operation facilities were conducted in all regions to ensure that requirements for the protection of passengers, crew, vessels and facilities were met. Co-operation between Transport Canada and industry on the new security program will continue to strengthen the security of the cruise industry in Canada.

International Transport Safety Initiatives

Road

Transport Canada is also actively participating in international crash worthiness research activities under the auspices of the International Harmoned Research Activities (IHRA) and the International Standards Organization (ISO). The department's areas of research, include bio-mechanics, vehicle compatibility, side impact protection, advanced offset frontal protection, and intelligent transportation systems (ITS). The ITS research is intended to assess the safety implications of such vehicle technologies as collision warning, navigation and improved driver warning systems.

The department has also been a major contributor to North America-wide research into the causes of fatique among commercial drivers. In partnership with the United States Federal Highways Administration and, with the Canadian and American trucking industry, the department is participating in research that will lead to improved hour of service regimes for truck and bus drivers.

Canada hosted the 16th International Technical Conference on the Enhanced Safety of Vehicles in Windsor, Ontario, in 1998. Approximately 750 delegates from 19 countries attended the conference and exhibition. The event attracted 39 exhibitors, mostly from the US, as well as from Europe and Japan, who presented the latest advances in motor vehicle safety research. Transport Minister David Collenette delivered the keynote address.

Aviation

Trade liberalization has increased the need for regulatory harmonization and a strong commitment to partnership between the department, the aviation community, other governments and the public. During the year, Transport Canada continued negotiations with other International Civil Aviation Organization member states to develop bilateral air worthiness agreements/technical arrangements to improve trade harmonization such as technical arrangements on certification, maintenance and manufacturing with Japan; Memorandum of Understanding of Cooperation to produce Bell 427 helicopters in Korea; technical arrangements and certification with the joint air worthiness European member states; a certification agreement with Brazil to streamline importation of aircraft; and bilateral technical arrangements on air worthiness with Israel.

Transport Canada is developing a tri-national (Canada, United States and Mexico) aviation accident/incident reporting system to improve the comparability of aviation safety information reported by the three countries. Phase I of the study, which consisted of data collection and analysis among the three civil aviation authorities, was completed in early 1998. The department has adopted tri-national definitions of concepts and has explored several options to develop an automated accident and incident reporting system.

Marine

Under Transport Canada's Port State Control program, the inspection of foreign ships to ensure compliance with international maritime conventions continues to be an effective vehicle for enhancing the safety of life at sea and the protection of the marine environment.

Canada is one of the countries that has signed two Memoranda of Understanding on Port State Control, namely the Paris and Tokyo MOUs. In March 1998, based on Canada's Port State Control initiative, ministers responsible for maritime safety in Europe, and the North Atlantic and Asia-Pacific states signed the joint ministerial declaration, "Tightening the Net" to eliminate substandard shipping. This international action demonstrates a shared commitment to safer ships and cleaner seas, as well as to acceptable living and working conditions on-board ships.

Multimodal

The department is increasing industry's role in promoting safety and security standards and working with them to identify and resolve potential safety issues. In addition, a data exchange initiative is being carried out jointly with the United States and Mexico to evaluate transportation in Canada on an international level and allow the department to set goals based on international standings.

Transportation of Dangerous Goods

The new TDG regulations will provide more harmonization between the modes of transportation, between federal and provincial requirements, and between domestic and international practices. Transport Canada consults and co-operates with industry, emergency responders, carriers, all provinces and territories, the United Sates and Mexico, the United Nations Committee of Experts on TDG, the International Maritime Organization, the International Civil Aviation Organization, the International Atomic Energy Agency, the Organization for Economic Co-operation and Development and other federal departments.

The Canadian Transport Emergency Centre and the US and Mexico have developed the North American Emergency Response Guide Book, which is now available in three languages – English, French and Spanish. Transport Canada distributed free copies of the guide to ensure there would be one in every fire-fighting truck and highway patrol vehicle in Canada.

Research and Development

Under NAFTA, Transport Canada is working with the United States Department of Transportation and the Mexican SCT on a five-year plan for science and technology cooperation among the three countries. The focus of the plan will be on advancements that contribute to improving transportation safety and security, facilitating trade and tourism, minimizing environmental impacts, enhancing infrastructure renewal and management, and improving accessibility and mobility.

Provincial/Municipal Transport Safety Initiatives

Rail

Provincial governments are responsible for the safety of intra-provincial short-line rail transportation. Provincial and municipal governments share jurisdiction over roadways approaching rail crossings and enforcement of provincial legislation governing driver behavior.

In general, provincial railway safety provisions are consistent with federal requirements to promote railway safety in Canada. Provincial government initiatives deal mainly with reducing railway and highway grade crossing and trespassing accidents by contributing to improvements of approach roads, crossing signals and fencing.

Regional goals and priorities for railway safety are in line with the national goals and priorities to establish and implement policies and rules, awareness and education, monitoring and enforcement, and safety programs.

Road

Provincial governments have significant road safety responsibilities, including driver licensing, vehicle inspection, highway infrastructure and the enforcement of highways regulations. Municipal governments are responsible for the enforcement of provincial road safety regulations and for the management of local road infrastructure within their jurisdictions.

Transportation of Dangerous Goods

The Canadian TDG program is jointly administered by the federal, provincial and territorial governments. Provinces have full jurisdiction over the use of roads by vehicles, regardless of any other jurisdiction over the activity being conducted at the time. Therefore, there exists 13 (soon to be 14 with the creation of Nunavut in April 1999) legally binding sets of requirements for the transportation of dangerous goods. The provinces and the federal government recognize the potential for overlap and have agreed to participate jointly in a National Task Force on the Transportation of Dangerous Goods.

This Task Force brings together federal, provincial and territorial TDG representatives, who meet three times a year under the co-chairmanship of a provincial representative and the federal representative. The Task Force determines the priorities of the TDG program and decides on a common set of requirements to increase public safety. Thus, even though there exists, legally, thirteen separate sets of requirements, the results are the same.

The Minister's Advisory Council addresses the needs, issues and concerns of stakeholders. Representatives from various sectors of the industry (production, transportation, manufacturing and employee safety), and from providers of public safety (federal, provincial and municipal governments, and police and fire-fighters) meet three times a year to discuss the orientation of the program and provide advice to the Minister of Transport.

Because of the harmonization, every provincial TDG inspector who enforces a provincial TDG statute is increasing compliance with the federal law; any federal TDG inspector who enforces a federal TDG requirement is increasing compliance with provincial laws.

5

TRANSPORTATION AND ENVIRONMENT

Dealing with the environmental impacts of transportation activity poses an ongoing challenge for Canada as well as other nations. Meeting sustainable development objectives and our international environmental commitments are important elements of addressing this challenge.

Transportation activity contributes to a range of environmental problems that affect air, land, and water – with associated impacts on human health and quality of life. Preventing and mitigating these environmental problems and their associated impacts is an ongoing challenge for Canada. In 1998, governments across Canada, industry and stakeholders continued to take action to address transport-related environmental challenges. The objective is to promote sustainable transportation by ensuring that environment, economic and social considerations are factored into decisions affecting transportation activity.

Promoting sustainable transportation is a shared responsibility amongst government, industry and individual Canadians. This chapter provides an overview of some key initiatives undertaken in 1998 by Canadians.

KEY DEVELOPMENTS IN 1998

CLIMATE CHANGE[1] AND THE KYOTO PROTOCOL

The transportation sector was responsible for about 27 per cent of total 1995 greenhouse gas emissions or 163.5 Megatonnes CO_2-equivalent. In terms of CO_2 emissions, transport's contribution was about 31 per cent, or 149.5 Megatonnes. This indicates that CO_2 emissions make up a relatively higher proportion of

1 Unless noted otherwise, the information presented in this section is derived from the *Transportation Sector Foundation Paper*, December 1998, and Natural Resources Canada, April 1997, *Canada's Energy Outlook 1996-2020.*

GREENHOUSE GASES AND CLIMATE CHANGE: THE PROBLEM

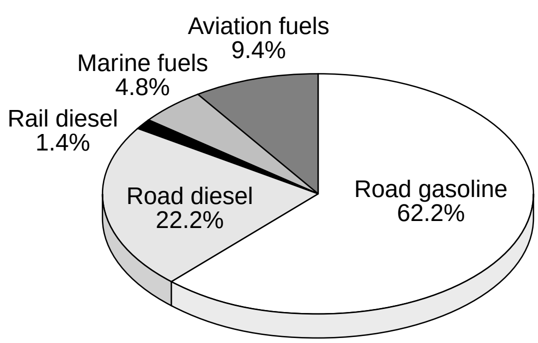
The temperature on Earth is regulated by a system known as the "greenhouse effect." Greenhouse gases trap the heat of the sun, preventing radiation from dissipating into space. Without the effect of these naturally occurring gases, the average temperature on Earth would be -18 degrees Celsius, instead of the current 15 degrees Celsius. Life as we know it would be impossible.

Scientific evidence indicates that human activities may be accelerating climate change. Levels of greenhouse gases such as carbon dioxide, methane, and nitrous oxide have increased significantly since the industrial age. Each year, the world releases 5 to 5.5 billion tonnes of carbon dioxide by burning fossil fuels. It is projected that when the amount of greenhouse gases in the atmosphere is increased, the result may be an increase in global average temperatures that in turn cause climate change.

Carbon dioxide (CO_2) is the most significant greenhouse gas, accounting for more than 50 per cent of all contributions to global warming. Other greenhouse gases are nitrous oxide, methane and water vapour. The principal source of the CO_2 releases is the burning of fossil fuels (oil products, natural gas, coal) during activities such as transportation.

Source: Environment Canada's Climate Change Website.

FIGURE 5-1
RELATIVE CONTRIBUTIONS OF MODES TO TRANSPORT GHG EMISSIONS, 1997



Source: Marbek Resource Consultants, based on fuel sales data from Transport Canada, derived from Statistics Canada Catalogue 57-003, January 1999, and on emission factors contained in NRCan Canada's Energy Outlook 1996-2020 (April 1997).

transportation sector emissions than in other sectors. Road transport (which includes automobiles, and light and heavy duty trucks) is the most significant contributing component. The estimated 1997 contribution of various modes to greenhouse gas emissions is shown in Figure 5-1.

Kyoto Protocol

In December 1997, the parties to the United Nations Framework Convention on Climate Change agreed in Kyoto, Japan, to a Protocol that would limit annual greenhouse gas emissions to 5.2 per cent below 1990 levels within the period 2008 - 2012. Differentiated limits were specified by country. Canada is committed to reach a level of greenhouse gas emissions that is six per cent below its 1990 level. This is a significant challenge, particularly for the transportation sector which is the largest contributor to Canada's total greenhouse gas emissions.

Immediately following Kyoto, Canada's First Ministers agreed to establish a process to examine the consequences of Kyoto and provide for the full participation of the provincial and territorial governments with the federal government in any implementation and management of the Protocol. Ministers of Energy and Environment were asked to present First Ministers with a national strategy on Climate Change by December 1999.

In April 1998, federal and provincial/territorial Ministers of Energy and Environment approved a national process for developing a climate change strategy. Fifteen Issue Tables were established to conduct this work. In May 1998, the federal, provincial and territorial Ministers of Transport agreed to create and sponsor a Transportation Table.

The Transportation Table is composed of twenty-six representatives drawn from federal, provincial and municipal governments, transport sector private organizations, environmental groups and other stakeholders in Canada's transport system. It is responsible for identifying and analyzing options to reduce greenhouse gas emissions from all aspects of Canada's transportation system. This includes all modes; fuels; passenger transport; transportation equipment (excluding manufacturing emissions); transportation infrastructure; freight transport;

urban transit; vehicle technology and standards; intermodal transportation; and transportation demand management.

By mid-1999, the Transportation Table will submit, to Ministers of Transport and the National Climate Change Secretariat, an options paper which identifies specific measures to reduce transport greenhouse gas emissions including their costs, benefits and impacts.

The Table will build an incremental package of measures designed to meet the Kyoto target. The outputs of the Transportation Table and other Issues Tables will then be integrated into options for a national strategy on climate change by December, 1999. Following broader consultations and analysis this work will be refined into a long term strategy for consideration by First Ministers.

CLEANER AIR

Most air pollution is caused by the fossil fuels we burn in our vehicles, homes, thermal power plants and factories. Many chemicals have been identified in urban air pollution. A small number of these have been found to contribute to a range of air quality problems in Canada. These pollutants include nitrogen oxides (NO_X), carbon monoxide (CO), sulphur dioxide (SO_2), particulate matter (PM) and volatile organic compounds (VOC). When some of them combine, they produce smog or acid rain.

Smog

Smog is the most visible form of air pollution. The effects of smog are felt locally, regionally, and across national boundaries. In Canada, exposure to elevated levels of ground-level ozone, the major component of smog, is most severe in the Windsor-Quebec City corridor of Ontario and Quebec, southern parts of Nova Scotia and New Brunswick, and the Lower Fraser Valley of British Columbia. About 40 to 50 per cent of Canada's emissions of smog-forming pollutants are attributed to activity in the transportation sector.[2]

Transport Canada is a partner in the Federal Smog Management Plan and continues to work towards fulfilling its commitments made in Phase 2 of the plan tabled in November 1997.

In 1998, Transport Canada participated in a number of new initiatives to mitigate air quality concerns in Canada.

Under the Environmental Standards Sub-Agreement of the Accord on Environmental Harmonization, Transport Canada is participating in the development of Canada-wide standards on particulate matter and ozone. Phase 3 of the Federal Smog Management Plan will be founded on the federal implementation strategy of these national air quality standards that all Canadian jurisdictions will formally agree to meet.

Transport Canada is also participating in a joint venture with the Montréal Urban Community (MUC) and Aéroports de Montréal (ADM) in a year-long study of airport air quality. For this purpose, the department has provided ADM with its mobile air monitoring vehicle.

This year, Transport Canada partnered with Environment Canada for the first time on its Vehicle Emissions Inspection Clinics. Largely a public awareness initiative, the clinics are conducted across Canada to better inform Canadians about emissions from the cars they drive.

> The Climate Change Action Fund – In its 1998 Budget, the Government of Canada committed $150 million over the next three years to build momentum toward concrete action and results on climate change.

On the international front, Transport Canada is continuing its work with the International Civil Aviation Organization (ICAO) in a working group addressing ground source emissions, and its work with the United Nations Economic Commission for Europe (UN-ECE) which adopted and signed protocols on persistent organic pollutants (POPs) and heavy metals in 1998 under the Convention on Long Range Transboundary Air Pollution (LRTAP).

Proposed Regulations on Sulphur in Gasoline

In July 1998, the CCME endorsed a report from a federal-provincial *Task Force on Cleaner Vehicles and Fuels* which called for a reduction in sulphur in gasoline. In October 1998, the federal government announced that it will introduce regulations to significantly lower the allowable level of sulphur in gasoline sold in Canada. The proposed regulations would reduce the sulphur content in gasoline to an average level of 30 parts per million (ppm) with a maximum of 80 ppm. This is a 90 per cent reduction from average levels today. To reduce the impact on fuel and vehicle industries, the requirement would be phased in. In 2002, the level would be lowered to an average of 150 ppm,

2 Transport Canada, Environmental Affairs

Carbon dioxide (CO_2) emissions are primarily linked to vehicle fuel consumption rather than the use of emission control devices. Transport Canada has jointly administered the Voluntary Fuel Consumption Program with Natural Resources Canada since 1977. Under this program, the new passenger car fleet is 50 per cent more fuel efficient than in 1973.

with a maximum of 200 ppm. The 30 ppm level would come into effect in 2005.

The primary objective of the proposed regulation is to reduce air pollution. It also has the potential to open the door for the introduction of vehicle technology that could increase vehicle fuel efficiency.

Canada-Wide Acid Rain Strategy

In October 1998, federal, provincial, and territorial Energy and Environment Ministers signed the *Canada-wide Acid Rain Strategy for Post-2000*. The strategy builds on the successful effort of the last decade to reduce pollutants that cause acid rain. It commits governments to establishing targets and timelines for further reductions in SO_2 emissions.

Diesel Engine Settlement in the US

In October 1998, the US Department of Justice and the US Environment Protection Agency announced the largest civil penalty ever for violation of environmental law. Under this settlement, seven major manufacturers of diesel engines will spend more than $1 billion US to resolve claims that they installed computer devices in heavy duty diesel engines which resulted in illegal amounts of air pollution emissions. Canada's goal is to develop a solution that achieves the same effect as the US consent decrees.

VEHICLE EMISSIONS REGULATION *(MOTOR VEHICLE SAFETY ACT)* AND PROPOSED AMENDMENTS TO THE *CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)*

Motor vehicles are a major source of air pollution. Transport Canada promulgates performance based standards under the *Motor Vehicle Safety Act* to limit the amount of specific pollutants that can be emitted by road vehicles. Manufacturers must find ways of meeting these standards through the use of emission control and monitoring technologies. The legislative authority to regulate which is to be transferred to the *Canadian Environmental Protection Act (CEPA)*, governs emissions of particulates (PM), carbon monoxide (CO), nitrogen oxides (NO_X) and volatile organic compounds.

Since 1971, Canadian motor vehicle emission standards have been made progressively more stringent. Cars today are about 98 per cent cleaner than before emission controls were required. This has led to reductions in emissions from the transportation sector that have exceeded those from any other industrial sector of the Canadian economy. On August 20, 1997, Transport Canada published comprehensive new emission regulations in the Canada Gazette Part II. The new regulations require the more stringent control of exhaust emissions (hydrocarbons (HC), CO, NO_X and PM), evaporative emissions (mostly HC) and refuelling emissions (mostly HC) from 1998 and later model year vehicles. The new regulations include tighter emission control requirements for cars and trucks, heavy-duty vehicles and motorcycles, operating on gasoline, diesel fuel, methanol, natural gas or liquefied petroleum gas. In addition, the new regulations require that new cars and trucks be equipped with on-board diagnostic systems to monitor vehicle emission control systems for proper functioning and to alert the driver of any malfunction by illuminating a dashboard light.

Canada's new vehicle emission standards are fully harmonized with those applicable in the United States under the Environmental Protection Agency's federal emission control program. These are the most stringent national emission standards in the world and are consistent with a recommendation of the CCME's *Task Force on Cleaner Vehicles and Fuels.*

Proposed Amendments to CEPA

In March 1998, the Minister of the Environment introduced legislation to amend CEPA. Significantly, the proposed amendments would shift CEPA's focus from controlling pollution to preventing it. The intent behind CEPA is to protect the environment and human health to contribute to sustainable development through pollution prevention. CEPA will provide flexible legislation with the tools needed for environmental protection. Building on partnerships with all sectors of society and through the use of economic instruments and voluntary initiatives, CEPA will promote environmental protection.

The new CEPA aims to be a key tool in the delivery of enhanced levels of environmental quality. The Act would encourage greater citizen participation by providing easy access to environmental information and by providing opportunities for public input before decisions are made. It would also allow citizens to bring civil suits in cases of significant damage to the environment if the government fails to enforce the Act.

Elements of the amended Act that would directly affect the transportation sector include:

- New authority in CEPA to control motor vehicle and other engine emissions and to develop a new national emissions mark for engines meeting emissions requirements, and
- A national fuels mark to show that fuels meet environmental standards.

In late 1998, the proposed amendments were being reviewed clause-by-clause by the House of Commons Standing Committee on Environment and Sustainable Development.

Transport Canada's eight strategic environmental challenges:

1. minimize the risk of environmental damage from transportation accidents;
2. promote greening of operations in the transportation sector;
3. reduce air emissions from transportation sources;
4. promote education and awareness on sustainable transportation;
5. assess the department's direct budgetary transfers for their environmental impact;
6. refine sustainable transportation performance indicators;
7. understand the environmental costs of transportation; and
8. develop and promote the application of cleaner transportation systems and technologies.

EMS ACTIVITY IN 1998

EMS approaches were applied in a number of Transport Canada's activities during 1998 in the broad areas of resource use, land management, waste management, hazardous materials/dangerous goods management, and emergency response. Specific programs have addressed polychlorobiphenyls (PCBs), storage tanks, and the motor vehicle fleet.

Specific Examples

The department has introduced a No Waste program at its Ottawa headquarters. In the first eight months of operation, it was found that 83 per cent of solid waste was being diverted from landfill. This exceeded the 75 per cent target set for the program.

The department is in the process of gathering inventory information on storage tanks, contaminated sites and ozone depleting substances in order to develop an environmental information management system.

As part of its divestiture process, all airports and ports in the process of being transferred undergo environmental baseline studies to determine whether remediation will be required. In addition, NAV CANADA properties have undergone Phase I site assessments and based on this information more detailed assessments will now be undertaken.

The Department conducted and approved 268 environmental assessments in accordance with the Canadian Environmental Assessment Act (CEAA).

ADVANCES IN R, D & D

An important element in addressing environment challenges is Canada's efforts in the area of research, development and demonstration (R, D & D). In 1998, steady progress was made in the R, D & D of vehicle and fuel technologies that result in low or zero emissions. Electric vehicles, including hybrid electric vehicles, are being produced in limited numbers by major automobile manufacturers such as Toyota, and are expected to be available in Canada in the next few years. Hydrogen-powered buses, using technology developed in Canada, are being tested in various jurisdictions. (The chapter entitled *Transportation and Energy* provides further information about Ballard's fuel cell power systems.)

TRANSPORT CANADA'S SUSTAINABLE DEVELOPMENT STRATEGY – AN UPDATE

The Transport Canada Sustainable Development Strategy (SDS), tabled in Parliament in

1998 REPORT OF THE COMMISSIONER OF THE ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

In May 1998, the Commissioner of the Environment and Sustainable Development reported that 28 federal government departments and agencies had prepared their first sustainable development strategies and tabled them in the House of Commons. The Commissioner noted that Transport Canada and other departments now face three main challenges:

1. Implementing their strategies
2. Establishing clear and measurable targets
3. Updating their strategies by the end of 2000.

Selected Comments by the Commissioner of Environment and Sustainable Development note that,

"This first round of sustainable development strategies represents a significant step forward. We now have a picture of how each department views sustainable development and of the actions each one intends to take to promote it."

"Climate change is perhaps the most daunting of a new generation of environmental problems testing governments around the world. It involves questions that go to the heart of how we live and how we make our living..."

"In a number of areas, the federal government is failing to meet its policy commitments because it is paying too little attention to the management side of the sustainable development question."

"Most departments failed to set the clear targets that could be used internally to judge whether or not the strategy is being successfully implemented. And many strategies restate the status quo rather than making new concrete commitments that will better protect our environment and promote sustainable development."

Transport Canada is working to address these concerns.

December 1997, identified eight strategic environmental challenges on which to concentrate efforts. The challenges focus on promoting sustainable development in the transportation sector, and in the management of the Department's own operations.

During 1998, the department worked in partnership with others to begin to implement its SDS. To this end, Transport Canada has developed a comprehensive sustainable development action plan. Some of these efforts build on existing initiatives, recognizing their contribution to sustainable development. Of particular note are the following:

Environmental Management System (EMS) – Transport Canada is in the process of implementing a department-wide EMS. Using the principles of ISO 14000, it has developed a system that will incorporate environmental considerations into all aspects of operational decision-making.

Strategic Environmental Assessment – In addition to assessing the environmental impacts of projects, Transport Canada is committed to strategic environmental assessment of policies and programs. The Department worked with the Canadian Environmental Assessment Agency (CEAA) and other federal departments to develop an action plan and implementation strategy entitled *Integrating Policy Environmental Assessment into the Federal Decision-making Process.*

Reducing Air Emissions – As noted in earlier sections on climate change and cleaner air, this was a major focus of activity for governments as well as for the transportation industry and other stakeholders.

TRANSPORTATION PROGRAMS AIMED AT IMPROVING ENVIRONMENTAL QUALITY

A number of federal and provincial Canadian programs relate specifically to transportation and the environment (primarily air quality). Some of these programs are described briefly below.

BRITISH COLUMBIA'S CLEANER VEHICLES AND FUELS PROGRAM[3]

The primary purpose of this program is to control the emission of smog precursors. As a secondary benefit, it may also reduce greenhouse gas emissions. The program is operated by the Clean Vehicles and Fuels

3 BC Ministry of Environment, Lands & Parks website.

Program, Ministry of Environment, Lands, and Parks, Province of British Columbia.

Cleaner Vehicles

In 1995, BC launched tough auto emissions standards primarily aimed at reducing smog. The new regulations require that, starting in the year 2001, all new cars sold in the province must meet the same Low-Emission Vehicle (LEV) standards as in California. A LEV produces up to 70 per cent less emissions (smog) than pre-1996 vehicles (Tier 0). As part of the regulation, between 1996 and 2001 manufacturers will have to identify other measures to reduce vehicle emissions. The regulation also sets targets to bring Cleaner Technology Vehicles to the BC market: five per cent of new vehicle sales by the year 2001; ten per cent by the year 2003.

Other provincial government initiatives have included support for natural gas transit buses, Ballard Power Systems fuel cell technology, and lower emission vehicles for fleets.

Cleaner Fuels

BC adopted a regulation requiring new "clean air" standards for the quality of gasoline sold in the province, beginning in 1996. The standards target benzene and sulphur.

VEHICLE INSPECTION AND MAINTENANCE PROGRAMS

All new motor vehicles sold in Canada must meet stringent pollution standards. However, if the vehicle is tampered with or the pollution control equipment is not properly maintained, the environmental benefits of improved technology are lost. Inspection and maintenance (I/M) programs attempt to respond to this problem. The programs are recommended for areas where motor vehicles are a major source of harmful emissions, where air pollution is a problem, or as a pollution prevention measure. The effectiveness of the programs in reducing pollution is currently the subject of some debate.

I/M programs involve the regular inspection of motor vehicles to verify the presence of pollution control equipment and to ensure compliance with provincial emissions limits. When a vehicle that exceeds pollution limits is detected, the vehicle must be repaired.

To facilitate the development of a uniform and consistent approach to I/M programs across Canada, a task force made up of environmental groups, government, and industry stakeholders developed an *Environmental Code of Practice for Motor Vehicle Emission Inspection and Maintenance Programs*.

Three provincial I/M programs are described below.

British Columbia's AirCare® Program[4]

AirCare is the provincial vehicle emissions inspection-and-maintenance program that has been in place in the Lower Fraser Valley since 1992 (also directed primarily towards reduction of smog). The program is managed by the Clean Vehicles and Fuels Program, Ministry of Environment, Lands, and Parks, Province of British Columbia.

Standards were strengthened in 1995. The program, developed jointly by the Province, the Greater Vancouver Regional District (GVRD) and Environment Canada, requires that all light-duty vehicles pass an annual emissions inspection as a condition of licensing. Vehicles that fail the test have to be repaired and re-tested at approved service centres. Full repairs, although encouraged, are not required if they cost the owner more than a set repair-cost limit, which varies according to the age of the vehicle.

The program reduces nitrogen oxides and volatile organic compounds, precursors of ground-level ozone and secondary fine particulate. Emissions of nitrogen oxides have been reduced by three per cent; volatile organic compounds by 18 per cent; and carbon monoxide by 24 per cent.[5]

Reports indicate that fuel savings resulting from AirCare-related repairs are estimated to be over $7 million per year.[6]

Ontario Drive Clean

Drive Clean was originally introduced in August 1997 and was scheduled to take effect in 1998. The start-up date has been postponed until spring 1999. The program is positioned as a major initiative to fight smog.

A new regulation under the Ontario Highway Traffic Act will require proof of an emissions certificate for renewing registration and transferring ownership of cars and other light-duty vehicles (under 4,500 kg). This sets the stage for the province's Drive Clean Program. It specifies the model ages of

4 From BC Environment website.

5 National Round Table on the Environment and the Economy, 1996, *Backgrounder on Sustainable Transportation in Canada*, p.47.

6 BC Environment, Lands & Parks website

vehicles covered under Drive Clean and how often they must be tested. Vehicles that fail the test have to be repaired and re-tested at approved service centres. The new regulation will come into effect on April 1, 1999 in the Greater Toronto Area and Hamilton-Wentworth region for passenger cars and light trucks. On January 1, 2001 it will extend to 13 other urban areas.

Drive Clean will later apply province-wide to heavy-duty vehicles (more than 4,5000 kg). Antique vehicles (20 years old or more), commercial farm vehicles and motorcycles are excluded from the program. Motorcycles will be included when recognized emissions standards are in place.

Quebec Inspection and Maintenance

The province of Quebec announced a two-year voluntary I&M pilot program in 1997. The program is being managed by the “Association québécoise pour la lutte contre la pollution atmosphérique” and is sponsored by the provincial Ministry of Environment, Environment Canada, and others. The program operated from April to October 1997 with voluntary clinics held throughout the province. Voluntary clinics were also held during the summer of 1998.

Guidelines for Evaporative Emissions Controls

Transportation-related emissions result not only from fuel combustion when the automobile is in operation, but also from evaporation of the fuel itself before it is burned in the car engine. There are two methods to avoid evaporative emissions from gasoline fuel: vapour recovery and gasoline volatility limits.

Environment Canada and the CCME have developed guidelines to reduce the evaporation of gasoline at service stations. Gasoline volatility is also regulated during the summer months in certain provinces to reduce evaporative emissions.

Locomotive Emissions Monitoring Program[7]

The 1995 Memorandum of Understanding between Environment Canada, CCME, and the Railway Association of Canada (RAC) requires the RAC to make an annual report to Environment Canada concerning the emissions of exhaust gases, particularly oxides of nitrogen, from locomotives. The MOU does not include voluntary undertakings to reduce the emissions, but it does commit the railways to monitor and report them. The MOU was developed from the recommendations contained in the joint Environment Canada/Railway Association of Canada report entitled *Recommended Reporting Requirements for the Locomotive Emissions Monitoring Program.* The report is to include data on the traffic moved and the fuel consumed, estimates of the consequent emissions of certain exhaust gases, and information on any improvements in equipment or operating practices that will lead to reduced emissions. As part of the agreement, the RAC also agreed to monitor developments in railway operations technology and to encourage member railways to implement new cost effective technologies that will reduce the emissions from their new equipment.

The first annual report, based on data up to 1995, was published in 1997. The annual fuel consumption rate in gallons per 1,000 Gross Ton-Miles showed an average annual decrease of 1.9 per cent over the 1990 level. This initiative will continue with further reports as data becomes available.

Technology Partnerships Canada (TPC)

Environmental industries and their related technologies are a key target area for investment by Technology Partnerships Canada (TPC), an Industry Canada program of targeted repayable investments. For example, TPC invested $30 million in Ballard Power Systems, developers of fuel cell technology, and $4.3 million in GFI Control systems to develop gaseous fuel engine control systems for alternative transportation fuel vehicles.

Looking Ahead

Governments across Canada, industry and stakeholders will continue to take action to address transport-related environmental challenges. The objective is to promote sustainable transportation by ensuring that environmental, economic and social considerations are factored into decisions affecting transportation activity. Partnerships and clear and open lines of communications will be essential in achieving this objective.

7 Environment Canada, November 1997, *Locomotive Emissions Monitoring*, Reporting Year 1995, EPS 2/TS/10

6

TRANSPORTATION AND ENERGY

Energy plays a vital role in the transportation sector.

Energy and sustainable development are closely linked.

Given the current technology available to move transportation equipment, energy plays a vital role in transportation activities.

- It is an essential input to transportation activity. The growth in transportation needs could not have been satisfied without access to sufficient energy supply to look after the said needs.
- It represents, on average, 12 per cent of the cost of transportation. It is preceded in terms of importance by the costs of labour, materials, goods and services, and capital, which respectively account for 35 per cent, 26 per cent and 17 per cent of the total.
- In 1996, the transportation sector accounted for 2029 petajoules, or 26.6 per cent, of secondary energy demand in Canada[1]; and for close to 60 per cent of all petroleum use in Canada.
- Between 1990 and 1996, transportation energy use and transportation activity grew for both passenger and freight transport activities. But transportation activity grew at a more rapid pace than that of the sector's energy use, an indication that energy savings were taking place in transportation activities. But savings were not sufficient to offset the growth in transportation demand.

Transportation and the Environment

The energy consumed in transportation activities accounts for 27 per cent of Canada's greenhouse gas emissions. The relationship between transportation energy use and the environment, including a discussion of greenhouse gas emissions and climate change, was covered separately in the previous chapter entitled Transportation and Environment

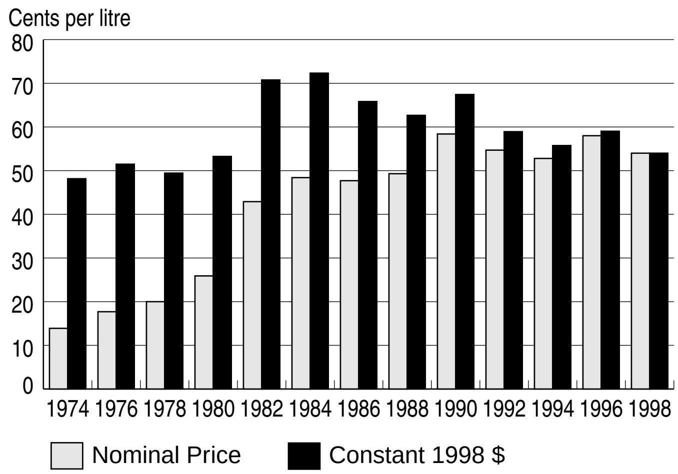
1 Natural Resources Canada, Office of Energy Efficiency. Energy Efficiency Trends in Canada, 1990-1996 (June, 1998)

TABLE 6-1
GROWTH BETWEEN 1990 AND 1996 IN ENERGY USE AND TRANSPORTATION ACTIVITIES

	Energy Use	*Transportation Activity*
Passenger Transportation	+ 9.8%	+ 17.8%
Freight Transportation	+ 11.0%	+ 14.7%

Source: Natural Resources Canada, Office of Energy Efficiency report "Energy Efficiency Trends in Canada 1990 to 1996", June 1998, p.49.

FIGURE 6-1
GASOLINE RETAIL PRICES
1974 – 1998



Source: Foundation Paper for the Transportation Table, Transport Canada, Economic Analysis, p. 130.

DEVELOPMENTS IN 1998

CHANGES IN THE PRICE OF OIL AND PETROLEUM PRODUCTS

As shown in Figure 6-1, gasoline prices are at their lowest levels in about 20 years. As for other goods, transport-related consumption of energy has some inverse relationship between price and quantity used. The cost of fuel is one of the factors that comes into play in transportation decisions. On the passenger side, for example, the choice between private and public transport services or the type of personal transport vehicle to purchase are influenced to some degree by the price of fuel.

DEVELOPMENTS IN ENERGY-RELATED TRANSPORTATION R&D

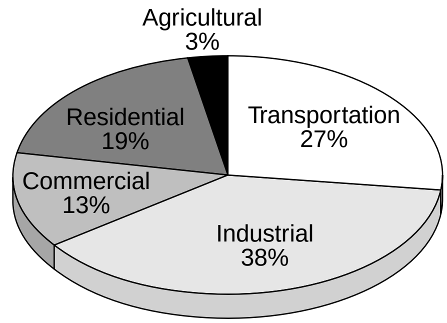
Some of the ongoing research and development (R&D) in the transportation sector supports the development of technologies improving fuel efficiency and/or new environmentally friendlier sources of energy for the benefits of Canadians. Developments arising out of transportation R&D in recent years are highlighted below. (The chapter entitled Transportation and Environment identified other R&D developments that have both energy and environmental impacts.)

- Of particular interest is the vehicle technology R&D conducted by Ballard Power Systems of Vancouver. Ballard is the world leader in the development of proton exchange membrane fuel cell power systems. The Ballard Fuel Cell is a proprietary zero-emission engine that converts natural gas, methanol, gasoline, or hydrogen fuel into electricity without combustion, and consequently without emissions. During 1998, Ballard reached agreements with General Motors, Ford, Daimler-Benz and Honda respectively to supply a range of products and services that would advance the penetration of fuel cell technology into the market.
- Another significant development is the joint venture between Iogen, an Ottawa-based company, and Petro-Canada regarding the production of ethanol fuel. The venture will include the construction of a $15 million to $30 million ethanol test plant at Iogen's Ottawa facilities, plus a licensing option for Petro-Canada to build full-scale ethanol refineries. The test plant will use Iogen's patented process to convert straw, corn stalks and wood waste into biomass based ethanol.

Energy Demand

Figure 6-2 below illustrates the breakdown of end-use energy demand in the four principal sources of use of energy using sectors in Canada.[2] It shows that the sector accounted for 2,029 petajoules, or 26.6 per cent of total end-use energy demand in Canada in 1996. At that time, the transportation sector was second only to the industrial sector in terms of energy end-use, followed by the residential and commercial sectors.

FIGURE 6-2
END-USE ENERGY DEMAND IN CANADA, BY SECTOR
1996

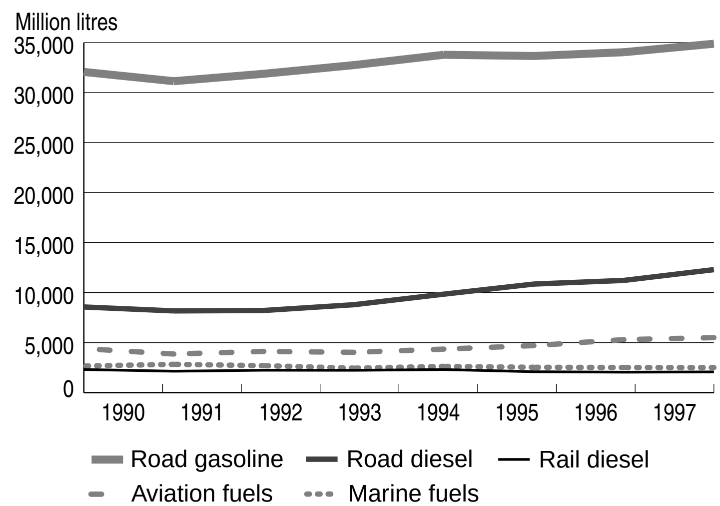


Source: NRCanada, 1998

Fuel Sales

Transport Canada uses fuel sales as the key indicator of energy use. Canadian refinery fuel sales indicate that total sales of fuels used for transportation activity grew by over 14.1 per cent between 1990 and 1997. Overall, fuel sales increased by almost four per cent between 1996 and 1997 alone.

FIGURE 6-3
SALES OF FUELS USED FOR TRANSPORTATION ACTIVITY
1990 – 1997



Source: NRCanada, 1998

Much of the upward trend in fuel sales is attributable to an increase of over five per cent in sales of road diesel fuel over the 1990-1997 period. Sales of road gasoline and marine fuel have remained relatively stable. Figure 6-3 shows the trend in sales for each of the fuels used in the transportation sector between 1990 and 1997. (See the section entitled Factors Influencing Transportation Energy Use for a discussion of possible reasons for the trends.)

Figure 6-4 shows how much each mode contributes to the total use of fuels for transportation activities. Motor gasoline and road diesel fuel together accounted for over 80 per cent of fuel sales. Aviation fuels (comprised of aviation gasoline and jet fuels) accounted for most of the balance.

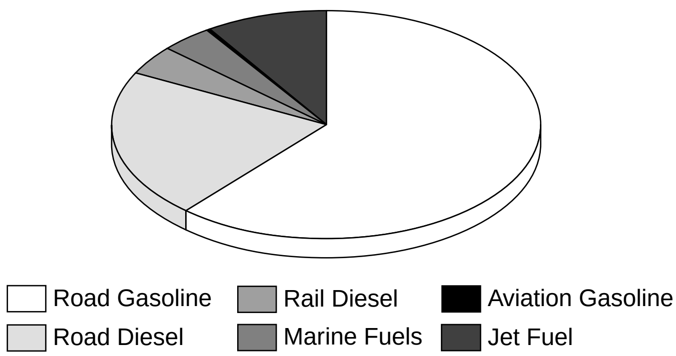
Alternative transportation fuels include propane, natural gas, methanol, ethanol, electricity and hydrogen. Overall, alternative fuels programs in Canada and the U.S. have had limited success in replacing conventional fuels such as gasoline and diesel. Even with Canada's abundant supplies of domestic natural gas, propane and natural gas have had only limited market success, achieving two per cent and 0.5 per cent market shares respectively. About 20,000 vehicles operate on natural gas; 150,000 vehicles operate on propane.[3]

2 Natural Resources Canada, Office of Energy. Efficiency, Energy Efficiency Trends in Canada 1990 to 1996 (June 1998)

3 Transportation Table on Climate Change Foundation Paper, December 1998.

FIGURE 6-4
FUEL SALES BY MODE IN CANADA
1997

Per Cent of Total 1997 Sales



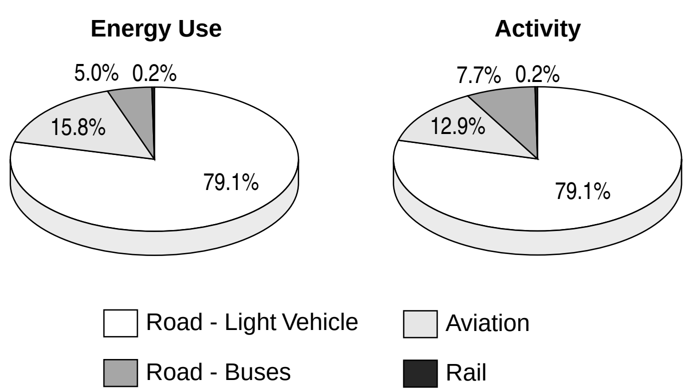
Source: Transport Canada Fuel Sales Data derived from Statistics Canada, Cat. 57-003, January 1999

TABLE 6-2
CONSUMPTION OF CONVENTIONAL AND ALTERNATIVE FUELS

Fuel	***1990*** *Per Cent*	***1995*** *Per Cent*
Gasoline	77.7	73.3
Diesel	20.2	24.0
Propane	1.7	2.0
Natural Gas	0.2	0.5
Electricity	0.2	0.2
Other Fuels (e.g. ethanol)	0.0	0.1
Total	**100.0**	**100.0**

Source: NRCan April 1997. Canada's Energy Outlook 1996-2020.

FIGURE 6-5
ENERGY USE AND ACTIVITY BY MODE
PASSENGER TRANSPORTATION



Source: Figure 6.1, p.50 from NRCan 1998 for presentation; data from p. 76 of that publication

Table 6-2 presents the shares of conventional and alternative Canadian fuel consumption in 1990 and 1995 respectively.[4] It shows that diesel fuel demonstrated the most growth, apparently at the expense of gasoline, and that alternative fuels have made modest inroads over the period.

Energy Use by Transportation Mode

Transportation energy use is composed of a passenger segment, the largest and dominated by light vehicle use, and a freight segment. According to Natural Resources Canada (June 1998), the passenger sub-sector, comprising road, rail and air passenger activity, accounts for 64.7 per cent of transportation energy used. The freight sub-sector, including road, rail and marine freight activity, accounts for the balance. From 1990 to 1996, passenger transportation energy use increased by 9.8 per cent; freight transportation energy use increased by 11.0 per cent over the same period.

Within the passenger sub-sector, light vehicle road passenger transportation is the most significant mode in terms of energy use (see Figure 6-5). It accounts for 78.9 per cent of both energy use and activity (passenger-kilometres). The breakdown of energy use and activity within the freight sub-sector are shown in Figure 6-6. Within the freight sub-sector, trucks account for 72.7 per cent of energy use, while the marine sub-sector accounted for 15.5 per cent and rail for 11.8 per cent.

4 1995 is the most recent year for which NRCan has complete data.

FACTORS INFLUENCING TRANSPORTATION ENERGY USE

Transportation energy use is influenced by the following factors:

- Fuel efficiency
- Level of transportation activity
- Other factors such as stock replacement, mix of vehicle types in the stock and vehicle operation and maintenance

These will be discussed briefly below.

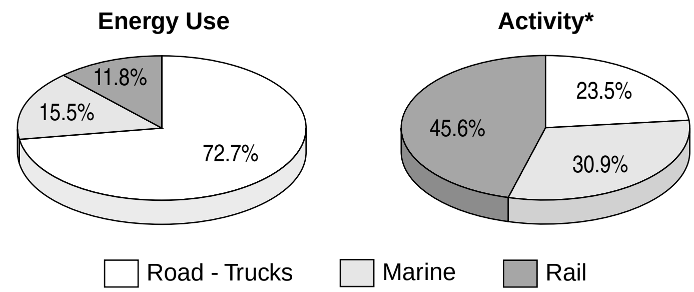
FUEL EFFICIENCY

Fuel efficiency in vehicles is a measure of how much fuel is consumed over a set distance. Traditionally it is represented in terms of litres of fuel per 100 kilometres travelled. Vehicle fuel consumption is a function of the efficiency of vehicle weight and fuel technology, as well as other factors.

An ongoing interest in reducing transportation energy use has resulted in a continuing focus on fuel efficiency. Since the oil price shock of the1970s, cars and light trucks have become more and more fuel efficient. Figure 6-7 illustrates an improvement in car fuel efficiency from 11.5 L/100 km in 1979 to 7.9 L/100 km in 1996. The improvement in fuel efficiency has been attributed to vehicle weight reductions and advances in technology. Light truck fuel efficiency has also improved since the late 1970s. It is currently at about 11.2 L/100 km.

A change in the structure or "shape" of the fleet can affect the amount of energy used in the transportation sector as a whole.

FIGURE 6-6
ENERGY USE AND ACTIVITY BY MODE
FREIGHT TRANSPORTATION

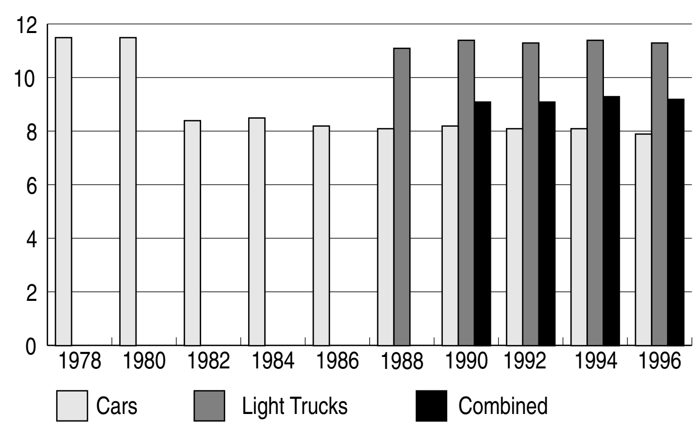


* Measured in tonne-kilometres

Source: Figure 6.2, p.50 from NRCan 1998 for presentation; data from p. 76 of that publication

FIGURE 6-7
CANADIAN MOTOR VEHICLE FUEL EFFICIENCY
1978 – 1996

(litres per 100 kilometres)



Source: Transport Canada, Motor Vehicle Standards and Research Directorate; Figure 6.2, p.50 from NRCan 1998 for presentation; data from p. 76 of that publication

Because of the relative importance of the passenger sub-sector, shifts in the mix of activity between small cars, large cars and light trucks, for example, can have an impact on energy use. Choosing more efficient vehicles can reduce overall fleet energy use. The impact of a shift from small and large cars to light trucks, with all other factors remaining equal, was to increase light-duty vehicle energy demand by 10 petajoules.[5]

The fuel efficiency of various types of transportation modes is discussed below.[6] In principle, a number of technological changes could improve vehicle fuel efficiency in all modes. The opportunities to take advantage of these advances is time-lagged because it takes time to design new vehicles, convert plants to produce them and replace the fleet.

5 NRCan, 1998

6 *Transportation Table on Climate Change -- Foundation Paper,* December1998

Road Transportation - Automobiles and Light Trucks

Data indicates that the company average fuel efficiency of new passenger cars has not improved significantly since 1986, and that of light-duty vehicles (new cars and light trucks combined) has not changed significantly since 1982. Reasons for this lack of significant improvement include the increasing preference by consumers for less fuel efficient light trucks over automobiles, lower gasoline prices and the need to meet consumer preferences for vehicle performance. Competing design considerations also inhibit improvements to fuel economy. In certain cases, fuel economy benefits have been realized, but have been offset by safety features such as air bags and increased emission controls which add weight to the vehicle and reduce its efficiency.

Road Transportation - Heavy Trucks and Buses

Heavy truck and bus fuel consumption has improved less than that of light duty vehicles over the past 20 years. One important reason for this is that heavy-duty vehicles were already more energy efficient than passenger vehicles on the basis of fuel consumption per unit of weight. Use of the efficient diesel engine is largely responsible for this advantage. Diesel engine designs are improving steadily. For example, turbocharged direct-injection diesels offer fuel savings of 30 per cent to 40 per cent compared with gasoline engines.

Rail Transportation - Locomotives

Since the mid 1990s, the North American manufacturers of diesel electric locomotives introduced alternative current (A.C.) traction for railroad motive power, increasing substantially the horsepower of the diesel engine. A.C. locomotives offer improved performance and reliability. One A.C. 6000 horsepower diesel engine unit permits the replacement of two existing locomotives. According to Industry Canada (June 1998), Canadian Pacific's acquisition of 262 new AC traction locomotives should decrease the carrier's fuel consumption by 20 per cent.

Marine Transportation - Ships

New developments are taking place in two areas with respect to marine engines: gas turbines and diesel electric systems. Although they may offer significant advantages, actual estimates of the fuel consumption potential for these technologies are not available.

Air Transportation - Aircraft Technology

The fastest growing of all transport modes, commercial air travel has also made the greatest strides in improving energy efficiency. From the early 1960s to the mid 1990s, the fuel consumption per passenger seat-kilometre of newly certified aircraft in Canada decreased by approximately 50 per cent. This decrease was due to improved aerodynamic efficiencies, larger capacity aircraft, as well as engine technology improvements. Energy use per passenger-kilometre was also reduced due to increased load factors (passenger-kilometres per available seat-kilometres), and improvements in operating procedures.

In the last half of the 1980s, improvements slowed, due to slower stock turnover, lower jet fuel prices, and worsening air traffic congestion.

Transportation Activity Levels

Transportation activity is typically measured as passenger-kilometres for passenger transportation, and tonne-kilometres for freight transportation.

Changes in activity levels were the most significant factor causing energy use to increase from 1990 to 1996. Had activity not changed, passenger and freight transportation energy use would have been 206 petajoules and 86 petajoules lower, respectively, in 1996 than they actually were (NRCan, 1998). More people, more vehicles, more kilometres!

As noted previously, the transportation sector includes passenger and freight transportation. The passenger sub-sector is the largest, accounting for 64.7 per cent of transportation energy use. Light vehicle road passenger transportation is the most significant mode of the passenger sub-sector, accounting for 78.9 per cent of both energy and activity passenger-kilometres. Combined with buses, road transport accounts for 83.9 per cent of energy and 86.8 per cent of passenger kilometres. The remaining energy and activity are accounted for mainly by the air sector. This profile suggests that changes in the level of activity in the passenger sub-sector would have the most direct impact on how much energy is used in the transportation sector as a whole.

From 1990 to 1996, light vehicle activity, defined as passenger-kilometres, increased by an estimated 20.9 per cent. Improvements in the fuel efficiency of the fleet achieved over the period were not sufficient to offset the increase in light vehicle transport energy use.

Increases in the level of road passenger transportation activity are due to a range of factors including population growth, an increase in the stock of vehicles used for passenger travel, a decrease in the cost of driving a private vehicle relative to the cost of urban and intercity bus transport, and changes in socio-economic-demographic conditions such as urban sprawl.

Activity in the freight sub-sector includes the movement of goods by trucks, rail and marine. Freight trucking accounts for the largest share of freight energy use, followed by marine and rail. Activity distribution, defined as tonne-kilometres, is significantly different than energy use as trucks account for only 23.5 per cent of total freight activity, while rail and marine account for 45.6 and 30.9 per cent respectively[7]. This reflects the fact that rail and marine carry bulk commodities while trucks tend to carry more lightweight goods (e.g. consumer goods, parts).

Over the period 1990 to 1996, freight activity increased by 14.7 per cent. An increase in road freight activity, amounting to 44.2 per cent, was the largest contributor to the overall growth of total freight activity. Rail and marine activity also increased over the period, but by smaller amounts, 12.9 per cent and 1.2 per cent respectively.

A key factor that drives the level of freight transportation activity is economic activity. Increases in the general level of economic activity often result in increases in the level of freight transportation activity.

OTHER FACTORS

Other factors can potentially affect how much transportation energy is used. These include vehicle stock replacement and vehicle operation and maintenance practices.

Vehicle stock replacement

As the fuel efficiency of new vehicles improves and older less efficient vehicles are replaced, the overall efficiency of the transportation fleet improves. Fleet turnover has had a significant impact on fleet fuel efficiency over the 1990-1996 period. In 1990, 19 per cent of the car stock was 1970 vintage, compared to four per cent in 1996. Over the same period, 1990 vintage vehicles grew from six per cent to 45 per cent of the stock.[8] Despite these efficiency improvements, the shift to a newer vehicle stock has not been sufficient to outweigh the overall increase in fuel use caused by increased levels of transportation activity.

Vehicle operation and maintenance practices

Speed, acceleration and idling practices are some of the elements of driving that can affect the amount of energy used by a vehicle; routine tune-ups can also have a beneficial impact.

CANADA'S FUEL EFFICIENCY PROGRAMS

Fuel consumption plays a significant role in how much energy is used for transportation, and a number of Canadian initiatives are consequently aimed at promoting transportation fuel efficiency. Some of these programs are described briefly below.

Transportation activity is typically measured as passenger-kilometres for passenger transportation, and tonne-kilometres for freight transportation.

MOTOR VEHICLE FUEL CONSUMPTION STANDARDS ACT AND *MOTOR VEHICLE FUEL CONSUMPTION PROGRAM*

The joint Government-Industry Voluntary Fuel Consumption Program set the first Company Average Fuel Consumption (CAFC) targets for automobiles in 1980; subsequently, government passed Bill C-107, the *Motor Vehicle Fuel Consumption Standards Act (MVFCSA)*. This legislation exists as an alternative

TRANSPORTATION DEMAND MANAGEMENT (TDM)

The goal of TDM is to modify how consumers use the transportation system. TDM attempts to decrease transportation activity levels by reducing the frequency of trips, reducing the average length of trips, and increasing vehicle occupancy. Typically, TDM includes a range of approaches such as tele-commuting, ride-sharing and alternative work scheduling.

The impacts of TDM on transportation activity has not been determined unequivocally; further research is required.

7 NRCan, (1998)

8 NRCan, (1998)

to voluntary fuel efficiency standards. The program sets voluntary fuel efficiency standards for new vehicles, and encourages manufacturers to produce and sell more fuel-efficient cars and light trucks. Under the program, motor vehicle manufacturers have to meet voluntary annual Company Average Fuel Consumption targets for new light vehicles sold in Canada. A 1995 Memorandum of Understanding between Natural Resources Canada and key vehicle manufacturers provides an opportunity to expand the voluntary commitment by manufacturers on vehicle fuel efficiency. It incorporates a more balanced approach to improving motor vehicle fuel efficiency, including initiatives aimed at vehicle owners and operators as well as new vehicle technology.

EnerGuide Labelling Program for Vehicles

This program, which was developed jointly by government and industry, replaces the long-running fuel consumption labelling program administered until recently by Transport Canada. Under the new program, motor vehicle manufacturers voluntarily affix fuel consumption labels to new vehicles offered for sale. The label will also show the estimated fuel cost of the vehicle. This allows buyers to compare the average city and highway fuel consumption ratings of all new cars, vans, and light-duty trucks, and to assess the potential economic and environmental savings that can be realized by choosing to purchase one vehicle over another.

The program produces and distributes over 400,000 Fuel Consumption Guides that provide vehicle buyers with the fuel consumption ratings for all new, light-duty vehicles. The Guide is published annually by Natural Resources Canada in cooperation with the vehicle industry and Transport Canada.

Auto$mart

Auto$mart encourages energy-efficient and environmentally-responsible decisions. Its approach involves the dissemination of information materials and joint initiatives concerning personal vehicles with public sector and private sector partners. NRCan delivers this program, working with the private sector and other levels of government to develop the information products that communicate the required information. Auto$mart information products include: the Auto$mart Student Driving Kit, the Auto$mart Fuel Consumption Guide, the Fuel Economy Calculator, a 1-800 line, a web site, etc. The education components include a student driving kit, car care clinics, and other elements, such as a syndicated radio program, that are still under development.

Each year the program distributes about 300,000 publications, and reaches 400,000 new drivers through 600 participating driver-educators.

Fleet Energy Program

The aim of this program is to increase energy efficiency and the use of alternative transportation fuels in the public sector and commercial fleets. It consists of two elements: FleetWise and FleetSmart.

FleetWise

This program incorporates information, tools and services, is aimed at assisting federal departments to cut costs and reduce emissions from the operation of federal fleets. The approach to achieving the program goals is to increase fuel efficiency and use alternative transportation fuels in federal government vehicles. The program is managed through an Interdepartmental Task Force that includes NRCan, Treasury Board, Environment Canada, and Public Works and Government Services Canada.

FleetSmart

The FleetSmart program encourages other Canadian fleet operators to reduce operating costs through energy-efficient practices and the use of alternative fuels. Announced in 1997, the program works in partnership with fleet and industry associations, vehicle and engine manufacturers, and equipment suppliers. The program develops energy use data and profiles for fleet segments and provides a range of products such as a FleetSmart Tool Kit, an Internet site (fuel prices and source lists), success stories, and studies that identify best practices, and a SmartDriver training alternative. About 400 fleets are registered in the program, representing over 90,000 vehicles.

Transportation Efficiency R&D Programs

The NRCan Transportation Efficiency R&D program supports the development of technologies to reduce fuel consumption in Canada. Research and development focus on high fuel-efficiency, low emission technologies. The program, suspended temporarily, recommenced with new funding in April 1998.

7

TRANSPORTATION AND REGIONAL ECONOMIES

Provincial transportation investment ranges between 11.3 and 37.8 per cent of their total investment, most of which is road related. The value-added of commercial transportation, as a percentage of provincial GDP, is between 2.9 and 5.9 per cent.

From the beginning of Canada as a nation, transportation has been a vital link in the interlocking chain of dreams and practicalities that have made this vast country economically viable. At Confederation, road, marine and rail transportation were the essential components of the new nation's productivity infrastructure. Today, while air transportation has become a major addition to Canada's transportation mix, the road, marine and rail modes are still essential contributors to the nation's economy. This section examines the role played by all four modes in contributing to the individual economies of each province and territory.

The discussion is based on the application of three indicators: the value-added [1] of commercial transportation [2], total transportation demand [3], and investment [4] by

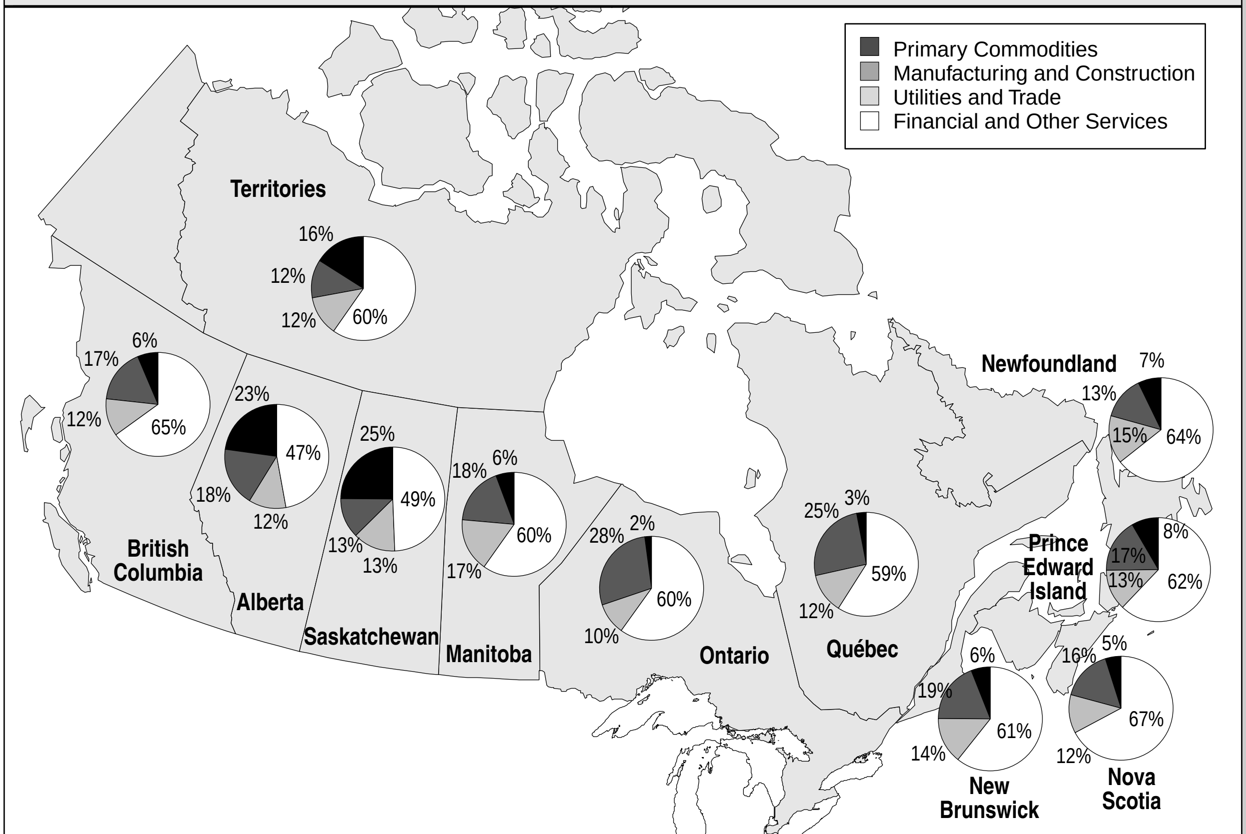
1 Value-added refers to payments such as wages and profits made to labour and capital used in production throughout the provincial economy. Because value -added is determined by payments to labour and capital, transport's importance to a province's economy is determined by the location of the workers and capital employed by commercial carriers. Value-added measures the production or supply of transport.

2 Commercial transport can be defined as "industries that charge fees to transport goods, passengers or both." Commercial transport is part of "total transport," where total transport also includes private spending on transport (such as consumer purchases of cars) and government expenditures on transport (such as highway maintenance and construction).

3 Total transport demand measures transport sales to consumers, businesses and governments within the province. In contrast to value-added, total transport demand includes private and government expenditures on transport, as well as sales of commercial carriers. Using total transport demand means that transport's importance to a province's economy depends on the location of the consumers, businesses and governments that pay for transport.

4 Whether made by business or government, "transport investment" can be defined as both new infrastructure construction and purchases of new machinery and equipment. Investment excludes repair and maintenance expenditure, which are expenditures on existing infrastructure, machinery and equipment.

FIGURE 7-1
STRUCTURE OF PROVINCIAL ECONOMIES IN TERMS OF PROVINCIAL GROSS DOMESTIC PRODUCT
1997



Source: Statistics Canada, Cat. 15-203-XPB, Provincial Gross Product by Industry, 1984-1997.

businesses and governments in transportation infrastructure and machinery. The value-added of commercial transportation can be compared with provincial gross domestic product (PGDP), the standard measure of a province's total value of production. Total transportation demand can be compared with a province's final domestic demand (PFDD), a measure of the total value of sales in a provincial economy. The two aggregate economic measures are related, in that PGDP is equal to PFDD, plus the trade balance.

The Supply of Transportation

The importance of transportation[5] to a provincial economy, and its predominant modes of transportation, are primarily determined by the province's geography, its economic structure (particularly its production of primary commodities), and its share of both interprovincial and international trade. An additional determinant of transportation's importance to provincial economies is the province's proximity to central Canada: provinces adjacent to the central provinces of Ontario and Quebec act as hubs for transportation moving in and out of Central Canada. Both Manitoba and New Brunswick are in hub positions, and enjoy a larger share of transportation activities than the other provinces in eastern and western Canada. Similarly, the large transportation component in British Columbia's economy reflects its position as a gateway for trade with the Pacific Rim countries.

5 "Transportation" in this subsection refers to commercial transportation.

TABLE 7-1
ANNUAL GROWTH IN PROVINCIAL ECONOMIES, REAL GROSS DOMESTIC PRODUCT
1997

(Per cent)

Province/ Territory	*Primary Commodities*	*Manufacturing and Construction*	*Utilities and Trade*	*Financial and Other Services*	*Total Economy*
Canada	2.0	6.4	4.0	3.2	3.9
Newfoundland	14.5	-4.0	4.3	1.2	1.7
Prince Edward Island	6.3	-1.0	5.1	1.7	2.0
Nova Scotia	-6.1	4.7	7.0	1.1	2.0
New Brunswick	-6.3	-2.0	4.2	1.5	0.7
Quebec	-0.1	3.9	3.3	1.6	2.4
Ontario	0.2	6.8	4.2	3.5	4.4
Manitoba	0.7	10.4	5.4	3.1	4.6
Saskatchewan	5.3	14.2	5.4	4.7	6.0
Alberta	4.1	16.5	6.9	6.0	7.5
British Columbia	-1.3	1.2	0.5	3.2	2.3
Territories	-16.2	14.2	-1.2	1.8	-0.7

Source: Statistics Canada, Cat. 15-203-XPB, Provincial Gross Product by Industry, 1984-1997.

Economic Structure of Provincial Economies

Figure 7-1 shows the economic structure of the different provincial economies. The map illustrates that, in general, Canada's eastern provinces have a relatively high share of financial and other services, including government services, and moderate levels of primary commodity production. The provinces of central Canada (Ontario and Quebec) have economies characterized by high levels of manufacturing and low levels of primary commodity production. In western Canada, Alberta, Saskatchewan and the Territories (Yukon and Northwest) are more dependent on primary commodity production, such as oil, grain, and mining, while the economies of British Columbia and Manitoba are more balanced, despite their moderate levels of primary commodity production activities.

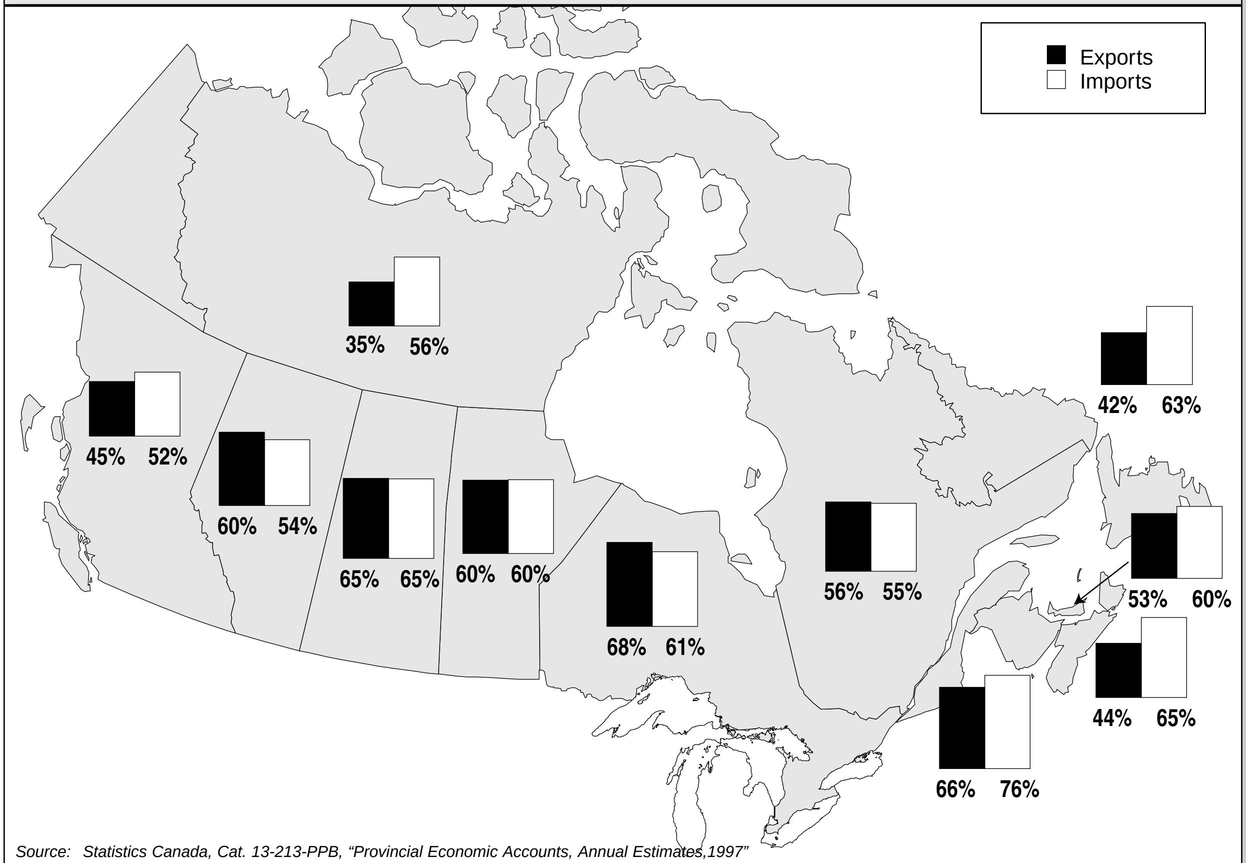
Table 7-1 demonstrates that, in 1997, the four eastern provinces continued to lag behind central and western Canada in annual growth, although Prince Edward Island's and Nova Scotia's economies grew more than New Brunswick's and Newfoundland's. In central Canada, Quebec's economy also underperformed the national average, while Ontario's exceeded it, thanks to robust expansion in its manufacturing and construction sectors. Manitoba's, Saskatchewan's and Alberta's economies had the highest growth rates in the country, also driven largely by manufacturing and construction. The economy of British Columbia, Canada's western-most province, trailed the national average due to continuing recession in Japan, a trend accentuated during 1998 by the onset of the Asian financial crisis.

Trade in Provincial Economies

Figure 7-2 depicts every province's total international plus interprovincial imports and exports in 1997 as a percentage of provincial gross domestic product (PGDP). The four Eastern provinces—Newfoundland, Nova Scotia, Prince Edward Island and New Brunswick – each show a trade deficit, reflecting their reliance on a large share of imports. In central Canada, both Quebec and Ontario had trade surpluses (one per cent of GDP in Quebec, seven per cent in Ontario) with Ontario having the highest share among all the provinces of exports as a percentage of GDP (68 per cent). In Western Canada, Manitoba and Saskatchewan enjoyed balanced trade, with Alberta showing a trade surplus of six per cent of GDP. British Columbia and the Territories suffered trade deficits: seven and 21 per cent, respectively. In both economies, export share was low as a percentage of GDP, again possibly due to continuing economic problems in Asia.

In terms of trade growth, Table 7-2 reveals that both imports and exports grew faster than the provincial economies (see Table 7-1) in every province except Alberta, where export growth lagged the rapid growth of its other sectors. Prince Edward Island was the only province

FIGURE 7-2
IMPORTS AND EXPORTS AS A PERCENTAGE OF PROVINCIAL GROSS DOMESTIC PRODUCT, IN CURRENT DOLLARS, 1997



Source: Statistics Canada, Cat. 13-213-PPB, "Provincial Economic Accounts, Annual Estimates,1997"

whose export growth exceeded growth in imports.

The Value-Added of Commercial Transportation

Figure 7-3 depicts each province's share of commercial transportation. In eastern Canada, four factors contribute to high shares of commercial transportation as a portion of each province's PGDP. The first is their distant location from markets in central Canada. The second factor is the geographic dispersion of their populations. The third is their high share of imports, and the fourth factor, their moderate levels of primary commodity production.

New Brunswick, the eastern province closest to both central Canada and the US, is the Atlantic provinces' gateway for road and rail transportation to and from these locations. Consequently, a number of large transportation firms have headquartered their operations in New Brunswick, giving it a higher share of commercial transportation than Newfoundland and Nova Scotia, (but not necessarily Prince Edward Island[6]). In fact, New Brunswick has the third-highest share of commercial transportation in Canada, after Prince Edward Island and Manitoba.

Geography influences the importance to each Eastern province of the four transportation modes — rail, road, marine and air. Not surprisingly, marine is the most important mode in the two island provinces, Newfoundland and Prince Edward Island, where it constitutes the largest share of PGDP of all provinces. Newfoundland and British Columbia are the two provinces with the highest share of air transportation. In Nova Scotia and

6 It is important to note the difficulty in estimating data for small provinces such as Prince Edward Island (P.E.I.). The data presented for P.E.I. and other small populations (such as the Territories) should be viewed with caution, particularly as 1997 data represent a major historical data revision by Statistics Canada.

New Brunswick, truck transportation is the dominant mode, with New Brunswick's gateway position making truck transportation more important to it than to any other province.

In Ontario and Quebec, commercial transportation's contribution to PGDP is relatively low, due to three factors: the first is the low share of primary commodities in the economy; the second, higher population densities; and the third, their proximity to large US markets. In both provinces, the most important mode is trucking, followed by "other transportation," such as urban transit, charter and intercity bus, taxis, travel and tour operators.[7]

The higher levels of commercial transportation seen in western Canada also result from three contributing factors: the provinces' reliance on primary-commodities production, their lower population density, and their greater distance from markets in central Canada. Manitoba, which shares Ontario's western border, is western Canada's gateway for traffic with central Canada. Consequently, Manitoba's commercial-carrier share of PGDP exceeds that of all provinces except Prince Edward Island. Saskatchewan's PGDP also has a large share of commercial transportation, while Alberta[8] has the lowest share of the western provinces. British Columbia's high share results from both its unique geographical position as a province divided from the others by the Rocky Mountain barrier, and its role as a transportation gateway to Pacific Rim countries. The Territories' dispersed population and isolation from southern Canada have also made commercial transportation an important contributor to their PGDP.

TABLE 7-2
ANNUAL GROWTH OF PROVINCIAL IMPORTS AND EXPORTS
1997

(Per cent)

Province/Territory	*Exports*	*Imports*
Newfoundland	6.8	9.1
Prince Edward Island	17.1	5.1
Nova Scotia	5.5	10.5
New Brunswick	3.8	5.3
Quebec	5.2	7.1
Ontario	9.0	13.5
Manitoba	10.3	10.5
Saskatchewan	6.2	9.5
Alberta	5.1	13.1
British Columbia	4.8	10.9
Territories	-9.1	13.5

Source: Statistics Canada, Cat. 13-213-PPB, Provincial Economic Accounts, Annual Estimates, 1997

Overall, rail is the most important transportation mode in terms of modal contributions to the western provinces' PGDP, particularly in Manitoba and Saskatchewan, where trucking comes in second to rail. In fact, Manitoba's share of rail as a percentage of PGDP exceeds that of all other provinces. In Alberta and British Columbia, the reverse is true: trucking makes the dominant contribution to the commercial transportation component of PGDP, followed by rail. In the Territories, "other transportation" dominates, followed by trucking and air. Air transportation contributes a higher share to the PGDP of the Territories than is the case in any other province.

Table 7-3 illustrates annual growth in commercial transportation in 1997. In eastern Canada, commercial transportation growth exceeded PGDP growth in Nova Scotia and New Brunswick, and was less than PGDP growth in Newfoundland and Prince Edward Island. The fastest-growing modes were air in P.E.I. and New Brunswick, rail in Newfoundland[9], and marine in Nova Scotia. In all four provinces, growth rates for "other transportation" declined.

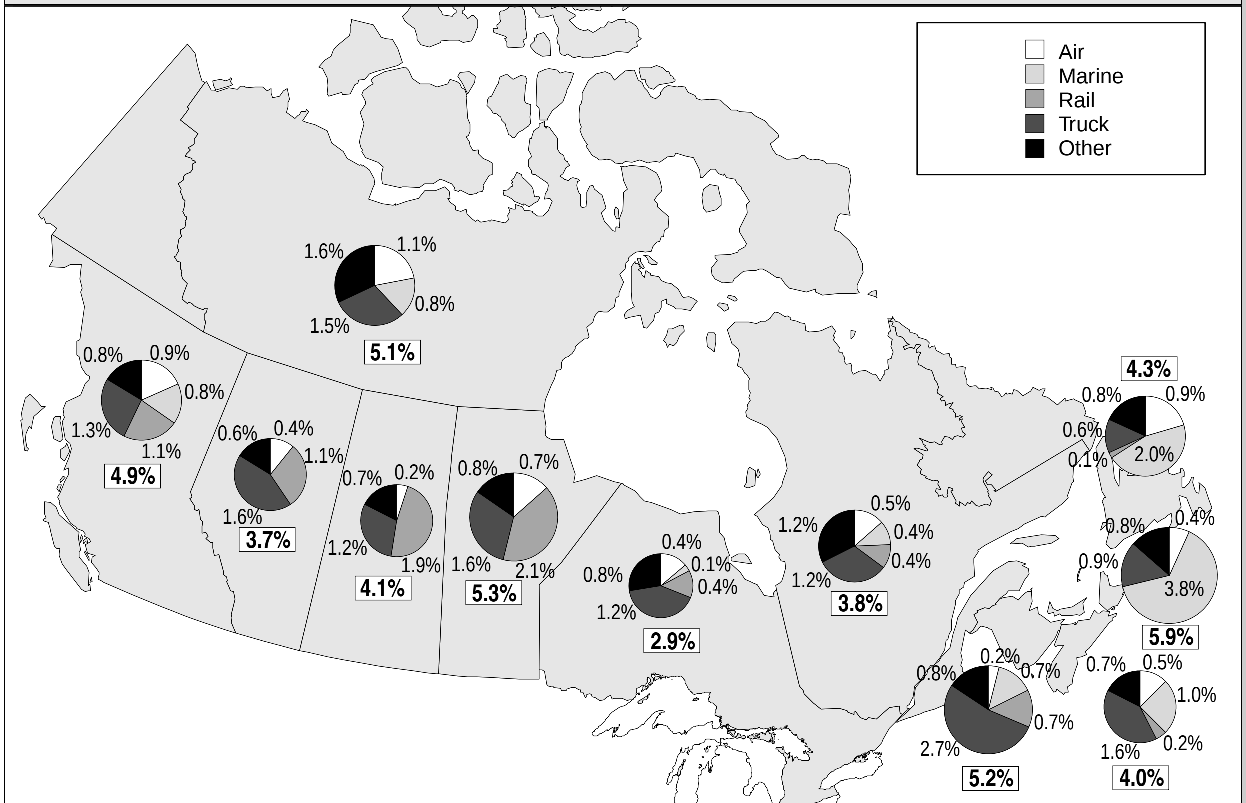
In Quebec and Ontario, commercial transportation growth exceeded PGDP growth. The highest growth rates were for trucking in Ontario, and marine in Quebec, with "other transportation" declining in both provinces.

7 "Other transport" refers to urban transit, charter and intercity bus, taxis, travel and tour operators, and miscellaneous transport.

8 The commercial-carrier share of Alberta's economy in particular, but also of Saskatchewan's, will considerably underestimate the importance of transport to these provinces, because the principal and most valuable primary commodities produced (oil, natural gas) are generally transported by pipeline. Pipelines are currently not considered transport by Transport Canada, but will come to be considered transport in 2000, with the advent of North American Industrial Classification System.

9 Newfoundland's share of rail, may be somewhat unrepresentative. The province's only railway is located in Labrador. It transports iron ore from Labrador to Quebec for processing on the North shore of the St. Lawrence River. Neither of the island provinces of Newfoundland and Prince Edward Island have railways.

FIGURE 7-3
VALUE-ADDED OF COMMERCIAL TRANSPORTATION AS A PERCENTAGE OF PROVINCIAL GROSS DOMESTIC PRODUCT, 1997



Note: Real GDP at Factor Cost.

Source: *Statistics Canada, Transport Canada Estimates*

TABLE 7-3
ANNUAL GROWTH OF COMMERCIAL TRANSPORTATION 1997

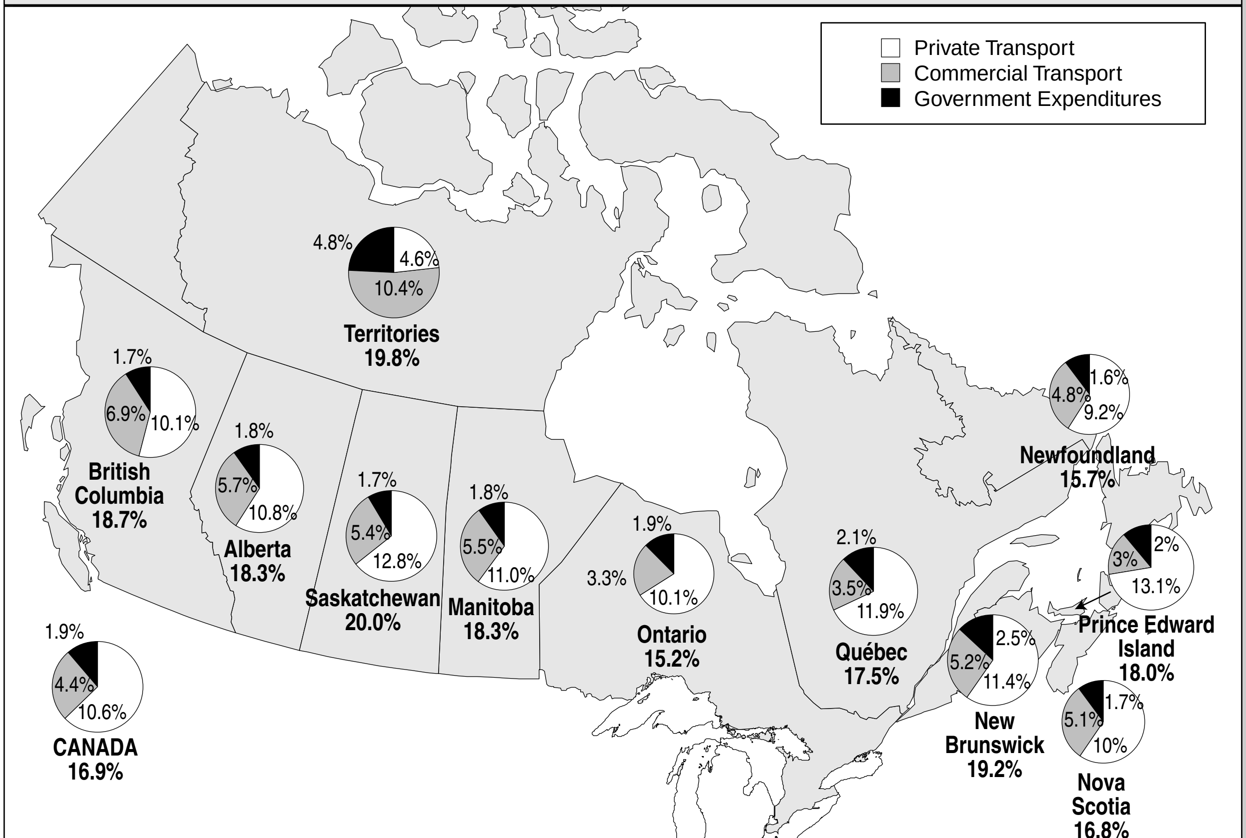
(Per cent)

Province/Territory	*Air*	*Marine*	*Rail*	*Truck*	*Other*	*Transport*	*GDP*
Newfoundland	5.4	0.6	40.0	-3.9	-6.8	0.0	1.8
Prince Edward Island	9.2	3.4	0.0	0.0	-4.7	1.4	1.9
Nova Scotia	4.9	13.6	5.9	7.9	-11.7	4.8	2.0
New Brunswick	16.0	-3.3	3.4	4.2	-10.5	0.8	0.7
Quebec	3.3	13.6	0.2	8.3	-4.4	3.0	2.4
Ontario	8.1	-5.4	7.7	12.5	-0.1	6.9	4.4
Manitoba	7.7	0.0	6.2	3.6	-5.9	3.5	4.5
Saskatchewan	8.5	0.0	12.1	6.7	3.4	8.7	6.0
Alberta	13.2	0.0	21.8	11.4	2.6	12.8	7.5
British Columbia	2.1	-1.8	7.6	4.7	-2.4	2.5	2.3
Northwest Territories	7.8	-13.8	0.0	9.1	-1.8	1.2	-0.7

Source: *Statistics Canada, Transport Canada Estimates;*
Statistics Canada, Cat. 13-213-PPB, Provincial Economic Accounts, Annual Estimates, 1997

Commercial transportation growth exceeded PGDP growth in British Columbia, Alberta, and Saskatchewan, but not in Manitoba and the Territories. Rail topped the growth figures in Saskatchewan, Alberta and British Columbia, while air dominated growth in Manitoba, and trucking led growth in the Territories. "Other transportation" declined as a contributor to PDGP in Manitoba, British Columbia and the Territories.

FIGURE 7-4
TOTAL TRANSPORT DEMAND AS A PERCENTAGE OF FINAL DOMESTIC DEMAND
1997



Source: Transport Canada

TOTAL TRANSPORTATION DEMAND

The first sections of this chapter used "value-added" as an indicator of the importance of transportation to the provinces' economies, a concept tied to a "supply" perspective. This section and the following one on investment use an indicator of the demand for "total transportation." This latter indicator defines transportation more broadly by including three factors: private spending on transportation [10] (such as consumer purchases of cars); government expenditures on transportation [11] (such as highway maintenance and construction); and sales of commercial carriers [12] (such as the purchases of any commercial transportation carrier's services).

"Total transportation demand" [13] refers to purchases of transportation by consumers, businesses, and governments located within a province. Total transportation demand can be compared with "provincial final domestic demand (PFDD)," defined as the total value of all goods and services sold in the provincial economies in one year.

The main difference between "commercial transportation value-added" and "commercial transportation demand" lies in the trade balance, where Canada runs a substantial trade deficit in air and

10 "Private transportation sales" refer to retail sales to consumers, businesses and government. They are calculated as the sum of retail sales by automobile dealers, gas stations, and automobile parts and repair shops.

11 Government expenditures are estimated net of direct fees for services. Direct fees are distinguished from indirect fees, such as fuel-excise taxes, which form part of general government revenues.

12 This definition of "commercial carriers" differs from that used in the section on value-added, principally because it excludes "other transport."

13 "Total transport demand" combines the intermediate- and final-demand goods and services, and should not be confused with the standard macro-economic concept of final demand. Because of this combination, this definition contains considerable double-counting, and will thus overestimate the importance of transport demand as a proportion of final domestic demand.

TABLE 7-4
ANNUAL GROWTH IN TOTAL TRANSPORTATION DEMAND
1997

(Per cent)

Province/ Territory	*Private Transportation*	*Commercial Transportation*	*Government Expenditures*	*Transportation Demand*	*Domestic Demand*
Newfoundland	9.4	11.7	10.9	10.3	3.7
Prince Edward Island	11.8	-6.3	21.5	9.9	(1.5)
Nova Scotia	8.2	15.4	4.7	9.9	6.1
New Brunswick	6.0	8.4	1.7	5.9	1.1
Quebec	12.1	8.5	0.1	9.7	3.1
Ontario	6.9	10.8	1.2	6.9	6.1
Manitoba	12.8	14.7	0.4	11.9	5.0
Saskatchewan	25.6	12.7	8.5	20.1	8.7
Alberta	20.5	15.6	19.3	18.8	11.1
British Columbia	4.2	6.8	(8.1)	3.9	4.7
Territories	31.2	14.7	10.6	10.9	4.5

Source: Statistics Canada, Transport Canada Estimates

marine transportation, and a smaller surplus in land transportation (such as trucking). This is because Canadians' demand for commercial transportation is somewhat higher than what is measured under the value-added concept, given that they consume more air and marine transportation supplied by carriers based outside Canada than from Canadian-based carriers.

Figure 7-4 shows the proportion of total transportation demand as a portion of provincial final domestic demand. (A table with a more detailed breakdown of total transportation demand can be found in Appendix 7-1a.) The most interesting observation is that private transportation makes up the largest segment of total transportation demand in all provinces, but not in the Territories. The second-largest component of transportation demand in all provinces (and the largest in the Territories) is commercial transportation. Government spending on transportation forms the smallest component of total transportation demand in all provinces and the Territories.

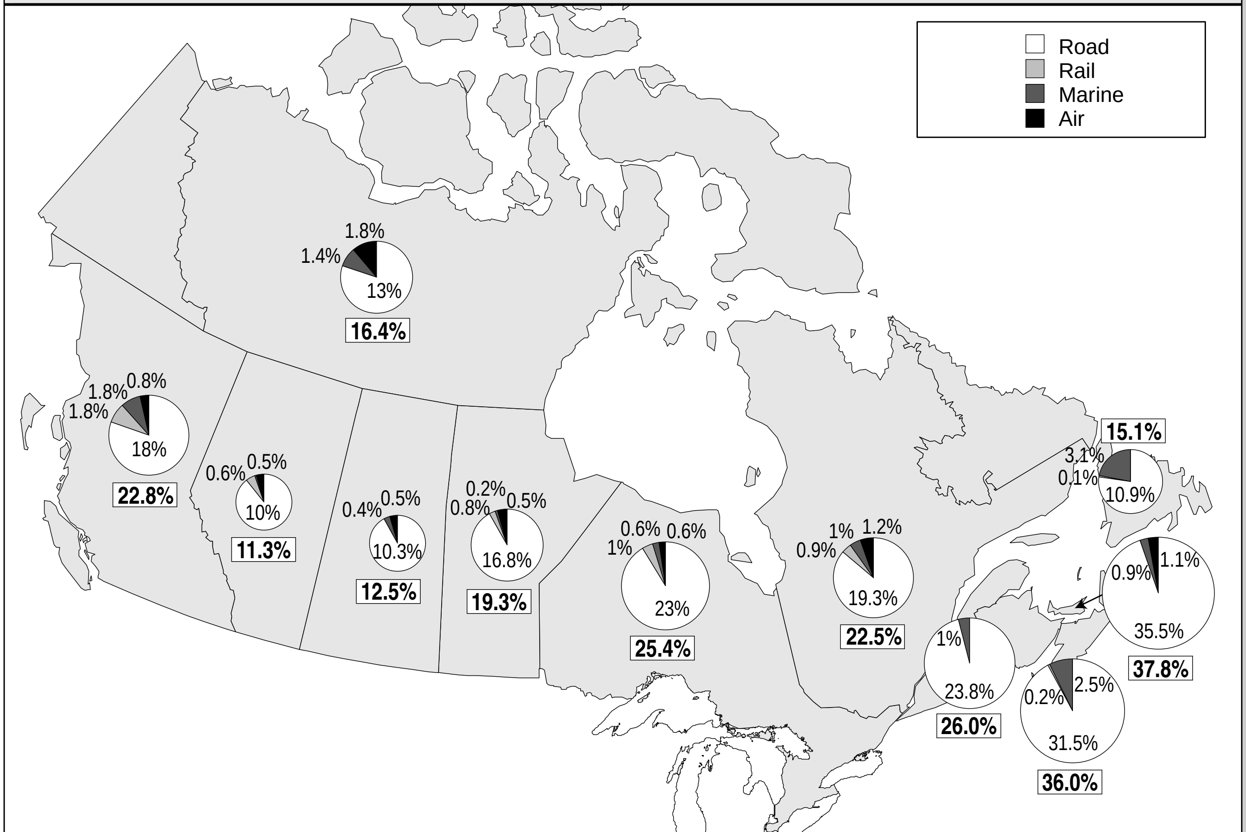
The distribution of total transportation demand distribution in eastern, central and western Canada again indicates higher total transportation demand in eastern and western Canada, except for Newfoundland and Nova Scotia. In these provinces, lower spending on private transportation leads to a proportionately lower share of total transportation within the PFDD. Among the provinces, total transportation demand contributed most to the PFDD in Saskatchewan, closely followed by the Territories. The province with the smallest share is Ontario.

Proportional to PFDD, private transportation spending is highest in Prince Edward Island, with Saskatchewan coming in second. The Territories have the lowest share of private transportation, but the highest share of commercial transportation. Commercial transportation provides the next-largest share in British Columbia. The Territories also have the largest share of government expenditures, followed by New Brunswick. Newfoundland has the lowest share of government expenditures on private transportation.

Table 7-4 illustrates that in 1997, total transportation demand outgrew domestic demand in all provinces and the Territories, with the exception of British Columbia, where domestic demand growth surpassed the one of transportation. The highest growth was in Saskatchewan and Alberta, the lowest in British Columbia. Private transportation demand exceeded growth in domestic demand in all provinces except British Columbia. Again, growth was fastest in Saskatchewan and Alberta, and slowest in British Columbia. Commercial transportation growth exceeded domestic demand everywhere but in P.E.I. (which saw a decline), with the highest rates in Alberta and Nova Scotia.

Government expenditures on transportation declined in B.C. and the Territories, and grew by less than domestic demand in Nova Scotia, Quebec, Ontario, Manitoba and Saskatchewan.

FIGURE 7-5
TRANSPORTATION INVESTMENT AS A PERCENTAGE OF TOTAL INVESTMENT
1996



Source: Statistics Canada, Cat. 61-233 "Capital Expenditures by Type of Asset"

Provincial Transportation Investment

"Transportation investment", as defined here, includes both "new transportation infrastructure construction" and "purchases of new transportation machinery and equipment by business and government." This definition excludes repair and maintenance expenditures, which belong under "expenditures on existing infrastructure, machinery and equipment." The analysis of transport investment given here uses the broader definition of total transportation demand (purchases of transportation by consumers, businesses, and governments located within a province).

Transportation infrastructure investment is broken down by modal activities – that is, into road, rail, marine and air. A more detailed breakdown is found in Appendix 7-2.

Figure 7-5 shows the relative share in 1996 of transportation investment as a portion of total investment (with residential construction extracted). The key observation is the predominance of road transportation investment in all provinces and the Territories.

The provinces with both the largest proportion of their total investment in "transportation" and on "road" are Prince Edward Island and Nova Scotia. Prince Edward Island's high transportation investment figures reflect construction of the Confederation Bridge linking Prince Edward Island to the mainland (construction having been completed in 1997). Alberta and Saskatchewan made proportionately the lowest investments in both transportation and road investment. These low levels are explained by the capital intensity of primary commodity production (oil, grain), with the economies of both Alberta and Saskatchewan heavily dependent on primary commodities. The relative importance of other transportation investment is primarily determined by geography, with Newfoundland

and Nova Scotia having the highest shares of marine, British Columbia the highest share of rail, and the Territories the highest share of air investment.

APPENDIX 7-1a
TOTAL TRANSPORT DEMAND, 1997
AS A PERCENTAGE OF FINAL DOMESTIC DEMAND

(Per cent)

Province/ Territory	*Private Transportation*				*Commercial Transportation*					*Government Expenditures*				*Total*	*Government Revenues*		
	VEHICLE DEALERS	GASOLINE STATIONS	PARTS AND REPAIRS	(1) TOTAL PRIVATE	AIR	MARINE	RAIL	TRUCK	(2) TOTAL COMMERCIAL	ROAD-RELATED	URBAN TRANSIT	OTHER TRANSPORTATION	(3) TOTAL SPENDING	TRANSPORTATION DEMAND (1+2+3)	FUEL TAXES	LICENCE FEES	(4) TOTAL REVENUES
Newfoundland	6.0	1.8	1.4	9.2	2.8	0.6	0.1	1.3	4.8	1.6	0.0	0.6	2.2	16.3	1.3	0.4	1.7
Prince Edward Island	7.1	4.4	1.7	13.1	1.1	0.1	0.0	1.7	3.0	2.4	0.0	0.5	2.9	19.0	1.8	0.3	2.1
Nova Scotia	6.6	1.9	1.5	10.0	1.3	1.3	0.7	1.9	5.1	1.3	0.2	0.3	1.8	16.9	1.2	0.2	1.4
New Brunswick	8.0	1.7	1.7	11.4	0.9	0.9	0.7	2.8	5.2	2.4	0.0	0.6	3.1	19.7	1.3	0.4	1.7
Quebec	8.0	1.9	2.0	11.9	1.1	0.5	0.4	1.5	3.5	1.4	0.4	0.4	2.2	17.6	1.5	0.7	2.2
Ontario	6.6	1.9	1.6	10.1	1.3	0.1	0.4	1.4	3.3	1.3	0.4	0.3	2.0	15.4	1.2	0.2	1.4
Manitoba	7.3	2.2	1.5	11.0	2.0	0.0	1.1	2.4	5.5	1.4	0.2	0.4	2.0	18.5	1.1	0.2	1.3
Saskatchewan	7.5	2.1	3.3	12.8	0.8	0.0	2.6	2.0	5.4	1.5	0.1	0.4	2.0	20.2	1.9	0.3	2.2
Alberta	7.2	2.0	1.6	10.8	1.9	0.0	1.2	2.6	5.7	1.5	0.2	0.4	2.1	18.6	0.9	0.2	1.1
British Columbia	6.5	2.1	1.5	10.1	1.8	1.3	2.1	1.7	6.9	1.1	0.3	0.3	1.7	18.7	0.8	0.3	1.2
Territories	3.1	0.9	0.7	4.6	8.2	0.1	0.1	1.9	10.4	2.3	0.0	2.1	4.4	19.4	0.7	0.1	0.8

Source: Statistics Canada, Transport Canada Estimates

APPENDIX 7-1b
ANNUAL GROWTH
TOTAL TRANSPORT DEMAND, 1997

(Per cent)

Province/ Territory	*Private Transportation*				*Commercial Transportation*					*Government Expenditures*				*Total*	*Government Revenues*		
	VEHICLE DEALERS	GASOLINE STATIONS	PARTS AND REPAIRS	(1) TOTAL PRIVATE	AIR	MARINE	RAIL	TRUCK	(2) TOTAL COMMERCIAL	ROAD-RELATED	URBAN TRANSIT	OTHER TRANSPORTATION	(3) TOTAL SPENDING	TRANSPORTATION DEMAND (1+2+3)	FUEL TAXES	LICENCE FEES	(4) TOTAL REVENUES
Newfoundland	22.9	-19.9	9.4	9.4	12.1	14.9	5.0	10.2	11.7	19.8	-2.2	-8.4	10.9	10.3	8.4	3.9	7.3
Prince Edward Island	21.1	3.7	0.0	11.8	16.0	-18.4	0.0	-14.0	-6.3	22.2	0.0	18.4	21.5	9.9	47.1	10.9	40.5
Nova Scotia	13.6	-17.6	31.6	8.2	11.5	20.3	10.8	16.8	15.4	5.8	2.4	1.8	4.7	9.9	1.3	-8.0	-0.1
New Brunswick	12.5	-5.9	-7.6	6.0	23.3	-8.6	-12.4	17.3	8.4	1.7	14.2	1.0	1.7	5.9	-0.7	-0.2	-0.6
Quebec	16.4	-4.3	13.7	12.1	9.8	-4.4	5.7	13.8	8.5	0.0	-1.5	2.4	0.1	9.7	5.5	22.0	10.1
Ontario	8.4	-0.4	10.0	6.9	14.9	4.6	12.4	7.2	10.8	0.7	6.8	-3.2	1.2	6.9	3.2	0.3	2.7
Manitoba	20.5	-1.4	2.3	12.8	14.5	30.2	14.3	15.0	14.7	2.7	-2.2	-6.5	0.4	11.9	6.2	-6.0	4.0
Saskatchewan	14.7	-7.0	123.8	25.6	15.3	0.0	20.5	2.8	12.7	7.1	-2.2	16.7	8.5	20.1	2.2	4.0	2.5
Alberta	21.5	17.2	20.3	20.5	20.3	0.0	5.7	17.2	15.6	21.8	3.8	19.9	19.3	18.8	1.6	6.7	2.6
British Columbia	-0.1	13.2	12.5	4.2	8.6	-3.9	9.2	11.4	6.8	-9.5	0.6	-8.4	-8.1	3.9	-5.2	0.8	-3.6
Territories	33.0	20.7	37.3	31.2	14.6	402.5	19.0	9.1	14.7	-11.5	-2.2	-9.6	-10.6	10.9	4.0	16.4	6.0

Source: Statistics Canada, Transport Canada Estimates

APPENDIX 7-2
INVESTMENT IN TRANSPORTATION AS A PERCENTAGE OF TOTAL INVESTMENT, 1996

(Per cent)

Province/Territory	Total Transportation			Road			Rail			Marine			Air		
	TOTAL	STRUCTURE	MACHINERY	TOTAL	STRUCTURE	MACHINERY	TOTAL	STRUCTURE	MACHINERY	TOTAL	STRUCTURE	MACHINERY	TOTAL	STRUCTURE	MACHINERY
Newfoundland	15.1	6.6	8.5	10.9	5.4	5.5	0.1	0.1	0.0	3.1	1.0	2.0	0.0	0.0	0.0
Prince Edward Island	37.8	33.0	4.7	35.5	32.4	3.1	0.0	0.0	0.0	0.9	0.7	0.2	1.1	0.0	1.1
Nova Scotia	36.0	7.1	28.9	31.5	5.8	25.8	0.2	0.2	0.0	2.	1.1	1.4	0.0	0.0	0.0
New Brunswick	26.0	18.3	7.6	23.8	17.2	6.6	0.0	0.0	0.0	1.0	0.8	0.2	0.0	0.0	0.0
Quebec	22.5	7.3	15.2	19.3	6.4	13.0	0.9	0.3	0.5	1.	0.5	0.5	1.2	0.1	1.1
Ontario	25.4	5.9	19.5	23.0	4.8	18.2	1.0	0.5	0.5	0.6	0.4	0.2	0.6	0.0	0.6
Manitoba	19.3	5.9	13.4	16.8	5.1	11.7	0.5	0.5	0.0	0.2	0.2	0.1	0.8	0.1	0.8
Saskatchewan	12.5	3.2	9.3	10.3	2.1%	8.2	0.0	0.0	0.0	0.4	0.4	0.0	0.5	0.1	0.4
Alberta	11.3	2.4	8.9	10.0	2.0	8.0	0.6	0.3	0.3	0.1	0.0	0.0	0.5	0.0	0.5
British Columbia	22.8	9.0	13.8	18.0	6.8	11.3	1.8	1.1	0.8	1.8	0.9	0.9	0.8	0.0	0.8
Territories	16.4	12.3	4.1	12.9	10.2	2.7	0.0	0.0	0.0	1.4	1.0	0.4	1.8	1.0	0.9

Source: Statistics Canada, Cat. 61-223, "Capital Expenditures by Type of Asset, 1996"

8

TRANSPORTATION AND EMPLOYMENT

Transportation contributed directly to more than 730,000 jobs in 1998, or 6.4 per cent of total employment in Canada.

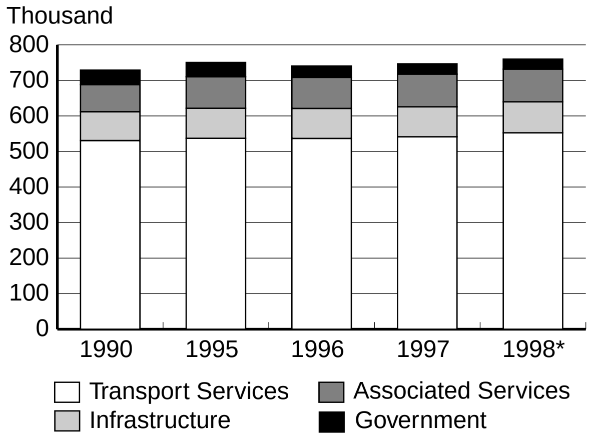
Transportation is an important contributor to employment in Canada. Transport Canada estimates indicate that, this sector continues to directly account for 6.4 per cent of total employment in this country.

This chapter looks at three specific areas: first, the number of people whose jobs are directly tied to the transportation sector; second, the average annual salary earned by transportation employees; and third, a brief look at labour relations in the transportation sector.

The overall picture presented here is incomplete in some areas, primarily due to a lack of data for such information as the numbers of municipal employees working in transportation-related jobs, federal and provincial employees in traffic enforcement, federal employees in customs, and so on. This lack of data makes it difficult to compare across modes on an area-by-area basis. Timeliness of data is another serious shortcoming, as it affects the ability to include current data and related modal comparisons. In addition, for the purposes of this report, "soft[1]" figures were not used. In many cases, the missing information is a result of data-reporting procedures that are in flux due to changes in jurisdiction. For example, statistics formerly gathered and reported by a federal organization have recently been devolved to a different level of government or the private sector. As new reporting procedures develop, and as additional and new sources are explored, it is hoped that many of the "missing pieces" can be filled in, leading to more comprehensive analyses in future editions of Transport Canada's annual report.

1 Estimated, derived or unverifiable data

FIGURE 8-1
TRANSPORTATION EMPLOYMENT
1998



* Estimated

Source: Transport Canada

This chapter only includes jobs directly associated with transportation. It does not cover employment in areas such as manufacturing (of vehicles, signs and other transport-related products), the service sector (motels, restaurants and other services) or other areas that exist only or partially because the transportation sector needs them.

WORKFORCE

OVERVIEW

In 1998, an estimated 730,000 people worked full-time in the transportation sector, accounting for 6.4 per cent of the share of total employment. It must be emphasized that due to the lack of current data for most areas covered in this chapter, the 1998 figure is a broad estimate developed by Transport Canada.

In 1997, the sector's share of total employment was also 6.4 per cent; in 1996 it was 6.5 per cent; and in 1995 it was 6.7 per cent. Five years earlier, in 1990, the share was an estimated 6.2 per cent.

Jobs directly associated with transportation can be broken down into the following employment categories:

- transport services
- transportation infrastructure
- government services tied to transportation, and
- "other" associated services.

Within the sector as a whole, transport services account for the greatest proportion of jobs. In 1998, an estimated 524,000 employees (71.6 per cent) worked directly in the delivery of transport services such as air, marine, rail, truck and bus carriers' operations. Associated services, such as marine pilotage, travel agencies and tour operators, accounted for 92,000 jobs (12.6 per cent), while jobs related to development and maintenance of infrastructure made up 87,000 positions (11.9 per cent). Transport-related jobs in the federal, provincial and local governments accounted for the remaining positions (3.9 per cent).

Figure 8-1 shows estimated full-time employment levels, by each of the four categories of interest, from 1990 to 1998.

Table 8-1 shows the number of people employed full-time in various modes in transportation-related positions in four categories: transport services, transport infrastructure, government services and associated services.

The trucking industry alone is an important employer in the transportation sector, accounting for an estimated 41.1 per cent of full-time jobs in 1998. Air is the second-largest employer, with an estimated 15.1 per cent of all jobs. It must be emphasized that the figures in Table 8-1 are related only to direct full-time employment. Jobs that partially serve the needs of these modes, such as employment at hotels, motels and restaurants, among others, have not been included.

This report also excludes a regional employment summary, due to numerous data gaps. Wherever possible, however, regional breakdowns are provided in individual chapter sections. Transport Canada intends that additional information concerning regional employment will become available over the next year, allowing for a more comprehensive regional breakdown in the 1999 annual report.

TRANSPORT SERVICES

Rail

Rail transport services discussed here include personnel such as engineers and conductors, who provide rail transportation services directly, and workers who carry out equipment maintenance. The discussion also includes estimates of carrier managerial and administrative staff allocated to transportation services. The most recent year for which this level of information is available is 1997.

An estimated 32,956 personnel provided transportation, equipment maintenance and related administrative rail services in 1997, accounting for 71.0 per cent of all employment in the rail industry. Of this total, 17,660 personnel (54 per cent) were directly involved in transportation, while 10,464 workers (32 per cent) were involved in equipment maintenance.

Since 1990, employment in rail transport services has fallen by 33 per cent. Those involved with equipment maintenance were the most affected, with a 43 per cent decrease in employment between 1990 and 1997.

Carriers may contract out some work related to equipment maintenance, although the number of employees associated with contract work is not known at this time. Continued research over the next year may allow for a better estimate of this component.

Table 8-2 shows employment distribution in rail transport services.

The share of employment associated with rail transportation services, when compared with total rail employment, including incidental services, has been

TABLE 8-1
TRANSPORTATION EMPLOYMENT BY CATEGORY

(In thousands of workers)

	1990	*1995*	*1996*	*1997*	*1998(e)*
Transport Services					
Air[1]	68.0	61.0	61.0	70.0	77.0
Marine[2]	30.0	28.0	23.0	20.7	19.0
Rail[3]	49.2	36.8	34.1	33.0	32.0
Truck[4]	253.9	286.3	294.1	296.6	300.9
Bus/Urban Transit[5]	69.2	60.9	59.1	57.8	57.8
Local Services[6]	31.2	34.7	35.5	36.4	37.3
Total (e)	**501.5**	**507.7**	**506.8**	**514.5**	**524.0**
Transport Infrastructure					
Air[7]	n/a	n/a	n/a	n/a	2.7
Marine[8]	1.2	1.6	1.7	1.6	1.5
Rail[9]	19.9	14.9	13.9	13.9	13.9
Highway[10]	60.0	68.0	68.8	68.8	68.8
Total (e)	**81.1**	**84.5**	**84.4**	**84.3**	**86.9**
Government Services[11]	**40.7**	**40.0**	**32.1**	**29.1**	**28.4**
Associated Services:					
Air[12]	21.0	30.0	29.5	30.5	30.5
Marine[13]	8.5	8.5	8.2	8.5	8.5
"Other" Services[14]	47.4	50.7	50.1	53.3	53.2
Total (e)	**76.9**	**89.2**	**87.8**	**92.3**	**92.2**
GRAND TOTAL (e)[15]	**700.2**	**721.4**	**711.1**	**720.2**	**731.5**

Note: Due to confidential data which has only been included in the grand total, the individual sections do not necessarily add up to the sum given for the grand total.

n/a: not available; **e:** estimate by Transport Canada

Sources:
1 1998 based on first nine months' data; Statistics Canada Survey of Employment, Payroll and Hours (SEPH)
2 1990–Statistics Canada SEPH; 1995 to 1998 Transport Canada estimates
3 Transport Canada estimates
4 Statistics Canada, Cat. 53-222-XPB, Census; Statistics Canada Survey of Employment, Payroll and Hours (SEPH); Transport Canada
5 1990–1996 Statistics Canada Cat. 53-215, 1997–1998 Transport Canada estimate. May include part-time employees in school bus operations as well as charter bus operations
6 1991 & 1996 Census data; 1990, 1995, 1997, 1998 Transport Canada estimates
7 Canadian Airport Authorities
8 St. Lawrence Seaway Authority, Statistics Canada Cat. 54-205, Proposed Canadian Port Authorities. 1990 does not include Seaway data. Ports: 1990–1997 CPC ports data; 1998 data reflects proposed Canadian Port Authorities
9 Transport Canada estimates based on Statistics Canada Cat. 52-216
10 Transport Canada based on 1986, 1991 and 1996 Census data
11 1990, 1997 and 1998 include estimates of 20,000 for provincial and territorial employment. Source: Government Estimates
12 Statistics Canada, Annual Survey of Travel Agents and Tour Guides
13 Pilotage Authorities, Statistics Canada Census
14 Insurance Bureau of Canada, Statistics Canada Census
15 Excludes part-time employees. Unfortunately, part-time data was available only in 1991 for Urban Transit (1,223 employees); in 1995 for Urban Transit and Small For-Hire carriers (13,849 employees); and in 1996 for Urban Transit, Small For-Hire carriers and Owner-Operators carriers (30,632 employees).

TABLE 8-2
EMPLOYMENT
BY RAIL TRANSPORT SERVICES

	Total Rail[1]	*Transport Services*	*Per Cent of Total*[2]	*Class I*	*Class II & III*
1990					
General[3]		7,100		6,510	590
Transportation		23,598		20,819	2,779
Equip. Maintenance		18,477		16,618	1,859
Total	**69,119**	**49,175**	**71.1**	**43,947**	**5,228**
1995					
General[3]		5,706		5,274	432
Transportation		19,719		17,676	2,043
Equip. Maintenance		11,405		10,243	1,162
Total	**51,754**	**36,830**	**71.2**	**33,193**	**3,637**
1996					
General[3]		5,039		4,627	412
Transportation		18,206		16,225	1,981
Equip. Maintenance		10,886		9,757	1,129
Total	**48,038**	**34,131**	**71.1**	**30,609**	**3,522**
1997					
General[3]		4,852		4,475	357
Transportation		17,660		15,684	1,976
Equip. Maintenance		10,464		9,352	1,112
Total	**46,402**	**32,976**	**71.0**	**29,511**	**3,445**

Note: 1 "Total Rail" employment limited to carrier personnel (does not include incidental rail services).
2 Total transport services as a percentage of total rail employment
3 Estimated number of managerial and administrative personnel allocated to transportation

Source: Statistics Canada Cat. 52-216; Transport Canada

TABLE 8-3
TOTAL EMPLOYMENT
BY RAIL TRANSPORTATION SERVICES

	Transport Services[1]	*Per Cent of Total*	*Rail Carrier*[1]	*Per Cent of Total*	*Total*[2]
1990	49.2	71.3	69.1	100	69.0
1995	36.8	69.4	51.8	97.7	53.0
1996	34.1	66.9	48.0	94.1	51.0
1997	32.7	67.3	46.4	94.7	49.0
1998	32.0 est.	66.7	42.0 est.	n/a	48.0*

* Preliminary data based on first three quarters of 1998; Statistics Canada SEPH

Est. : Transport Canada n/a: not available
Source: 1 – Statistics Canada, Cat. 52-216
2 – Statistics Canada, Statistics Canada Survey of Employment, Payrolls and Hours

steadily decreasing since 1990. A similar pattern is evident in total carrier employment, which suggests that employment related to incidental services[2] has increased slightly over the last decade.

Table 8-3 shows the total estimated full-time employment figures by rail transportation services.

Trucking

For-Hire Trucking Firms

For-hire trucking firms[3] employed an estimated 31 per cent of all personnel engaged in trucking activity in Canada in 1997. In addition to their company employees, for-hire trucking firms also contracted 26,588 owner-operators over the course of the year.[4]

The average number of company drivers decreased slightly in 1997, but continued to account for 55.9 per cent of total company employees. Since 1991, the ratio of company drivers to total employees has remained relatively stable at between 55 and 60 per cent.

The average number of company drivers increased by almost 23 per cent from 1991 to 1997, despite a 1.1 per cent decrease in drivers in 1997 over 1996 levels. The numbers of other company employees increased by 30.8 per cent over the same period.

For-hire trucking firms are continuing to rely increasingly on the services of owner-operators. Between 1991 and 1997, the number of owner-operators used by for-hire trucking firms increased by 42 per cent.

2 Incidental services: jobs which are associated with the rail industry, but are not defined in Statistics Canada, Cat. 72-002.

3 Includes Canadian domiciled for-hire carriers with annual revenues of $1 million or more.

4 These owner-operators may also have been providing services to small for-hire and private carriers. An owner-operator may repesent more than one employee.

Table 8-4 gives employment figures showing employment by for-hire trucking firms.

TABLE 8-4
EMPLOYMENT
BY FOR-HIRE TRUCKING FIRMS[1]

	Company Drivers	*Other Employees[2]*	*Total Company Employees*
1991	41,725	30,892	72,617
1995	50,323	39,963	90,286
1996[3]	51,833	37,182	89,015
1997[3]	51,256	40,397	91,653

1 Includes Canadian-domiciled for-hire carriers with annual revenues of $1 million or more
2 Other Employees: maintenance and garage, terminal and other employees
3 1996/1997: annual figures are an average of quarterly data for each year.

Source: Statistics Canada Cat. 53-222-XPB

In 1997, the highest level of employment by for-hire carriers was in Ontario, accounting for 41.4 per cent of total company employees in this category. Over 24 per cent were employed on the Prairies, and 19 per cent in Quebec. Carriers in Ontario also accounted for 41 per cent of company drivers, and 43 per cent of all "other" company employees, such as those working in garages or terminals, or as maintenance workers.

Ontario-based carriers were also the largest users of owner-operators, accounting for 39 per cent of the total owner-operators employed by for-hire carriers in Canada. Medium and large carriers based in the Prairie Provinces accounted for 27.1 per cent of owner-operators used, while an additional 15 per cent were from Quebec-based carriers.

Table 8-5 gives the regional distribution of employment by for-hire trucking firms.

Small For-Hire Carriers

In 1996, an estimated 8,140 small for-hire carriers[5] reported 35,754 full- and part-time employees across Canada. In addition, these companies used the services of 3,490 owner-operators[6] on a full- and part-time basis. The largest number of company employees, 35 per cent, worked for carriers based in Quebec. Contracts to owner-operators were most predominant in Ontario, followed closely by companies located in the Prairie Provinces.

Small for-hire firms employed 24,344 full- and part-time drivers throughout Canada in 1996, accounting for 68 per cent of company employees. The largest concentration of company drivers was in Quebec (37 per cent) and Ontario (23 per cent).

Total employment by small for-hire firms increased by more than 10 per cent in 1996, despite only a two per cent increase in the estimated number of companies. The use of full-time owner-operator services also increased significantly (more than 69 per cent), from 1,594 in 1995 to 2,695 in 1996. Employment of part-time owner-operator services decreased from 2,586 in 1995 to 795 in 1996.

The number of company drivers (full- and part-time) increased by 3.6 per cent in 1996. The use of full-time drivers jumped from 17,403 in 1995 to 19,197 in 1996, while the number of part-time drivers decreased by 16 per cent.

TABLE 8-5
EMPLOYMENT BY MEDIUM AND LARGE FOR-HIRE TRUCKING FIRMS BY REGION
1997

	Canada	*Atlantic Region*	*Quebec*	*Ontario*	*Prairie Provinces*	*British Columbia*	*Territories*
Company Drivers	51,256	3,100	10,519	20,779	12,520	4,238	100
Other Company Employees	40,397	3,467	6,858	17,209	9,728	3,006	129
Total Company Employees	**91,653**	**6,567**	**17,377**	**37,988**	**22,248**	**7,244**	**229**

Notes:
* Includes Canadian domiciled for-hire trucking firms with annual revenues of $1 million or more
Other Employees: maintenance and garage, terminal and other employees
1997: Annual figures are an average of quarterly data for the year.

Source: Statistics Canada Cat. 53-222-XPB

5 Canadian-based for-hire carriers with operating revenues greater than or equal to $30,000 and less than or equal to $999,999.

6 Owner-operators may be employed by more than one category of carriers over the course of the year.

TABLE 8-6
EMPLOYMENT BY SMALL FOR-HIRE TRUCKING FIRMS
1995 AND 1996

	Canada	Atlantic Region	Quebec	Ontario	Prairie Provinces	British Columbia	Territories
1995							
Company							
Full-Time	22,588	1,944	6,115	6,086	4,528	3,879	36
Part-Time	9,800	649	3,369	2,889	1,796	1,089	7
1996							
Company							
Full-Time	26,353	1,667	9,586	6,044	5,293	3,733	30
Part-Time	9,401	779	2,917	2,607	1,636	1,446	16

Source: Statistics Canada, Cat. 50-002-XPB

TABLE 8-7
EMPLOYMENT BY PRIVATE CARRIERS
1995 – 1997

	Canada	Atlantic Region	Quebec	Ontario	Prairie Provinces	British Columbia
1995						
Highway Drivers	6,136	144	1,282	3,511	781	418
Local Drivers	8,738	334	2,592	3,635	1,233	944
Other Employees	5,368	169	1,158	2,845	498	698
Total	**20,242**	**647**	**5,032**	**9,991**	**2,512**	**2,060**
1996						
Highway Drivers	5,600	189	1,032	3,362	682	335
Local Drivers	8,087	358	2,468	3,155	1,087	1,019
Other Employees	6,306	247	1,289	3,152	707	911
Total	**19,993**	**794**	**4,789**	**9,669**	**2,476**	**2,265**
1997						
Highway Drivers	4,379	133	1,007	2,364	533	342
Local Drivers	8,001	433	2,297	2,897	1,257	1,117
Other Employees	5,212	154	1,596	2,326	469	667
Total	**17,592**	**720**	**4,900**	**7,587**	**2,259**	**2,126**

Source: Statistics Canada Cat. 53-222-XPB

TABLE 8-8
NUMBER OF FULL-TIME EMPLOYEES: OWNER OPERATORS
1995 and 1996

	Canada	Atlantic Region	Quebec	Ontario	Prairie Provinces	British Columbia	Territories
1995	57,335	5,010	10,050	17,420	15,848	8,896	110
1996	61,377	4,684	10,266	17,492	16,256	12,592	86

Source: Statistics Canada Cat. 53-222-XPB

TABLE 8-9
TOTAL EMPLOYMENT IN THE TRUCKING INDUSTRY

	Medium and Large For-Hire	Small For-hire	Private	Owner-Operator	Sub-Total	Delivery Drivers	Total
1991	72,617	27,355	27,184	52,000	179,156	90,310	269,466
1995	90,286	32,388	20,242	57,335	200,251	95,940	296,191
1996	89,015	35,754	19,993	61,377	206,139	97,400	303,539
1997	91,654	n/a	17,592	n/a	206,377	98,900	305,277

Medium and large For-Hire Carriers: Includes Canadian-domiciled for-hire carriers with annual revenues of $1 million or more
Small For-Hire Carriers: Includes Canadian-domiciled for-hire carriers with operating revenues of greater than $25K and less than $1 million. Estimated for 1991.
Private Carriers: Includes private carriers with operating expenses of $1 million or more. Estimated for 1991.
Owner-Operators: Estimated for 1991.
Sub-Total: 1997 includes TC estimate of 35,754 for private carriers and 80,240 owner-operators
Delivery Drivers: Based on 1991 and 1996 Census data; estimated values for 1995 and 1997
Note: According to 1996 Census data, there were 227,310 truck drivers in Canada
1991 Est.: by Transport Canada

Source: Statistics Canada Cat. 53-222-XPB, SEPH and Transport Canada

Table 8-6 shows the number of full-time and part-time workers employed by small for-hire trucking firms.

Private Carriers

There were an estimated 422 private carriers[7] in Canada in 1997, employing 17,592 people. Total employment by private carriers has decreased by 15 per cent since 1995 even though the number of carriers has remained relatively stable.

The number of highway drivers, in particular, has decreased significantly, from well over 6,000 in 1995 to 4,379 in 1997 (a 29 per cent decrease). Most of this decline was recorded in Ontario, where the numbers of highway drivers dropped by 30 per cent.

Table 8-7 shows the distribution of employment categories among private carriers.

Owner-Operators

In 1996, some 40,090 owner-operators reported 61,377 full-time and 18,863 part-time employees across Canada. Most were employed in Ontario (28.5 per cent), with the Prairies coming a close second (26.5 per cent). Of these employees, 53,785 were drivers, accounting for 88 per cent of total full-time employees. There were also 9,511 part-time drivers, accounting for 50 per cent of the total part-time employees.

Owner-operators across Canada reported a seven per cent increase in the number of full-time employees in 1996. Most of this increase occurred in British Columbia, where the number of employees increased by over 40 per cent.

Table 8-8 sets out the number of full-time owner-operators in 1995 and 1996.

Total Trucking Employment

Available information for large and small for-hire carriers, private operators, owner-operators and delivery drivers suggests that the number of individuals employed full and part time in the trucking sector in 1997 was well over 300,000.

7 Data limited to Canadian domiciled private carriers with operating expenses of $1,000,000 or more. A private carrier is a company whose principal occupation is not trucking, but maintains its own fleet of vehicles (owned or leased) for transporting its own freight. Response rate for this survey is very low, which may effect data quality.

TABLE 8-10
EMPLOYMENT BY SCHEDULED INTERCITY BUS OPERATORS

	1990	*1995*	*1996*
Drivers	2,457	1,643	1,419
Mechanics	591	242	149
Other	2,062	1,660	1,571
Total	**5,110**	**3,545**	**3,139**

1990: includes companies with operating revenues of $500,000 or more
1995/1996: includes companies with operating revenues of $2 million or more

Source: Statistics Canada, Cat. 53-215

TABLE 8-11
EMPLOYMENT BY SCHOOL BUS OPERATORS

	1990	*1995*	*1996*
Drivers	20,544	15,007	13,638
Mechanics	1,198	820	780
Other	1,553	1,663	1,398
Total	**23,295**	**17,490**	**15,816**

1990: includes companies with operating revenues of $500,000 or more
1995/1996: includes companies with operating revenues of $2 million or more

Source: Statistics Canada, Cat. 53-215

TABLE 8-12
REGIONAL DISTRIBUTION OF EMPLOYMENT BY SCHOOL BUS OPERATORS

	Canada	*Atlantic and Quebec*	*Ontario*	*Western Canada and Territories*
1990	23,295	5,637	15,814	1,844
1995	17,490	3,012	12,308	2,170
1996	15,816	2,666	10,888	2.262

1990: includes companies with operating revenues of $500,000 or more
1995/1996: includes companies with operating revenues of $2 million or more

Source: Statistics Canada, Cat. 53-215

Table 8-9 shows the distribution of employment among different categories in the trucking industry.

A number of considerations should be taken into account when reviewing these estimates. First, the data for delivery drivers does not include other personnel employed by the company, which introduces underestimation into the overall numbers shown above. Second, census data for 1996 reported 227,310 truck drivers in Canada. Considering that drivers account for between 55 and 60 per cent of company personnel, the above figures for total trucking employment would appear to be an underestimation.

Bus

Scheduled Intercity Services

In 1996, 14 large, scheduled intercity bus[8] operators reported that they employed a total of 3,139 people. Forty-five per cent of these employees were drivers, and 5 per cent were mechanics. Administrative staff and terminal and sales personnel made up the remainder. Although 26 small, scheduled intercity operators[9] also filed reports in 1996, employment data are not available for these carriers.

Comparisons over time are difficult in the intercity bus industry, due to changes in coverage by the intercity bus survey. Regional breakouts for employment by the intercity industry are not available.

Table 8-10 shows employment numbers and categories for scheduled intercity bus operators.

School Bus Industry

An estimated 676 large school bus companies operated in Canada in 1996. These companies reported that they employed 15,816 people for the year. Of these, over 86 per cent were drivers, with mechanics accounting for five per cent and other staff accounting for nine per cent. A breakout between full- and part-time employees was not possible.

Comparisons over time of employment in this industry are difficult, due to changes in survey coverage.

Table 8-11 shows employment by school bus operators.

Ontario accounted for almost 69 per cent of all employees

8 In 1996, large scheduled intercity bus operations included carriers with annual revenues greater than $2,000,000. Prior to 1995, the survey included carriers with annual revenues greater than $5,000,000.

9 Include those carriers with annual revenues greater than $200,000 but less than $2,000,000.

reported by school bus companies across Canada in 1996. Companies in that province also accounted for 69 per cent of all school bus drivers.

Table 8-12 shows the regional distribution of employment by school bus operators.

Charter and Other Passenger Bus Industry

An estimated 98 charter and other passenger bus companies reported a total workforce of 3,390 employees in Canada in 1996. Over 52 per cent of these were situated in Ontario. A breakout between full and part-time employees is not possible.

Comparisons over time of employment in this industry are difficult, due to changes in survey coverage.

Table 8-13 shows employment by charter and other passenger bus companies.

Of the 52 per cent of employees located in Ontario in 1996, 72 per cent were drivers, five per cent were mechanics and 33 per cent were administrative and management personnel.

Table 8-14 shows employment by charter and other passenger bus companies, by region.

Local Services

Urban Transit

In 1996, 77 urban transit companies reported a combined workforce totalling 38,425 people. Sixty-one per cent of this total workforce were directly involved in the transportation operations of the companies (for example, as drivers). Only four per cent were part-time employees.

Table 8-15 shows employment by urban transit companies.

TABLE 8-13
CATEGORY OF EMPLOYMENT FOR CHARTER AND OTHER PASSENGER BUS COMPANIES, 1990 – 1996

	1990	*1995*	*1996*
Drivers	2,218	1,720	2,431
Mechanics	215	214	219
Other	390	508	740
Total	**2,823**	**2,442**	**3,390**

1990: includes companies with operating revenues of $500,000 or more
1995/1996: includes companies with operating revenues of $2 million or more

Source: Statistics Canada, Cat. 53-215

TABLE 8-14
CHARTER AND OTHER PASSENGER BUS COMPANIES EMPLOYMENT BY REGION, 1990 – 1996

	Canada	*Atlantic and Quebec*	*Ontario*	*Western Canada and Territories*
1990	2,823	658	1,422	743
1995	2,442	455	1,560	427
1996	3,390	655	1,758	977

1990: includes companies with operating revenues of $500,000 or more
1995/1996: includes companies with operating revenues of $2 million or more

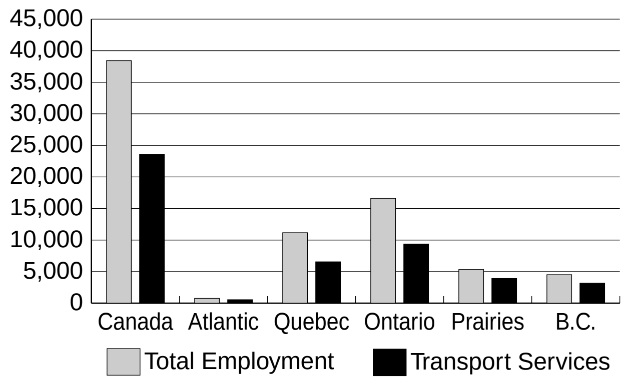
Source: Statistics Canada, Cat. 53-215

TABLE 8-15
EMPLOYMENT BY URBAN TRANSIT COMPANIES 1990 – 1996

	1990	*1995*	*1996*
Transport Operations			
Full-Time	23,884	25,447	22,807
Part-Time	300	793	787
Total	**24,184**	**26,240**	**23,594**
Rev. Vehicle Maint.			
Full-Time	7,057	4,786	6,795
Part-Time	240	240	193
Total	**7,297**	**5,026**	**6,988**
Non-Rev. Veh. Maint.			
Full-Time	3,191	3,102	3,136
Part-Time	293	122	150
Total	**3,484**	**3,224**	**3,286**
General & Admin.			
Full-Time	3,810	4,160	4,114
Part-Time	390	308	442
Total	**4,200**	**4,468**	**4,556**
Total			
Full-Time	37,943	37,494	36,852
Part-Time	1,223	1,463	1,573
Total	**39,166**	**38,957**	**38,425**

Source: Statistics Canada, Cat. 53-215

FIGURE 8-2
EMPLOYMENT
URBAN TRANSIT COMPANIES, 1996



Source: Statistics Canada, Cat. 53-215-XIB

Figure 8-2 shows levels of regional urban transit employment in Canada.

In 1996, 72 per cent of all employees in this industry were located in Central Canada, with Ontario accounting for 43 per cent and Quebec 29 per cent.

Table 8-16 shows the regional breakdown of regional employment by urban transit companies in 1996.

Taxi and Limousine Services

According to census data, there were 35,490 taxi and limousine drivers in Canada in 1996, up from 29,950 in 1986, for an 18 per cent increase. Ontario, Quebec and British Columbia accounted for 75 per cent of the 1996 total.

Figure 8-3 shows the number of limousine and taxi drivers, by region, from 1986 to 1996.

Ontario accounted for 40 per cent of all taxi and limousine drivers in Canada in 1996, an increase of 27 per cent over 1986 levels. 24 per cent were employed in Quebec, up ten per cent from 1986, and 12 per cent were employed in British Columbia, up 16 per cent from 1986.

Table 8-17 identifies the number of taxi and limousine drivers employed in each province for 1986, 1991 and 1996.

TABLE 8-16
REGIONAL BREAKDOWN OF EMPLOYMENT
BY URBAN TRANSIT COMPANIES, 1996

	Transportation Operations	*Per Cent of Total Employment*	*Total Employment*
Canada			
Full-Time	22,807		36,852
Part-Time	787		1,573
Total	**23,594**	**61.4**	**38,425**
Atlantic			
Full-Time	519		704
Part-Time	33		58
Total	**552**	**72.4**	**762**
Quebec			
Full-Time	6,543		10,810
Part-Time	11		356
Total	**6,554**	**58.7**	**11,166**
Ontario			
Full-Time	9,006		15,980
Part-Time	370		634
Total	**9,376**	**56.4**	**16,614**
Prairies			
Full-Time	3,616		4,956
Part-Time	304		376
Total	**3,920**	**73.5**	**5,332**
British Columbia			
Full-Time	3,101		4,374
Part-Time	64		144
Total	**3,165**	**70.1**	**4,518**
Territories			
Full-Time	22		28
Part-Time	5		n/a
Total	**27**	**n/a**	**n/a**

Source: Statistics Canada, Cat. 53-215

Air

In 1997[10], 52,896 persons were employed with Level I to IV[11] air carriers, accounting for approximately 75 per cent of all air transport personnel. Total Levels I to III air carrier employment increased by 3.3 per cent, with pilots and copilots (4.3 per cent growth) and other flight personnel (7.3 per cent growth) accounting for most of the increase. Level IV air carrier jobs decreased by 3.9 per cent in 1997.

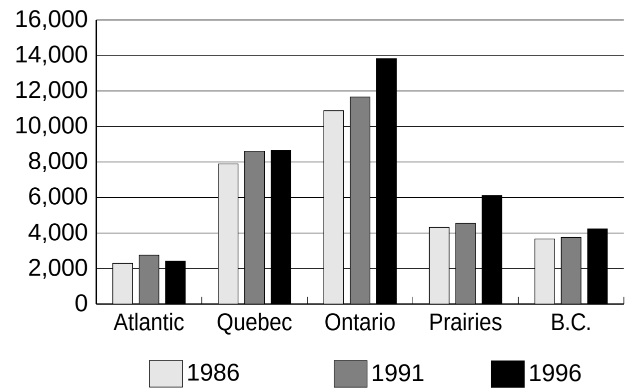
Level I to III[12] carriers accounted for the highest proportion of total employees, with an estimated 69 per cent of total personnel in 1997. Pilots and copilots made up 14 per cent of Level I to III employees. Other flight personnel comprised 19 per cent, management seven per cent, and other carrier personnel 60 per cent.

Although the total number of other flight personnel dropped significantly between 1990 and 1995, the number increased substantially in 1996 and 1997. The 1997 employment level of maintenance, aircraft, traffic-services and other personnel was 14 per cent below the 1990 level.

Table 8-18 shows the number of people employed by Levels I to IV air carriers between 1990 and 1997.

In 1997, Ontario had the highest percentage of personnel employed by major air carriers[13] (31 per cent), followed by British Columbia (27 per cent) and Quebec (21 per cent).

FIGURE 8-3
EMPLOYMENT
TAXI AND LIMO DRIVERS



Source: Statistics Canada, Census

TABLE 8-17
NUMBER OF TAXI AND LIMOUSINE DRIVERS
EMPLOYED IN EACH PROVINCE

	1986	*1991*	*1996*
Newfoundland	585	650	655
Prince Edward Island	N/A	135	150
Nova Scotia	1,225	1,270	1,100
New Brunswick	480	700	515
Quebec	7,890	8,610	8,665
Ontario	10,890	11,660	13,825
Manitoba	970	1,090	1,355
Saskatchewan	650	765	1,040
Alberta	2,700	2,695	3,710
British Columbia	3,665	3,750	4,235
Territories	N/A	185	235
Canada	**29,950**	**31,510**	**35,490**

Source: Statistics Canada, Census

Figure 8-4 shows the number of major air carrier employees, by region, for 1997.

Between 1990 and 1996, Levels I to IV carriers accounted for 83 to 85 per cent of total air-carrier employment. Carriers classified as Levels V to VI were responsible for the remaining 15 to 18 per cent. In 1997, however, the ratio of Levels I to IV employment dropped to 75.6 per cent, reflecting an apparent increase in the numbers of persons employed by Levels V to VI carriers.

10 1997 is the most current year of data available at this level of detail.

11 Level I–III: Canadian air carriers that in each of the two calendar years immediately preceding the report year transported 5,000 revenue passengers or more and/or 1,000 tonnes of revenue goods or more.
Level IV: Canadian air carriers not classified in Levels I–III that, in each of the two calendar years immediately preceding the report year, realized annual gross revenues of more than $500,000 for air services for which the air carrier held a licence.

12 There were 880 Level I–VI air carriers in 1996. Levels I–III: 104: Level IV: 120: Level V: 627: Level VI: 29
Source: Statistics Canada

13 Air Canada and Canadian Airlines

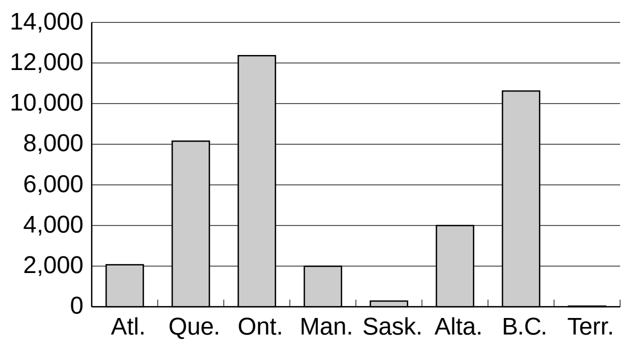
TABLE 8-18
DISTRIBUTION OF EMPLOYMENT
BY LEVELS I-IV AIR CARRIERS

Year	Levels I - III						
	Pilots and Copilots	*Other Flight Personnel*	*Management & Administration*	*Other Carrier Personnel*	*Total Levels I - III*	*Total Level IV*	*Total Levels I - IV*
1990	6,080	8,691	3,467	33,738	51,976	4,355	56,331
1995	6,295	8,010	3,590	28,408	46,303	4,077	50,380
1996	6,478	8,593	3,523	28,411	47,005	4,537	51,542
1997	6,757	9,217	3,584	28,977	48,535	4,361	52,896

Level I – III: Canadian air carriers that in each of the two calendar years immediately preceding the report year, transported 5,000 revenue passengers or more and 1,000 tonnes of revenue goods or more.
Level IV: Canadian air carriers not classified in Levels I-III that, in each of the two calendar years immediately preceding the report year, realized annual gross revenues of less than $500,000 for air services for which the air carrier held a license.

Source: Statistics Canada Cat. 51-206-XPB

FIGURE 8-4
MAJOR AIR CARRIER EMPLOYEES, BY REGION
1997



Source: Level I Air Carriers

TABLE 8-19
TOTAL FULL-TIME EMPLOYMENT
AIR CARRIERS

	(000) Levels I-IV[1]	*Levels I-IV % of Total*	*Total Air Carrier*[2]
1990	56.3	82.8	68.0
1995	50.4	82.6	61.0
1996	51.9	85.1	61.0
1997	52.9	75.6	70.0
1998*	n/a	n/a	77.0

* Preliminary data based on first three quarters of 1998

Sources: 1 Statistics Canada Cat. 51-206-XPB
2 Statistics Canada Survey of Employment, Payroll and Hours (SEPH).

Table 8-19 illustrates the total number of full-time workers employed by air carriers between 1990 and 1998.

Marine

Carriers based in Canada reported 14,328 employees in 1996, with vessel crew accounting for over two-thirds of all these employees. Thirty per cent of vessel crew were classified as officers.

Between 1990 and 1995, government-owned carriers were the most significant employers, accounting for 57 to 59 per cent of total personnel. Due to confidentiality considerations, the 1996 figures for private-carrier employees had to be amalgamated with those for government carriers. Transport Canada expects, however, that much the same relationship would have been observed in that year. For-hire carriers accounted for 38, 39 and 42.5 per cent of all employees in 1990, 1995 and 1996, respectively.

The number of workers employed by Canadian-based carriers remained relatively stable between 1990 and 1995. A 37 per cent decrease in 1996, however, can be accounted for mainly because in that year Canadian Coast Guard

(CCG) personnel ceased to be included in the employment statistics for government carriers.

Table 8-20 shows the number of people employed in various categories by Canadian-based marine carriers.

Preliminary data[14] for total marine employment for 1998 indicates that total employment in the marine industry, including incidental services[15], has decreased by an estimated 37 per cent since 1990. The share of personnel at Canadian-based carriers, including Canadian Coast Guard personnel, is estimated to have remained relatively stable[16].

Table 8-21 clarifies the adjustment to marine-employment data starting in 1996, the year in which Canadian Coast Guard employees were first excluded from employment data attributed to Canadian-based carriers.

Ferry operations account for a large proportion of employment in the marine transport services sector. In 1996, ferry operations generated about two thirds of all transportation jobs provided by Canadian-based carriers.

A number of ferry operators in Canada are Crown corporations and are therefore included in the "Government" employment figures in Table 8-21. Information from the Canadian Ferry Operators Association suggests that, in 1996, 85 per cent of all employees in ferry operations were employed by government services[17].

TABLE 8-20
EMPLOYMENT
BY CANADIAN-BASED MARINE CARRIERS[1]

(In thousands of workers)

		Government	*For-Hire*	*Private*	*Total*
1990	Vessel Crew	7,490	6,334	897	14,721
	Other	6,110	2,702	451	9,071
	Total	**13,600**	**9,036**	**1,348**	**23,792**
1995	Vessel Crew	6,948	6,256	319	13,523
	Other	6,185	2,461	124	8,702
	Total	**13,133**	**8,717**	**443**	**22,225**
1996[2]	Vessel Crew	5,148	4,493	N/A	9,641
	Other	2,805	1,882	N/A	4,687
	Total	**7,953**	**6,375**[3]	**N/A**	**14,328**
1997 Est. Total		**6,624**			**11,517**

1 Does not include employees from employer associations.
2 Preliminary data. Starting in 1996, data for Government carriers does not include Canadian Coast Guard personnel. Private carrier employee counts included with Government carriers.
3 Does not include contract employees.

Source: Statistics Canada, Cat. 54-205, Transport Canada

TABLE 8-21
EMPLOYMENT
BY MARINE SECTOR

(In thousands of workers)

	Canadian-Based Carriers[1]	*Adjusted Data: Canadian-Based Carriers[1]*	*Per cent of Total[1]*	*Total Marine Employment[2]*
1990	23.8		79.3	30.0
1995	22.2		79.2	28.0
1996	13.8	17.8	77.4	23.0
1997 est.	11.5	16.9	81.6	20.7
1998	n/a	n/a	n/a	19.0

Sources: 1 Statistics Canada Cat. 54-205. 1996 is the most current year of data at this level of detail. Data for 1997 is a Transport Canada estimate. Canadian-based Carriers: starting in 1996, does not include Canadian Coast Guard (CCG) personnel. Adjusted Data: adjusted to include CCG personnel. "Per Cent of Total" includes CCG personnel
2 Statistics Canada, Survey of Employment, Payrolls and Hours, adjusted by Transport Canada. Includes employment related to incidental services.

14 Transport Canada estimate

15 Incidental services: jobs which are associated with the marine industry, but are not defined in Statistics Canada, Cat. 72-002.

16 While the share of total employment is assumed to have remained stable, the actual numbers of employees, including CCG personnel, has declined.

17 To minimize the possibility of double counts, it is assumed that government and private employment figures provided by Statistics Canada include all jobs reported by the members of the Canadian Ferry Operators Association.

TABLE 8-22
REGIONAL DISTRIBUTION OF EMPLOYMENT BY CANADIAN FERRY OPERATORS*

	British Columbia	Prairies and Territories	Ontario	Quebec	Atlantic	Total
1990	3,332	61	591	645/745	3,766	8,395/8,495
1995	4,605	57	450	610/740	3,310	9,032/9,162
1996	4,785	57	327	597	3,310	9,076
1997	4,872	57	344	609	1,670	7,552

* Limited to members of the Canadian Ferry Operators Association; split numbers for Quebec due to seasonal fluctuations

Source: Canadian Ferry Operators Association (CFOA)

Employment by ferry operators decreased by 17 per cent in 1997, primarily due to the opening of the Confederation Bridge between Prince Edward Island and the mainland and the subsequent reduction of ferry services.

British Columbia accounted for almost two thirds of all employment by ferry operators in 1997. The Atlantic region, even with the reduction of services between Prince Edward Island and the mainland, continued to be a major employer, generating over 20 per cent of jobs related to ferry operations.

Total employment in this industry decreased by approximately 11 per cent between 1990 and 1997. British Columbia is the only region where employment was higher in 1997 than in 1990.

Table 8-22 shows the regional distribution of employment by Canadian ferry operators in 1990, 1995, 1996 and 1997.

Data Gaps in Transport Services

The above sections do not by any means cover all the personnel employed in the transport services sector. The following examples are meant to provide the reader with an indication of some, but not all, of the jobs that have not been included.

For trucking, there is no coverage of small private carriers[18] and some for-hire services. Survey, rather than census, approaches may lead to the exclusion of significant carriers (in terms of employment). Local bus operations such as those that serve the disabled[19] are not included. Air taxi services and company jobs, other than drivers, associated with local delivery services have also not been taken into account. While the number of taxi and limousine drivers were available from the Census, management, administration, dispatch and maintenance jobs associated with taxi and limousine services were not available. In air, jobs related to general aviation are not captured.

In many sectors, it was not possible to break out full, versus part-time employment. A significant lack of timely data for 1997 and 1998 also made coverage of this area difficult.

It is hoped that in the coming year, information to address many of these gaps will be found, and that a more comprehensive picture of transport services employment will be possible for future reports.

TRANSPORT INFRASTRUCTURE

This section includes personnel employed at airports, harbours, ports and other transport-related facilities. It also includes personnel totally dedicated to transport infrastructure construction and maintenance (e.g. rail right of way, roads and highways).

Rail

Road maintenance personnel employed by all rail carriers decreased by 33 per cent between 1990 and 1997. This compares very closely with the industry's 37.5 per cent decline in total employment over the same period.

In percentage terms, downsizing has affected all classes of carriers. Class I carriers experienced a 33 per cent decline, while Class II and III carriers saw road maintenance crews drop by 35 per cent. The overall percentage of employees dedicated to building and maintenance of railroads has remained very stable at between 29 to 30 per cent since 1990.

Table 8-23 shows employment in rail infrastructure services.

Highways

Determining the number of people employed in the construction and maintenance of

18 Private carriers with operating expenses of less than $1 million

19 Unless they are operated by the large urban transit companies.

highways in Canada is very difficult because there are no clear sources for this information. In addition, this is an industry affected by economic cycles and other factors. The employment figures shown in this report are based on Census data for the industry classification "Highways and Heavy Construction".

There were 68,820 people employed under this classification in 1996. Over time, employment levels have been unstable, with levels increasing by over 11 per cent between 1991 and 1996, but decreasing by 14 per cent between 1986 and 1991.

Between 1986 and 1996, Ontario, Quebec and British Columbia had the highest levels of employment in this sector. In 1996, these three provinces accounted for 62 per cent of all personnel. Furthermore, employment levels in Ontario and British Columbia increased by 24 and 19 per cent, respectively, over 1991 levels.

Some of the personnel employed in construction and maintenance of highways are federal, provincial and municipal employees. It is impossible, however, to determine how much double counting occurs. In addition, the percentage of people solely employed in heavy construction is impossible to determine. The following figures may therefore be slightly overstated with respect to "highways."

Table 8-24 shows regional distribution of employment in highways and heavy construction.

TABLE 8-23
EMPLOYMENT IN
RAIL INFRASTRUCTURE SERVICES

	Total Rail	*Infrastructure Services*	*Per cent of Total*	*Class I*	*Class II and III*
1990					
General[1]		4,232		3,674	558
Road Maintenance		15,712		13,456	2,256
Total	**69,119**	**19,944**	**28.9**	**17,130**	**2,814**
1995					
General[1]		3,369		2,961	408
Road Maintenance		11,555		9,999	1,556
Total	**51,754**	**14,924**	**28.8**	**12,960**	**1,964**
1996					
General[1]		3,015		2,632	383
Road Maintenance		10,892		9,392	1,500
Total	**48,038**	**13,907**	**28.9**	**12,024**	**1,883**
1997					
General[1]		2,518		2,178	340
Road Maintenance		10,506		9,041	1,465
Total	**43,212**	**13,024**	**30.1**	**11,219**	**1,805**

1 Estimated number of management and administrative personnel allocated to road maintenance

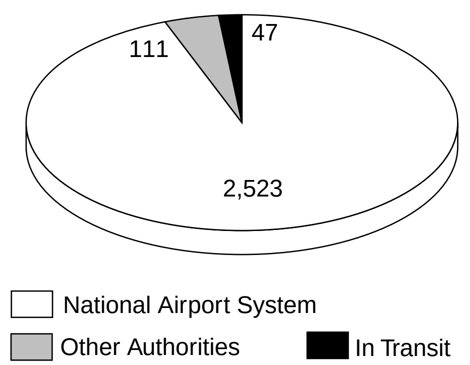
Source: Statistics Canada, Cat. 52-216; Transport Canada

TABLE 8-24
EMPLOYMENT, BY REGION
HIGHWAYS AND HEAVY CONSTRUCTION

	1986	*1991*	*1996*
Atlantic	11,580	9,550	11,150
Quebec	13,580	11,590	11,745
Ontario	19,050	16,855	20,900
Prairies	17,675	14,760	14,180
British Columbia	9,210	8,615	10,230
Territories	525	440	605
Canada	**71,615**	**61,810**	**68,820**

Source: Statistics Canada, Cat. 93-326

FIGURE 8-5
EMPLOYMENT
AIRPORT AUTHORITIES



Source: Canadian Airport Authorities

TABLE 8-25
EMPLOYMENT, CANADIAN AIRPORT AUTHORITIES
1998

	National Airport System	*Other Airport Authorities*	*In Transit*
Newfoundland	44	13	-
Prince Edward Island	-	-	27
Nova Scotia	-	18	-
New Brunswick	39	-	-
Quebec	650	-	9
Ontario	901	24	11
Manitoba	128	3	-
Saskatchewan	21	-	-
Alberta	314	15	-
British Columbia	384	38	-
Yukon	15	-	-
Northwest Territories	27	-	-
Total	**2,523**	**111**	**47**

Source: Canadian Airport Authorities

Air

In 1998,[20] the airports included in the national airport system and transferred, employed 2,523 full-time persons. There were also 111 full-time airport employees engaged at other airport authorities and an additional 47 who were in the process of being transferred from their previous employer (Transport Canada) to being employed by an airport authority. It must be noted that employment at airports which have not been transferred, or employment at airports which have been transferred but are not Local Airport Authorities (LAA) or Canadian Airport Authorities (CAA) are not included in the above figures.

Transferred CAAs and LAAs which are part of the national airports system accounted for 94 per cent of all personnel. CAAs not in the national airports system employed 111 persons (four per cent).

Figure 8-5 shows employment levels at Canadian airport authorities.

Ontario and Quebec, with a number of large airport authorities, had the highest number of airport-authority employees. Significant numbers of personnel were also employed at airports in British Columbia and Alberta.

Table 8-25 shows employment by the Canadian Airport Authorities in 1998.

Marine

Ports

Eighteen ports[21] are slated to become Canadian Port Authorities

20 As of February 1, 1999.

21 Prince Rupert, Vancouver, Fraser River, North Fraser, Nanaimo, Port Alberni, Thunder Bay, Windsor, Hamilton, Toronto, Port Saguenay, Trois-Rivières, Sept-Îles, Québec, Montréal, Halifax, Saint John, St. John's.

(CPAs) under provisions in the new *Canada Marine Act*. Six are located in British Columbia, four in Ontario, five in Quebec and three in the Atlantic region.

Figure 8-6 shows employment levels at the proposed Canadian Port Authorities, by region.

In 1998, 38 per cent of all employees at the proposed CPAs were located in British Columbia, 34 per cent in Quebec, 19 per cent in Ontario and the remaining nine per cent in the Atlantic region. An estimated 71 per cent of all staff were full-time, 20 per cent were part-time and the remainder were on contract. Approximately 17.5 per cent of port employees were classified as management and 25 per cent as administrative staff. Other employees made up the remaining 57.5 per cent.

Table 8-26 shows employment by proposed Canadian Port Authorities in 1998.

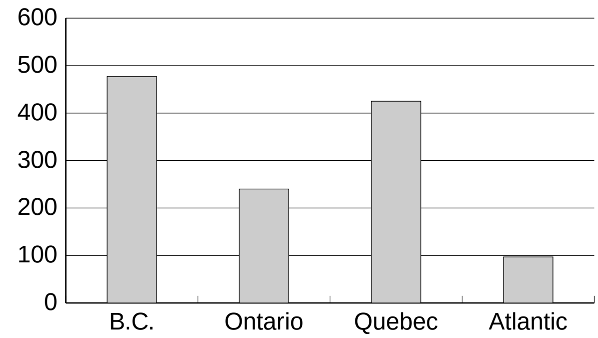
To establish some historical perspective, Table 8-27 shows historical employment data for ports that were associated with the Canada Ports Corporation.[22]

St. Lawrence Seaway Authority

The St. Lawrence Seaway Authority has been going through a downsizing period in the 1990s, and the total number of employees has fallen by over 11 per cent between 1996 and 1998. Both administration and operations employees have recorded similar decreases.

Table 8-28 shows employment, by category, in the St. Lawrence Seaway Authority from 1995 to 1998.

FIGURE 8-6
EMPLOYMENT
CANADIAN PORT AUTHORITIES



Source: Proposed Canadian Port Authorities

TABLE 8-26
EMPLOYMENT BY PROPOSED CANADIAN PORT AUTHORITIES
1998

	Total Employees	Full-Time	Part-Time	Contract
Management	219	209	5	5
Administration	315	265	39	11
Other	647	405	202	40
Total	**1,238**	**879**	**246**	**56**

Note: totals do not equal sum of individual parts. Some ports did not provide detailed breakouts of staff.

Source: Proposed Canadian Port Authorities

TABLE 8-27
EMPLOYMENT
BY CANADA PORTS CORPORATION

	1990	1995	1996	1997
CPC Ports	1,194	937	959	921

Source: CPC Annual Reports

TABLE 8-28
EMPLOYMENT BY CATEGORY IN THE
ST. LAWRENCE SEAWAY AUTHORITY, 1995 – 1998

	1995*	1996	1997	1998**
Management	N/A	13	12	15
Administration	N/A	86	84	75
Operations	N/A	611	591	540
Total	**739**	**710**	**687**	**630**
Temporary Employees	N/A	34	49	55

* Number of permanent positions as of March 1995.
** As of June, 1998.

Source: St. Lawrence Seaway Authority

22 Vancouver, Prince Rupert, Montréal, Québec City, Saint John, Halifax, St. John's, Churchill, Belledune, Sept-Îles, Trois-Rivières, Chicoutimi, Prescott and Port Colborne.

TABLE 8-29
PLANNED FULL-TIME EQUIVALENTS IN FEDERAL DEPARTMENTS AND AGENCIES

	1990/91	1995/96	1996/97	1997/98	1998/99
Transport Canada	19,857	18,388	12,257	4,840	4,480
Canadian Coast Guard	-	-	-	3,731	3,468
Transportation Safety Board	300	300	255	223	229
Canadian Transportation Agency	491	447	356	260	249
Civil Aviation Tribunal	6	8	8	8	8
Total	**20,654**	**18,688**	**12,512**	**9,062**	**8,434**

Source: 1990 – 1999 Estimates, Federal Government Main Estimates

Other Marine Infrastructure Jobs

According to 1996 census data, there were 1,915 lock and cable ferry operators in Canada in 1996, compared with 1,980 in 1991. In some instances, personnel employed in these trades may have already been included with the port authority personnel. Various other jobs related to marine infrastructure, such as dredging, construction and maintenance of piers, berths, and terminals, are not specifically addressed in this section.

Gaps include all personnel employed by non-port authorities and private firms. As a result, the employment picture presented for marine infrastructure is not as comprehensive as it should be due to data availability issues.

Data Gaps in Transportation Infrastructure

In this section, numerous data gaps exist in the figures presented for employment related to transportation infrastructure. Some employment figures are not captured or impossible to break out from more aggregate information.

For airports, only full-time employment at Canadian Airport Authorities are included; employment at other airports which are not covered in the federal government employment data in the next section have not been reported. Part-time, contract or term employment at any airport has not been identified.

In the case of ports, only employment at the proposed Canadian Port Authorities have been identified. Construction, maintenance and dredging jobs at private companies have not been reported. It was also not possible, for example, to report on employment at private terminal and grain handling operations.

It is expected that employment data shown for construction and maintenance of highways may be high, as it is impossible to break out the number of workers employed in "heavy construction". However, 1991[23] census data for "excavating, grading, paving and related occupations" (not including railway section and track workers), indicated 97,330 workers.

Government Services Tied to Transportation

Federal Government Services

The federal government was to devote 8,434 employees in five departments/agencies during 1998/99 to transportation[24]. This was a seven per cent decrease from 1997/98. These numbers do not include a significant number of positions primarily concerned with transportation in other federal departments and agencies.

Revenue Canada/Customs, Immigration and the federal police have a large number of employees primarily dedicated to border, airport and ports customs inspections, which are transportation-related activities. Agriculture Canada, Heritage Canada (e.g. Parks Canada locks), National Capital Commission (roads, bridges, other transport services), Fisheries and Oceans (Harbours and Ports) all have transport-related functions. Most departments and agencies have some transport-related functions, but employment figures are not captured at a level of detail that allows identification of the exact numbers of employees tied to transportation activities.

Table 8-29 shows planned full-time equivalents[25] in federal departments and agencies that deal directly with transportation.

Provincial and Territorial Government Services

It has been estimated that the number of employees working in transport-related activities in provincial and territorial governments has slowly decreased by about 14 per cent since 1992. It must be noted, however, that Table 8-30 does not include numerous transport-related functions such as policing, safety or regulatory services provided by provincial governments, or that are directly and indirectly associated

23 Census categories changed between 1991 and 1996; there was no equivalent category reported by the 1996 Census.

24 Transport Canada, Canadian Coast Guard, Transportation Safety Board, Canadian Transportation Agency, Civil Aviation Tribunal.

25 The number of full-time positions; this does not necessarily directly equate to the number of people working in the positions.

with transportation activities, such as truck-inspection and highway-patrol services.

Table 8-30 shows employment by provincial and territorial governments from 1992 to 1996.

Municipal Government Services

It was not possible to develop a comprehensive picture for the number of municipal employees associated with transportation for this year's report. For example, there are no figures available to represent employment in such areas as street cleaning, snow removal, parking control or policing. As pointed out earlier, some municipal employees are included in the employment levels shown for street maintenance and construction. It is hoped that ongoing work in this area will allow for a more comprehensive examination in future reports.

TABLE 8-30
EMPLOYMENT BY PROVINCIAL AND TERRITORIAL GOVERNMENTS, 1992 – 1996

	1992	*1993*	*1994*	*1995*	*1996*
Transportation and Communications	45,733	44,604	43,124	42,630	39,202
Transportation*	22,900	22,300	21,600	21,300	19,600

* Estimate, based on the assumption that transportation accounts for approximately 50-52 per cent of total employment in transportation and communications (Federal Government ratios based on Statistics Canada, Employment, Earnings and Hours, 1997, Cat. 72-002-XPB).

Source: Statistics Canada, Public Sector Employment and Wages and Salaries, 1996

ASSOCIATED SERVICES

Estimates of employment in the transportation sector would be incomplete without including the number of people employed in the many other services directly associated with transportation. The services related to "sales" cover a wide variety of positions in such areas as travel agents, tour operators, third party service providers (e.g. intermodal marketing companies) and freight brokers. Services related to "operations" are also numerous: they include navigation support (e.g. air, marine and rail traffic control, marine pilotage, Coast Guard navigation services), food catering (air, rail), marine bunkering and towing, maintenance of equipment, and insurance. Associated administrative support (e.g. accountants, financial experts, auditors, marketing experts) also account for a significant number of jobs. Finally, there are many modal associations offering administrative and other staff functions in such areas as trucking, marine, rail, and bus, as well as professional positions in areas such as marine law, railway and engineering. Unions representing transport employees also have administrative and other staff functions.

Marine

Pilotage Services

Canada has four pilotage authorities, which employed 537 people in 1997.[26] Employment levels have decreased by about five per cent since 1993. This should not be interpreted as a trend, however, because employment in this industry is very sensitive to traffic and corresponding demand for pilotage services.

Pilots account for between 70 and 75 per cent of total employment at the authorities. Since 1993, contract pilots have consistently accounted for 72 to 74 per cent of total pilots used by the authorities.

Table 8-31 shows the regional breakdown of employment by pilotage authorities from 1993 to 1997.

The Laurentian Pilotage Authority is the largest employer of all the pilotage authorities, accounting for approximately 40 per cent of all staff employed by pilotage authorities in Canada. It is also the largest employer of contract pilots. The Great Lakes Authority is the smallest organization (in terms of personnel), with about 15 per cent of all staff employed by the four authorities.

Maritime Employers Association

The Maritime Employers Association (MEA) is an association of employers, such as shipping lines and grain companies, that negotiates collective agreements with longshore workers and interacts with their union to provide labour at ports in Montreal, Trois-Rivières, Bécancour, Toronto and Hamilton. The employment figures shown in Table 8-34 represents the unionized workforce available to the MEA.

The unionized workforce available to the MEA decreased sharply in 1996, the year that Quebec City withdrew from the association. The number of hours worked, however, increased by 25 per cent over 1993 numbers. Labour costs (in current dollars) have increased by 19 per cent between 1993 and 1997.

26 Each authority uses the services of contract pilots. These pilots, while included in the above data, are not directly employed by the Authority.

**TABLE 8-31
EMPLOYMENT
PILOTAGE AUTHORITIES**

	1993	1994	1995	1996	1997
Great Lakes Pilotage					
Administration	12.5	10.5	10.5	10.5	10
Pilots	62	55	58	57	63
Other[1]	8	8	8	8	9
Total	**82.5**	**73.5**	**76.5**	**75.5**	**82**
Atlantic Pilotage					
Administration	10	10	9	9	9
Pilots	50	46	48	51	50
Other[1]	17	17	13	13	13
Total	**77**	**73**	**70**	**73**	**72**
Laurentian Pilotage					
Administration	16	15	14	13	13
Pilots	188	181	173	173	175
Other[1]	34	33	32	28	28
Total	**238**	**229**	**219**	**214**	**216**
Pacific Pilotage					
Administration	13	13	13	12	12
Pilots	113	110	113	115	115
Other[1]	45	45	45	40	40
Total	**171**	**168**	**171**	**167**	**167**
Canada					
Administration	51.5	48.5	46.5	44.5	44
Pilots	413	392	392	396	403
Contract Pilots[2]	298	288	286	291	291
Other[1]	104	103	98	89	90
Grand Total	**568.5**	**543.5**	**536.5**	**529.5**	**537**

1 Other includes dispatch, pilot boat and other unspecified services.
2 Number of contract pilots are included in figures shown for "Pilots".
Source: Pilotage Authorities

**TABLE 8-32
EMPLOYMENT
MARITIME EMPLOYERS ASSOCIATION[1]**

	1993	1994	1995	1996	1997
Employees	2,345	2,254	2,058	1,204	1,285
Labour Costs[2]	71,995	82,924	81,221	82,640	85,864
Hours Worked[3]	1,446	1,725	1,683	1,761	1,816

1 Includes ports of Montreal, Trois-Rivières, Bécancour, Toronto and Hamilton (Quebec, Halifax, Saint John 1993 to 1995).
2 In thousands of dollars.
3 In thousands.
Source: Maritime Employers Association

**TABLE 8-33
EMPLOYMENT
BRITISH COLUMBIA MARITIME EMPLOYERS ASSOCIATION[1]**

	1993	1994	1995	1996	1997
Employees	3,794	3,961	3,953	3,857	3,919
Labour Costs[2]	154,144	164,390	178,870	184,630	194,806
Hours Worked[3]	4,216	4,385	4,546	4,569	4,669

1 Includes ports of Vancouver, New Westminster, Prince Rupert, Chemainus, Alberni, Victoria, Stewart and others.
2 In thousands of dollars.
3 In thousands.
Source: British Columbia Maritime Employers Association

Table 8-32 shows employment by the Maritime Employers Association from 1993 to 1997.

British Columbia Maritime Employers Association

The British Columbia Maritime Employers Association (BCMEA) is an association of employers (shipping lines, grain companies, etc.) that negotiates collective agreements with longshore workers and interacts with the longshore workers union to provide labour at ports along the West Coast. The employment figures shown in Table 8-34 represent the unionized workforce available to the BCMEA.

Table 8-33 shows employment by the British Columbia Maritime Employers Association from 1993 to 1997.

Longshore Workers and Material Handlers

According to the 1996 Census, Canada has just under 140,000 longshore workers and material handlers. Longshore workers made up 5.5 per cent of this workforce. By definition, the figures for the MEA and BCMEA would also be included in these data. Therefore, the census data has been used to calculate total employment for "Associated Services". It is interesting to note that the numbers quoted by the BCMEA for 1996 are considerably higher than the number of longshore workers shown for British Columbia in the census data. This indicates that some of the BCMEA workforce (approximately 23 per cent) are probably considered as material handlers in the census definition.

It is also impossible to determine whether material handlers are limited to the marine sector or whether they also include

TABLE 8-34
CENSUS EMPLOYMENT DATA
LONGSHORE WORKERS

	Canada	Atlantic Region	Quebec	Ontario	Prairie Provinces	British Columbia	Territories
1991[1]:							
Longshore Workers	8,795	N/A	N/A	N/A	N/A	N/A	N/A
1996:							
Longshore Workers	7,705	1,925	1,725	870	160	3,010	15

1 Group classifications changed from 1991 to 1996 Census. It is not possible to get regional breakouts for 1991 that will match with 1996 data.

Source: Statistics Canada, Census

other modes and private operations, such as warehouses and terminals.

Table 8-34 shows the regional distribution of longshore workers and material handlers.

Air

Travel Agencies and Tour Operators

An estimated 30,500 personnel were employed by travel agencies and tour operators in 1998. This was almost identical to employment levels in 1997. It was, however, a significant increase (more than 45 per cent) over 1990 levels.

Employers in Ontario and Quebec accounted for two thirds of all employees in this industry in 1997, with 40 per cent located in Ontario and 27 per cent in Quebec. British Columbia and Alberta accounted for 15 and 10 per cent respectively.

Table 8-35 shows travel agencies and tour operators by estimated employment.

Table 8-36 shows employment by province of travel agencies and tour operators.

TABLE 8-35
TRAVEL AGENCIES AND TOUR OPERATORS
BY ESTIMATED EMPLOYMENT

	1990	1995	1996	1997	1998*
Canada	21,000	30,000	29,466	30,487	30,511

* Estimate based on first 10 months of data.

Source: Statistics Canada, Annual Survey of Travel Agencies, Tour Operators

TABLE 8-36
EMPLOYMENT OF TRAVEL AGENCIES AND TOUR OPERATORS
BY PROVINCE

	1996	1997
Newfoundland	257	248
Prince Edward Island	NR	NR
Nova Scotia	310	608
New Brunswick	NR	NR
Quebec	6,656	8,343
Ontario	12,712	11,938
Manitoba	872	670
Saskatchewan	597	673
Alberta	3,276	3,052
British Columbia	4,541	4,674

NR: Not Reportable due to confidentiality

Source: Statistics Canada, Annual Survey of Travel Agencies & Tour Operators

TABLE 8-37
DISTRIBUTION OF EMPLOYMENT IN "OTHER" ASSOCIATED SERVICES, 1991 AND 1996

	1991	1996
Customs, Ship & Other Brokers	3,255	4,755
Marine & Railway Traffic Control[1]	2,820	2,275
Transportation Route & Crew Schedulers	1,330	2,085
Air Traffic Control[2]	4,260	4,330
Motor Vehicle Mechanics[3]	159,930	164,670
Air Transport Ramp Attendants[4]	7,675	8,305

1 The Railway Traffic Control personnel are already included in the Rail Carrier employment data. The Marine Traffic Control may be included in the Port and Seaway employment figures.
2 With the exception of private controllers at places like Southport, Manitoba, these are a subset of total air navigation figures already reported earlier.
3 Some proportion may already have been included in the trucking employment data.
4 Some proportions are already included in the air carrier employment figures.

Source: Statistics Canada, Census

It must be noted that while air transport accounts for a large percentage of the business of travel agencies and tour operators, other modes, such as bus and rail, are also covered by these agencies.

Air Navigation Services

Census data from 1991 and 1996 indicate that there were 4,260 and 4,330 individuals employed as air traffic controllers in Canada, respectively, in those years. There is no information relating to the numbers of management and administrative staff associated with the air traffic services. However, prior to December 1, 1996[27], Canada's air navigation system was operated by Transport Canada. Therefore, air traffic controllers and associated management and administration staff are included in the federal government figures shown in Table 8-29.

Other Air-Related Associated Services

Associations such as the Air Transport Association of Canada, the Northern Air Transport Association, the Ultra Light Pilots Association of Canada, Canadian Owners and Pilots Association and the Canadian Seaplane Association of Canada, among others, also employ people in the air transport sector. In addition, carrier and air navigation staff are represented by a number of unions. Each of these associations or unions have dedicated staff functions that are not accounted for in this report.

Other associated services include, but are not limited to, catering, cleaning, accounting, finance, marketing and insurance. Employment data for these areas have not been addressed in this report, although it is hoped that ongoing research will allow these services to be covered in the next Annual Report.

"Other" Associated Services

As with each section in this chapter, numerous data gaps are evident regarding services associated with transportation. The following paragraphs and table address some of the gaps using census and industry data, but not completely. It is hoped that continuing research will allow for more complete coverage in future reports.

The Insurance Bureau of Canada estimates that there were 104,000 people employed in the insurance industry in 1997, and that 42.39 per cent of all premiums written[28] were related to transport. Given a direct allocation of resources, there were an estimated 44,100 employees associated with the transport sector. Using the same rationale, historical employment levels were 43,700 in 1993, 45,600 in 1994; 41,700 in 1995; and 40,900 in 1996.[29]

According to the Canadian International Freight Forwarders Association (CIFFA), the Canadian freight-forwarding industry consists of 280 firms in 1998 that employ 6,100 people directly involved in forwarding and another 9,000 in other activities.

Table 8-37 shows the distribution of employment in "other associated services" for 1991 and 1996. As indicated in the table footnotes, in many instances, some proportion of the employment data has already been counted earlier in the chapter. To minimize possible double counts, none of the figures shown in Table 8-37 have been included in the overall summary.

27 Air traffic services in Canada were taken over by NAV Canada on December 1, 1996.
28 Premiums written: the number of insurance contracts issued.
29 The Insurance Bureau cautions against year-to-year comparisons due to changes in sources used each year to compile the data.

TABLE 8-38
AVERAGE WEEKLY EARNINGS IN THE TRANSPORTATION SECTOR BY MODE[1]

(Current Dollars)

	Total Transport	*Rail*	*Water[2]*	*Air[2]*	*Truck*	*Public Transit*	*Other[3]*
1985	515	589	561	592	482	459	449
1990	602	770	683	719	544	513	536
1995	684	942	799	789	599	590	631
1996	695	977	813	803	613	577	659
1997	716	999	829	816	638	627	690
1998[4]	729	990	830	812	671	633	695

1 Does not include owner-operators, private trucking, delivery services or government employees.
2 Does not include incidental services (jobs which are associated with a particular industry, but are not defined in Statistics Canada Cat. 72-002).
3 Other includes taxis, inter-urban, pipeline and other modes.
4 Average based on the first 10 months of 1998.

Source: Statistics Canada, CANSIM and Cat. 72-002 (SEPH)

AVERAGE SALARIES

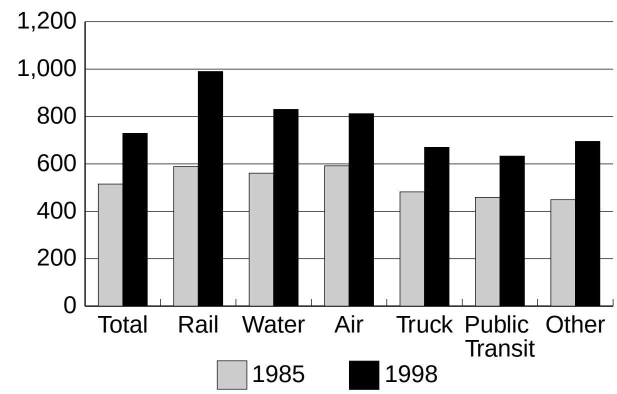
OVERVIEW

At the end of the first three quarters of 1998, average weekly earnings across all modes, including overtime, was $729. This was a small (1.8 per cent) increase over 1997 weekly earnings. At the top end, railway employees averaged $990 per week, whereas public transit employees averaged $633 and trucking employees averaged $671. The trucking industry registered the highest increase in average weekly earnings (more than five per cent over 1997), while air and rail experienced a slight decrease.

Between 1985 and 1998, rail enjoyed the largest increase in average weekly earnings including overtime. Trucking and public transit had the smallest increases. Average transportation wages (all sectors) increased by 42 per cent between 1985 and 1998, compared with a 46 per cent increase in the economy as a whole.

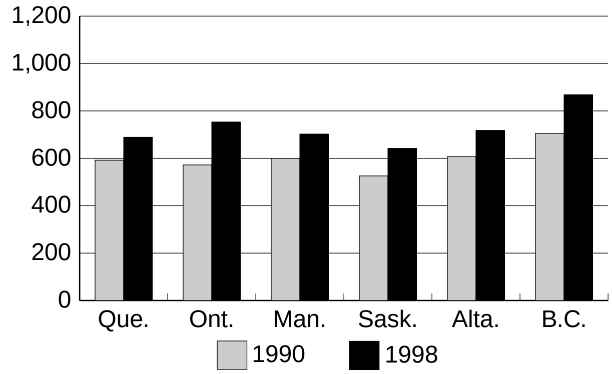
Table 8-38 compares the 1985 and 1998 average weekly earnings in the transportation sector by mode.

FIGURE 8-7
AVERAGE WEEKLY EARNINGS BY MODE



Source: Statistics Canada, Cat. 72-002

FIGURE 8-8
AVERAGE WEEKLY EARNINGS BY REGION



Source: *Statistics Canada, Cat. 72-002-XPB, December*

Figure 8-7 shows average weekly earnings, by mode, in the transportation sector.

Average weekly earnings for transportation-related jobs in 1998 were highest in British Columbia, followed by Ontario and Alberta. Workers in Saskatchewan and Quebec continued to have the lowest average weekly earnings. Employees in Quebec and Saskatchewan registered minor decreases in average weekly earnings in 1998 from 1997, while workers in British Columbia saw earnings increase by over six per cent.

Figure 8-8 shows average weekly earnings, by region, for 1990 and 1998.

If compared with 1990, employees in Ontario enjoyed the largest percentage increase in average weekly earnings over the last decade, followed by British Columbia and Saskatchewan.

Table 8-39 shows the regional distribution of weekly earnings in the transportation sector.

RAIL

Since 1990, average annual compensation[30] for those directly involved in providing rail transportation services has been significantly higher than the overall annual average in the rail sector as a whole. This difference has been widening over time. In 1996, the differential was 12.3 per cent, compared with nine per cent in 1990.

Equipment and road-maintenance rail workers consistently earn less than the average for the whole rail sector. In 1996, wages for these groups averaged 13 and 11 per cent less than the sector average. Equipment maintenance workers for Class II carriers earned much closer to the industry average than did their Class I counterparts.

Table 8-40 shows the average annual compensation earned in the rail industry in various categories.

TABLE 8-39
AVERAGE WEEKLY EARNINGS IN TRANSPORTATION[1] BY REGION

(Current Dollars)

	Atlantic Region[2]	*Quebec*	*Ontario*	*Manitoba*	*Saskatchewan*	*Alberta*	*British Columbia*	*Territories*[3]
1990	N/A	592.12	572.20	599.82	525.73	607.29	705.00	N/A
1995	N/A	673.63	704.92	673.07	578.16	655.47	785.01	N/A
1996	N/A	649.88	725.43	704.79	637.15	707.16	812.97	N/A
1997	N/A	690.01	720.72	700.64	642.55	689.26	816.98	N/A
1998 Preliminary[4]	N/A	688.82	753.25	702.38	641.84	717.80	868.45	N/A

1 Does not include owner-operators, private trucking, delivery services or government employees.
2 Atl. : Newfoundland, Prince Edward Island, New Brunswick, Nova Scotia (Data available only for Transportation and Storage).
3 Terr.: Yukon and Northwest Territories (Data available only for Transportation and Storage).
4 1998 is based on preliminary information available for the first three quarters of the year.

Source: *Statistics Canada, Cat. 72-002-XPB, December*

30 The gross amount paid to employees, including vacations, holidays, leaves of absence with pay and before deductions for income tax.

TRUCK

An examination of regional average weekly earnings in the trucking industry shows a wide range across the country. In 1998, the lowest weekly earnings were in the Atlantic Region, with Prince Edward Island and Newfoundland 30 per cent below the national average. The highest average weekly earnings were in British Columbia, 20 per cent above the national average of $671 per week. At $678, the average weekly earnings in Alberta were almost representative of the national average.

Table 8-41 shows the regional distribution of average weekly earnings in trucking in Eastern Canada.

Table 8-42 shows the regional distribution of average weekly earnings in trucking in Western Canada.

BUS

In 1996,[31] the average salary of employees of large scheduled intercity bus[32] operators was $34,359. This was a two per cent decrease from the average salary level reported in 1990 (current dollars).

Large[33] school bus companies reported an average annual salary of $15,474 in 1996. Average salaries for this industry in Quebec were significantly higher (24 per cent) than the industry average across Canada. Average salaries in Western Canada were 30 per cent below the Canadian average.

TABLE 8-40
AVERAGE ANNUAL COMPENSATION IN THE RAIL INDUSTRY

(Current Dollars)

	Total Rail[1]	*Transportation Services*	*Class I*	*Class II and III*
1990				
General		44,855	45,745	36,955
Transportation		44,978	45,916	37,948
Equipment Maintenance		37,874	38,181	35,131
Road Maintenance		37,024	38,433	28,623
Total	**41,251**			
1995				
General		54,762	55,983	42,800
Transportation		56,573	57,068	52,291
Equipment Maintenance		45,795	45,750	46,190
Road Maintenance		46,368	47,760	37,422
Total	**51,602**			
1996				
General		54,597	55,871	42,969
Transportation		58,273	59,312	49,767
Equipment Maintenance		44,976	44,569	48,500
Road Maintenance		46,040	47,314	38,062
Total	**51,870**			
1997[2]	**54,580**	**N/A**	**N/A**	**N/A**

1 "Total Rail" employment limited to carrier personnel.
2 Railway Trends, Railway Association of Canada.

Source: Statistics Canada, Cat. 52-216

TABLE 8-41
AVERAGE WEEKLY EARNINGS IN THE TRUCKING INDUSTRY IN EASTERN CANADA

(Current Dollars)

	Ontario	*Quebec*	*New Brunswick*	*Nova Scotia*	*New-found-land*	*Prince Edward Island*	*Canada*
1990	572	517	401	422	433	393	544
1995	642	557	551	510	442	n/a	599
1996	666	553	553	505	434	478	613
1997	678	573	577	538	516	535	638
1998[1]	717	613	518	543	468	467	671

1 1998 based on first 10 months

Note: Trucking includes establishments primarily engaged in the provision of trucking. Transfer and related services includes truck "broker-operators." Average weekly earnings include overtime.

Source: Statistics Canada, CANSIM Series and Cat. 72-002 (Survey of Employment, Payroll and Hours)

31 Most current data available at this level of detail.

32 1995 and 1996: large scheduled intercity bus operations with annual revenues greater than $2,000,000. 1990: carriers with annual revenues greater than $500,000.

33 1995 and 1996: large bus operations with annual revenues greater than $2,000,000. 1990: carriers with annual revenues greater than $500,000.

TABLE 8-42
AVERAGE WEEKLY EARNINGS IN THE TRUCKING INDUSTRY IN WESTERN CANADA

(current dollars)

	British Columbia	*Alberta*	*Manitoba*	*Saskatchewan*	*Canada*
1985	508	427	448	443	482
1990	627	523	561	484	544
1995	670	597	562	529	599
1996	680	627	575	540	613
1997	724	660	590	569	638
1998[1]	811	678	615	584	671

1 1998 based on first 10 months

Note: Trucking includes establishments primarily engaged in the provision of trucking, transfer and related services. Truck “broker-operators” are included in this industry.
Average weekly earnings include overtime.

Source: Statistics Canada CANSIM Series and Cat. 72-002 (Survey of Employment, Payroll and Hours)

TABLE 8-43
AVERAGE ANNUAL SALARY IN THE BUS INDUSTRY

(Current Dollars)

	1990	*1995*	*1996*	*1997*
InterCity	35,050	36,034	34,359	35,103
School Bus	18,692	14,463	15,474	N/A
Charter & Other	19,609	23,185	19,652	26,408
Urban Transit	42,186	50,882	52,275	52,828

Source: Statistics Canada, Cat. 53-215

Table 8-43 shows the average annual salary in the bus industry. It is difficult to compare salaries over time in the bus industry due to apparent erratic fluctuations in the data.

Large[34] charter and other passenger bus companies in Canada in 1996 reported an average annual salary of $19,652. Average salaries in Western Canada were over 32 per cent higher than the industry average; in Ontario, average salaries were 16 per cent lower than the industry norm.

Urban transit companies in 1996 reported an average annual salary of $52,275. Urban transit workers in Quebec enjoyed the highest average salaries, followed closely by British Columbia. Average annual salaries in the Atlantic Region and on the Prairies were considerably lower than the national average.

34 1995 and 1996: large bus operations with annual revenues greater than $2,000,000. 1990: carriers with annual revenues greater than $500,000.

Marine

Preliminary data indicate that labour costs in the water-borne trades declined by four per cent in 1996. In the case of government carriers, most of the decline can be explained by the exclusion of Canadian Coast Guard data. (In 1997, the data shows a slight increase (two per cent). Labour costs for for-hire carriers increased throughout the 1990 to 1997 period.

Table 8-44 shows the labour costs of the Canadian-based marine carrier sector.

TABLE 8-44
ANNUAL LABOUR COSTS PER EMPLOYEE OF CANADIAN-BASED MARINE CARRIERS

(Current Dollars)

	Government	*For-Hire*	*Total*
1990			
Vessel Crew	36,395	46,950	41,492
Other	54,279	32,137	47,549
Total	**44,429**	**42,520**	**43,832**
1995			
Vessel Crew	45,652	52,466	49,301
Other	55,186	36,380	50,013
Total	**50,142**	**47,925**	**49,580**
1996[1]			
Vessel Crew	46,097	53,257	49,395
Other	44,912	39,841	42,944
Total	**45,679**	**49,552**	**47,350**
1997			
Vessel Crew	48,445	56,250	52,559
Other	46,553	42,493	44,879
Total	**47,709**	**52,329**	**48,426**

1 Preliminary data. Private carrier information included with government carriers.

Source: Statistics Canada, Cat. 54-205

Air

Average annual salaries declined marginally for all employees' groups except "other carrier personnel" in 1997[35] (Level I–III carriers). Pilots and other flight personnel saw average salaries decrease by 0.8 and 2.1 per cent, respectively. Average annual salaries of general management and administrative staff decreased by two per cent, whereas other carrier personnel saw increases of 1.8 per cent. Overall, average salaries paid to Level I to III air carrier personnel were 11.5 per cent higher than those received by Level IV carrier personnel. This was a significant improvement over 1990, when average salaries received by employees of Level IV carriers were 30 per cent less than those paid to their Level I to III counterparts.

Table 8-45 shows the distribution and average annual salary level of various employment categories in Levels I to IV for Canadian air carriers.

35 1997 is the most current year of data available at this level of detail

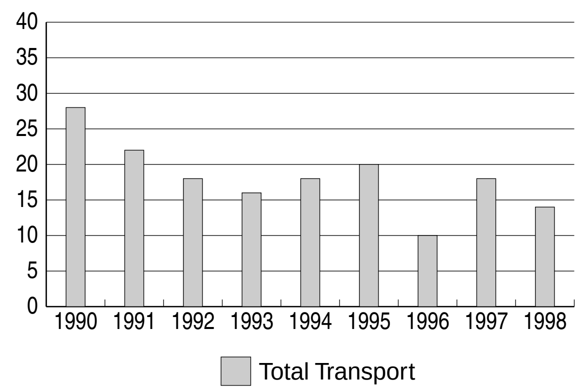
TABLE 8-45
LABOUR COST
OF CANADIAN AIR CARRIERS

Year	Levels I - III					Level IV	Levels I - IV
	Pilots and Copilots	*Other Flight Personnel*	*Management & Administration*	*Other Carrier Personnel*	*Total Levels I - IV*	*Total Level IV*	*Total Levels I - IV*
1990	75,833	30,341	41,151	37,194	40,832	31,430	40,105
1995	77,482	35,951	48,734	40,132	45,153	42,794	44,962
1996	82,341	38,061	51,072	42,448	47,789	43,700	47,429
1997	81,719	37,248	50,093	43,216	47,949	43,003	47,542

Level I – III: Canadian air carriers that in each of the two calendar years immediately preceding the report year, transported 5,000 revenue passengers or more and 1,000 tonnes of revenue goods or more.
Level IV: Canadian air carriers not classified in Levels I-III that, in each of the two calendar years immediately preceding the report year, realized annual gross revenues of less than $500,000 for air services for which the air carrier held a license.

Source: Statistics Canada Cat. 51-206-XPB

FIGURE 8-9
NUMBER OF LABOUR STOPPAGES
IN THE TRANSPORTATION SECTOR, 1990 – 1998



Source: Human Resources Canada

LABOUR STOPPAGES IN TRANSPORTATION

NUMBER OF WORK STOPPAGES

Canada has enjoyed relatively few labour stoppages since 1990. The years 1990 and 1991, with 28 and 22 stoppages respectively, were the most active years in terms of labour action. In both years, the bus/urban transit industry accounted for the highest proportion of work stoppages.

Figure 8-9 shows the number of labour stoppages in the transportation sector.

In 1998, the air, truck and water industries accounted for most labour stoppages (64 per cent), with three stoppages each. Bus and urban transit industries had four stoppages. There was one labour action leading to a work stoppage in the rail industry.

Table 8-46 shows the number of labour stoppages from 1990 to 1998.

Three stoppages in the rail sector during 1995 led to that year having the highest number of affected employees due to work stoppages since 1990. Of the 35,252 employees affected in 1995, over 89 per cent were railway employees.

Figure 8-10 shows the number of employees involved in labour stoppages since 1990.

There were 2,283 workers involved in the 18 labour stoppages that occurred in 1997. The air sector accounted for 52 per cent of total worker involvement. The trucking and water industries accounted for 25 and 21 per cent, respectively.

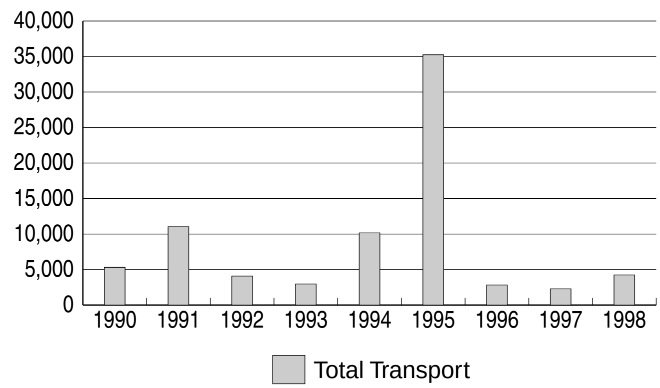
Table 8-47 shows the number of workers involved in labour stoppages from 1990 to 1998.

TABLE 8-46
NUMBER OF LABOUR STOPPAGES BY MODE OF TRANSPORTATION, 1990 – 1998

	Air	*Rail*	*Water*	*Truck*	*Bus/ Urban*	*Taxi*	*Total*
1990	1	3	6	5	11	2	28
1991	2	0	5	4	10	1	22
1992	2	1	3	5	3	4	18
1993	2	2	2	4	4	2	16
1994	3	4	1	3	4	3	18
1995	1	3	4	3	3	6	20
1996	1	1	0	2	4	2	10
1997	7	0	4	5	1	1	18
1998	3	1	3	3	4	-	14

Source: Human Resources Canada

FIGURE 8-10
LABOUR STOPPAGES EMPLOYEES INVOLVED, 1990 – 1998



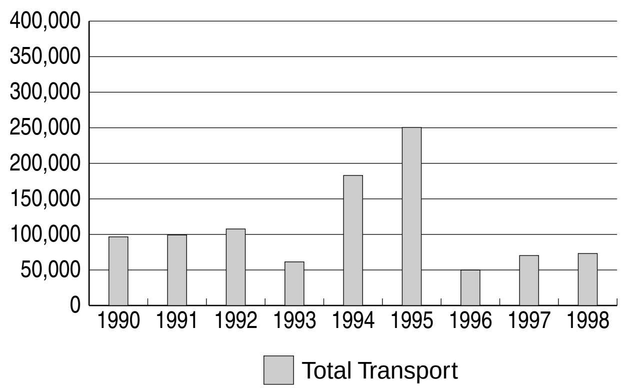
Source: Human Resources Canada

TABLE 8-47
NUMBER OF WORKERS INVOLVED IN LABOUR STOPPAGES BY MODE OF TRANSPORTATION, 1990 – 1998

	Air	*Rail*	*Marine*	*Truck*	*Bus/ Urban*	*Taxi*	*Total Transport*
1990	24	1,880	408	570	2,385	44	5,311
1991	520	0	267	131	10,070	41	11,029
1992	543	258	1,305	651	1,150	179	4,086
1993	446	1,612	106	245	533	29	2,971
1994	538	678	3,500	40	974	4,433	10,163
1995	65	31,540	2,306	209	838	294	35,252
1996	147	502	0	100	2,031	49	2,829
1997	1,177	0	472	559	68	7	2,283
1998	2,693	25	378	140	1,006	0	4,242

Source: Human Resources Canada

FIGURE 8-11
LABOUR STOPPAGES IN THE TRANSPORTATION SECTOR PERSON-DAYS LOST, 1990 – 1998



Source: Human Resources Canada

TABLE 8-48
NUMBER OF PERSON-DAYS LOST IN LABOUR STOPPAGES BY MODE OF TRANSPORTATION, 1990 – 1998

	Air	*Rail*	*Marine*	*Truck*	*Bus/ Urban*	*Taxi*	*Total Transport*
1990	1,100	29,540	20,160	14,100	31,070	630	96,600
1991	10,890	0	13,450	1,900	70,990	1,920	99,150
1992	89,090	1,290	10,070	4,200	1,090	1,950	107,690
1993	15,460	40,720	210	2,970	1,020	1,030	61,410
1994	6,960	30,170	32,500	1,750	25,400	86,150	182,930
1995	3,420	211,730	15,010	1,000	6,000	13,260	250,420
1996	600	2,150	0	850	42,820	3,440	49,860
1997	51,420	0	1,499	14,220	2,340	850	70,329
1998	33,840	180	10,340	660	28,150	0	73,170

Source: Human Resources Canada

PERSON-DAYS LOST

In 1998, 73,170 person-days were lost as a result of 14 labour stoppages, averaging just over 5,226 person-days lost per stoppage. The air sector was the most affected, accounting for 53 per cent of the total person-days lost, and averaging just under 11,280 person-days lost per stoppage. The water sector, with 3 stoppages in the year, averaged 3,447 person-days lost per stoppage; trucking averaged just 220.

Figure 8-11 and Table 8-48 show the number of person-days lost in labour stoppages from 1990 to 1998.

9

TRANSPORTATION AND TRADE

US trade share continued to increase as the growth of Canada's exports to the US surpassed the one of Canada's exports to the rest of the world.

Transportation is essential to trade. Canada's open economy relies on transportation for international trade, shipping to and receiving goods from foreign markets, and for domestic trade between provinces and regions.[1]

This chapter looks at domestic and international trade and their influence on transportation. Domestic trade is examined in terms of goods and services[2] trade, and interprovincial and intraprovincial trade; and international trade is looked at in terms of goods and services trade, trade with the US, and trade with other countries. In particular, the chapter examines how trade has influenced the type of transportation used, such as the rise of exports creating increased demand for transportation, but only in certain modes.

DOMESTIC TRADE

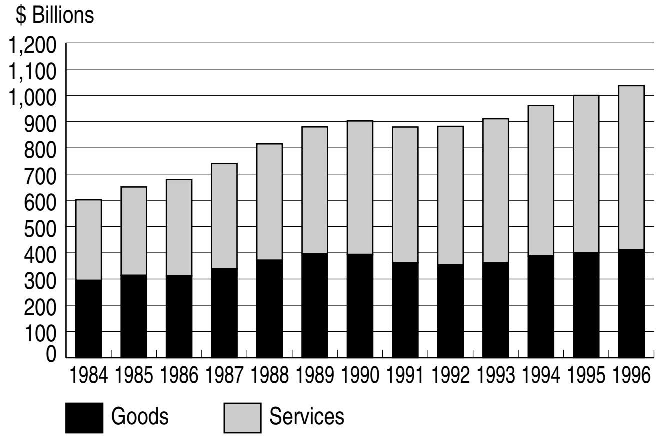
From 1984 to 1996, domestic trade rose from $602 billion to $1,037 billion (in current dollars). The increase was steady and interrupted only by the recession in the early 1990s. At seven per cent, the average annual growth rate was larger in the 1980s than in the post-recession period. From 1992 to 1996, the average annual growth rate was four per cent.

When broken down into goods and services, domestic trade experienced interesting trends from 1984 to 1996. Services'share of domestic trade increased from 50 to 60 per cent, enjoying continuous growth despite the recession from 1990 to 1992. Services also had an average annual growth rate of 6.1 per cent, more than twice that of goods at 2.8 per cent.

1 Interprovincial trade flows are estimated using the provincial National Accounts information system, which is based on inputs and outputs. The most recent year information is available is 1996, and a modal breakdown of the provincial trade flows is not included.

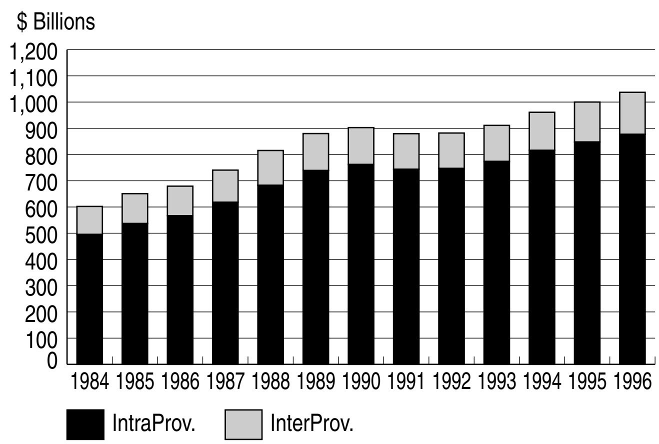
2 Goods consist of primary and manufactured products while services refer to activities such as transportation and storage, communication services, wholesale and retail trade services, finance, insurance and real estate services, business and personal and miscellaneous services.

FIGURE 9-1
DOMESTIC TRADE, BY TYPE
1984 – 1996



Source: Statistics Canada, Input-Output Division

FIGURE 9-2
DOMESTIC TRADE, BY SECTOR
1984 – 1996



Source: Statistics Canada, Input-Output Division

In terms of intraprovincial and interprovincial trade, however, there is little difference in domestic trade. Intraprovincial and interprovincial trade kept a similar share over the years, with intraprovincial trade at 85 per cent and interprovincial at 15 per cent.

Figures 9-1 and 9-2 show Canada's domestic trade by type and by sector from 1984 to 1996.

DOMESTIC TRADE AND TRANSPORTATION BY MODE

Examining transportation flows is a good way of estimating how important each mode is to domestic trade. In general, goods and services generate different needs in transportation.

In 1996, air, marine, rail and for-hire trucking moved 431 million metric tonnes of goods. Rail led the way with 46 per cent of tonnage, followed closely by for-hire trucking at 42 per cent. Marine was third, with 11 per cent. Air carried less than one per cent.

Table 9-1 shows that marine, rail and for-hire trucking were the modes used to ship primary products — grains, forestry commodities, metallic ores and concentrates, mineral fuels and non-metallic minerals. However, container shipping accounts for less than one per cent of domestic marine tonnage and six per cent of domestic rail tonnes.

For-hire trucking[3] realized half of its activity in shipping manufactured products — general freight, machinery and equipment, metal fabricated products, vehicles and parts, paper and paper products,

3 For-hire trucking includes Class I and II carriers earning an annual intercity revenue of $1 million and more, as defined by Statistics Canada in the "Quarterly For-Hire Trucking (Commodity Origin/Destination) Survey." Courier and messenger service, private carrier and owner operator activities are excluded from the Survey.

and chemicals. Modal transportation flows are examined in Chapter 14, on Freight Transportation

The real share of trucking would be higher, if the activities of small for-hire carriers, private trucking carriers and owner operators were added in.

Table 9-1 shows the domestic transportation flows for 1996.

INTRAPROVINCIAL TRADE

From 1984 to 1996, intraprovincial trade registered a five per cent average annual increase, from $495 billion to $877 billion, largely due to the growth in services. Figures 9-3 and 9-4 show intraprovincial trade by type and by province from 1984 to 1996. Services' share grew from 55 to 63 per cent.

Following the recession and up to 1996 inclusively, consumer spending on goods stalled in many provinces. Services increased on average by six per cent each year, while goods leveled at three per cent. Ontario remained the leader with 40 per cent of intraprovincial trade, followed by Quebec with 22 per cent, Alberta with 12 per cent and British Columbia with 14 per cent.

In 1996, each province's intra-provincial trade was mostly related to services, accounting for $556 billion, or 63 per cent of total intra-provincial trade. Personal and other miscellaneous services dominated with a 17 per cent share, followed by financial services (16 per cent), retail and wholesale services (15 per cent), construction-related services (14 per cent) and rent owner occupancy services at 11 per cent. The share of transportation services was seven per cent of total intra-provincial services trade.

TABLE 9-1
DOMESTIC TRANSPORTATION FLOWS
1996

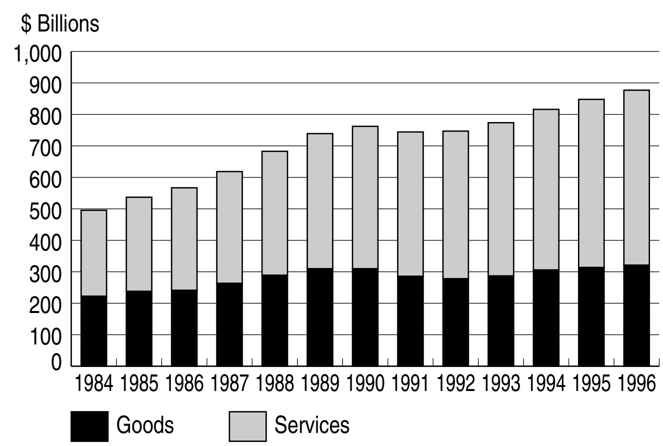
(Million metric tonnes)

	Rail	*Marine*	*For-hire Truck*	*Air*	*Total*
Primary products					
Grains	31.5	6.2	4.3		41.9
Forest prod.	20.1	10.1	29.3		59.5
Metallic ores	47.0	7.1	1.1		55.1
Non-metallic min.	62.2	11.0	21.3		94.5
Minerals fuels	4.1	7.9	23.1		35.2
Total:	**164.9**	**42.3**	**79.0**	**0.0**	**286.2**
Manufactured products	**35.1**	**6.5**	**102.9**	**0.5**	**145.1**
Total All products	**200.0**	**48.8**	**181.9**	**0.5**	**431.3**

Note: * Traffic flows take into account movements of shipments i.e. either loadings or unloadings (No double counting).

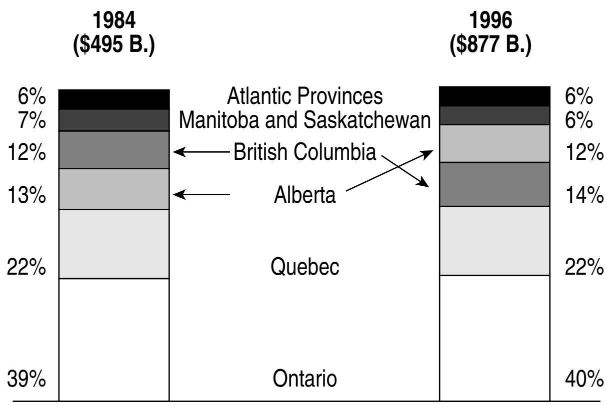
Source: Transport Canada, adapted from various Statistics Canada publications

FIGURE 9-3
INTRA-PROVINCIAL TRADE, BY TYPE
1984 – 1996



Source: Statistics Canada, Input-Output Division

FIGURE 9-4
INTRA-PROVINCIAL TRADE, BY PROVINCE
1984 and 1996



Source: Statistics Canada, Input-Output Division

TABLE 9-2
DOMESTIC TRANSPORTATION FLOWS BY SECTOR AND MODE
1996

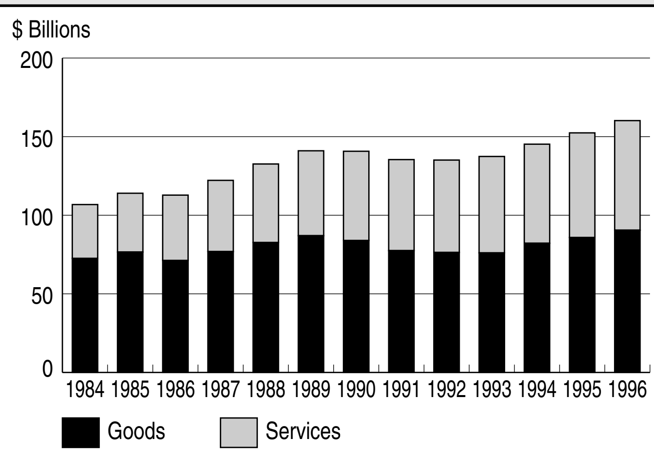
(Million metric tonnes)

	Rail	*Marine*	*For-hire Truck*	*Air*	*Total*
Sectors					
Intra-Provincial	87.6	30.4	143.1	N/A	261.1
Inter-Provincial	112.4	18.4	38.8	N/A	170.1
Total:	**200.0**	**48.8**	**181.9**	**0.5**	**431.3**

Note: * Traffic flows take into account movements of shipments i.e. either loadings or unloadings (No double counting).

Source: Transport Canada, adapted from various Statistics Canada publications

FIGURE 9-5
INTER-PROVINCIAL TRADE, BY TYPE
1984 – 1996



Source: Statistics Canada, Input-Output Division

Modal transportation

Roughly 60 per cent of domestic tonnage was related to intra-provincial activities and was moved mainly by for-hire trucks and rail. As mentioned previously, trucking's share is probably larger than shown here because data on private carriers, small local carriers and owner operators was not available.

Table 9-2 shows Canada's domestic trade flows by sector and mode for 1996.

INTERPROVINCIAL TRADE

Although a smaller component of domestic trade than the intraprovincial sector, interprovincial trade is still important. Over time, it shows economic interactions between provinces and reveals changes to such interactions.

From 1984 to 1996, interprovincial trade rose from $107 billion to $160 billion, for an average annual increase of 3.4 per cent, despite a negative growth during the 1990–1992 recession. Services drove this performance, registering a 6.1 per cent average annual growth, while goods experienced a 1.8 per cent average annual growth.

Figure 9-5 shows interprovincial trade by type, with services' share climbing from 32 to 44 per cent, and goods, although still dominant, declining in its total share.

Main East-West Routes

In 1996, the trade between Ontario and Quebec was worth $20 billion, making each the other's largest domestic trade partner. Combined, Ontario –Quebec trade accounted for 29 per cent of total interprovincial trade. Ontario and Alberta's interprovincial trade followed at 13 per cent.

Table 9-3 presents the key interprovincial trade markets and reveals that neighbouring provinces generally enjoy stronger trade links. Trade flow imbalances are also evident — only Ontario registered a trade surplus every year.

In 1996, total inter-provincial trade amounted to $160 billion. Ten inter-provincial trade flows. each with over $5 billion of trade, accounted for 68 per cent of that total, five of which with Ontario as the originating province. The most significant inter-provincial trade activity was observed from Ontario to Quebec, with $25.5 billion of trade, and composed of 54 per cent goods and 46 per cent services. The trade of goods within that inter-provincial market had to do with automobiles, trucks and transportation equipment ($3 billion); food-processed products ($2.4 billion); chemical products ($1.4 billion) and primary metal products. Services exported to Quebec had to do mainly with wholesale services ($3.6 billion), financial ($3.4 billion), transportation, business and personal services.

The second largest flow, from Quebec to Ontario, amounted to $20.2 billion, $13.2 billion of goods and $7 billion of services. Main goods traded were food-processed items, primary metal products, chemicals and transportation equipment. Services included wholesale and retail services, transportation and financial services.

Figures 9-6 and 9-7 show main inter-provincial trade flows in 1996.

TABLE 9-3
INTER-PROVINCIAL TRADE*, 1996
MAIN EAST-WEST ROUTES

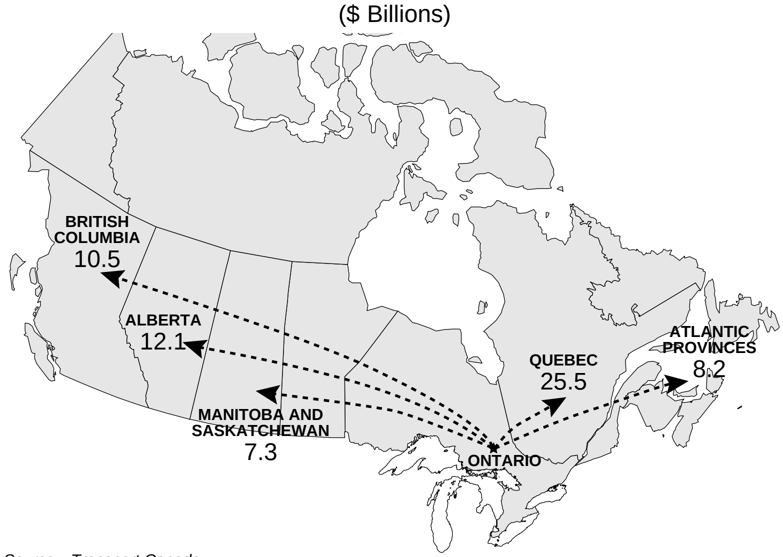
($ Billion)

Routes (from/ to)	Trade Value	Total 2-way	Share in %
Ontario / Quebec	25.5	45.7	29%
Quebec/ Ontario	20.2		
Ontario / Alberta	12.1	20.7	13%
Alberta / Ontario	8.5		
Ontario / B.C.	10.5	14.6	9%
B.C. / Ontario	4.0		
Ontario / Man. & Sask.	7.3	12.2	8%
Man. & Sask./ Ontario	4.9		
Alberta / B.C.	6.1	11.4	7%
B.C. / Alberta	5.3		
Ontario / Atlantic prov.	8.2	10.6	7%
Atlantic prov. / Ontario	2.4		
Quebec / Atlantic prov.	5.0	7.9	5%
Atlantic prov. / Quebec	2.9		
Alberta / Man. & Sask.	4.5	7.8	5%
Man. & Sask. / Alberta	3.4		
Sub-Total:		**130.8**	**82%**
Other routes		**29.4**	**18%**
TOTAL Inter-provincial trade:		**160.2**	**100%**

Note: * No double counting as the exports of one province are the imports of another.
Source: *Transport Canada, adapted from Statistics Canada, Input-Output Division*

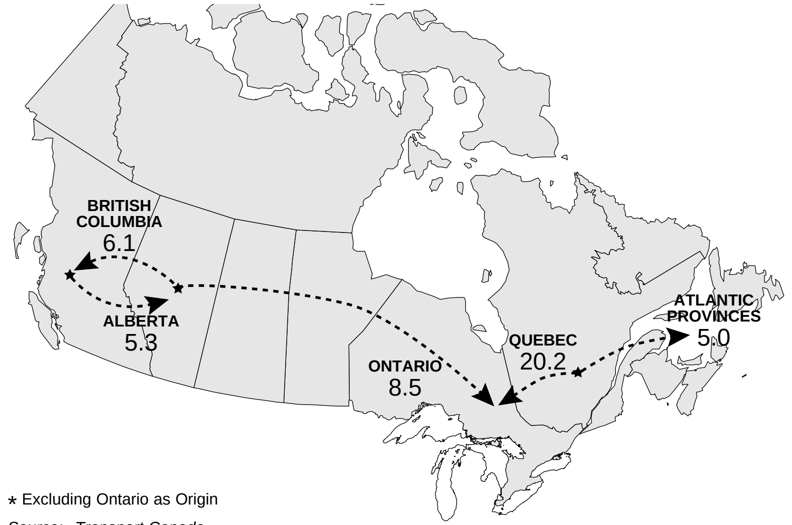
FIGURE 9-6
INTER-PROVINCIAL TRADE, 1996
MAIN TRADE FLOWS, ONTARIO AS ORIGIN

($ Billions)



Source: *Transport Canada*

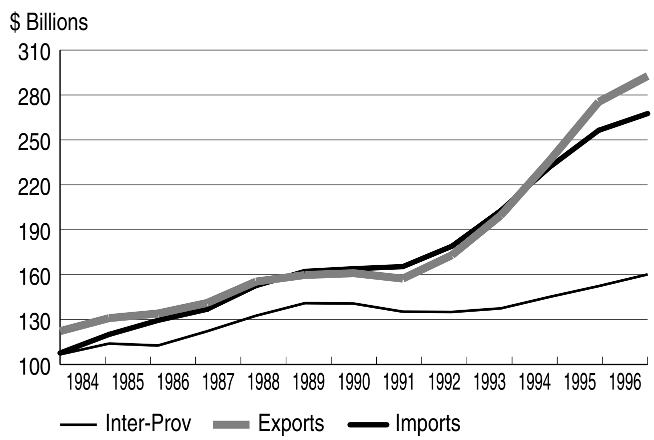
FIGURE 9-7
INTER-PROVINCIAL TRADE, 1996
MAIN TRADE FLOWS, OTHER REGIONS* AS ORIGIN
($ Billions)



* Excluding Ontario as Origin

Source: Transport Canada

FIGURE 9-8
TRENDS: INTER-PROVINCIAL TRADE
Vs EXPORTS / IMPORTS, 1984 – 1996



Source: Statistics Canada, Input-Output Division

Major Goods and Services

In 1996, the major goods shipped in interprovincial trade were:

- passenger autos, trucks and other transportation equipment at $9.8 billion;
- fruits, vegetables and other food products at $8.1 billion;
- chemical products at $8 billion;
- mineral fuels at $7.9 billion; and
- meat, fish and dairy products at $6.8 billion.

These goods represent 45 per cent of total goods exported to other provinces.

The major services used were:

- wholesale services at $16.8 billion;
- transportation services at $13.7 billion;
- financial services at $13.6 billion; and
- personal and miscellaneous services at $8.2 billion.

These services accounted for 75 per cent of total services exported to other provinces.

International Trade

Trade flows are a good indication of what is influencing the Canadian economy. Comparing east/west interprovincial trade flows with north/south international trade flows demonstrate how foreign trade increased in economic importance during the early 1990s.

Figure 9-8 shows that from 1984 to 1990, interprovincial trade was almost as important as international exports, with both growing at an average annual rate of 4.7 per cent. From 1990 to

1996, international exports increased at an average annual rate of 10.5 per cent, while interprovincial trade grew at 2.2 per cent. Also from 1990 to 1996, international exports climbed from $161 billion to $293 billion, while interprovincial trade went from $141 billion to $160 billion. International imports grew significantly, reaching an average annual rate of 7.3 per cent from 1984 to 1990 and 8.5 per cent from 1990 to 1996.

Figure 9-8 shows trends in interprovincial trade versus exports and imports from 1984 to 1996.

Composition of Exports and Imports

As would be expected, foreign exports and imports are mostly goods, accounting for 84 per cent of total international trade, with services accounting for the remaining 16 per cent.

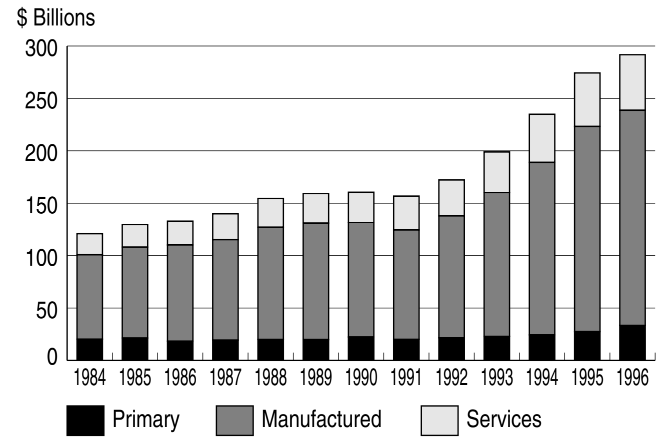
Figures 9-9 and 9-10 show Canada's exports to and imports from the world by type from 1984 to 1996.

In 1996, the major exports of goods were automobiles, trucks and other transportation equipment, accounting for $69.1 billion of total manufactured goods exported, followed by pulp and paper products at $18.6 billion, mineral fuels at $17.4 billion, machinery and equipment at $16.5 billion, and primary metal products at $15.3 billion.

The major exports of services included transportation services at $14.7 billion, followed by wholesale services at $10.8 billion, personal and miscellaneous services at $10.1 billion.

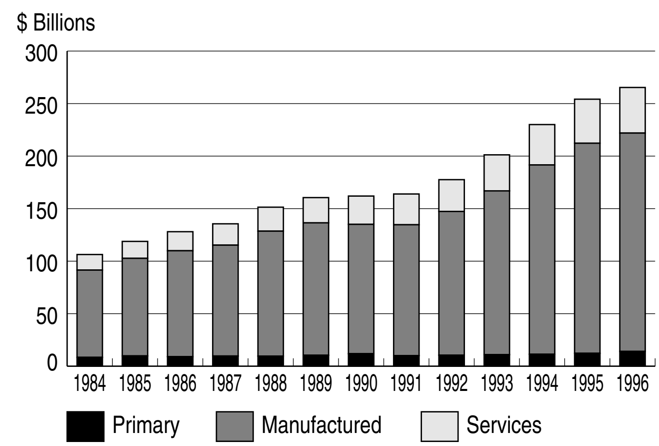
The major imports of goods were automobiles, trucks and other transportation equipment at

FIGURE 9-9
EXPORTS TO WORLD, BY TYPE
1984 – 1996



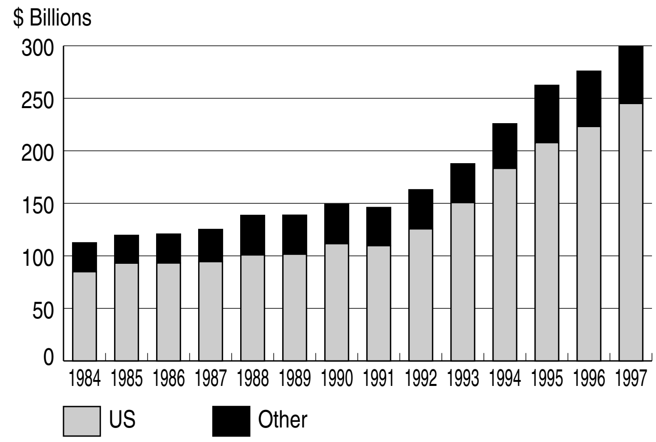
Source: Statistics Canada, Input-Output Division

FIGURE 9-10
IMPORTS FROM WORLD, BY TYPE
1984 – 1996



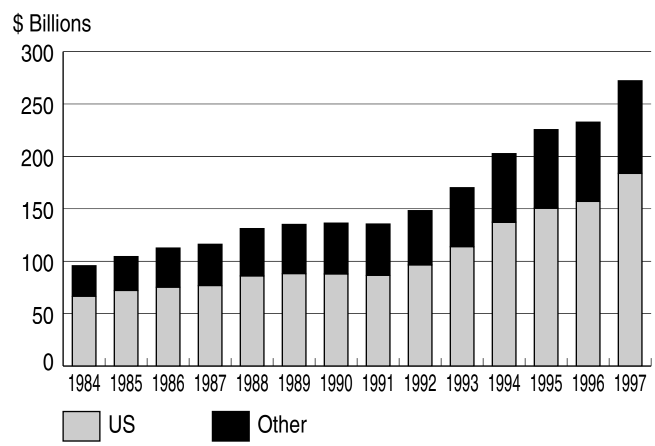
Source: Statistics Canada, Input-Output Division

FIGURE 9-11
EXPORTS TO WORLD, US vs Non-US
1984 – 1997



Source: *Statistics Canada, International Trade Division*

FIGURE 9-12
IMPORTS FROM WORLD, US vs Non-US
1984 – 1997



Source: *Statistics Canada, International Trade Division*

$57.5 billion of all imported manufactured goods, followed by machinery and equipment at $32.9 billion, electrical and communication products at $23.1 billion, and chemical products at $17.8 billion. The major imports of services were personal and miscellaneous services at $12.3 billion and business services at $9.9 billion.

Main Trade Flows

To illustrate how trade flows affect the choice of modes, the trade flows of goods will be examined in two ways: Canada's trade with the US and Canada's trade with countries other than the US.

CANADA/US TRADE

Impact of Canada–US Trade

Canada's trade with the US has been and continues to be a determining influence in the overall performance of Canada's international trade. From 1984 to 1997, the share of exports to the US increased from 75 to 82 per cent. Between 1984 and 1990, exports had an average annual growth rate of 4.7 per cent, and then, from 1990 to 1997, skyrocketed to almost 12 per cent. Total exports to the US jumped from $112 billion in 1990 to $245 billion in 1997. Between 1984 and 1997, exports to countries other than the US experienced a 5.3 per cent average annual growth rate.

Imports from the US oscillated between 64 and 69 per cent, experiencing growth patterns similar to exports. From 1984 to 1990, imports increased by an average annual growth rate of 4.8 per cent, and then, from 1990 to 1997, jumped to 11 per cent. Total imports from the US leapt from $88 billion in 1990 to

$184 billion in 1997. As for countries other than the US, imports grew robustly with an average annual growth rate of 8.9 per cent from 1984 to 1997.

Figures 9-11 and 9-12 show Canada's imports and exports to the US and countries other than the US.

Modal Split and Composition of US Trade

For exports and imports, surface modes were the favourite choice for transborder trade.[4] In 1997, road handled almost 60 per cent of exports to the US and almost 79 per cent of imports from the US, followed by rail with 24 and ten per cent respectively. Pipeline transport (included under "Other") also figured strongly in exports.

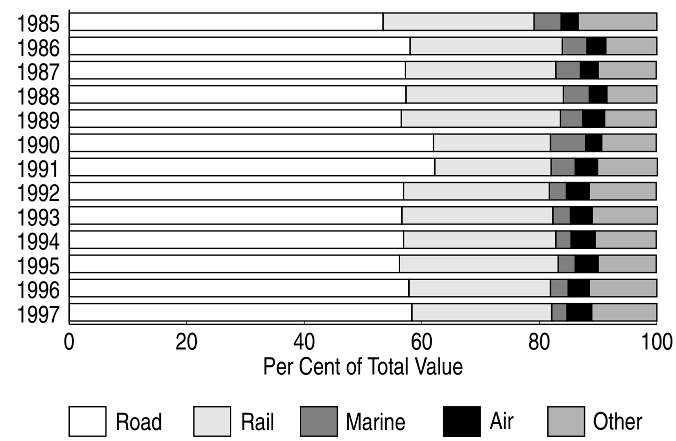
Figures 9-13 and 9-14 show Canada's exports to and imports from the US by modal share.

The major exports of goods were motor vehicles and parts at $65.9 billion, followed by machinery and equipment at $60.4 billion, forest products at $18.1 billion, petroleum products at $17.3 billion, and non-ferrous and alloy products at $11.2 billion.

The modes used for shipping and their respective shares were:

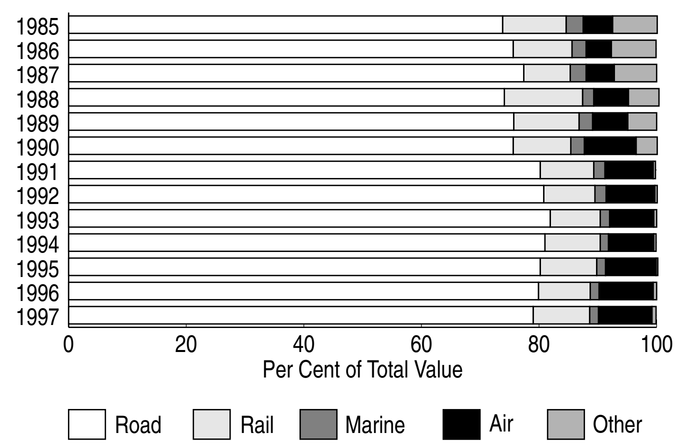
- motor vehicles and parts: 58 per cent by road, 42 per cent by rail;
- machinery and equipment: 80 per cent by road, 15 per cent by air;
- forest products: 34 per cent by road, 54 per cent by rail; and
- petroleum products: 72 per cent by pipeline, 19 per cent by marine.

FIGURE 9-13
EXPORTS TO THE US BY MODAL SHARES
1985 – 1997



Source: Statistics Canada, International Trade Division

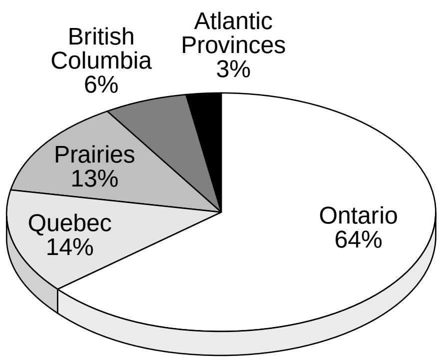
FIGURE 9-14
IMPORTS FROM THE US BY MODAL SHARES
1985 – 1997



Source: Statistics Canada, International Trade Division

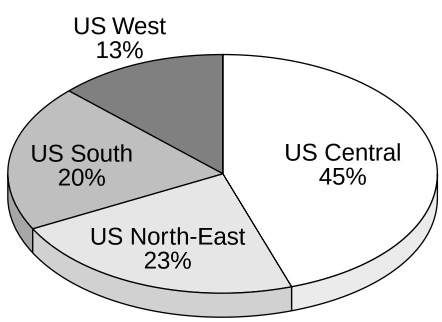
4 More than one mode of transportation might be used to carry traded goods from origin to destination. For exports, the mode of transportation indicates the mode by which the international boundary is crossed. This may be different from the mode within Canada. For imports, the mode of transportation represents the last mode by which the cargo was transported to the port of clearance in Canada. This may not be the mode by which the cargo arrived at the Canadian port of entry in the case of inland clearance. This may, therefore, lead to some underestimation of Canadian imports by the marine and air transportation modes.

FIGURE 9-15
CANADA-US TRADE, BY REGION
1997



Source: Statistics Canada, International Trade Division

FIGURE 9-16
CANADA-US TRADE, BY US REGION
1997



Source: Statistics Canada, International Trade Division

The major imports of goods were machinery and equipment at $70.9 billion, with road accounting for 80 per cent and air for 18 per cent. Motor vehicles and parts were next at $50.6 billion, with road accounting for 80 per cent and rail for 20 per cent.

Canada–US Trade by Region and States[5]

In 1997, Ontario dominated Canada–US trade, accounting for 64 per cent of total trade, or $140 billion in exports and $134 billion in imports. Quebec and the Prairies (Manitoba, Saskatchewan and Alberta) followed with 14 and 13 per cent respectively. All Canadian regions, except the Yukon and Northwest Territories, registered a positive balance of their trade with the US (i.e., exports were greater than imports).

Figures 9-15 and 9-16 show Canada–US trade by province and by US region for 1997.

In 1997, the central US region captured $191 billion of the transborder Canadian trade. The north-east region came second with $96 billion, followed by the southern region at $85 billion and the western region at $57 billion. All US regions, except the south, recorded a negative trade balance with Canada.

5 “US Central” includes the states bordering the Great Lakes (central east) and those of North and South Dakota, Nebraska, Kansas, Iowa, Minnesota and Missouri (central west); “US North East” refers to New England States and Atlantic States such as New Jersey, New York and Pennsylvania; “US South” includes southern states from the Atlantic coast to the Gulf of Mexico; and “US West” refers to US mountain states and Pacific states.

Major Canada–US Trade Flows

In 1997, Canada and the US had 14 different trade flows worth $10 billion each, accounting for 81 per cent of total Canada–US trade.

The largest trade flow occurred between Ontario and the US states bordering the Great Lakes, with exports of $72 billion and imports of $59 billion that account for 30 per cent of total Canada–US trade. Ontario's exports, mostly to Michigan, were dominated by the vehicles and parts trade, valued at $48.2 billion. The main modes used were road at $26.7 billion and rail at $21.5 billion.

Likewise, Ontario's imports were mainly from Michigan and mostly in the vehicle and parts trade, at $30.6 billion. The main mode used was road at $26.6 billion, followed by rail at $4 billion. Ontario also imported $16 billion in machinery and equipment, with road as the mode of choice.

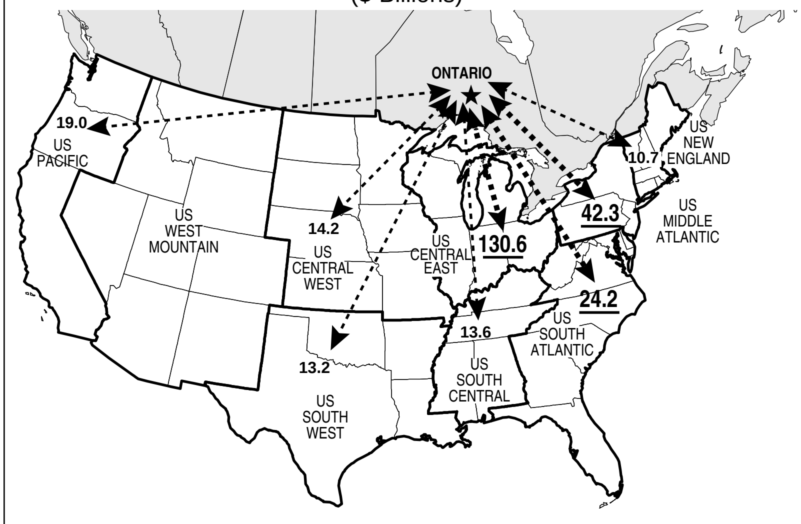
Figures 9-17 and 9-18 show Canada–US trade flows involving Ontario and other Canadian regions in 1997.

Table 9-4 identifies the 14 trade flows, showing the trade balance and modal breakdown for each.

Of the 14 trade flows, 8 involve Ontario, an indication of how important this province is to Canada's trade with the US.

FIGURE 9-17
CANADA-US TRADE
MAIN ONTARIO TRADE FLOWS, 1997

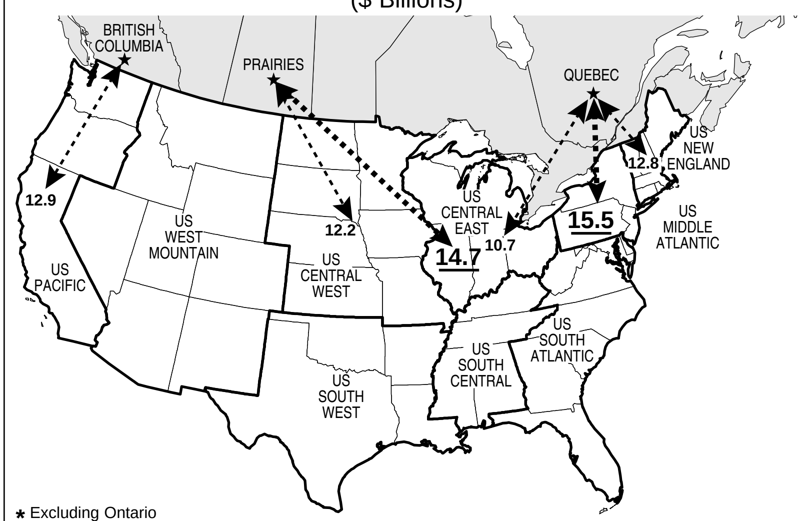
($ Billions)



Source: *Transport Canada*

FIGURE 9-18
CANADA-US TRADE
MAIN CANADIAN REGIONS* TRADE FLOWS, 1997

($ Billions)



* Excluding Ontario

Source: *Transport Canada*

TABLE 9-4
CANADA-US TRANSBORDER TRADE, 1997
MAIN NORTH-SOUTH TRADE FLOWS

($ Billion)

Canadian Region	*US Region*	*Exports from Canada*	*Imports to Canada*	*Total trade*	*Share in Per cent*	*Main modes used (Percent of total value)*
Ontario	US Central East	71.7	58.9	130.6	30	Road (76%), Rail (22%)
Ontario	US Middle Atlantic	23.3	19.0	42.3	10	Road (83%), Rail (10%)
Ontario	US South Atlantic	9.6	14.6	24.2	6	Road (80%), Rail (10%)
Ontario	US Pacific	10.9	8.1	19.0	4	Road (60%), Air (27%)
Ontario	US Central West	5.6	8.6	14.2	3	Road (73%), Rail (18%)
Ontario	US South Central	4.8	8.8	13.6	3	Road (79%), Rail (17%)
Ontario	US South West	5.0	8.2	13.2	3	Road (70%), Rail (17%)
Ontario	US New England	5.6	5.0	10.7	2	Road (78%), Air (14%)
Quebec	US Middle Atlantic	11.3	4.3	15.5	4	Road (77%), Rail (13%)
Quebec	US New England	8.1	4.6	12.8	3	Road (84%), Air (6%)
Quebec	US Central East	8.8	1.9	10.7	2	Road (54%), Rail (34%)
Prairies	US Central East	10.0	4.7	14.7	3	Road (36%), Pipeline (44%)
Prairies	US Central West	8.7	3.4	12.2	3	Road (48%), Pipeline (37%)
B.C.	US Pacific	6.9	6.0	12.9	3	Road (71%), Marine (9%)
Sub-Total:		**190.4**	**156.1**	**346.5**	**81**	
Other		54.7	27.8	82.5	19	
TOTAL Canada/US trade:		**245.1**	**183.9**	**429.0**	**100**	

Source: Transport Canada, adapted from Statistics Canada, International Trade Division

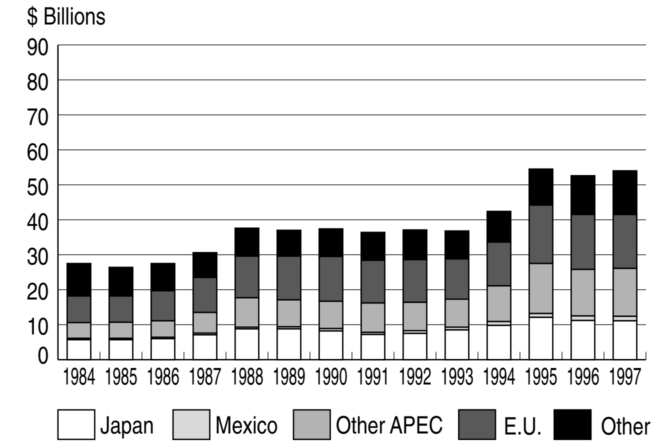
CANADA'S TRADE WITH COUNTRIES OTHER THAN THE US

As mentioned previously, Canada's trade with countries other than the US is not as significant as trade with the US. In the 1990s, Canadian exports to the US rose twice as much as exports to countries other than the US. In 1997, Canada's exports to countries other than the US represented 18 per cent of total exports, compared with 25 per cent in 1984. From 1984 to 1990, imports from these countries grew greater on average than imports from the US, but the reverse occurred between 1990 and 1997, with imports falling from 36 to 32 per cent.

Canada has a negative trade balance with most countries other than the US. In 1997, exports to overseas countries were $54 billion, while imports from the same countries reached $88.2 billion. From 1990 to 1997, Canada's exports to Japan, Mexico and other APEC[6] countries grew at the average annual rate of 6.6 per cent, while exports to European Union countries increased by 2.6 per cent yearly. On the import side, a similar trend was observed, imports from APEC countries (excluding the US) growing at ten per cent per year over that same period while imports from E.U. countries increased by six per cent annually.

Figures 9-19 and 9-20 show Canada's exports to and imports from countries other than the US.

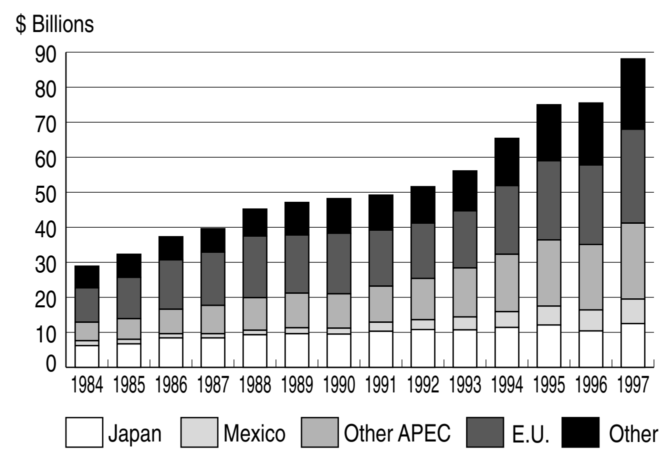
FIGURE 9-19
EXPORTS TO NON-US COUNTRIES
1984 – 1997



Note: APEC = Asia-Pacific Economic Cooperation Group E.U. = European Union

Source: Statistics Canada, International Trade Division

FIGURE 9-20
IMPORTS FROM NON-US COUNTRIES
1984 – 1997

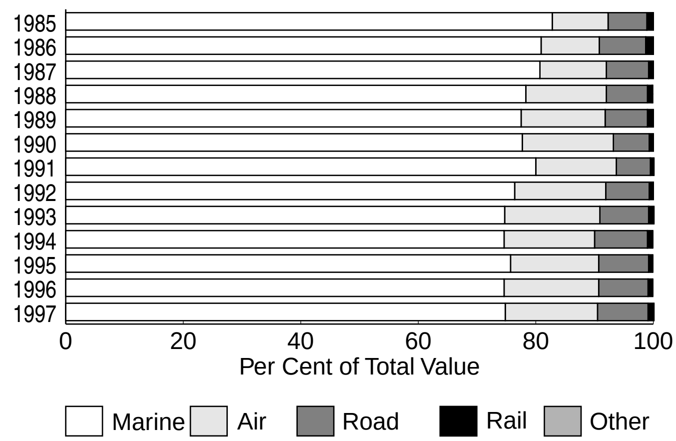


Note: APEC = Asia-Pacific Economic Cooperation Group E.U. = European Union

Source: Statistics Canada, International Trade Division

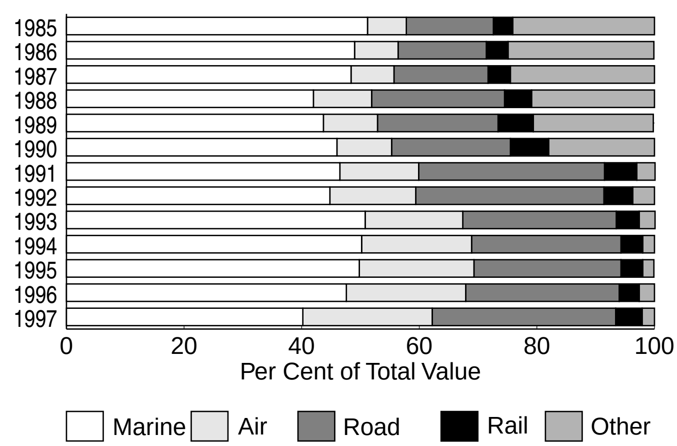
6 Not counting Canada and the US, the Asia-Pacific Economic Cooperation Group (APEC) has 17 members: Australia, New Zealand and Papua New Guinea; Chile, Peru and Mexico; Brunei, China People's Republic, Hong Kong, Indonesia, Japan, South Korea, Malaysia, Philippines, Singapore, Taiwan and Thailand.

FIGURE 9-21
EXPORTS TO NON-US COUNTRIES BY MODAL SHARES, 1985 – 1997



Source: *Statistics Canada, International Trade Division*

FIGURE 9-22
IMPORTS FROM NON-US COUNTRIES BY MODAL SHARES, 1985 – 1997



Source: *Statistics Canada, International Trade Division*

Modal Breakdown and Composition of Trade

From 1985 to 1997, marine was the dominant mode in trade with countries other than the US. Marine's share of total trade declined, however, while air's share increased. In particular, marine's share of exports fell from 83 per cent to 75 per cent, while air's share experienced the opposite, increasing from ten per cent to 16 per cent.

In 1985, marine accounted for 51 per cent of total goods imported from countries other than the US. By 1997, the figure had declined to 40 per cent. Over the same period, air's share grew from seven per cent to 22 per cent, reflecting the growing trade of high-valued commodities to and from Canada, such as electronic and telecommunications equipment.

In 1997, exports by marine accounted for $39.2 billion of total exports to countries other than the US. Forest products were the biggest export at $10 billion, followed by cereals at $6.7 billion, metal ores at $2.9 billion, coal at $2.5 billion, and non-ferrous metals and alloys at $2.5 billion. Imports by marine totalled $35.4 billion, including petroleum products at $7 billion, motor vehicles and parts at $4.9 billion, food products at $3.4 billion and manufactured end-products. (Please see Freight Transportation Chapter for trade traffic by air).

Figures 9-21 and 9-22 show Canada's exports to and imports from countries other than the US by modal share from 1985 to 1997.

Direction of Trade Flows

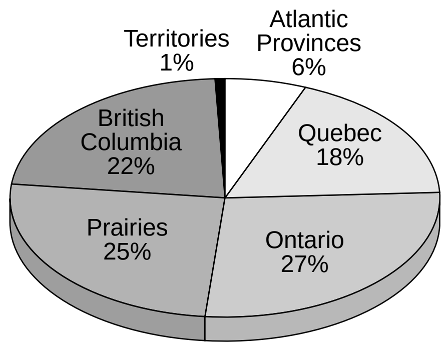
In 1997, Canada's eastern provinces (Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland) accounted for just over half of Canada's exports to countries other than the US, while the western provinces (Manitoba, Saskatchewan, Alberta and British Columbia) accounted for just under half. For import of goods, the eastern provinces accounted for over 80 per cent, dominated by Ontario at 47 per cent.

Figures 9-23 and 9-24 show Canada's exports to and imports from countries other than the US by province for 1997.

In 1997, eastern Canada imported more than it exported to countries other than the US. For Ontario, the ratio of imports to exports was $41.5 billion to $14.7 billion; for Quebec, $22.0 billion to $9.8 billion; and for the Atlantic provinces (New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland), $8.4 billion to $3.3 billion.

For western Canada, the ratio was reversed. For the Prairie region (Manitoba, Saskatchewan, Alberta), the ratio of imports to exports was $4.5 billion to $13.7 billion and for British Columbia, $11.7 billion to $12.1 billion. The reverse ratio is largely due to the western provinces' major trade with Pacific Rim countries.

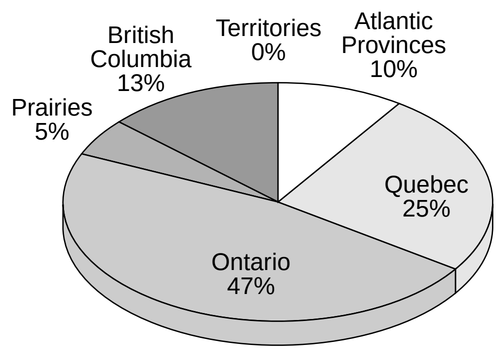
FIGURE 9-23
EXPORTS TO NON-US COUNTRIES BY PROVINCE, 1997



($54 Billion)

Source: Statistics Canada, International Trade Division

FIGURE 9-24
IMPORTS FROM NON-US COUNTRIES BY PROVINCE, 1997

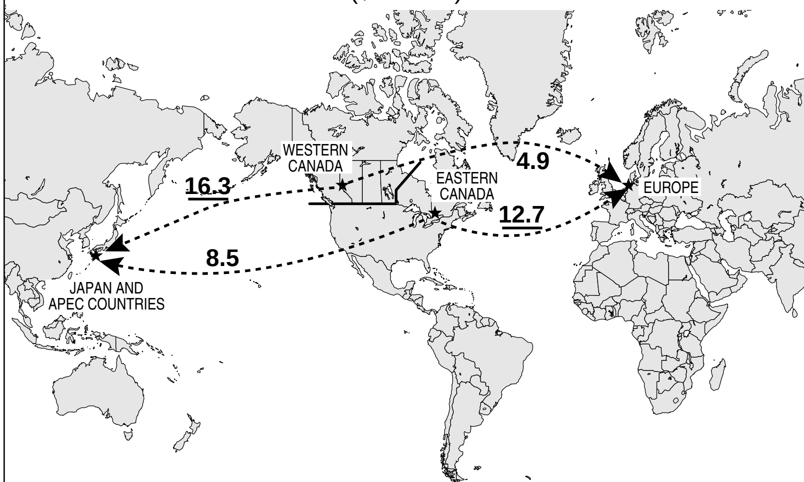


($88.2 Billion)

Source: Statistics Canada, International Trade Division

FIGURE 9-25
EXPORTS TO NON-US COUNTRIES
BY MODAL SHARES, 1985 – 1997

($ Billions)



Source: Transport Canada

TABLE 9-5
CANADA'S TRADE WITH NON-US COUNTRIES
MAIN TRADE FLOWS - EXPORTS, 1997

($ Billion)

Exports to:	*Origin* Eastern Provinces	Western Provinces	*Total*	*Main Modes Used (Per cent of total value)*
Japan & other APEC	8.5	16.3	24.8	Marine (79%), Air (13%)
E.U. & other Europe	12.7	4.9	17.6	Marine (71%), Air (24%)
Latin America	3.4	1.4	4.8	Marine (53%), Road (23%)
Middle E. & Africa	1.9	2.6	4.5	Marine (75%), Air (13%)
Mexico	0.7	0.6	1.3	Marine (38%), Road (40%)
Other	0.5	0.4	0.9	Marine (84%), Air (10%)
TOTALS	**27.8**	**26.2**	**54.0**	

Source: Transport Canada, adapted from Statistics Canada, International Trade Division

Major Trade Flows

Canada's export trade to countries other than the US has four major trade flows, which account for 79 per cent of those exports in 1997. These are: western provinces to Japan and other APEC countries at $16.3 billion; western provinces to the European Union and other European countries at $4.9 billion; eastern provinces to the European Union and other European countries at $12.7 billion; and eastern provinces to Japan and other APEC countries at $8.5 billion.

Figure 9-25 and Table 9-5 show the major trade flows for Canada's export trade with countries other than the US.

Canada's largest trade flow occurs from the western provinces to Japan and other APEC countries and is mainly composed of forest products, followed by cereals, coal, chemicals and food-processed products. Marine was almost the sole mode used, at 96 per cent.

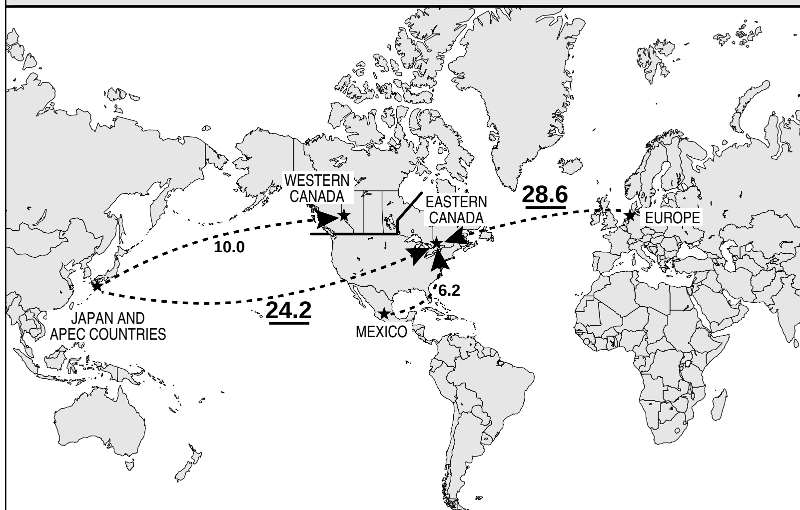
Canada's import trade from countries other than the US also has four major trade flows, which account for 78 per cent of total goods imported. These are: the European Union and other European countries to the eastern provinces at $28.6 billion; Japan and other APEC countries to eastern provinces at $24.2 billion; Japan and other APEC countries to western provinces at $10.0 billion; and Mexico to eastern provinces at $6.2 billion.

Figure 9-26 and Table 9-6 show the major trade flows for Canada's import trade with countries other than the US.

Notably, three of the flows are to eastern provinces, and mostly to Ontario at that. In 1997, Eastern Canada imported $28.6 billion from the European Union and other European countries, mostly in manufactured end-products (transportation and telecommunication equipment, machinery and other equipment) at $11.7 billion, followed by petroleum products at $5.3 billion and chemicals at $3.1 billion. The main mode used was marine, at 49 per cent, followed by air at 29 per cent.

Likewise, the eastern provinces imported a total of $24.2 billion from Japan and other APEC countries, including manufactured end-products at $17.9 billion; motor vehicles and parts at $1.5 billion; and food-processed products at $1.3 billion. The main mode used was marine, at 32 per cent, followed by air at 25 per cent and road at 37 per cent. Road could be overestimated due to trans-shipments via the US. As well as some of that traffic going to the marine and air modes.[7]

FIGURE 9-26
IMPORTS FROM NON-US COUNTRIES BY MODAL SHARES, 1985 – 1997



Source: Transport Canada

TABLE 9-6
CANADA'S TRADE WITH NON-US COUNTRIES MAIN TRADE FLOWS - IMPORTS, 1997

	($ Billions) Destination			
Imports from:	*Eastern Provinces*	*Western Provinces*	*Total*	*Main Modes Used (Per cent of total value)*
Japan & other APEC	24.2	10.0	34.3	Marine (41%), Road (34%)
E.U. & other Europe	28.6	3.9	32.5	Marine (47%), Air (31%)
Mexico	6.2	0.8	7.0	Road (67%), Rail (22%)
Latin America	3.9	0.4	4.3	Marine (48%), Road (36%)
Middle East & Africa	3.8	0.2	4.0	Marine (78%), Air (10%)
Other	5.2	0.9	6.1	Road (58%), Air (26%)
TOTALS	**72.0**	**16.2**	**88.2**	

Source: Transport Canada, adapted from Statistics Canada, International Trade Division

7 Truck and rail information can be used to estimate the importance of Canada's trade with countries other than the US, routed through the US. However, in the import case, such an estimate is more difficult to arrive at, as cargo control documents information may lead to some underestimation of Canadian imports by the marine and air modes.

TABLE 9-7
DOMESTIC EXPORTS BY COUNTRY GROUPINGS
1997 vs 1998

($ Billion)

Destination	*Jan./Dec. 1997*	*Jan./Dec. 1998*	*Growth Rate (Per cent)*
USA	229.3	252.4	+ 10.1
Japan	11.0	8.2	- 26.0
Other APEC	13.4	9.7	- 27.6
Mexico	1.2	1.3	+ 6.6
E.U.	14.7	15.1	+ 2.7
Other countries	11.6	10.1	- 13.0
Total World	**281.2**	**296.7**	**+ 5.5**

Note: Preliminary data for 1998.

Source: Statistics Canada, Cat. 65-001, December 1998

TABLE 9-8
IMPORTS TO CANADA BY COUNTRY GROUPINGS
1997 vs 1998

($ Billion)

Origin	*Jan./Dec. 1997*	*Jan./Dec. 1998*	*Growth Rate (Per cent)*
USA	184.3	203.3	+ 10.3
Japan	12.6	14.0	+ 11.4
Other APEC	21.8	24.8	+ 13.6
Mexico	7.0	7.6	+ 8.9
E.U.	26.9	28.4	+ 5.7
Other countries	20.2	20.1	+ 0.5
Total World	**272.9**	**298.3**	**+ 9.3**

Note: Preliminary data for 1998.

Source: Statistics Canada, Cat. 65-001, December 1998

RECENT TRENDS

In recent years, trade and the global economy have been tackling the Asian and Latin American currency crisis and recession. In 1998, exports to Japan and Asian APEC countries declined respectively by 26 and 28 per cent from their 1997 levels. Exports under the “Other” category, which includes the Latin American economies, decreased by 13 per cent over the same period.

For the same period, however, exports to the US increased by over ten per cent. By the end of 1998, Canada’s exports to the US accounted for 85 per cent of total Canadian exports, compared with 81 per cent a year previous.

Table 9-7 shows Canada’s exports by major country grouping.

In 1998, Canada’s imports from Japan and APEC Asian countries were still strong, registering an increase of 11 and 14 per cent respectively.

Table 9-8 shows the increase is in accordance with the general trends in imports.

10

TRANSPORTATION AND TOURISM

Tourist spending in Canada amounted to $44 billion, 40 per cent of which was on transportation.

In a country as vast as Canada, transportation and tourism[1] are intrinsically related. There are great distances between tourist destinations, and tourists need a fast, efficient and convenient means of getting from place to place, whether it's around the corner or across the country. Canada's transportation system must cover all demands, both large and small.

The year 1998 was one characterized by change. American tourists flocked to Canada in record numbers on the strength of their dollar. The number of Asian and European tourists fell as a result of economic and financial difficulties of countries and changes in the relative value of their currencies. At the same time, Canadian travel to destinations other than the US increased. In 1997, tourist spending in Canada amounted to $44 billion, of which $17.6 or 40 per cent went to transportation.

TOURISM EXPENDITURES

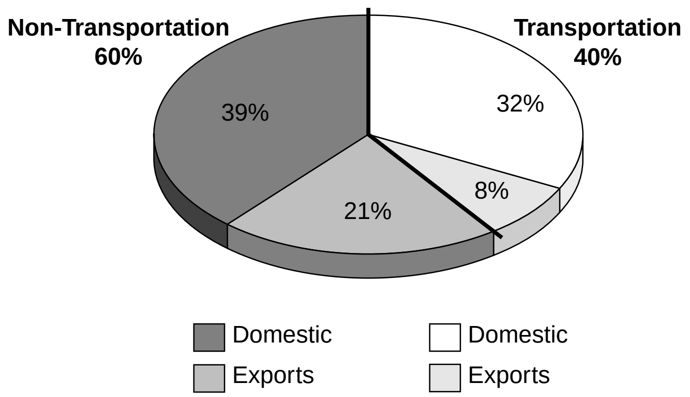
TOURISM SPENDING IN CANADA

Tourism spending in Canada has grown steadily during the 1990s, rising at an average rate of 2.9 per cent per year from 1991 to 1997. In 1997, tourism spending reached $44 billion, a 5.3 per cent increase over 1996. Available data

1 Tourism refers to people travelling to and staying in places outside their usual environment. These trips are for business, leisure or other purposes, and last no longer than one year. For Canadians within Canada, a trip must be at least 80 kilometres from the traveller's place of residence to be considered tourist travel. International travel refers to travel to or from Canada. This definition of tourism, which is much broader than the common definition that only includes leisure travel, often only to major destinations, is used by the United Nations World Tourism Organization, Statistics Canada and the Canadian Tourism Commission.

FIGURE 10-1
DISTRIBUTION OF TOURISM SPENDING IN CANADA
1997

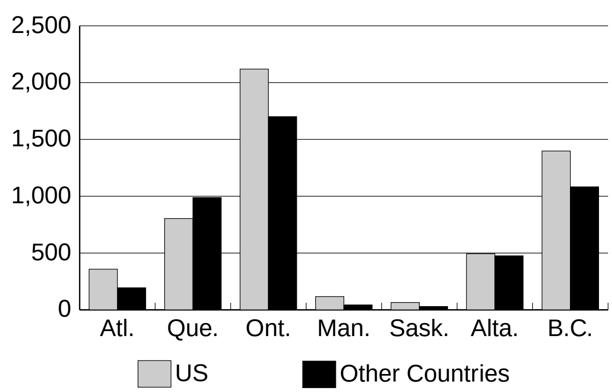
(Total $44.0 Billion)



Source: Statistics Canada, Cat. 13-009-XPB

FIGURE 10-2
TOURISM SPENDING IN CANADA BY PROVINCE
1997

($Millions)



Source: Statistics Canada, Special Compilations

indicates that this upward trend continued in 1998, when tourism spending in the third quarter of the year reached $17.3 billion, a 6.5 per cent increase over the same period in 1997.

The lower Canadian dollar contributed greatly to the rise in tourism spending in Canada. It kept Canadians at home to spend their tourist dollars, while attracting more tourists from the US. This rise was tempered by the Asian financial crisis, which caused a drop in Asian tourists.

DISTRIBUTION OF SPENDING

Figure 10-1 shows the distribution of tourist spending in Canada for 1997. Canadians spent the greatest amount, with $31.3 billion or 71 per cent, while foreign tourists spent $13.1 billion or 29 per cent. Growth in tourism spending by foreign visiters was 5.2 per cent in 1997, compared with a 5.3 per cent increase in expenditures by Canadians. Foreign spending on tourism, on the other hand, remained at approximately 23 per cent between 1987 and 1993, and then began to rise to its 1997 level. This trend appears to have continued in 1998.

International tourists staying at least one night spent the greatest proportion of their tourist dollars – 39 per cent – in Ontario. British Columbia was second with 25 per cent, and the province of Quebec third with 18 per cent. Tourists from the US made up about 70 per cent of all overnight visitors, but accounted for just over half the spending, which reflects the fact that overseas tourists stay longer than US tourists. For most provinces, spending by Americans exceeded those of tourists from other countries. However, in Quebec, spending by overseas visitors exceeded spending by US visitors, while in Alberta, their spending was about equal. Figure 10-2 shows the distribution of tourist spending across Canada.

Spending on Transportation

Tourism expenditures on transportation were $17.6 billion in 1997, up 6.6 per cent from the previous year. Transportation spending accounted for 40 per cent of all 1997 tourism spending in Canada. Of this, $9.8 billion, or 56 per cent, was spent on air transportation, a 10.3 per cent increase from 1996. Air transportation spending has been on the increase since 1991 and accounts for over 55 per cent of the increase in transportation expenditures during this time. Air transportation accounted for about the same 55 per cent share in both export and domestic tourism spending on transportation.

Motor vehicle transportation was the other major spending category in 1997, with 37 per cent of the total spending. But spending on motor vehicle transportation has only increased by three per cent since 1991.

Intercity bus transport accounted for three per cent and rail for one per cent of the tourism spending on transportation in 1997.

The remaining spending went to water transport, urban transit, taxis and parking.

Figure 10-3 shows the quarterly distribution of tourist spending on transportation from 1986 to 1998.

Supply and Demand

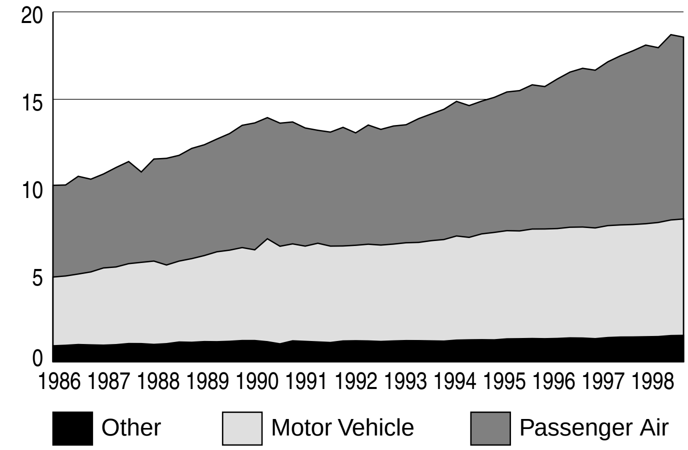
An appreciation of the importance of transportation to tourism can be obtain from looking at National Tourism Indicators, which estimate the supply and demand of commodities in the tourism industry.

Table 10-1 shows supply and demand of tourist goods in Canada in 1997, with supply corresponding to production of goods used by the tourist industry and demand corresponding to tourist expenditures on those goods.

Total tourist spending equals spending by both Canadians and foreigners. Domestic tourism demand equals Canadian spending on domestically produced tourism commodities for both domestic and international travel, including the purchases of airline tickets from Canadian carriers for non-Canadian destinations.

FIGURE 10-3
QUARTERLY DISTRIBUTION OF TOURISM SPENDING ON TRANSPORTATION, 1986 – 1998

(Billions of dollars, seasonally adjusted*)



* Quarterly data at annual rates

Source: Statistics Canada, Cat. 13-009-XPB

TABLE 10-1
SUPPLY AND DEMAND OF TOURIST GOODS IN CANADA 1997

(Millions of dollars)

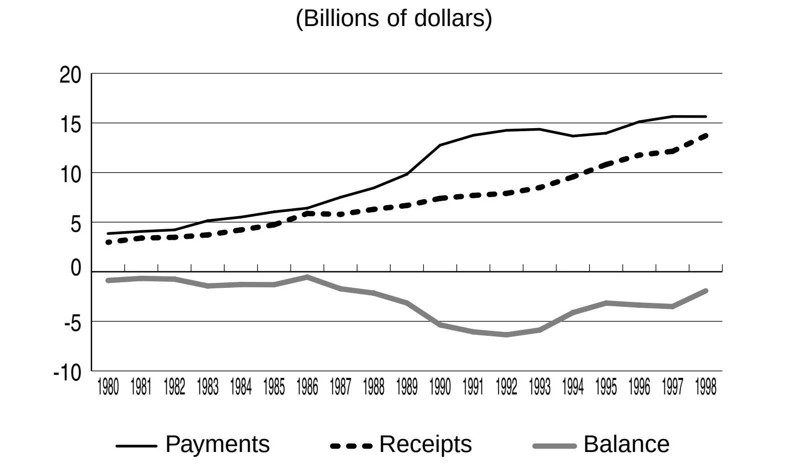
	Demand: Domestic	Demand: Exports	Demand: Total	Supply	Demand as Per Cent of Supply
Transportation	14,280	3,347	17,627	40,633	43
Passenger air transport	7,909	1,889	9,798	10,511	93
Passenger rail transport	132	71	203	221	92
Interurban bus transport	397	168	565	628	90
Vehicle rental	353	549	902	1,020	88
Vehicle repairs and parts	1,829	69	1,898	10,542	18
Vehicle fuel	3,229	398	3,627	15,545	23
Other transportation	431	203	634	2,166	29
Accommodation	3,375	2,813	6,188	6,682	93
Food and beverage services	4,174	2,911	7,085	31,047	23
Other tourism commodities	3,275	1,169	4,444	13,133	34
Total tourism commodities	25,140	10,204	35,344	91,495	39
Total other commodities	6,149	2,494	8,643		
Tourism expenditures	31,253	12,734	43,987		

Source: Statistics Canada, Cat. 13-009-XPB

Expenditures by foreigners on tourism commodities produced in Canada are tourism exports, including purchases of airline tickets from Canadian carriers for travel to and/or from Canada. Tourism commodities are those for which a significant amount of demand comes from tourism expenditures.[2] Since tourism does

2 Two exceptions to the definition are parking and urban transit, which are considered tourism commodities even though tourism demand for them is not a major portion of their demand. If these services were not available, tourists might be less inclined to visit an area or take part in activities there.

FIGURE 10-4
CANADA'S INTERNATIONAL TRAVEL ACCOUNT
1980 – 1998



Source: Statistics Canada, Cat. 67-203

not account for all spending on a particular commodity, tourism demand does not equal supply.

Tourism accounted for 43 per cent of transportation spending by consumers and businesses in 1997. In fact, tourism spending accounted for 92 per cent of air transportation receipts. Similarly, tourism accounted for a high proportion of spending for rail, intercity bus and vehicle transportation. The proportion is much lower, around 20 per cent, for local transportation, including personally owned motor vehicles and spending on taxi and local transit, which are included in the other category in Table 10-1.

For all tourism commodities, including transportation as well as accommodation, food and beverage services, recreation and entertainment, travel agency services and convention fees, tourism demand accounted for 39 per cent of spending.

The Travel Account and International Passenger Fares

Figure 10-4 illustrates the trends in Canada's international travel account from 1980 to 1998.

Travel Deficits

Canada's international travel account tallies the value of spending by foreigners travelling in Canada against the value of spending by Canadians travelling outside Canada. A deficit means that Canadians are spending more outside Canada than foreigners are spending in Canada.

After growing for the two previous years, Canada's travel deficit fell sharply by 45 per cent in 1998 to $1.9 billion. The 1998 deficit is the smallest in 10 years, reflecting strong spending by US tourists, who have come to Canada in record numbers, as well as reduced expenditures by Canadians while outside Canada.

Canadians spent a total of $15.6 billion outside the country in 1998. While Canadians reduced their spending by three per cent to $9.7 billion in the US, they increased their spending in other countries by six per cent to $6.0 billion.

Foreign travellers, on the other hand, spent a total $13.7 billion in Canada. Visitors from the US increased their spending by 24 per cent to $8.6 billion, taking advantage of the low Canadian dollar, as well as higher disposable incomes resulting from strong economic growth in their country. In the first nine months of 1998, US tourists accounted for $2 out of every $3 dollars spent by foreign travellers in Canada, compared with about $1 out of every $2 in 1997.

In fact, Canada's travel deficit with the US fell to $1.1 billion, a 65 per cent decrease and its lowest level since 1988. But while this travel deficit fell, Canada's deficit with other countries more than doubled to $835 million as Canadians increased their overseas spending by six per cent to $6 billion, and overseas visitors reduced their expenditures in Canada by two per cent to $5.1 billion.

International Passenger Fares

In 1998, Canadians purchased $3.79 billion worth of passenger fares from foreign carriers while, in turn, Canadian carriers sold $2.38 billion in passenger fares to foreign travellers. This leaves a deficit of $1.41 billion in this account.

Air fares accounted for almost all of these transactions. Canadians purchased $3.70 billion in air fares from foreign carriers, while

Canadian air carriers sold $2.35 billion in air fares to foreign travellers.

For land transportation, Canadians spent $84 million on passenger fares from foreign carriers, while foreign travellers spent $28 million on fares from Canadian carriers. Passenger fares for water transportation are included with air fares and they represent an amount smaller than those for land.

TRAVEL OVERVIEW

Table 10-2 presents a summary of Canadian travel in 1997, the latest year for which data is available. Canadian travel includes domestic travel, which is travel by Canadians in Canada; and international travel, which is travel by Canadians to the US and overseas, as well as travel to Canada by visitors from the US and other countries.

DOMESTIC TRAVEL

In 1997, Canadians made 128 million trips considered tourist travel. In 1998, domestic travel appeared to increase, evidenced by 51.6 million trips in the third quarter of the year, which represents a 16 per cent increase from the same period the previous year. This increase coincides with a 21 per cent decrease in Canadians going to the US.

Table 10-2 shows a summary of domestic travel in Canada for 1997.

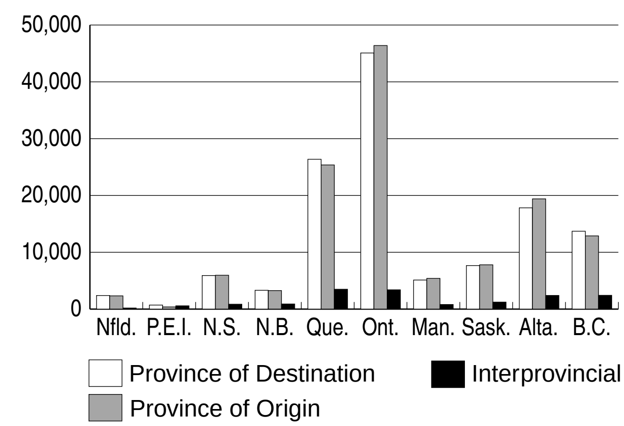
As Table 10-2 shows, 65.7 million, or 51 per cent, person-trips (to be referred from here on as "trips") in Canada were for more than one night, while 62.5 million trips were completed on the same day. Of the overnight trips, 52.2 million, or 79 per cent, were to a destination in the same province. On average, these trips lasted 2.8 nights and represented a distance of 267 kilometres. Overnight interprovincial trips lasted longer, averaging 5.6 nights. They were also longer, averaging 1,069 kilometres. The average one-way distance for all domestic trips was 294 kilometres.

TABLE 10-2
DOMESTIC AND INTERNATIONAL TRAVEL IN CANADA
1997

		Person-trips (000)	*Duration (nights)*	*Average distance (km)*	*Average spending ($)*
Domestic		128,177	1.7	294	128
Same-day		62,450	-	149	54
Overnight		65,727	3.4	432	200
Intraprovincial		52,239	2.8	267	130
Interprovincial		13,489	5.6	1,069	468
	1998 Data				
Canadians	46,985	54,925	-	-	268
to US	42,768	50,942	-	-	183
Same Day	29,346	35,815	-	-	31
Overnight	13,426	15,127	7.1	-	540
to Other Countries	4,218	3,984	18.9	-	1,358
Americans	43,857	40,490	-	-	165
Same Day	28,968	27,089	-	-	48
Overnight	14,890	13,401	3.8	-	400
Non-US Residents	4,207	4,586	-	-	988
Same Day	229	352	-	-	41
Overnight	3,978	4,234	10.9	-	1,066

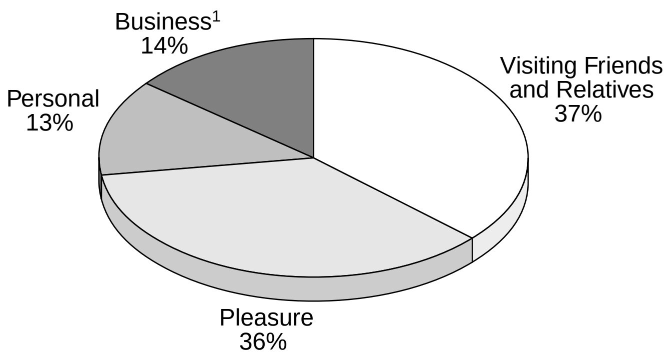
Source: Statistics Canada, Special Compilations

FIGURE 10-5
DISTRIBUTION OF DOMESTIC TRAVEL BY PROVINCE
1997



Source: Statistics Canada, Cat. 87-504-XPB

FIGURE 10-6
DOMESTIC TRAVEL IN CANADA BY PURPOSE
1997



1 Includes conventions (business and non-business)

Source: Statistics Canada, Special Compilations

TABLE 10-3
1997 DOMESTIC TRAVEL ACTIVITY ACCORDING TO TRANSPORTATION MODE

(Per cent of person-trips)

			-------------- *Overnight* --------------		
	Total	*Same Day*	*Total*	*Non-Business*	*Business*
Car	91.4	95.7	87.3	90.6	62.3
Plane	4.5	1.1	7.8	4.6	31.7
Bus	2.7	2.3	3.1	3.1	3.1
Rail	0.6	0.2	0.9	0.8	1.6
Boat	0.4	0.2	0.4	0.4	-
Other	0.5	0.4	0.5	0.5	0.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Statistics Canada, Special Compilations

Distribution of Travel by Province

Interestingly, the distribution of travel by province reflects provincial populations. In 1997, Ontario, the most populous province, was the destination for 35 per cent of the total domestic trips made, followed by Quebec with 21 per cent, Alberta with 14 per cent and British Columbia with 11 per cent.

Figure 10-5 shows the distribution of domestic travel by province for 1997.

On a per capita basis, Canadians took an average of 4.2 trips in 1997. Going by province, Prince Edward Island had the lowest per capita travel rate at 2.8 trips per year, reflecting the size of the province, while the residents of Ontario, Quebec, Newfoundland and British Columbia were just below the national average. The residents of Manitoba, Saskatchewan and Alberta, as well as the residents of New Brunswick and Nova Scotia, travelled more than the national average.

In addition, half of the provinces were a destination for more trips than they were the origin in 1997. Ontario, Manitoba, Saskatchewan, Alberta and New Brunswick were net sources of domestic travellers, while the other provinces were net recipients of domestic visitors.

The importance of interprovincial travel varies greatly by province. For instance, in Prince Edward Island, interprovincial travel accounted for 82 per cent of all trips, including intraprovincial trips, which had P.E.I. as a destination.

This reflects the importance of tourism to P.E.I. By contrast only eight per cent of trips that had Ontario as a destination came from outside the province.

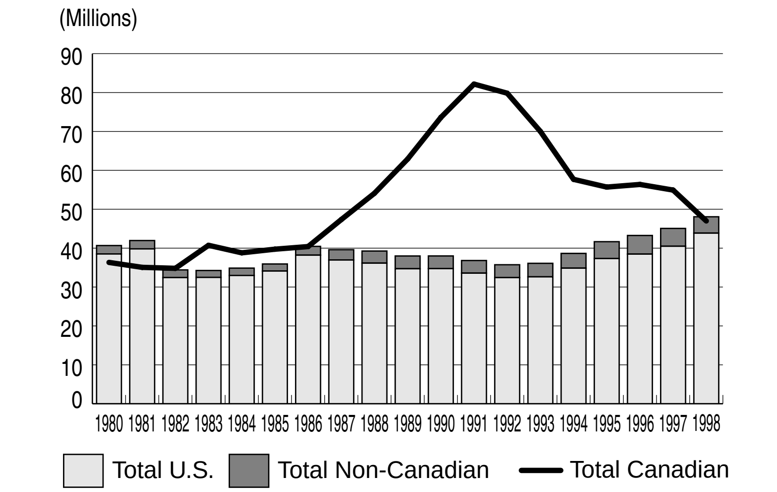
Purpose of Travel

In most cases, Canadians travelled domestically for pleasure or to visit friends and relatives. Pleasure trips accounted for 36 per cent of domestic travel in 1997, while visits accounted for 37 per cent. Travelling for business, on the other hand, made up only 14 per cent of all domestic trips, but it accounted for 34 per cent of all spending. Trips for personal reasons, such as health or religion, accounted for the remaining 13 per cent of domestic trips.

Figure 10-6 illustrates domestic travel in Canada in 1997, according to the purpose of the travel.

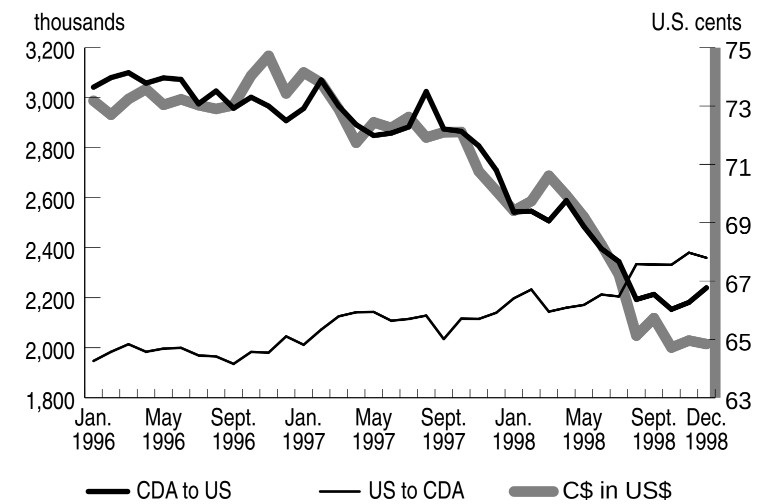
Canadians visiting friends and relatives was the most common activity as it was part of 54 per cent of all trips. Canadians associated some of their travel to outdoor activities, such as walking (11 per cent of trips), swimming (eight per cent) or fishing (four per cent). They took trips for shopping and sightseeing on 26 per cent and 16 per cent of the trips, respectively.

FIGURE 10-7
INTERNATIONAL TRAVELLERS IN CANADA
1980 – 1998



Source: Statistics Canada, Special Compilations

FIGURE 10-8
SAME-DAY CANADA/US AUTOMOBILE EXCURSIONS IN 1998
(SEASONALLY ADJUSTED)



Source: Statistics Canada, CANSIM

Means of Travel

Canadians turned to the automobile most frequently for domestic travel, using it on 91 per cent of all domestic trips in 1997. Other modes accounted for the remaining nine per cent, with air taking up five per cent. For overnight trips, air travel became more important, accounting for eight per cent of these trips, while the share of automobile trips fell to 87 per cent. For business travel, as well, air becomes important, accounting for 32 per cent of this travel.

Table 10-3 shows 1997 domestic travel activity according to mode of transportation.

INTERNATIONAL TRAVEL

In 1998, 95 million international travellers crossed Canadian borders, representing a decrease of just under five per cent from 1997. At the same time, Canadians took 47 million international trips, a drop of 14.5 per cent from 1997.

Of these 47 million trips, Canadians travelled more overseas and less to the US. Travellers from the US, however, came in larger numbers – 43.9 million trips, an increase of 8.3 per cent in 1998 from 1997. Trips by overseas (non-U.S.) travellers were 4.2 million, a drop of 8.3 per cent.

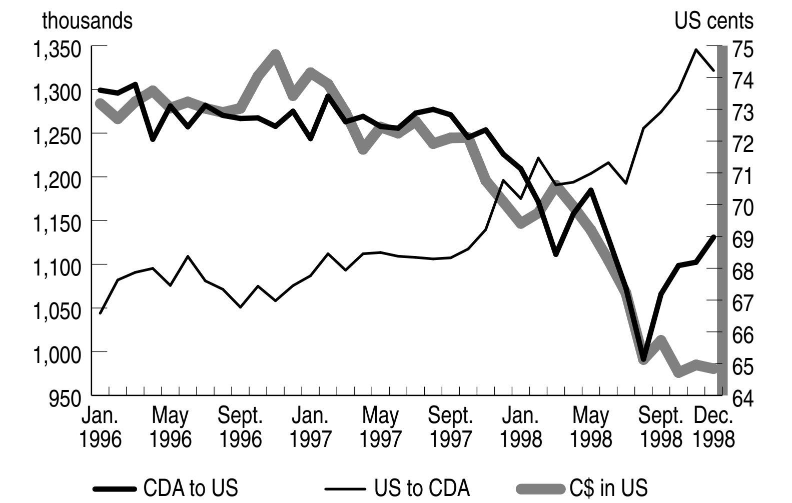
Figure 10-7, which presents the distribution of international travellers coming to Canada from 1980 to 1998, shows a steady increase in past years of the number of US travellers coming to Canada.

Canada/US Travel

In 1998, Canada/US travel accounted for 91 per cent of all international trips to and from Canada. The most important part of this travel was same-day automobile, which accounted for 64 per cent of all trips between the two countries.

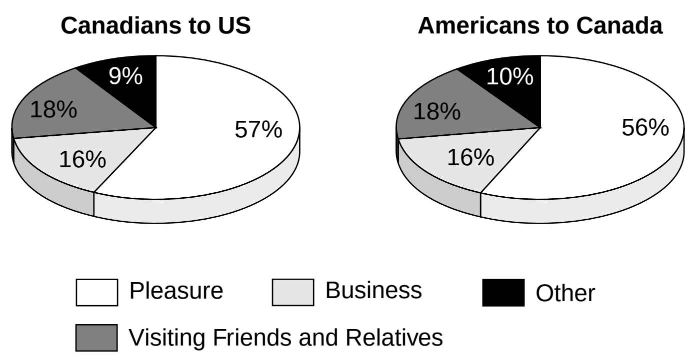
There has been a major shift in Canada/US travel. In 1998, there was a surge in the number of Americans making same-day trips to Canada, while the number of Canadians going to the US has been falling for some time. In 1998 as well, the number of same-day and overnight trips that Americans took to Canada exceeded the number of similar

FIGURE 10-9
OVERNIGHT CANADA/US EXCURSIONS



Source: Statistics Canada, CANSIM

FIGURE 10-10
1997 CANADA/US TRAVEL ACCORDING TO PURPOSE



Source: Statistics Canada, Special Compilations

trips that Canadians took to the US. This shift is likely attributable to the fall in the value of Canadian currency accompanied by the strong US economy.

Figure 10-8 shows the number of same-day Canada/US automobile excursions in 1998, while Figure 10-9 shows the number of overnight excursions. Both illustrate that a shift has taken place.

Distribution of Travel

For same-day visits in 1997, New York and Michigan were by far the most popular destinations for Canadians, accounting for 18.4 per cent and 8.3 per cent respectively of the total same-day visits.

For stays of one night or longer, the most popular states were New York, accounting for 11.3 per cent of the total trips in 1997; Florida, for 9.9 per cent ; Washington, for 8.9 per cent; Michigan, for 6.2 per cent; and California, for 4.7 per cent. In 1997, overnight trips to Florida increased 9.7 per cent, while overnight trips to California increased 7.4 per cent. Overnight trips to New York, however, fell nine per cent.

Purpose of Travel

Canadians and Americans have similar reasons for travelling between the two countries. In 1997, pleasure trips, including recreation and holiday trips, accounted for 57 per cent of all trips for both Canadians travelling to the US and for Americans travelling to Canada. Visiting family and friends, accounted for 18 per cent of Canadian trips and 17.7 per cent of US trips. Business was the primary purpose for 15.5 per cent of Canadian trips and 15.7 per cent of US trips. Personal reasons, such as health and religion, made up the remaining 9.4 per cent of Canadian trips and the 9.8 per cent of American trips.

Figure 10-10 illustrates 1997 Canada/US travel according to the purpose of the travel.

Means of Travel

As previously mentioned, same-day automobile trips are the most important part of Canada/US travel. In 1998, Canadians used a car to take 96.8 per cent of the 29.3 million same-day trips they made to the US Similarly, Americans used a car to make 93.4 per cent of the 29 million same-day trips they made to Canada. Bus was the next most important mode of transportation, accounting for 2.4 per cent of Canadian same-day trips and 3.3 per cent of American trips.

For overnight trips, automobile travel was less dominant but still the most important mode of travel. Of the 13.4 million overnight trips that Canadians took to the US in 1998, 56.6 per cent were taken by car, while the figure was 63.1 per cent for Americans taking overnight trips to Canada. Air was the next most important mode for overnight travel, accounting for 34 per cent of Canadian trips and 25 per cent of American trips.

Table 10-4 illustrates Canada/US travel by mode in 1998.

TABLE 10-4
1998 CANADA/US TRAVEL BY TRANSPORTATION MODE

(000s of person trips)

	Canadians (000)	*(%)*	*Americans (000)*	*(%)*
Same-Day	29,342	100.0	28,968	100.0
Auto	28,390	96.8	27,062	93.4
Plane	137	0.5	424	1.5
Bus	691	2.4	949	3.3
Other	123	0.4	533	1.8
Overnight	13,426	100.0	14,890	100.0
Auto	7,605	56.6	9,402	63.1
Plane	4,599	34.3	3,663	24.6
Bus	661	4.9	804	5.4
Boat	116	0.9	302	2.0
Foot	326	2.4	575	3.9
Other	119	0.9	143	1.0
Total	**42,768**		**43,857**	

Source: Statistics Canada, CANSIM

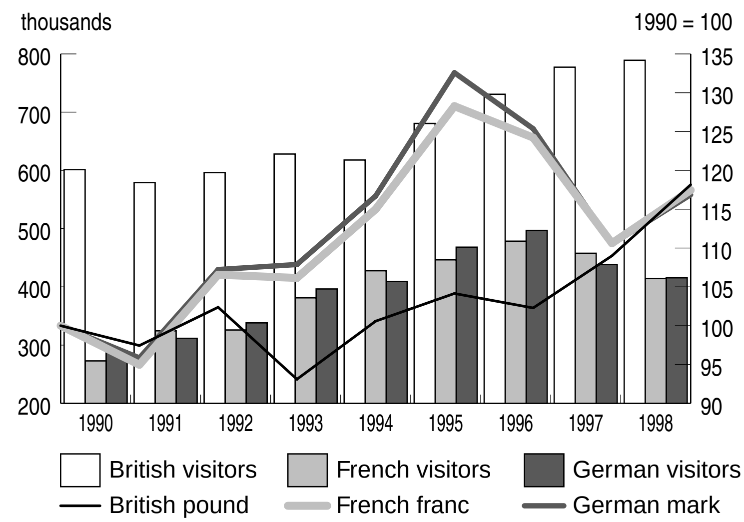
Travel between Canada and Countries other than the US

World economic developments have had a major impact on overseas travel to Canada. The two major factors were the fall in both European and Asian currencies, and the Asian financial crisis. After losing value in 1997 and the early part of 1998, most European currencies regained some of their strength in the latter part of 1998, but the Asian currencies still remained weak. Unfortunately, these developments affected some of Canada's major overseas travel markets.

From 1996 to 1997, the number of Asian travellers to Canada fell 9.5 per cent and declined a further 21 per cent in 1998. The number of Japanese travellers to Canada, who make up over 40 per cent of Asian travellers to Canada, declined 14 per cent in 1997 and 16 per cent in 1998. Consequently, Asia's share of overseas trips to Canada has fallen from 35 per cent in 1996 to 29 per cent in 1998.

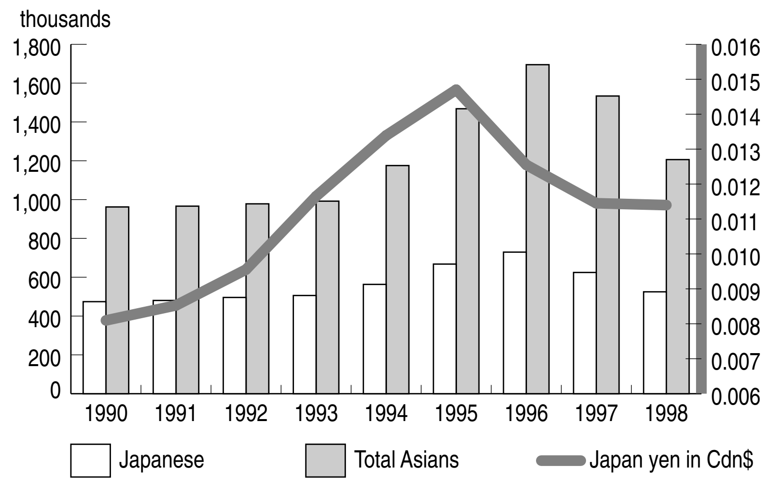
The number of European travellers to Canada – Canada's largest overseas tourist market – also declined, dropping 2.2 per cent in 1997 from the previous year and declined a further 2.4 per cent in 1998.

FIGURE 10-11
VISITORS TO CANADA FROM EUROPE
1990 – 1998



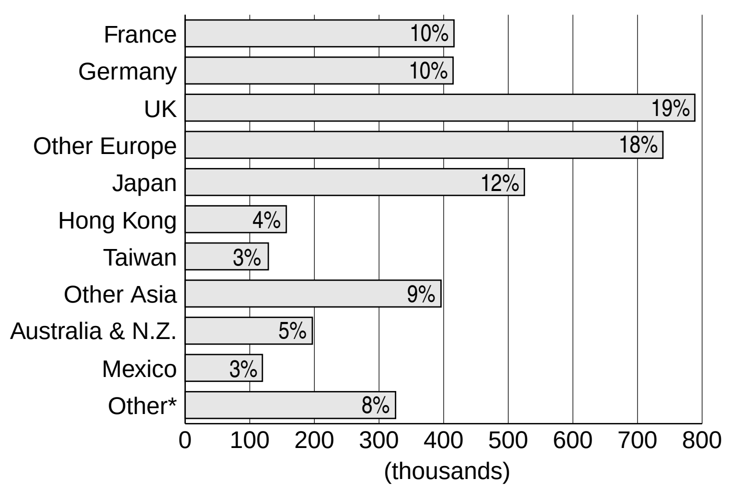
Note: indices for exchange rates are foreign currencies in terms of Canadian dollars.
Source: Statistics Canada, CANSIM; Bank of Canada

FIGURE 10-12
VISITORS TO CANADA FROM ASIA
1990 – 1998



Source: *Statistics Canada, CANSIM; Bank of Canada*

FIGURE 10-13
VISITORS FROM COUNTRIES OTHER THAN THE UNITED STATES BY REGION, 1998



* Caribbean, Central and South America and Africa

Source: *Statistics Canada, CANSIM*

Despite this overall decline in European travellers, however, the number of travellers from the United Kingdom increased by 5.8 per cent in 1997 and a further 1.2 per cent in 1998. By contrast, travellers to Canada from Germany declined by 12 per cent in 1997 and a further five per cent in 1998. Similarly, the number of travellers to Canada from France declined four per cent in 1997 and nine per cent in 1998.(Figure 10-11) As most currencies fell against the US dollar, there has also been a reduction in overseas trips via the US, declining 12.9 per cent in 1997 and 15.7 per cent in 1998.

Figure 10-12 shows visitors to Canada from Asia between 1990 and 1998, while Figure 10-11 shows visitors to Canada from Europe between 1990 and 1998 as well as the relative values of the currencies. Figure 10-13 presents the source of the overseas travellers entering Canada in 1998.

Distribution of Travel

Ontario was the most popular destination for international travel, attracting 45 per cent of all international trips in 1997. British Columbia was the second most popular with 22 per cent. For all provinces except Quebec and Alberta, travellers from countries other than the US make up between 20 and 25 per cent of the visitors, while in Quebec and Alberta, they make up just under 40 per cent.

Figure 10-14 shows the 1997 provincial destinations of international travellers staying at least one night.

In 1997, large changes in the source of overseas trips occurred in British Columbia, Alberta, and The Atlantic Provinces (Nova Scotia, New Brunswick, Prince Edward Island and Newfoundland). Trips by overseas travellers declined by about 20 per cent in both British Columbia and Alberta, although British Columbia was able to offset most of this decline from an increase in US visitors. Trips by overseas travellers increased by 11 per cent in the Atlantic Provinces. Other provinces had much more modest changes.

Canadian Travel Overseas

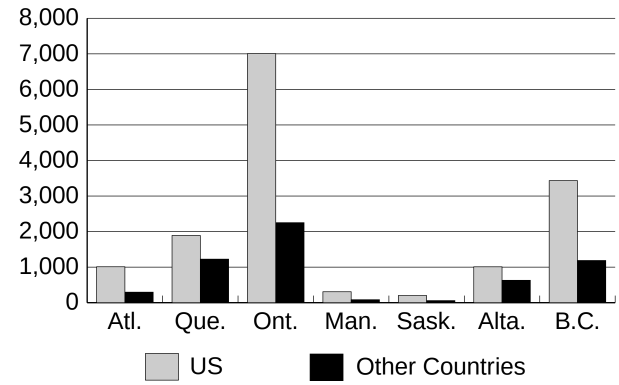
In 1997, Canadians increased their travel to other countries by 8.5 per cent and data for the first nine months shows further increases in 1998. Although Canadians reduced their trips to Europe, they increased their trips to the United Kingdom by 11 per cent in 1997. Europe, however, still remains the most popular overseas destination for Canadians, accounting for 41 per cent of the total overseas trips. The number of trips to Asia rose nine per cent from 1996, while trips to Mexico rose 30 per cent. The number of Canadian trips to other sunspots also increased.

Figure 10-15 shows the distribution of Canadian travel to countries other than the US in 1997.

Reason for Canadian Travel Overseas

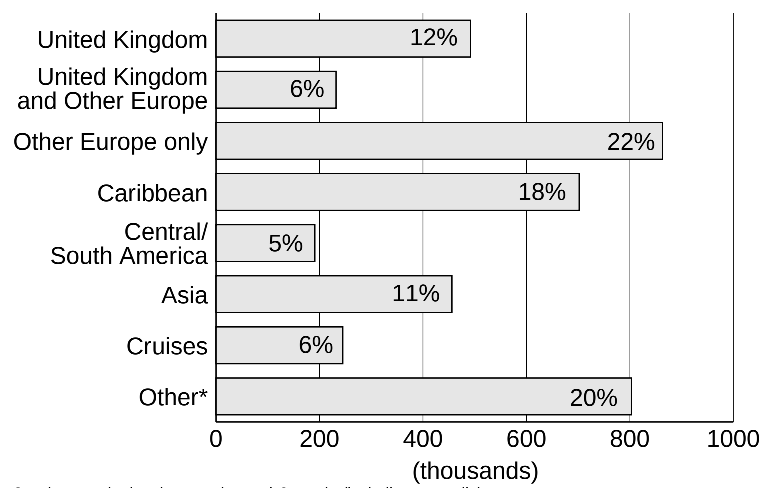
As in other types of Canadian travel, pleasure trips were the biggest reason for overseas travelling, accounting for at least 50 per cent of travel to and from countries other than the US in 1997. Non-business travel by overseas travellers fell seven per cent in 1997, while it rose seven per cent for Canadians. Business travel rose about 14 per cent for both Canadians and other non-US travellers, accounting for 18 per cent of both Canadian and overseas travel in 1997.

FIGURE 10-14
1997 DESTINATIONS BY PROVINCE OF OVERNIGHT INTERNATIONAL TRAVELLERS



Source: Statistics Canada, Special Compilations

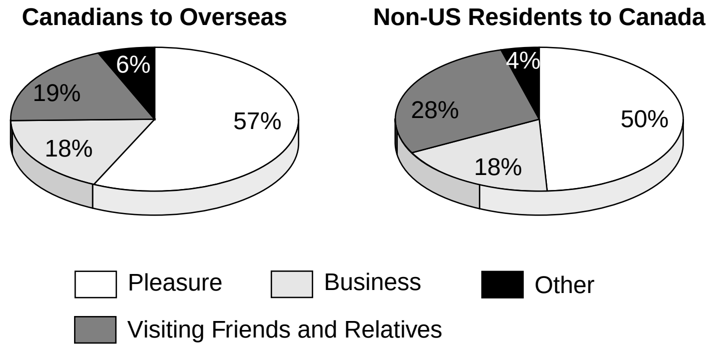
FIGURE 10-15
CANADIAN TRAVEL TO COUNTRIES OTHER THAN THE US IN 1997



* St. Pierre and Miquelon, Mexico and Oceania (including Australia)

Source: Statistics Canada, Special Compilations

FIGURE 10-16
DISTRIBUTION OF 1997 CANADIAN OVERSEAS TRAVEL BY PURPOSE



Source: Statistics Canada, Special Compilations

Figure 10-16 shows the distribution of Canadian overseas travel by purpose for 1997.

Means of Travel

Virtually all international travel to and from overseas takes place by air, including to and from Canada. Despite this, approximately 20 per cent of overseas travellers entered Canada by land from the US; 16 per cent of Canadians returning by air from countries other than the US returned via the US; and 33 per cent of non-Americans coming to Canada by air came via the US.

11

TRANSPORTATION AND INFORMATION TECHNOLOGY

Information and communication technologies make transportation more efficient.

By now, most Canadians are aware of the rapid transformation that the new information and communications technologies, or ICT, have brought into their lives. From cell phones to satellite dishes, there's hardly a family that doesn't rely on at least one of the new technologies to carry out a job or contribute to the day's entertainment.

Yet many Canadians would probably be surprised to learn how much these same technologies are also dramatically affecting the transportation modes that contribute to their nation's economy. They may realize that ICT has begun to change the way they travel, but be unaware of how much it is changing the way in which they order, buy, sell and deliver or receive goods. This chapter provides an overview of the main impacts of information and communications technology on all four modes that make up Canada's transportation sector: road, rail, marine and air.[1]

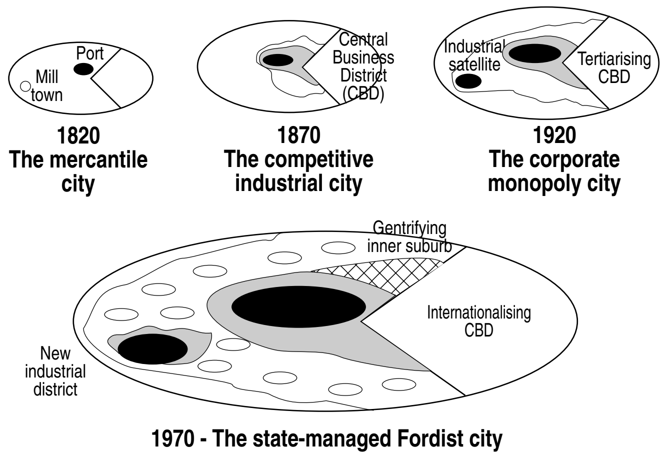
THE "BIG PICTURE": ICT, THE TRANSPORTATION SECTOR, AND GROWTH AND SOCIALIZATION

Most Canadians would probably say that ICT entered their lives rather suddenly in the early 1990s, and accelerated rapidly as the

1 The content of this chapter is a summary of information gathered from a project conducted in 1998 by Transport Canada to assess the impact of ICT on the Canadian transportation sector.

The project consisted of a literature review and two seminars in Ottawa, Ontario. The first seminar, focussing on ICT's impact on the supply of transportation, was held on November 2, 1998. The second, focussing on ICT and the demand for transportation, took place on November 27, 1998. Invited speakers included a mix of Canadian and international experts. The chapter summarizes the views expressed by the said experts. References help identify the experts expressing their views.

FIGURE 11-1
CHANGES IN URBAN FORM
1820 – 1970



Source: Graham, Stephen; Simon Marvin, 1996, "Telecommunications and the City; Electronic Spaces, Urban Places", Routledge, London

decade matured. Statistics bear out that ICT did indeed induce gains in economic productivity in the 1990s, but these technologies actually entered industry more than a decade earlier. Why then, did productivity increases take so long to appear?

Such a "productivity lag" occurs because societies need time to diffuse and understand new technologies, and to modify patterns of social and industrial organization to take advantage of them. ICT-related productivity increases in the 1990s may be the harbingers of first-stage changes to industrial and social organization that will become increasingly apparent as we enter the next millenium. A similar productivity lag accompanied the introduction of the railways, which ultimately increased the productivity of the eras that followed their introduction.

ICTs' impact goes way beyond their repercussions on the transportation sector, as it has repercussions for society as a whole.

One change foreseen is that ICT's ability to make information more easily and rapidly accessible will reduce the costs that businesses will charge to cover transaction and organization costs. These reductions could ultimately generate social and industrial changes.[2]

For example, businesses and other social organizations can reorganize the way they supply their clients' needs by making greater use of contract, rather than salaried, employees. Indications are that this trend has already begun, and may affect the transportation sector in the long term.

Two examples support this indication. The first is the growing number of businesses that have reduced their staff or are organizing their staff to work from home as telecommuters. The second is the increasing growth in the number of self-employed workers who rely on telecommuting to deliver at least some of their services to their clients.

These ongoing changes in social organization may have various long-term effects on the transportation sector, including changes in worker and employer location, changes in rush hour (or peak-load) commuting patterns, and changes in the need for mass-transit systems.

These changes may have further repercussions: the very organization of a community could ultimately be affected. Consider, for example, the implications of changes in worker and employer location. As more workers switch from regular daily shifts to bi- or tri-weekly meetings, they may be willing to accept longer commuting periods. Consequently, both workers and their employing industries may locate farther outside current urban concentrations, each taking advantage of more spacious and less expensive properties.[3]

2 "Transaction costs" refer to the costs of making a market, and all costs associated with gathering the information needed for all participants in a market (e.g. labour, management) to develop and sign a contract for each specific activity. The reason that we have firms, rather than contract for each individual exchange of labour or goods, is to reduce transaction costs (Coase, Ronald, 1937, "The Nature of the Firm", Economica, 4).

3 The extent of sprawl, and the pattern of urban form is, of course, also dependent on the deliberate social choices made by society in terms of urban planning. (Marvin, Simon, 1998, "Urban Futures, Integrating Telecommunications into Urban Planning", Proceedings, Transport Canada Seminars on the Impact of Information and Communications Technology on Transportation, Ottawa, Ontario, November, 1998).

Figure 11-1 illustrates how urban centres have, over time, spread from a central core to the outlying suburbs. ICT-diffusion has the potential to accentuate this historical trend. As workers and employers become more autonomous and flexible, scope increases for reducing or avoiding the daily traffic congestion associated with the traditional nine-to-five shift.

The Impact of ICT on the Supply of Transportation

Currently, most transportation companies use ICT in one or more of the following ways:

- to maximize planning efficiency (scheduling, routing) and administrative functions (payroll, etc.) through the use of optimization software;
- to track vehicles and cargo in real time through electronic communication between equipment, infrastructure and central logistics coordination centres, in combination with two-way communication between centres and drivers or pilots; and
- to automatically transmit transport-related documents such as manifests, bills of lading and invoices, while also automating financial transactions through electronic data interchange (EDI) systems.

TABLE 11-1
ITS CLASSIFICATION USED BY US D.O.T.

Bundle	*User Services*
a) Travel and Transport Management	1. En-Route Driver Information 2. Route Guidance 3. Traveler Services Information 4. Traffic Control 5. Incident management 6. Emission Testing and Mitigation
b) Travel Demand Management	7. Pre-trip Travel Information 8. Ride Matching and Reservation 9. Demand Management and Operations
c) Public Transportation Operations	10. Public Transportation Management 11. En-route Transit Management 12. Personalized Public Transit 13. Public Travel Security
d) Electronic Payment	14. Electronic payment services
e) Commercial Vehicle Operations	15. Commercial Vehicle Electronic Clearance 16. Automated Roadside Safety Inspection 17. On-board Safety Monitoring 18. Commercial Vehicle Administration Processes 19. Hazardous Material Incident Response 20. Commercial Fleet Management
f) Emergency Management	21. Emergency Notification and Personal Security 22. Emergency Vehicle Management
g) Advanced Vehicle Control and Safety Systems	23. Longitudinal Collision Avoidance 24. Lateral Collision Avoidance 25. Intersection Collision Avoidance 26. Vision Enhancement for Crash Avoidance 27. Safety Readiness 28. Pre-Crash Restraint Deployment 29. Automated Highway System

Source: Diebold Institute for Public Policy Studies, 1995, "Transportation Infostructures; The Development of Intelligent Transportation Systems", Praeger, Westport, Connecticut.

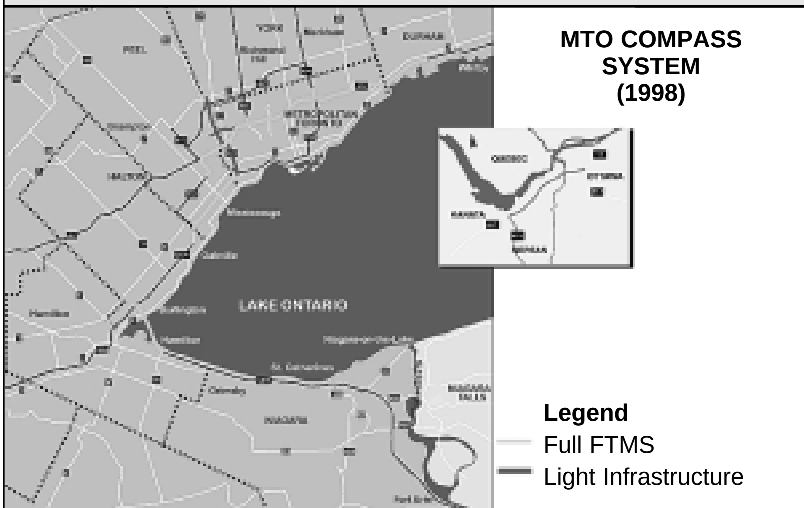
An Inevitable Marriage of Convenience: Intelligent Transportation Systems (ITS) and ICT

In terms of road transport, ICT-related investments are usually referred to as "intelligent transportation systems" (ITS). The US Department of Transportation (US DOT) divides ITS applications into seven bundles and 29 services, as shown in Table 11-1. The wide scope and sheer number of potential or current applications listed are an indication of the substantial impact that ITS will have on road transportation.

Current transport-related uses of ITS

In Canada, it is primarily the provincial and municipal governments that finance and implement ITS traffic-management systems. The federal government involvement thus far has been concentrated on ITS research and development and demonstration projects with the other jurisdictions and the private sector. In the United States, Europe or Japan,

FIGURE 11-2
TORONTO'S COMPASS SYSTEM



Source: Masters, Phil, 1999, "ITS for Highways and Roads in Canada", Proceedings, Transport Canada Seminars on the Impact of Information and Communications Technology on Transportation, Ottawa, Ontario, November, 1998.

where federal or supra-national governments (such as the European Community) have been extensively involved in both research and implementation.

Traffic Management

The principal ITS traffic-management applications being implemented in North America are:

- real-time tracking of congestion though mounted video-camera monitors that communicate their information to control facilities and allow more efficient response to "incidents" as well as feedback for drivers through the use of electronic billboards;
- automated reactive-control devices, such as traffic lights and ramp meters, that allow for more efficient traffic control; and
- automated electronic toll roads that enable automatic vehicle identification (AVI) and billing through the mail.

In Canada, the use of ITS for road traffic management is relatively advanced in major urban centres, notably in Toronto, Ontario. Toronto uses sophisticated ITS systems for both congestion control and monitoring (e.g. the Compass system and electronic road pricing). Similar congestion-control and monitoring systems are also in place in Montreal, Quebec, and are planned for Vancouver, British Columbia.

Toronto's ITS systems

Toronto's Compass system has three main components: one along the Queen Elizabeth Way (QEW) in Mississauga, another along the Burlington Skyway and the third along Highway 401[4], as shown in Figure 11-2. A light infrastructure extension to the Compass system includes the links to Highway 407 Electronic Toll Road (ETR), generating an integrated Toronto highway traffic management system.

The Compass system uses five main traffic-management strategies:

- congestion, detection and confirmation;
- incident management;
- motorist advisory;
- congestion management; and
- automated traffic infrastructure, such as ramp metering.

The system detects congestion primarily through detectors embedded in the pavement, and confirms detection through real-time video cameras located along the roadway. The two complementary monitoring networks are connected to a centralized Traffic Operations Centre by a fibre-optic cable network.

The Traffic Operations Centre, which also receives information on road conditions, construction and road maintenance, responds to the electronic information on congestion by notifying and coordinating relevant emergency services, such as police, private towing companies and ambulances. Within seconds of a confirmed incident, the system also communicates the information to motorists through large electronic signs (known as "changeable message signs" or "CMSs") located just before strategic detour points. The system also simultaneously faxes the information to the media.

CMSs also relay non-incident-related congestion information, such as messages indicating that

4 OTCC, Ontario Transportation Capital Corporation, 1998, Highway 407 ETR web site, part of the Ontario Ministry of Transportation Web Site, http://www.407etr.com.

A light Compass system is also used on Highway 417 in Ottawa, Ontario.

traffic is moving well (above 75 km/hour), moving slowly (40 – 75 km/hour), or moving very slowly (less than 40 km/hour). All this information is based on the real-time information generated by the vehicle detectors and cameras.

FIGURE 11-3
HIGHWAY 407 ETR

Source: Masters, Phil, 1999, "ITS for Highways and Roads in Canada", Proceedings, Transport Canada Seminars on the Impact of Information and Communications Technology on Transportation, Ottawa, Ontario, November, 1998.

Along the QEW component in Mississuaga, the Compass system also uses one of the main forms of automated traffic infrastructure: ramp metering. Automated traffic lights installed on the ramps generate an orderly and efficient flow of vehicles onto the highway. The traffic lights respond to vehicle detectors embedded in the highway pavement, enabling the lights to respond to both highway flow and the length of the waiting queue.

Electronic toll roads (ETRs) enable road infrastructure such as electronic tolling technologies to recognize vehicles automatically. Most recognition technology consists of a purchased electronic tag or transmitter, such as a transponder, and electronic readers that transmit the information captured from the transponder to a control centre that logs the transponder's activities, which automatically transmit electronic information (e.g. licence plate numbers), to electronic readers. Electronic identification of vehicles both entering and exiting the ETR allows for automated billing through the mail, which reduces congestion associated with manual toll booths and allows for specific user charges for road use, as well as congestion- and peak-load pricing.[5]

Toronto's Highway 407 ETR is currently the world's leading example of electronic road pricing. The 69-kilometre highway runs parallel to and north of Highway 401, which runs through Metropolitan Toronto. Highway 407 ETR was built by a public-private partnership under the aegis of the Ontario Transportation Capital Commission (OTCC), a semi-autonomous agency of the provincial government created to finance and build new roads in Ontario.

Highway 407 ETR vehicle identification is based on the use of both transponders and video cameras, which capture licence plate information on cars not equipped with transponders. All billing is done monthly by mail, by using Ontario Ministry of Transport databases that link licence plates with addresses.

Pricing for Highway 407 ETR use is designed to cover capital and operating costs, currently projected over 25 years[6] and based on peak-load pricing[6] principles, as described in Table 11-2.

In-vehicle driver information services

In North America, two categories of ITS for traffic management are at the experimental or introductory stages: in-vehicle driver information services and fully automated vehicle control systems.

These services provide drivers with electronic information regarding alternative routes, ride-share passengers, or hotel and tourist attractions. The systems share such features as in-vehicle computers with network connections that allow communication between the vehicle and automatic locating devices such as satellites and digital telephone beacons, or central logistics and information facilities. En-route guidance uses an automatic location device to place the vehicle on a digital map, while logistics routines then suggest the fastest route to a given location: essentially electronic replacement for reading maps and highway signs.

5 "Peak-load pricing" refers to charges and prices designed to recover the capacity costs of road capacity built specifically for the peak load (e.g. rush hour). "Congestion pricing" refers to charges designed to cover the external costs imposed on other motorists (e.g. lost time) by adding another car to an already congested road.

6 OTCC, Ontario Transportation Capital Corporation, 1998, Highway 407 ETR web site, part of the Ontario Ministry of Transportation Web Site, http://www.407etr.com

TABLE 11-2
HIGHWAY 407 ETR, PRICES PER KILOMETRE[1], PER RATE PERIOD AND VEHICLE CLASS

Vehicle Class	*Day Time, Peak Period Weekdays, 5:30- 9:30 a.m. 4:00- 7:00 p.m*	*Day Time, Off-Peak Weekdays 9:30- 4:00 pm 7:00-11.00 pm Holidays and weekends 5:30 a.m -11:00 pm*	*Night Time Period Weekdays 11:00 pm - 5:30 am Holidays and Weekends 11:00 pm - 5.30 am*
Light (5000 kgs or less; e.g. automobiles, light trucks)	10 cents	7 cents	4 cents
Heavy, single unit (5000 kgs. Or more; e.g. single unit trucks, buses)	20 cents	14 cents	8 cents
Heavy, multiple unit; tractor -trailers	30 cents	21 cents	12 cents

1 Additional prices are $1.00 per trip for all vehicles not equipped with transponders.

Source: OTCC, Ontario Transportation Capital Corporation, 1998, Highway 407 ETR web site, part of the Ontario Ministry of Transportation Web Site, http://www.407etr.com.

While in-vehicle systems are at the introductory stage in North America, one-way map navigation systems entered the market in Japan in 1989. As of 1996, approximately 40 models were being sold by 25 companies, with total sales of 1 million units. The older units now face competition from a two-way system capable of receiving real-time information on congestion and accidents as part of a national Vehicle Information and Communications System (VICS), built through the cooperation of the Ministries of Construction, Post and Telecommunications, and the National Policy Agency. The VICS released in 1996 relied on 600 beacons between Tokyo and Osaka[7]; it currently uses over 1,800 beacons covering all Japanese expressways.

The most radical and futuristic type of ITS applications are fully automated vehicle control systems designed to provide better control of the car itself, either through the driver or automatically, much like the anti-lock brakes or cruise control systems Canadians have been using for many years. Future in-vehicle systems will detect the proximity of other vehicles and/or the edge of the roadway or lane. The upcoming generation of this technology will alert the driver accordingly; but subsequent generations will make the appropriate correction automatically. More advanced systems will implement steering and speed control, and will regulate inter-vehicle spacing distances—a development expected to dramatically increase highway throughput.

In their fullest implementation, vehicle control systems can lead to automated highways on which cars will have preset positions and move together in automatic formations[8], a technique called platooning. Plattooning involves the coordination of multiple vehicles (5 to 15) on a highway using slots of a fixed size, 2 to 8 metres apart, with controlled operation while on the road. While implementation is obviously in the future, it should be noted that a demonstration of an operational automated highway system (AHS) took place in 1997, in San Diego, California.

The main impact of the new ITS systems will be to increase the capacity of road infrastructure, at lower cost than traditional road building, both in terms of money and space. Assessments in most of the literature support ITS investment on the grounds of reducing congestion, increasing safety and reducing environmental emissions (e.g., through reduced running of idle motors). Often overlooked in much of the literature, however, is the latent demand for automobiles, which empirical results indicate can run from 10 to 90 per cent of increases in road capacity, depending on the extent of pre-existing congestion. While the ability of ITS alone to mitigate congestion, injuries and emissions may be limited by latent demand, it is probable that the increases in road capacity generated by ITS, and the corresponding latent demand, will further increase private automobile use. In the long term, ITS's ability to expand road capacity may complement the other long-term trends toward post-suburban sprawl identified earlier in this chapter.

7 Tokuyama, Hideo, 1996, "Intelligent Transportation Systems in Japan", Public Roads, Autumn, pp 41-45.

8 Diebold Institute for Public Policy Studies, 1995, *Transportation Infostructures; The Development of Intelligent Transportation Systems,* Praeger, Westport, Connecticut.

Urban Transit

There are two principal applications of real-time ITS in urban transit:

- automated real-time tracking of vehicles, which combines two-way communication between vehicles and control facilities with communication of real-time vehicle locations to clients (e.g. electronic displays in shelters, automated phone replies and Internet sites); and
- smart cards, which allow for electronic fare payment, and often incorporate several modes of public transport (e.g. bus, subway, or light rail).

To these applications should be added the use of ICT-management tools such as optimization and expert programs, and associated databases designed for more efficient management of urban transit operations. Such programs typically optimize route scheduling, payroll, personnel and equipment allocations, and other management functions.

Automated time-tracking of vehicles

The main real-time application of ITS to urban transit involves sending information about the vehicle's progress to a central control facility and back to drivers. The information accumulated can be used by transit management for improved routing, planning and management for vehicles and personnel, as well as operations. For example, real-time tracking enables a central control facility to identify deviations from schedule. The control facility can then communicate corrective measures to drivers. Real-time information about vehicle location and projected arrival can also be provided to customers through automated telephone information services, electronic digital displays located at urban transit waiting areas, or other methods.

A Canadian example of real-time tracking in urban transit is provided by the "Societé de Transport de l'Outaouais", the urban transit system serving the City of Hull and environs, in the province of Quebec. The real-time tracking system, called SAGE PAS, is based on electronic communication between buses and a system of automated beacons installed along bus routes. The system has four main functions:

- real-time bus location
- visualization of buses on a bus route
- tracking of planned schedule
- communication with bus drivers.

The Societé de Transport de l'Outaouais communicates this information to passengers through an electronic telephone information service called INFOBUS, which provides the real-time arrival of the next two buses at any given bus-stop. The system is updated every minute.

Smart cards

Smart cards are electronic cards that can be purchased to pay fares electronically on one or all urban transit and transport operations, such as subway, bus, light rail, taxi and parking. Machines read the card and automatically debit the correct fare from the credit remaining on the card. The cards can be re-charged through payment into some form of re-charging machine, and then activated at first use. Smart-card technology can eliminate all of the different fare systems now in place, including coins, bills, tickets and passes. They could also enable large urban areas with different modes of urban transport to establish a single payment system. While increasing convenience for users, smart cards also reduce transit companies' costs by eliminating the need to collect and count coins. In addition, the cards automatically generate better data about passengers and revenues.

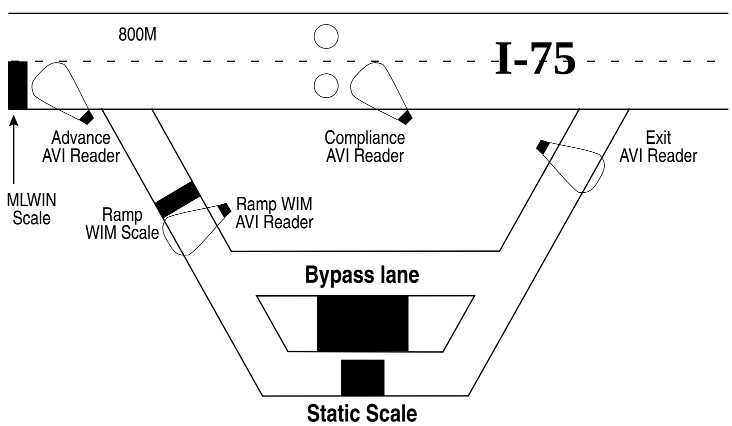
Current Canadian examples of urban transit systems that use smart (or "COMBO") cards are Ajax and Burlington in Ontario. The Outaouais region in Quebec plans to introduce them in 1999. Smart cards also present an attractive means to maintain and update commercial vehicle driver services records. They could, in combination with other technologies provide an hours of service record for the vehicle operators as well.

Automated high-occupancy vehicle lanes

Another interesting potential application of ICT to urban transit is automated high-occupancy vehicle (HOV) lanes for buses, taxis and car pools. These lanes would function similarly to current priority lanes, but with electronic features such as automatic identification and automatic priority at traffic lights and freeway ramps.

Their disadvantage is that they contradict the traffic optimization goal of ITS described earlier in this chapter. HOV lanes are designed to generate high-speed transit for HOV vehicles by monopolizing the use of one lane, thereby generating congestion for low-occupancy vehicles (LOV) and inducing modal shifts away from automobiles. In contrast, ITS traffic control is designed to optimize total traffic flow in all lanes, thus encouraging modal shifts to the automobile. This contradiction highlights the social

FIGURE 11-4
AUTOMATED MAINLINE CLEARANCE SYSTEM



Source: Lam , Joseph , 1999, "Overview of Current and Potential ITS Technologies", Proceedings, Transport Canada Seminars on the Impact of Information and Communications Technology on Transportation, Ottawa, Ontario, November, 1998.

dilemma associated with the automobile: whether to consciously improve automobile-use efficiency in order to increase private mobility, or to discourage automobile use in order to reduce automobile-associated problems such as pollution.

In the case of urban transit, the improvements generated by ITS, while important to improving the service to transit clientele, may not match the potential efficiency gains relative to automobiles.[9] This is essentially because of the nature of urban transit: A regular, scheduled, public service designed primarily to transport commuters living in densely populated urban areas to and from work at predicable peak hours, with an off-peak clientele constituted primarily of low-income consumers who don't own cars.

One problem is that public transportation is viewed overwhelmingly as an inferior good—transportation for those who have no alternative because of the lack of an automobile, or because of the high cost of driving and parking an automobile[10]. ICT will probably not change these realities, but will improve urban transit service for its clientele.

Trucking

The principal current real-time ITS applications in trucking are

- automated freight corridors
- automated vehicle location (AVL) systems
- electronic data interchanges (EDI) systems.

In this sector, too, these applications are often used together with ICT management tools such as optimization and expert programs and associated databases designed to allow for more efficient management of freight trucking operations.

Automated freight corridors use automatic vehicle identification (AVI) technology to identify vehicles electronically, allowing for more rapid transit through regulatory stops such as weight and inspection stations, or border crossings. Several Canadian projects related to electronic freight corridors are close to completing feasibility tests and making decisions about final implementation. They include the Advantage I-75/Avion project running through Ontario (Highway 401 from Kingston to Windsor); the US interstate I-75 that connects the states of Georgia and Florida; the border crossings at the Ambassador Bridge at Windsor; and the Peace bridge at Fort Erie, in Ontario.

The Advantage I-75/Avion project allows for electronic clearance at weight and inspection programs for selected transponder-equipped trucks, while allowing all participating American States and the Province of Ontario to maintain existing regulatory regimes. The program underwent an operational test from 1995 to 1997, with 4,500 transponder-equipped trucks and 29 weight/inspection stations equipped with AVI and automated weight-in-motion (WIM) scales.

Figure 11-4 illustrates how the system (known as the Automated Mainline Clearance System) works. Currently, it is being maintained for a year, financed at the expenses of the respective States and province (Ontario), and

9 It should be noted, however, that urban transit companies that do become more efficient through the use of ITS systems can actually increase their clientele, an example being the Société de Transport de l'Outaouais.

10 Dodge, David; Richard Morill; Kiril Stanilow, 1996, "Implications of Intelligent Transport Systems for Metropolitan Form", Urban Geography, 17(1), pp 714-739.

a final evaluation is to follow this experience[11].

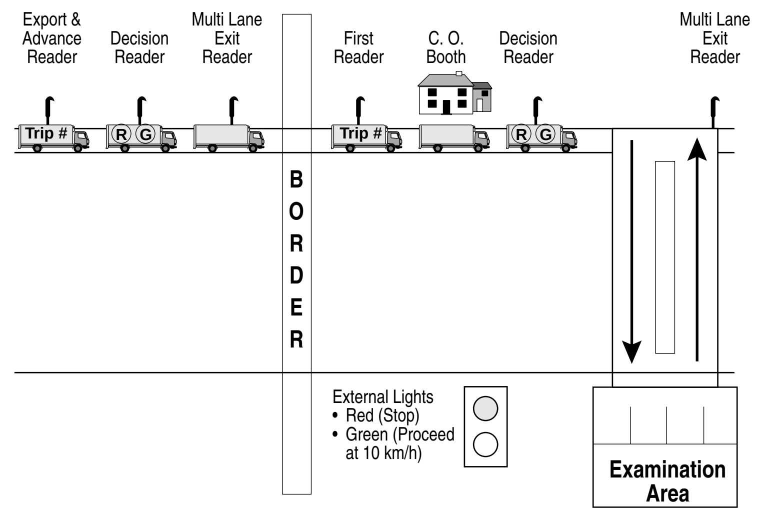
AVL/EDI

Trucking firms use automated vehicle location (AVL) and electronic data interchanges (EDI) systems primarily for real-time applications. AVI tags installed on trucks transmit identification data to AVI readers in telecommunications infrastructure such as digital telephone beacons and satellites. These process the information using global positioning systems (GPS), then transmit the real-time vehicle location to central logistics control facilities. AVL technology is usually combined with radio, digital telephone or other two-way communication devices to allow real-time communications between the control facility and drivers. These techniques promote more efficient truck use by, for example, reducing or eliminating driver stops for "call-backs." They also promote more efficient en-route guidance and monitoring, particularly for back hauls, congestion-avoidance, fuel consumption and safety.

These systems can also be used to track container and other types of freight. Managers use a form of bar code that allows them to track real-time freight locations and to communicate with trucking firms, shippers and receivers through EDI.

The most complete examples of vehicles and cargo tracking are probably found in the burgeoning multi-modal courier services, which let their clients access to real-time cargo status and location through the Internet. Figure 11-6 depicts some of the components

FIGURE 11-5
ELECTRONIC BORDER CROSSING TECHNOLOGY



Source: Lam , Joseph , 1999, "Overview of Current and Potential ITS Technologies", Proceedings, Transport Canada Seminars on the Impact of Information and Communications Technology on Transportation, Ottawa, Ontario, November, 1998.

found in a typical ITS freight-tracking system.

Transport firms use EDI to communicate transport-related information and documents such as manifests, bills of lading, invoices, orders and payments through an integrated electronic network of trucking firms, shippers, receivers, clients, government agencies and other interested parties. EDI is based on the Open System Interconnection (OSI) reference standard—seven layers and conforming protocols that facilitate communication among the internal operating systems of different network users.

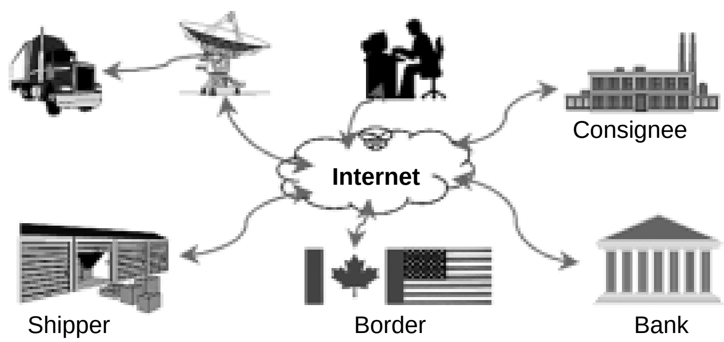
EDI transfers transport-related information quickly and efficiently, especially for applications related to prior, accurate information on freight arrival and departure. It allows for optimal use of loading bays and warehouses, as well as rapid electronic payment. EDI is an integral component of just-in-time (JIT) production, a production method that optimizes logistics and minimizes storage. JIT will be discussed later in this chapter under "ICT's Impact on Transportation Demand".

Electronic truck-freight markets

A new development related to EDI is the electronic truck-freight market. Electronic markets allow buyers and sellers of freight services to make automatic electronic bids. They are of particular interest for back-hauls because they reduce the transaction costs associated with making freight markets, thus reducing the role of intermediaries such as freight forwarders, as well as the need for, and scope of, long-term

11 Booze*Allen & Hamilton, 1998, "ITS Field Operational Test; Compendium of Field Operational Test Summaries," for Turner-Fairbank Highway Research Centre, US DOT.

**FIGURE 11-6
COMPONENTS OF A COMPLETE ELECTRONIC
FREIGHT TRACKING SYSTEM**



Source: Gaede, Eveline, 1999, "Challenger Motor Freight: Technology in Transportation", Proceedings, Transport Canada Seminars on the Impact of Information and Communications Technology on Transportation, Ottawa, Ontario, November, 1998.

fixed-price freight contracts. They also allow for more efficient use of trucks by minimizing waiting time and empty back-hauls.

Two interesting examples of existing Internet-based electronic freight markets are the Teleroute market covering Western Europe and the National Freight Exchange in the United States. Teleroute covers 16 countries, offers automatic translations, and allows for bids on characteristics such as weight, cargo type, origin and destination.

All of the ITS-based developments specific to trucking discussed so far may make the trucking industry more efficient and reliable, with lower costs and better service. This in turn may generate reductions in both the equipment and the labour required to carry equivalent tonne-kilometres of goods. These impacts, combined with possible reductions in traffic congestion, may increase truck-freight traffic in comparison with other transport modes, depending on the extent of ICT investment and use in the competing modes.

Electronic freight markets may also increase competition in the trucking industry and make prices more transparent. Freight brokers may become less necessary in the future.

ICT Use in Other Modes

While transport literature focusses mainly on how road transport has adopted ICT or ITS, both types of technologies are also prevalent in other transport modes, many of which may have moved faster than trucking to adopt ICT. Given the dearth of published literature on ICT diffusion in other transport modes, specific details are more difficult to report. Nevertheless, the use of ICT by other commercial transport modes is likely to have impacts similar to those experienced in freight-trucking activities.

One of the most important aspects of ICT – common to all transport modes – is pre-trip planning and scheduling. For consumers, this involves using ICT services such as the Internet to gather information about schedules, accommodation and entertainment, and to plan and book trips. In commercial transport operations, pre-trip planning and scheduling involves the use of ICT optimization and expert programs and their associated databases to optimize planned routing, scheduling and other logistic and management operations (payroll, personnel), as well as to minimize costs.

As with the freight-trucking activities, the other modes of transportation also have access to three main types of applications of ICT:

- computerized planning, scheduling and administration through optimization programs;
- real-time tracking of vehicles and cargo; and
- the use of EDI for administrative and financial document transmission, as well as for electronic markets.

ICT use in Rail Transport

With ICT diffusion, the main distinction between rail and freight-trucking has been in the ownership and nature of the infrastructure used in each mode. Private ownership dominates rail infrastructure, while public ownership dominates road infrastructure. Rail infrastructure is also more compact, with a limited number of users, compared with the larger and more diffused road network used by many commercial and private users.

These infrastructure differences may have contributed to the adoption of ICT technology in rail operations. This is supported by the productivity gains associated with steep cuts in employment in the Canadian rail industry in the 1990s, as discussed in Chapter 8, Transportation and Employment and Chapter 16, Price, Productivity and Financial Performance. While these impressive productivity improvements are fueled by many factors, a good part of the credit goes to ICT [12].

The ownership characteristics and relative concentration of rail infrastructure and rolling stock allow for the use of simpler tracking technologies. For example, the rail mode can use automatic car or locomotive identifiers such as bar codes and transponders, with readers attached to infrastructure, but trucking requires a global positioning system (GPS). When the Union Pacific Railway in the US wanted to track its trains using ITS, it simply installed bar codes in the cars and fibre-optic cables along the tracks, improving on-time success rates from 48 to 94 per cent [13]. West Coast Express, a British Columbia, Canada-based commuter rail service company, has equipped its locomotives with a GPS-based tracking system. This enables them to monitor trains, keep passengers informed of delays, and better share the tracks of CP Rail.

The main applications of ICT in today's Canadian rail freight [12]:

- radio and signals
- rail traffic dispatch and control
- automatic equipment ID and tracking
- electronic commerce
- shipment management
- inter-line systems with North American railroads
- mobile computing and
- data warehousing.

Future investments in ICT [12] are projected to include:

- Internet
- satellite
- advanced train control
- high-speed wireless
- expert/simulator systems
- seamless interaction with all modes, customers and suppliers.

In the case of passenger rail, many of the same ICT uses can be expected. Furthermore, the development of a relatively new high-speed passenger rail transport technology—magnetic-levitation (mag-lev)—may be able to compete with the automobile, air-passenger transport, and older high-speed rail systems such as France's TGV and Japan's Shinkansen systems. Mag-lev systems could resemble high-speed, large geographic-scale subway systems.

The mag-lev system currently on a drawing board in Japan (typically the most advanced country in terms of introducing public transport technology) suggests mag-lev's potential, and its association with ICT. The Hitachi corporation's Energy Research Lab are "dreaming up a new train…that makes the Shinkansen seem like a steam engine. Swapping ideas over a high speed computer network with engineers at a half dozen other Hitachi labs, they're pooling knowledge in chips, advanced materials, super-conductivity and software. Already they have a magnetic-levitation prototype that whooshes down a guideway at 300 mph on a cushion of air… Their goal is a nation wide mag-lev system controlled by a huge computer network that will behave like a living organism. Jobs such as scheduling and driving now done by humans will be surrendered to intelligent software, which will also untangle tie-ups, and adjust the flow of transport. It is a transportation system so vast and complex that no single Hitachi executive has a handle on the entire blueprint" (*Businessweek*, 1992)[14].

The implementation of mag-lev technology will depend on its proponents' ability to solicit the scale of public funding that has always been needed to implement all large, new transport infrastructure, from railways in the nineteenth century, to airports, air navigation systems, highways and road-infrastructure in the 1950 and 1960s. It will be no different for the ITS technology of today.

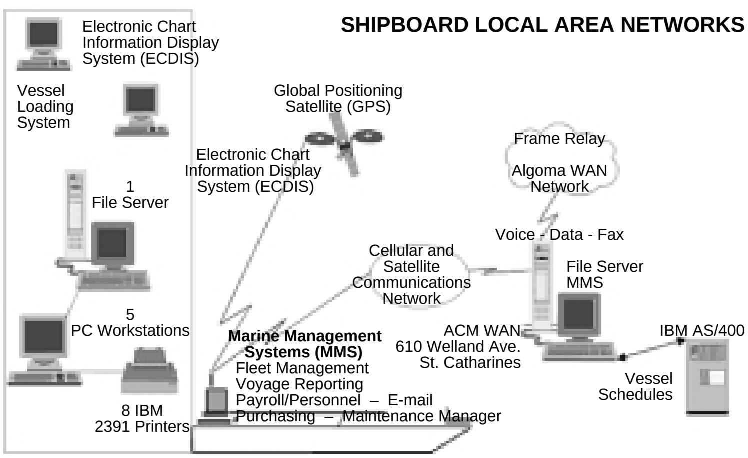
And, as with urban transit, the question of public investment in passenger rail also falls into the public policy debate. Put simply, the issue will focus on whether to continue supporting increased road use through public investment in roads and ITS technology, or to constrain road use through the re-allocation of public investment to alternative modes.

12 Foster, Anthony, 1999, "The Impact of ICT on Rail and Intermodal Transport", Proceedings, Transport Canada Seminars on the Impact of Information and Communications Technology on Transportation, Ottawa, Ontario, November, 1998.

13 Tapscott, Don, 1996, *The Digital Economy, Promise and Peril in the Age of Networked Intelligence*, New York, McGraw-Hill.

14 Gross, Neil, 1992, " Inside Hitachi", Business Week, September 28.

FIGURE 11-7
ICT TRACKING SYSTEM COMPONENTS IN SHIPPING



Source: Cook, Robert, 1999, "The Impact of ICT on Marine Transportation", Proceedings, Transport Canada Seminars on the Impact of Information and Communications Technology on Transportation, Ottawa, Ontario, November, 1998.

ICT use in Marine Transport

Use of ICT in marine-freight transport can be divided into two main areas: ICT used by shipping companies, and ICT used in marine infrastructure, such as ports or canals.

Shipping companies use real-time ICT for automatic ship-tracking systems that rely on satellite technology for GPSs, combined with electronic digital charts, as well as two-way digital communication from ship to shore. These systems make it possible to track ships in real time, both from shore and from sea, and to calculate optimal routing and scheduling.

Figure 11-7 illustrates the different ICT tracking and information components of one Canadian shipping company.

Marine infrastructure's main use of real-time ICT and electronic data processing systems is for tracking and optimizing the movements of ships and cargo, especially within a port or canal. It also uses this technology to optimize: loading and unloading by allocating berths and cranes; storage (particularly in container yards); and cargo pick-up and delivery by other freight modes, (rail, truck) at a port's gates.

In ports, particular emphasis is placed on container management and tracking, with some potential for the use of transponder-based technology, similar to that described earlier for trucking. However, an interesting problem related to real-time container tracking is the requirement for all transport companies to install standard identifiers, such as bar codes and transponders, on containers. Another interesting problem is the need to locate interior containers in densely packed container storage yards, with spread spectrum technology being explored to solve it.

EDI systems have been and are being implemented to allow for communication between marine shipping companies and brokers, marine infrastructure (ports) and other freight modes such as rail, allowing for seamless intermodal freight transfers.

ICT Use in Air Transport

As with marine and rail, ICT diffusion in air transport has been relatively rapid. The vast majority of both air navigation infrastructure suppliers and large commercial airlines now use GPS-based satellite tracking, allowing for ongoing consolidation of air traffic control infrastructure. (See Chapter 12, Transportation Infrastructure). Expert programs and EDI systems are also used for administering, routing, scheduling, and other management functions, and by maintenance personnel. Indeed, the airline industry is one of the most advanced of all industries in using EDI for electronic commerce to directly retail products such as airline tickets.

The airline industry's rapid adoption of electronic commerce may be a harbinger of similar moves to electronic markets in other transport industries, such as truck and rail-freight, where it is still relatively new. During the airline industry's early forays into EDI, there were no electronic connections between the airlines and their brokers, the travel agents. By the second stage, brokers and producers had become connected through computer reservation systems (CRSs) containing electronic information on different airlines products (e.g. fares and schedules), but consumers were still outside the loop. Now, both CRS-equivalent systems, such as Cheap Tickets Inc., and individual airlines are on the Internet, allowing for increasing amounts of direct sales between producer and consumer. This development has reduced or eliminated the role and costs associated with a physical intermediary, the broker. Direct electronic communications allow the airline industry to move towards personalizing relationships between industry and consumers, a change that may become the hallmark of the ICT era.

Direct electronic sales of tickets and other products (e.g. air mile rewards) allows the airlines to develop detailed, individual databases on specific consumer tastes and buying patterns. Over time, they can use this information to customize products and services to maximize revenues and minimize costs, as well as improve customer service and satisfaction.

ICT's Impact on Transportation Demand

The Impact of ICT on Complementary Industries to Freight Transport

Freight transport is complementary to the goods-producing industries. It also complements the wholesale and retail trade that support these industries. Freight transport is an intermediary industry whose primary function is to move goods to production facilities and manufactured goods to wholesale and retail markets. Consequently, freight transport's importance to the economy is highly correlated with the relative importance of the goods-producing and trade industries' importance to the economy.

Macro-Economic Trends in Goods and Services Production

Recent macro-economic analysis predicts that the modern knowledge-based economy will see a decline in the importance of goods-producing industries and growth in service industries.[15] The decline is more in the relative importance than in actual volume moved. The time period since the last recession (or from 1992 onwards), however, demonstrates the contrary: that is, solid growth in goods-producing industries, with goods-producing industries increasing their share of GDP in relation to services.

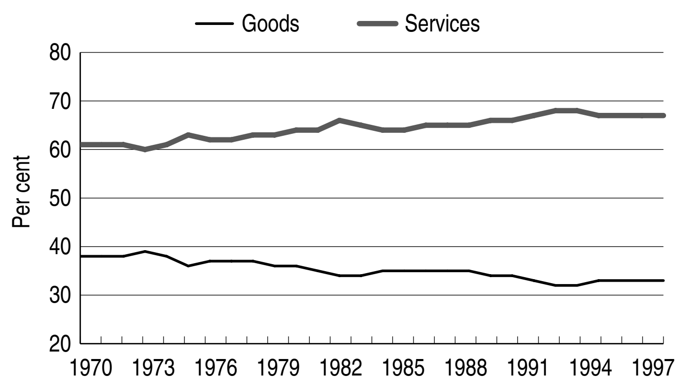
Figure 11-8 illustrates this phenomenon.

A more detailed look at the five leading growth sectors from 1972 – 1997, is shown in Table 11-3, which is roughly broken down into periods between recessions (1992 – 1997, 1982 – 1992, 1972 – 1982).

Table 11-3 indicates that the three complementary industries to freight transport (primary commodities, manufacturing and trade) rank respectively third, fifth and fourth in growth over the latest time period. The leading growth industries in all three time periods (communications, business and services) contain primarily ICT industries such as telecommunications and software companies.

Table 11-4 gives an assessment of growth in transport industries over the same time periods. It points out a correspondingly high growth in primarily freight-transportation industries (trucking, rail and marine) over the latest time period. The negative and low growth in passenger transport (such as intercity bus and urban transit) and other transportation (such as travel agents and freight forwarders) may reflect the social

FIGURE 11-8
SHARE OF GOODS AND SERVICES IN GROSS DOMESTIC PRODUCT, 1970 – 1997



Source: *Harris, Jeff, 1999, "Macro-economic Trends and the Demand for Freight Transportation", Proceedings, Transport Canada Seminars on the Impact of Information and Communications Technology on Transportation, Ottawa, Ontario, November, 1998.*

15 Examples of these analyses from a comparative international perspective are primarily from the OECD, and domestically from Industry Canada, with these studies generally set in the time period from 1971 to the early 1990s.

TABLE 11-3
LEADING GROWTH INDUSTRIES
1972 – 1997

R	1972 – 1982	1982 – 1992	1992 – 1997
1	Business Services	Communication	Business Services
2	Communication	Business Services	Communication
3	Health and Social Services	Trade	Manufacturing
4	Other Utilities	Financial Services	Trade
5	Construction	Health and Social Services	Primary Commodities

Source: Statistics Canada, Cansim

TABLE 11-4
ANNUAL GROWTH IN COMMERCIAL TRANSPORTATION INDUSTRIES
1972 – 1997

		Per cent	
	1972-1982	1982-1992	1992-1997
Transportation Industries	**2.2**	**2.4**	**2.4**
Rail	-1.6	4.1	4.3
Marine	2.3	-0.4	2.7
Truck	3.5	4.8	5.6
Primarily Freight	**1.5**	**3.6**	**4.8**
Air	5.1	0.0	3.0
Passenger Transit Systems	2.1	-2.2	-3.4
Other Transport	2.7	1.4	-2.6
Primarily Passenger	**2.9**	**-0.5**	**-1.4**

Source: Statistics Canada, Cansim

trends referred to earlier in this chapter, such as heightened automobile use and electronic commerce for direct ticket purchases.

While it is important to be cautious in explaining the observed trends, it is possible that non-ICT-related economic factors were responsible for the services growth from 1972 to 1992. Other such factors could include the energy crisis (1972 – 1982), public policy decisions related to deficit financing and growth in government services, or the ever-increasing participation of women in the labour force. It is also possible that the 1990s represent the initial phase of the new ICT-based economy, where the continuation of the observed trends from 1992 to 1997 in goods-production and trade may lead to an increase in the importance of freight transportation to the Canadian economy.

ICT and Industrial Processes

A shortage of data makes it difficult to observe the impact of ICT on industrial production processes, and therefore to assess whether these processes create a complementary demand for freight transport. It is possible, however, to speculate that the principal impacts will come from the new supply-chain management that integrates production, distribution and retail through common EDI systems.

Freight transportation is crucial to this new supply-chain management, with transport being the prime intermediary among industries using the just-in-time (JIT) processes. JIT integrates production, shipping and sales to streamline delivery and eliminate or minimize inventory accumulation through interconnected EDI systems.

Wal-Mart is a good example of JIT delivery. At Wal-Mart, an EDI network links retail stores, redistribution centres, suppliers and manufacturers with transportation industries. All information (sales history, number of items in transit) is digitized and maintained in a common database, to which floor retail staff (“associates”) have access through a bar code scanner and display read-out. The floor-level associate responsible for a given section, such as household wares, places the order. The order is then transmitted through the common network directly to suppliers, redistribution centres and transport firms. The supplier who receives the order ships it to the redistribution centre, where the goods are transferred from the supplier-delivery loading dock to the retail-store shipment dock, with minimal (24–48 hrs) trans-shipment time to the retail store. The result: 97 per cent of Wal-Mart’s goods never pass through a warehouse, and Wal-Mart can pay suppliers directly through customer sales[16].

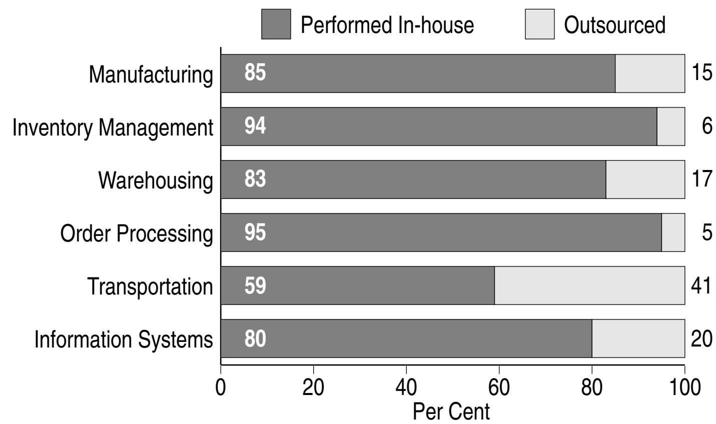
16 Tapscott, Don, 1996, *The Digital Economy, Promise and Peril in the Age of Networked Intelligence*, New York, McGraw-Hill.

JIT in manufacturing

In manufacturing, a JIT process is now common, but moves back through the production chain to intermediate and primary commodity producers. Car manufacturing plants, for example, are linked to parts suppliers by ICT networks. Each time a new car rolls off the assembly line, it is automatically registered by the parts supplier through a common EDI system, which then manufactures and ships the parts "just in time" to meet the demand from the plant. Again, warehousing is eliminated, reduced or transferred from the manufacturer to the supplier. Account settlements, transfer of designs and drawings, email and other business transactions between the automakers and their supply sidetracking partners are now done through an integrated ITC network.

For some suppliers, JIT delivery may result in changes in the average load weight and number of trips a transportation mode must provide. JIT may, for example, increase the number of trips. It may also be more conducive to truck transport, as freight trucks have lower capacity per unit, come in varying sizes, and have more dispatch flexibility than rail and marine transport. Consequently, the impact of JIT may be to increase the demand for freight-trucking relative to other freight modes. However, given the limited availability of data on the composition of the trucking fleet and of private trucking activity, these projections must be seen as conjecture.

FIGURE 11-9
INDUSTRIAL OUTSOURCING BY PRODUCTION COMPONENTS



Source: Mahmassani, Hani, 1999, "ICT and the Logistics Process: Third Party Providers and Freight Outsourcing", Proceedings, Transport Canada Seminars on the Impact of Information and Communications Technology on Transportation, Ottawa, Ontario, November, 1998

Outsourcing

One of the principal effects of ICT is that it reduces transaction costs, because fewer people are needed to manage and process a company's services. As a result, employers have begun to contract specific services to suppliers, rather than maintaining their own staffs. In the case of freight trucking, ICT allows for better information on freight logistics and performance (such as proportion of on-time delivery). Firms that need to transport their products to their markets are therefore beginning to contract out freight and all other logistic operations, rather than maintaining in-house staff.

Figure 11-9 shows that, of all components of industrial production, transportation currently has the largest share of outsourcing.

Large numbers of multinational corporations (Toys R Us, Scott Paper) are now outsourcing all of their logistics to the specialized logistics units of large transport firms. These firms have the ICT expertise to implement, manage and coordinate the various JIT logistics processes, including subcontracting to various transportation firms[17]. Advantages of using third-party logistics providers include:

- leveraging freight volumes for lower transport rates;
- spreading warehousing and equipment costs over a larger base, and maintaining higher utilization;
- better utilizing staff, equipment software and other resources;
- excelling through specialization; (e.g. by recruiting better logistics personnel, keeping up with new technology; and better

17 Miles, Gregory, 1995, "Marriages of Convenience; New Age Logistics Units Woo Customers via Information Technology," *International Business*, January, pp 32–36.

TABLE 11-5
TRUCK DRIVERS EMPLOYED BY INDUSTRY

Sector	*1991*	*Per cent*	*1996*	*Per cent*	*Annual Growth*
Commercial Transport	88,805	49.4	120,570	59.6	6
Own-Account	91,125	50.6	81,810	40.4	-2
Total	**179,930**	**100.0**	**202,380**	**100.0**	**2**

Source: Statistics Canada, Census Data.

integrating various players along the supply chain[18]).

In Canada, some interesting evidence of this shift from private to commercial transport is provided by data on truck drivers employed in private and commercial trucking operations from 1991 to 1996, shown in Table 11-5. This is another possible explanation for the high growth in commercial trucking noted in Table 11-4.

TRANSPORTATION AND TELECOMMUNICATIONS[19]

Much of the literature that has been written on the relationship between transportation and telecommunications focusses on whether transportation and telecommunications are substitutes for or complements to one another. This section looks at that literature in four sections: econometric studies, telecommuting, video-conferencing and other (i.e. teleshopping) studies.

Much of the literature dealing with the relationship between transportation and communications confuses two economic concepts: the concept of substitute/ complementary goods, and the concept of normal, inferior and superior goods.

"Substitutes" and "complements" refer to goods with a direct relationship, where changes in relative prices will affect demand. For example, an increase in the price of one good (e.g. an automobile) generates an increase in the demand for another good (e.g. Internet access), indicating they are substitutes (e.g. fewer automobiles, more Internet access).

"Normal," "inferior" and "superior" goods refer to changes in demand due to changes in income.

With normal goods, demand increases as incomes rises; with inferior goods, demand falls as income rises; and with superior goods, demand increases proportionally more than the rise in income. As an example, a common error in the literature assumes that, because both telecommunications and transport activity have increased over time, they are complements. Actually, as real income has also been rising over time, the observation probably indicates that they are both normal or superior goods.

Econometric Studies

A very interesting study conducted over approximately 25 years in England and Australia[20] analyzes the household demand for both consumer transportation (e.g. cars, buses) and communications from 1960 to 1986. While the study pre-dates the period we are interested in – the 1990s – it still offers signposts to current trends.

The study indicates that rising real income is the main factor that determines changes in the demand for both transport and communications, with a very slight substitute relationship between the two.

The principal results of the study can be seen in Table 11-6.

The data[20] indicate that the main impact on both transport and communications demand comes from rising real incomes rather than relative price changes. Private transport (such as the automobile) is highly income-elastic[21] in both countries, indicating private transport demand is particularly

18 Mahmassani, Hani, 1999, "ICT and the Logistics Process: Third Party Providers and Freight Outsourcing", Proceedings, Transport Canada Seminars on the Impact of Information and Communications Technology on Transportation, Ottawa, Ontario, November, 1998.

19 This entire section draws heavily on Mokhtarian et al., 1997.
Mokhtarian, Patricia, Ilan, Salamon, 1997, "Emerging Travel Patterns: Do Telecommunications Make a Difference", prepared for the eighth meeting of the International Association of Travel Behaviour Research, Austin Texas, September, 1997.

20 Selvanathan, E. and Saroja Selvanthan, 1994, "The Demand for Transport and Communications in the United Kingdom and Australia", Transportation Research B, 28(B)(1), pp. 1-9.

21 The degree to which demand changes in relation to increasing real income is measured through an economic concept called "the income elasticity of demand." Income elasticity measures the proportional change in quantity demanded for a good relative to proportional changes in real income. A good with an income elasticity of greater than one is referred as an "income-elastic" or "superior (luxury)" good, meaning its consumption rises proportionally faster than does real income. A good with an income elasticity between 0 and one is inelastic, while a good with a negative income elasticity is an inferior good.

TABLE 11-6
INCOME AND PRICE ELASTICITIES FOR TRANSPORT AND COMMUNICATIONS
UNITED KINGDOM AND AUSTRALIA, 1960 – 1986

	United Kingdom				Australia			
	Income Elasticity	Price Elasticity			Income Elasticity	Price Elasticity		
Goods		Private Transport	Public Transport	Communi-cations		Private Transport	Public Transport	Commun-cations
Private Transport	2.11	-.53	.07	.08	2.27	-.55	.15	.04
Public Transport	.98	.19	-.41	.03	.80	.49	-.73	.07
Communications	1.19	.57	.09	-.12	.50	.31	.18	-.60

Source: (Selvanathan, E. and Saroja Selvanthan, 1994, "The Demand for Transport and Communications in the United Kingdom and Australia", Transportation Research B, 28(B)(1), pp. 1-9

responsive to rising income, rising proportionally much faster than real income over time.

Communications demand is income-elastic in the United Kingdom, while the demand for private and public transport is income inelastic. All price elasticities (own, cross-price) are inelastic, indicting that demand is relatively unresponsive to price changes, with a very low cross-price elasticity[22] from communications to transport. The positive sign indicates a very slight substitution effect. This may not be particularly surprising, as transportation (moving people and goods) and communications (exchange of ideas) may serve primarily different purposes in society.

A different study[23] assesses whether commercial transport and telecommunications services purchased by industry are correlated. This study is based on a cross-sectional analysis of commercial transport and telecommunications inputs into 44 industries, for nine countries of the European union in 1980. The study finds that commercial transport and telecommunications are positively correlated, indicating that industries that purchase large amounts of commercial transportation also tend to purchase large amounts of commercial telecommunications services.

ICT and Telecommuting[24]

Public interest in the relationships among commuter transport and urban congestion, public infrastructure costs and pollution has resulted in a number of studies that examine how telecommuting could mitigate some of these problems. The studies are of two types: small-scale empirical studies of travel behaviour by telecommuters, and larger projections that amplify the results of the smaller studies.

The small-scale telecommunications studies compare transport activity by telecommuters on days when they commute to an office with transport activity on days when they work at home or from telecommuting centres. Much of this early work was related to environmental considerations, and many of the studies also include estimates of changes in fuel consumption, particularly for private vehicles.

These studies have relatively small samples, and are short run, meaning that they do not follow a cohort of telecommuters long enough to check whether the telecommuters' patterns for house and vehicles purchases changed. The results of the small studies are consistent, if unsurprising. They demonstrate that telecommuters traveled fewer kilometres on telecommuting days, which suggests a short-run substitute relationship between telecommuting and transport. The studies also indicated, again unsurprisingly, a slight tendency

22 The degree of substitutability or complementarity is judged by an economic concept called "the cross-price demand elasticity." This elasticity measures the proportional change in demand for "Good A" (e.g. transport) relative to a proportional change in the price of "Good B" (e.g. telecommunications). If the elasticity is negative the goods are substitutes; if positive, complements. The size of the elasticity indicates how closely the goods are related. An elasticity of zero means they are not directly related.

23 Plaut, Pnina, 1997, "Transportation-Communications Relationships in Industry," *Transportation Research* A, 31 A, pp. 419–425.

24 Shafizadeh, Kevan; Debbie Niemeier, Paticia Mokhtarian, Ilan Salomon, 1997, "The Costs and Benefits of Telecommuting: An Evaluation of Macro-scale Literature", paper presented at the eighth meeting of The International Association of Travel Behaviour Research, Austin, Texas, September, 1997

TABLE 11-7
LARGE SCALE TELECOMMUTING FORECASTS

Selected variables	*DOT study (1992 - 2002 annual average)*	*DOE study (2005, 2010 annual average)*
Vehicle mile savings (billions)	1,583-2,097	2,047-2,319
Fuel savings (million gallons)	100-134	46-69
Fuel cost savings (million $)	$ 86 -114	$ 51- 77
State and Federal Excise Tax Loss (million $)	$ 24-32	$ 14- 21
Avoided CO2 emissions (tons)	37,971 - 50,293	3,398 - 8,817
Avoided NOx emissions (tons)	4,557 - 6,036	620 - 1,903
Avoided Hydro-Carbon emissions (tons)	5,602-7,421	521 - 1,081

Source: Shafizadeh, Kevan; Debbie Niemeier, Paticia Mokhtarian, Ilan Salomon, 1997, "The Costs and Benefits of Telecommuting: An Evaluation of Macro-scale Literature", paper presented at the eighth meeting of The International Association of Travel Behaviour Research, Austin, Texas, September, 1997.

for reduced use of urban transit mode.[25]

The results of these studies have served as the basis for larger projections of potential telecommuting benefits, primarily at the national level in the United States. The two principal US studies are by the US Department of Transport[26] (DOT) and the US Department of Energy[27] (DOE). To generate projections of variables such as travel activity, fuel use and emission reductions, these larger studies rely on assumptions regarding increases in the number of individuals who would telecommute, the number of days per week they would telecommute, and reductions in private-vehicle travel on telecommuting days.

These studies – particularly that carried out by DOE – also attempt to quantify some of the benefits associated with the projected reductions in transport activity. Table 11-7 summarizes roughly comparable results for low- and high- range results. The divergence between the studies is largely explained by differing assumptions regarding fuel efficiency.

The DOE study bases its estimate of the total financial benefits from telecommuting through avoided expenditures in road-infrastructure capacity of $12,970 - $19,960 million from 1994 to 2010, for an average annual savings of $811 - $1,248 million dollars.

To place these results in perspective, the high estimate of annual fuel savings from the DOT study presented above represents approximately 0.1 per cent of gasoline consumption in the United States in 1993 (111,323 million gallons). However, the high estimated cost savings in annual road infrastructure from the DOE study represents approximately 1.8 per cent of total public expenditures on roads in 1993 ($69.6 billion). The discrepancy in the percentages may reflect the disproportionate influence of peak-hour commuting on road infrastructure costs, particularly capacity costs.

An interesting and similar result is found in a Canadian financial cost-benefit study of the greater Vancouver Area done as a Masters thesis.[28] The study finds that benefits outweigh costs for the three sectors of public, employers and employees. The principal beneficiary of telecommuting is the public sector, which can reduce expenditures on highway infrastructure. Suggested infrastructure cost reductions are based on estimates of future transport infrastructure costs relative to peak-hour commuting trips.

Table 11-8 indicates the distribution of net benefits.

The results of all these macro studies cited above should be used with caution, for two reasons.

25 Mokhtarian, Patricia, 1998, "A Synthetic Approach to Estimating the Impacts of Telecommuting on Travel", Urban Studies, 35 (2), pp. 215-241.
Mokhtarian, Patricia; Susan Handy, 1996, "Forecasting Telecommuting; An Exploration of Methodologies and Research Needs" Transportation 23, pp. 163-190.
Salomon, Ilan, 1998, "Technological Change and Social Forecasting: the Case of Telecommuting as a Travel Substitute", Transportation Research C 6, pp. 17-45.

26 US Department of Transportation, 1993, Transportation Implications of Telecommuting, Washington, D.C.

27 US Department of Energy, 1994, Energy, Emissions and the Social Consequences of Tele-commuting, Washington , D.C.

28 Finlay, Stephen, 1991, "Benefits, Costs and Policy Strategies for Telecommuting in Greater Vancouver" master thesis in Business Administration, Simon Fraser University, Vancouver, British Columbia.

First, they use a large number of relatively arbitrary assumptions to generate results; second, they rely solely on short-run telecommuting studies for their estimates of travel activity reductions. Nevertheless, the studies do point to two probable conclusions. One is that short-run reductions in total surface passenger travel activity due to telecommuting will be relatively small[29]; the other is that reductions in peak-hour commuter travel activity may be more substantial, with financial benefits primarily related to avoided costs for highway infrastructure.

TABLE 11-8
SECTOR DISTRIBUTION OF NET FINANCIAL BENEFITS FROM INCREASED TELECOMMUTING IN GREATER VANCOUVER

Present values in millions of 1991 Canadian dollars

Sectors	*Zero Traffic Growth Scenario*	*Reduced Traffic Growth Scenario*
Public Sector	1,546	637.1
Employers	85.4	46.8
Telecommuters	136.8	73.9

Source: Shafizadeh, Kevan; Debbie Niemeier, Paticia Mokhtarian, Ilan Salomon, 1997, "The Costs and Benefits of Telecommuting: An Evaluation of Macro-scale Literature", paper presented at the eighth meeting of The International Association of Travel Behaviour Research, Austin, Texas, September, 1997.

ICT and the Air Transport Market

Another major transportation market where ICT technologies and transport compete is the business air-travel market, where teleconferencing, video-conferencing and network-linked email have the potential to replace air travel. Certainly, ICT providers have consciously targeted the business-travel market – an apparently logical choice, since most business people travel to communicate.

Unfortunately, there are no comprehensive econometric studies of the business air-travel market that estimate the various elasticities, such as price and income, associated with ICT products and commercial air transportation. Early studies that used either surveys-methodology or case studies generated mixed results in terms of a substitute or a complement relationship. A modern Canadian study that used survey techniques on business travelers and business video-conferencing users indicates a substitute relationship.

Figure 11-10 projects the increase in business air travel substitution over time, beginning in 1996.

ICT and Other Passenger Transport Markets

While the commuter and air transport markets have the highest potential for direct competition between ICT and transport, other areas of potential competition have also been suggested, notably teleshopping and various forms of conventional and mobile telephones.

While there are no empirical studies in the area of teleshopping, the nature of shopping suggests limited substitutability. Shopping is not done primarily to communicate, but to purchase and transfer goods from a retail location to a household. While the search-and-purchase process may take place though the Internet, in most cases, the physical movement of goods must still follow.

The increase of teleshopping may, however, change the modal distribution of shopping travel from private vehicles to freight trucks or delivery vans. The Octopus book firm, for example, serves as both an on-line book dealer and a delivery service. The high growth in the courier services market may also be further accentuated by the growth in on-line shopping.

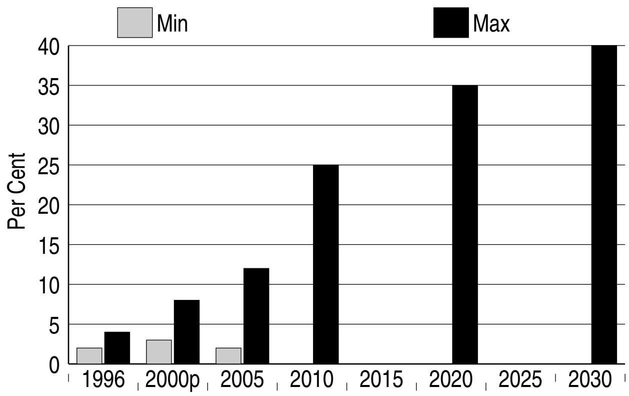
Two specific empirical surveys have looked at the relationship between telephones and transport. A week-long 1984 diary study in the Lyon, France, metropolitan area involving 663 people estimated that residential phone use generated trips between three and five per cent of the time, and replaced trips between 21 and 27 per cent of the time.[30] A mail survey of 7,347 cell-phone subscribers in the San Francisco Bay area found that 14.8 per cent of respondents reported driving less often after getting a cell phone, compared with eight per cent who reported driving more often.[31] While these results should be interpreted with caution, they do confirm the results of the Selvanthan study cited earlier, which indicates a

29 Mokhtarian, Patricia, 1998, "A Synthetic Approach to Estimating the Impacts of Telecommuting on Travel", Urban Studies, 35 (2), pp. 215-241.

30 Claisse, Gerard; Frantz Rowe, 1993, "Domestic Telephone Habits and Daily Mobility", Transportation Research A27(A), pp. 277-290

31 Yim, Youngbin, 1994, "The Effects of Mobile Telephones on Transportation and Urban Form", paper presented at 33rd annual meeting of the Western Regional Science Association, Tucson, Arizona, February 2-27.

FIGURE 11-10
PROJECTED GROWTH RATES FOR VIDEO-CONFERENCING IN THE BUSINESS AIR MARKET



Source: Roy, Jacques, 1999, "The Impact of Videoconferencing on Business Air Travel", Proceedings, Transport Canada Seminars on the Impact of Information and Communications Technology on Transportation, Ottawa, Ontario, November, 1998

relatively weak substitute relationship between consumer transport and conventional telecommunications such as the telephone.

SUMMARY

This chapter has reviewed some of the empirical work on the impact of ICT on transportation, based on a research project undertaken by Transport Canada in 1998.

In summary, the possible impact of ICT on passenger transportation may be to further augment the use of the automobile as the principal means of surface passenger transportation. The congruent effects of increasing urban sprawl and a declining peak daily flow; increased road capacity through ITS; and ICT-induced rising incomes, may in combination overwhelm the slight potential substitution effect from telecommuting.

In air travel, the impact of video-conferencing may generate some stagnation in the business air market.

With freight transport, conclusions are more difficult to draw, as the economy may be on a new and different growth path in the 1990s relative to the previous 20 years. Certainly freight transportation growth has been strong since the end of the 1992 recession, with particularly strong growth in trucking and rail, corresponding to growth in the goods-producing and trade sectors. Lack of data makes it more difficult to discern the impact of ICT-based supply-chain management and JIT production processes. There is, however, some evidence that companies are increasingly contracting out commercial transport rather than handling it themselves.

In terms of freight supply, all modes should experience increased efficiency and lower costs due to ICT investment, which should result in lower freight prices and gradual implementation of electronic freight markets that will in turn generate heightened price competition.

Modal shifts are harder to discern, due to the lack of data on relative ICT diffusion and related productivity gains by mode.

PART C

TRANSPORTATION, INFRASTRUCTURE AND SERVICES

A country's transportation system rests on transport infrastructure assets without which transport services could not be offered. So before reporting on the level of activities for each mode of transportation, this section gives an overview of the infrastructure system. It looks at changes affecting or that could affect directly or indirectly the country's transport infrastructure. Next it presents the infrastructure system and its use. It also conducts an analysis of some incidental services, because of their importance to safety and/or system efficiency. When possible, this section reviews some traffic and financial information. A section on the industry structure prevailing in each modes of transportation follows. This examines the recent changes to the structure of each modal transport industry. To make the coverage of transportation complete, it then analyzes measures of transport activity levels, by modes, with a focus on both freight and passenger transport. The report ends with one of the important concern of transportation policy, economic efficiency. Efficiency is examined from the perspectives of price, productivity and financial performance of the modal transport service industries.

PART C – TRANSPORTATION, INFRASTRUCTURE AND SERVICES

12

TRANSPORTATION INFRASTRUCTURE

Canada’s transportation infrastructure is affected by policies aimed at modernizing the system. In 1998, changes to infrastructure occurred through investments improving or adding services and through rationalization, transfers, changes in ownership or in the operators.

Efficient, modern transport services require a sound infrastructure composed of many interconnecting elements. Without rails, there are no trains. Without airports, aircraft cannot take off and land. Without roads, cars, trucks, and buses cannot circulate. Without ports, ships cannot moor or be loaded and unloaded.

This chapter describes the status of the essential elements of the infrastructure that supports the portion of Canada’s transportation system that moves both passengers and freight. It also describes events and issues of the past year that involved management of the assets of Canadian infrastructure components, such as the operation of airports, air navigation, ports, the Seaway, railways, roads and bridges. In addition, this chapter discusses related services such as marine pilotage, freight forwarders and warehouse operators.

This is the first annual report to include freight forwarders and warehouse operations. Both have become important components of transportation, especially in relation to trade, and we hope to expand that coverage in future years.

Canada’s transport infrastructure must be viewed within the context of its transport policy framework. Current policies encourage the use of “best practices” to make the system more cost-effective. The events of 1998 represent in large part the privatization and accompanying commercialization of Canada’s transportation system, which in turn resulted from the government’s strategic rethinking of the management and delivery of infrastructure-related services. A number of initiatives in 1998 have had an impact on infrastructure and associated services.

TABLE 12-1
COMPONENTS OF CANADA'S TRANSPORTATION INFRASTRUCTURE
1998

Mode	*Component*	*Number & Function*	*Activity Measure*[1]
AIR	**Air Navigation System**	• 7 area control centres, 44 air traffic control towers, 83 flight service stations, and 1,400 electronic aids to navigation • provides air traffic control, flight information, and other related air navigation services	• There were 7.6 million aircraft movements at all airports in 1998, with 43.6 per cent occurring at NAS airports.
	Airports	• approximately 1800 aerodromes across Canada in all jurisdictions • 631 *are* certified as airports, heliports or water/ice bases for float/ski planes. • enable landing, takeoff, maintenance of aircraft, and handling and servicing of both passengers and cargo	• 79.5 million passengers used all airports in 1997. • 93.5 per cent of passengers passed through the 26 airports that make up Canada's NAS.
MARINE	**Ports**	• more than 2,400 diverse facilities, ranging from large ports like Vancouver to small recreational and fishing harbours • the interface with railways and roads for goods, and passengers that are continuing to their next destination by water	• 376.4 million tonnes of international and domestic traffic was handled in 1997. • The top 20 ports handled 79.4 per cent of the total tonnage in 1997.
	St. Lawrence Seaway	• stretches from Montreal to Lake Erie, consisting of 15 locks, 13 operated by Canada, and 2 by the US • enables vessels to navigate the different elevations of Canadian waterways to reach the open waters of the Atlantic Ocean	• 38.9 and 40.4 million tonnes of cargo was moved in 1998 on the Montreal/ Lake Ontario and Welland sections respectively. • Grain, iron ore, coal, and steel products accounted for three-quarters of total traffic, of almost 49 million tonnes in 1997.
HIGHWAY	**Roads**	• more than 900,000 kilometres of public roads, mostly under provincial jurisdiction • 24,200 route kilometres built to North American road standards representing the National Highway System and carrying a significant proportion of the vehicle traffic • many border crossings with the United States dotting the countryside, 18 being major gateways and 130 having customs offices	• Annual average of 8,400 vehicles per day used the National Highway Sytem across Canada. • The highest counts of average vehicles per day are in Ontario (18,000) and Quebec (14,800). • An estimated 400 million tonnes of freight is moved each year. • 10 million truck trips cross the border annually carrying about $400 billion (70 per cent) of Canada-US trade.
	Bridges	• many bridges throughout Canada, 10 of which are vital links in Canada–US trade	• One third of total vehicle border crossings, or more than 30 million vehicle trips, crossed the bridges in Ontario.
RAILWAY	**Main Lines**	• 72.4 per cent of total railway trackage of approximately 50,100 route kilometres provided CN and CP Rail networks	• 318 million tonnes were moved in 1997. • CN and CP handle more than 90 per cent of total output.
	Regional and Shortlines	• about 51 regional and short lines operating in Canada • 51 per cent of the total trackage now controlled by 5 of these shortlines	• Regional and shortline rails account for more than 29 per cent of total annual tonnage, or about 9 per cent of total output in revenue tonne-kilometres.
	US Lines	• 368 route kilometres in Canada operated by CSX, Burlington Northern, Conrail, and Wisconsin Central	
	Passenger and Other Lines	• Passenger trackage of 242 kilometres owned or leased by Via Rail and Go Transit.	• 88 per cent of all intercity rail travelers (4.1 million in 1998) use Via. • Commuter rail travel (estimated at 29 million passengers in 1998) is in larger urban centres.

1 Based on the most recent full year of data available

Rail Transportation Infrastructure

In 1998, Canadian railways operated over approximately 50,100 route-kilometres of track, a marginal decrease from 1997. Of this total, CN accounts for about 42 per cent of total system route-kilometres, while CP Rail accounts for about 30 per cent. Over 25 per cent of the Canadian rail network is now owned and/or operated by regional or shortline railways. Of particular interest is the fact that the growth of shortline rail carriers has continued its strong pace, with an increase of 24 per cent over the previous year in terms of network operated. Based on CN and CP Rail's Three-Year Rationalization Plans, this growth is expected to continue.

Table 12-2 summarizes the ownership and operation of Canada's rail infrastructure.

As a result of rationalization activities (largely transfers to other operators), CN reduced its network by approximately ten per cent from 1997, while CP reduced its network by about five per cent [1]. The entire network shrunk by about 1.1 per cent during 1998 as a result of discontinuances.

Rationalization

Railway rationalization is a broad term referring to the wide range of ways a railway/carrier can deal with track that no longer provides it sufficient economic return. Although once virtually

TABLE 12-1
COMPONENTS OF CANADA'S TRANSPORTATION INFRASTRUCTURE - (Cont'd)
1998

Mode	*Component*	*Number & Function*	*Activity Measure*[1]
RELATED SERVICES	**Coast Guard**	• 262 automated light stations, 5 Loran C communication stations, over 6000 land-based, and more than 13,000 floating marine aids • information and other assistance to vessels provided by 22 communication centres and remote transmitter/receiver sites • search and rescue and environmental response provided by 53 stations (22 with in-shore boats and 31 regular) and 63 spill response depots • mission is to support safe and environmentally sustainable marine transportation	
	Marine Pilotage	• 4 pilotage authorities: **Atlantic** – Canadian waters around the Atlantic provinces, Newfoundland & Labrador; including Chaleur Bay, Quebec, south of Cap d'Espoir **Laurentian** – St. Lawrence waters between Les Escoumin, and the north gate of the St. Lambert lock, Saguenay River, and Chaleur Bay **Great Lakes** – waters in Manitoba, Ontario and Quebec south of the north entrance of the St Lambert Lock **Pacific** – covers the coastal waters of B.C. including the Fraser River • exist solely to provide services that safely guide vessels through their designated waters	• There were 54,095 total pilotage assignments in 1998, distributed as follows: - Atlantic – 9,725 - Laurentian – 22,018 - Great Lakes – 9,085 - Pacific – 13,267
	Freight Forwarders	• approximately 280 firms in 170 locations across Canada • transport-related services such as packaging, consolidation, storage, handling, export credits, insurance, documentation, and customs clearance	• Total net sales are well over $1.5 billion. • The percentage of international and domestic services is split at about 60:40. • Carrier splits are estimated at 30 per cent for ocean, 26 per cent for rail, 26 per cent for air, and 18 per cent for highway.
	Sufferance Warehouses	• Facilities used by Revenue Canada for customs clearing purposes • currently approximately 1,200 licensed sufferance warehouses across Canada	• Revenue Canada estimates close to 5.6 million shipments through these facilities in 1997/98. *1 Based on the most recent full year of data available*

1 Table 12-2 takes into account the effect of leasing to other operators when computing the extent of CN's and CP's networks.

TABLE 12-2
OWNERSHIP AND OPERATION OF CANADA'S RAIL INFRASTRUCTURE, 1998

	1998 Owned/ Leased Route Kilometers	1997 Owned/ Leased Route Kilometers	Per cent of Total (1998)	Per cent Change Over Previous Year
CN Rail	21,263	23,731	42.4	-10.4
CP Rail	15,034	15,750	30.0	-4.5
Regional and Shortline Railways	13,111	10,586	26.2	23.8
All Others*	686	571	1.4	20.0
Total	**50,093**	**50,638**		**-1.1**

* Terminal and switching railways, Canadian subsidiaries of US railroads and passenger and commuter railways

Source: Transport Canada

TABLE 12-3
CN AND CP RAIL RATIONALIZATION BY PROVINCE 1998

(Route-kilometres)

		B.C.	ALTA	SASK	MAN	ONT	QUE	N.B.	Total
Discontinuances	CP		35	234		32			301
	CN			36	134	33			204
	Total		**35**	**270**	**134**	**66**			**505**
Transfers	CP	360				54			415
	CN		1,029	56		491	352	336	2,264
	Total	**360**	**1,029**	**56**		**546**	**352**	**336**	**2,679**

Source: Transport Canada

synonymous with line abandonment, rationalization has come to include such restructuring activities as selling or leasing track and operations to other carriers, establishing "internal" shortlines[2] and discontinuing service[3]. Rationalization is intended to encourage a change in the structure of railway costs and the cost of providing rail service.

Transferring lines to other operators typically results in reduced operating costs (particularly labour) when compared with Class I operations and improvements in the service to shippers on the line.

During 1998, transfers to other operators accounted for most of the rationalization activity, about 84 per cent. In keeping with the requirements of the Act, those lines that were discontinued, some 505 kilometres of track, were offered first to other potential operators and to governments. Most of the rationalization activity and, indeed, most of the transfer activity, took place in Alberta, with a similar amount occurring in Ontario, Quebec and New Brunswick combined. (See Figure 12-1.)

Table 12-3 shows CN and CP Rail rationalization by province for 1998.

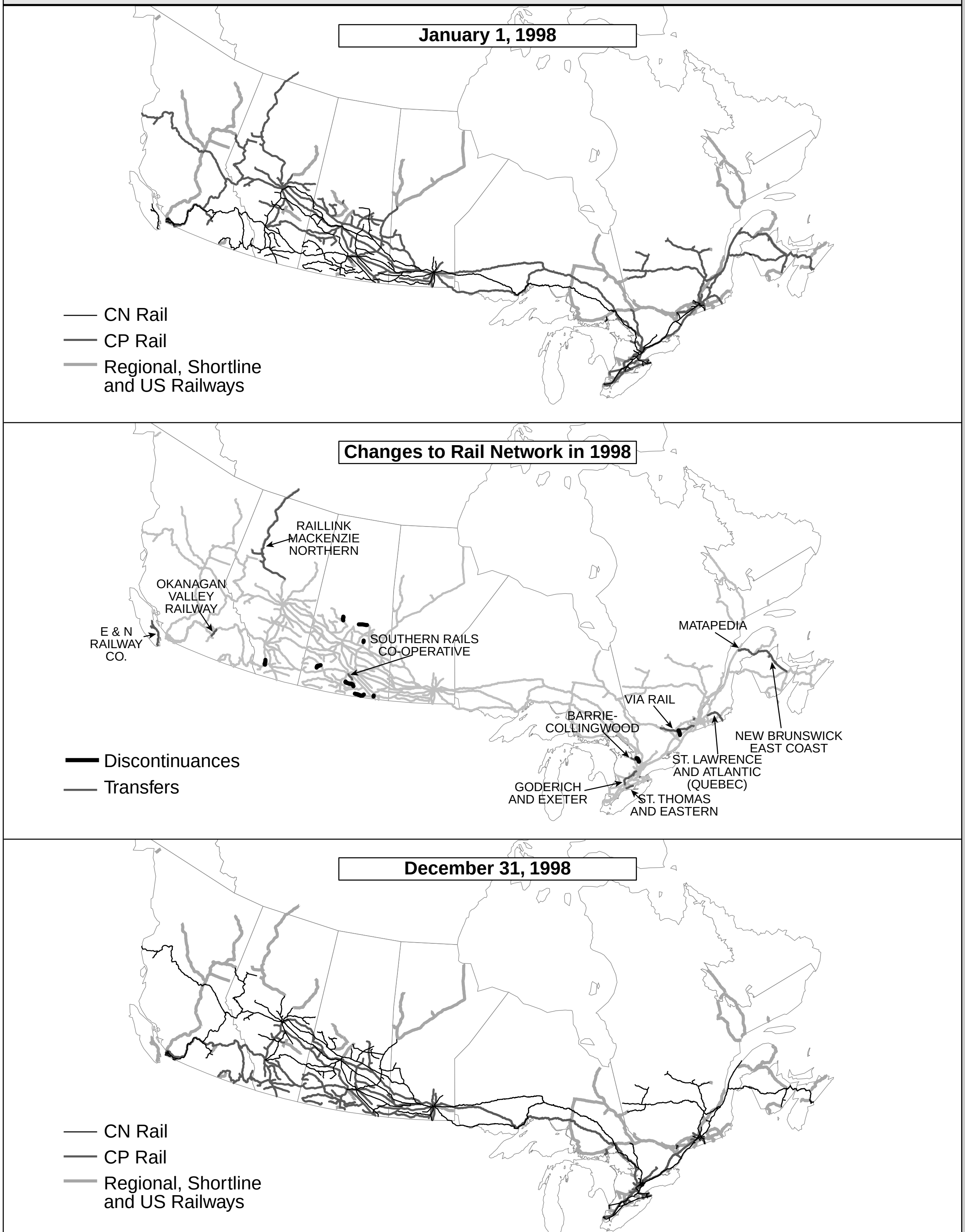
In 1997, eight new railways, operating over some 3,000 kilometres of track, started up. During 1998, the number and operational span of control of regional and shortline railways again increased significantly, as a further nine new railways with about 2,200 kilometres of track began operations. In addition to the formation of new railways, however, about 460 kilometres of track were transferred to existing carriers during 1998.

By carrier, CN accounted for about 85 per cent of all transfers that occurred in 1998. CN dominated this category for two reasons: the transfer of its northern Alberta lines to RaiLink, which now operate as RaiLink Mackenzie Northern; and the fact that it simply undertook more transactions with shortline carriers. Recent transfers of significant stretches of track in Ontario, Quebec and New Brunswick have essentially reduced CN to a spinal network for much of its eastern

2 Usually considered to be based on flexible arrangements with Class I railway labour to permit sections of track to be operated as though they were shortlines. However, they remain owned by the Class I carrier.

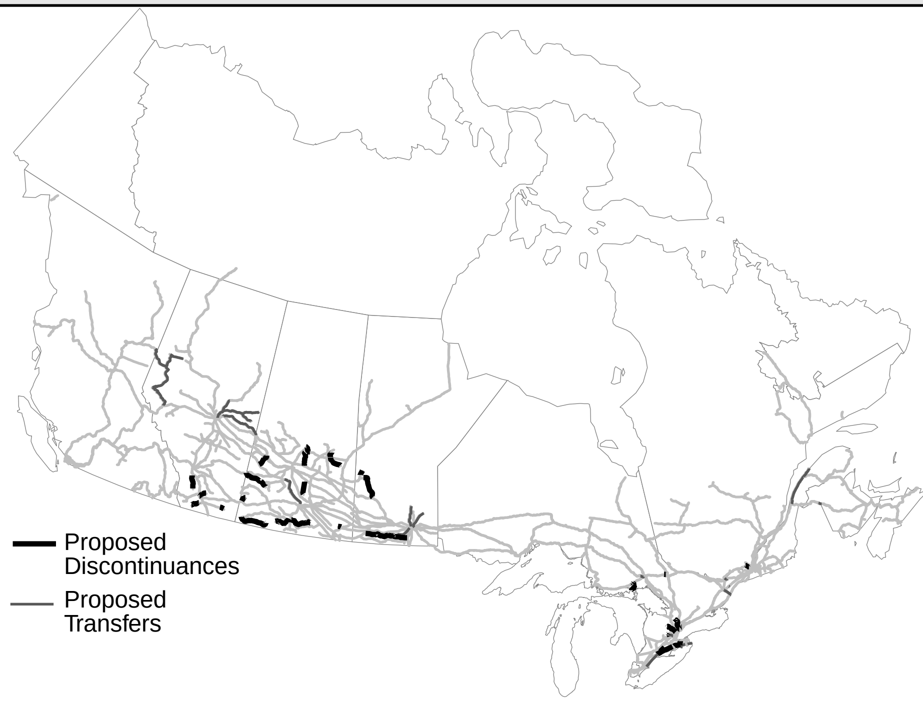
3 Among other objectives, the *Canada Transportation Act, 1996,* was intended to encourage the financial viability of railways by reducing the regulatory burden they face, and to facilitate railway rationalization and restructuring by significantly revising the rationalization process. The process is intended to allow the greatest possible opportunity for line retention through transfer to other operators. For those lines over which operations cannot continue, despite providing the opportunity for all interested parties to acquire the lines for continued rail operations, the Act provides for a process under which federal, provincial/territorial and municipal governments are offered the lines. Only after all avenues for continued operation have been explored are the lines discontinued.

FIGURE 12-1
CANADA'S RAIL NETWORK



Source: Transport Canada

FIGURE 12-2
BALANCE OF CN AND CP RAIL THREE-YEAR RATIONALIZATION PLANS AS OF DECEMBER 31, 1998



Source: *Transport Canada*

Canadian network. CP Rail had previously retrenched in the east to form a spinal system. Interestingly, of the rail network east of Winnipeg, 64 per cent is represented by CN and CP, while 36 per cent now comprises a system of Class II carriers, with well over half operating as feeders to the Class I system. The balance of the Class II carriers in the east are the legacy regional carriers[4].

A relatively modest amount of track, about 505 kilometres, was discontinued during 1998. This has followed the general pattern in recent years of far less trackage discontinued than transferred. Still, the amount of track discontinued in 1998 was low even by the standards of recent years. Most of the discontinuances in 1998 occurred in Saskatchewan and most were by CP Rail. In contrast, most of the transfers during 1998 were from CN.

Figure 12-3 gives a historical perspective on rationalization. It shows that transfers have essentially overtaken discontinuances as the preferred mode of rationalization during the 1990s, slowly at first, but increasingly so since 1996. It illustrates the pattern of discontinuances and transfers in cumulative terms since 1990.

Three-Year Plans

Under the Act, railways are required to make plans publicly available that outline their rationalization intentions for the next three-year period. The plans are revised periodically. In the remainder of CN's and CP's current three-year rationalization plans, approximately 1,680 kilometres of track are proposed for discontinuance and 2,300 kilometres for transfer. This represents 42 per cent and 58 per cent, respectively, of the total amount of trackage currently proposed for rationalization. Of the total net trackage currently in the plans, 3,144 kilometres (78 per cent) is proposed to occur in the western provinces; of the roughly 1,680 kilometres proposed for discontinuance, about 920 kilometres (55 per cent) is expected to occur in Saskatchewan. (See Figure 12-2)

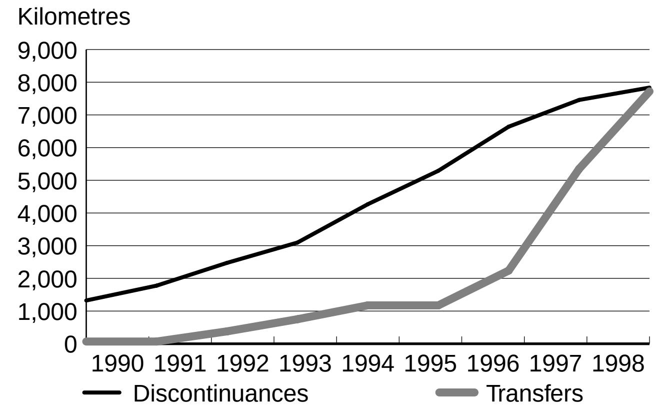
Table 12-4 shows the outstanding balance of transfers and discontinuances in CN and CP Rail's three-year rationalization plans as of December 31, 1998.

4 Algoma Central, Ontario Northland, Cartier, Quebec North Shore & Labrador.

Trends

In 1997, CN and CP operated over some 39,500 route-kilometres, or 78 per cent of the Canadian rail system. By the end of 1998, this had dropped to 36,300 kilometres, or 72.5 per cent. Class II carriers (shortline and regional railways) which had accounted for 21 per cent of the network (on a route-kilometre basis) in 1997, climbed to 26 per cent[5] by the end of 1998. Implementation of the current three-year plans would see CN and CP Rail trackage drop to 67 per cent of the Canadian network and Class II trackage increase to almost one third. For many years, CN and CP Rail directly owned and controlled approximately 90 per cent of the Canadian rail system. This began to change at a modest pace during the early to mid-1990s. It began to change sharply during 1996, in keeping with the marked growth in the number of shortline carriers and the network under their control.

FIGURE 12-3
CUMULATIVE CN AND CP RATIONALIZATION
1990 – 1998



Source: Transport Canada

TABLE 12-4
CN AND CP THREE-YEAR RATIONALIZATION PLANS BY PROVINCE, DECEMBER 31, 1998

(Route-kilometres)

		B.C.	*ALTA*	*SASK*	*MAN*	*ONT*	*QUE*	*N.B.*	*Total*
Discontinuances	CP		178	490		117	1		786
	CN			429	266	204			899
	Total		**178**	**918**	**266**	**321**	**1**		**1,684**
Transfers	CP			407	112	154	24	13	709
	CN	80	993		190	120	213		1,596
	Total	**80**	**993**	**407**	**302**	**273**	**237**	**13**	**2,305**

Source: Transport Canada

Highway Transportation Infrastructure

The Canadian Highway Network

Canada has over 900 thousand kilometres of roads and highways (referred to collectively as "roads" throughout the report). Responsibility for roads rests primarily with the provinces and territories.

The federal government has limited involvement in roads. This covers four areas of activity: ownership of a small amount of federal infrastructure; financial contributions to other levels of government for highway

5 The totals do not sum to 100 per cent since a small number of Class III and other railways were not included above.

TABLE 12-5
CANADA'S HIGHWAY / ROAD SYSTEM
DECEMBER 31, 1998

(2-lane equivalent km)

Province/ Territory	Total Length	Federal System	Provincial System	Municipal System	National Highway System[1]
British Columbia	65,728	2,050	42,279	21,399	5,516
Alberta	181,437	3,973	18,292	159,172	3,396
Saskatchewan	201,903	3,181	26,200	172,522	2,085
Manitoba	87,868	1,740	20,183	64,500	862
Ontario	167,891	2,346	28,458	137,087	4,924
Quebec	119,878	534	29,344	90,000	2,881
New Brunswick	21,883	218	18,480	3,185	955
Nova Scotia	25,992	291	23,371	2,330	901
Prince Edward Island	5,686	56	5,128	502	118
Newfoundland	13,081	207	8,747	4,127	947
Yukon	5,069	94	4,697	278	1,092
Northwest Territories	5,487	390	4,307	790	562
Total	901,903	15,080	229,486	655,892	24,239

1 Route Kilometres

Source: Council of Ministers Responsible for Transportation and Highway Safety; Transportation Association of Canada

construction; monitoring of international crossings; and research and development.

Municipal governments also have significant responsibility for roads, under various types of arrangements that are specific to each province or territory.

Table 12-5 shows the total length of roads in each province or territory, as well as the amount of road under each jurisdiction.

Major Highway Projects

Progress was made across Canada on major highway projects in 1998. The following list summarizes major road construction from information provided by provincial and territorial governments to Transport Canada.

Newfoundland

In November 1998 the first section of the St. John's Outer Ring Road was officially opened between the Trans-Canada Highway (TCH) near Pitts Memorial Drive and Allandale Road for a distance of 12 kilometres. The second phase will complete the section between Allandale Road and Portugal Cove Road and commence construction in 1999 on the section between Portugal Cove Road and Logy Bay Road. The $68.2 million Outer Ring Road is to be completed by 2003.

The government of Newfoundland and Labrador is in the midst of a six-year, $190 million program to upgrade and expand the Trans-Labrador Highway. In 1998, $28 million was spent on the project's first phase to upgrade the existing road between Churchill Falls and Happy Valley-Goose Bay to a high-standard gravel road.

Prince Edward Island

The 1.2 kilometre Hillsborough Bridge is a key segment of the Trans Canada Highway (TCH) and National Highway System (NHS) eastward from Charlottetown. A $21.7 million project involved widening the approaches and the existing bridge from two to four lanes over a distance of two kilometres. The four lane bridge was opened on July 16, 1998.

The Charlottetown Perimeter Highway is also part of the TCH and NHS. The $4 million, three kilometres project includes a new concrete overpass over Route 236 and extends the Perimeter Highway to Upton Road near the West Royalty Industrial Park. When the project is completed in 1999, it will remove through traffic from two congested intersections and commercial development along the present TCH.

Nova Scotia

A new, five kilometre, four-lane section of Highway 103 opened on November 3, 1998. This is part of the 17 kilometres, $22 million Highway 103 twinning project announced in 1997, and scheduled for completion in 2002. Construction of the 15 kilometres four-lane section to TCH 104 continued in 1998. This five-year, $57 million project will be completed in 1999.

New Brunswick

The Fredericton-Moncton Highway Project, upgrades to the National Highway System and a new Rural Roads Initiative are currently the main focus of the New Brunswick Department of Transportation.

The Fredericton-Moncton Highway is being built through a public-private partnership. This 195 kilometre four-lane highway will be opened and tolled in several phases. The first toll booth at River Glade opened in January. Expenditures on this highway project are expected to be in the order of $200 million in the 1999-2000 year.

New Brunswick is also continuing its NHS upgrading work, focusing on Routes 1 and 2 in the coming year. Work worth $67.4 million, cost-shared with the federal government under the HIP amendment, will be undertaken in the coming year. On Route #2, work will be completed from St-Basile to Saint Leonard (31.0 kilometres). This will mark the end of a project totalling more than $95 million which was begun in 1993. A 5.9 kilometre section of highway on Route #2 between Petitcodiac and River Glade (5.9 kilometres) will also be completed. On Route #1, a 15.2 kilometre section of highway from Norton to Sussex will be completed and opened.

By the fall of 1999 there will be continuous four-lane highway in New Brunswick from Lepreau to the Nova Scotia border, except for a short section of the Sussex Bypass.

The provincial government has committed itself to a new program of improvements to the province's collector and local roads, bridges and ferries. Called the Rural Roads Initiative, the program will see and additional $20 million spent on rural roads, bridges and ferries in 1999-2000.

Québec

Quebec invested $27 million ($23 million in 1998) in the construction of multiple levels at the intersection of Woodland and Morgan on Autoroute 20 in Montreal's West Island. This work was carried out in collaboration with local municipalities. This project will contribute significantly to improve safety in this area.

Major construction programs valued at $35 million were undertaken in 1998, on a 20-kilometre section of Route 138, east of Quebec City. This project is aimed at separating traffic flows, regularizing access, and realigning many intersections.

Ontario

In the 1998/99 fiscal year, Ontario allocated $834 million for highway construction, making it the largest highway construction program in the province's history. This will significantly accelerate the trend started in 1996 to improve the condition of Ontario's highways.

The province is currently engaged in a process to select a concessionaire to assume the 69-kilometre opened portion of the Highway 407 Central, with an obligation to construct two extensions to the highway: the 24-kilometre 407 West, and the 15-kilometre East Partial. If a satisfactory bid is received, a concessionaire will likely be selected in the spring of 1999 to assume full responsibility for construction, maintenance, operation and rehabilitation of the highway, and to set toll rates, collect tolls, and be responsible for highway safety. In the event that appropriate value is not received, then the highway extensions would be completed under a design-build process.

Manitoba

The 1998 construction program focused on the rehabilitation of the existing provincial highway system. Major construction projects included the completion of the Red River Floodway Bridge, a link in work that is on-going to twin Provincial Transportation Highway (PTH) 59 south from Winnipeg to Ile des Chenes. Work continued on the new PTH 110, which will facilitate through traffic between the Trans-Canada Highway (PTH 1) and PTH 10 and improve access to the industrial area on the east side of Brandon, where a major new hog-processing plant is under development.

Saskatchewan

In 1997, Saskatchewan announced the initiative to complete twinning all of the Trans-Canada Highway in Saskatchewan and the Yellowhead Highway from North Battleford to the Alberta Border within 15 years (380 kilometres will be twinned at a cost of $189 million). In 1998-99 approximately 28 kilometres of the Trans-Canada Highway, west of Gull Lake, was graded at a cost of $4.1 million. This segment will be paved and opened in 1999. A $2.5 million contract was started to grade 21 kilometres of the Trans-Canada Highway, east of Indian Head. This contract will be completed during the 1999-2000 construction season.

The province has recently completed construction of the Athabasca Road (Highway No. 905). This project involved construction of a 180 kilometres seasonal road in northern Saskatchewan from Points North Landing to Black Lake at a cost of $11.7 million. This project was completed with funding assistance from the federal government departments of Fisheries and Oceans, Canadian Coast Guard ($5.2 million) and Indian and Northern Affairs ($1.7 million).

Alberta

Substantial progress was made on upgrading the North/South Trade Corridor in 1998. Approximately $90 million in total is expected to be spent on the urban and rural portions of the corridor. Key projects in 1998 include continued four-laning of Highway 4 south of Lethbridge; four-laning of Highway 43 in the Grande Prairie, Valleyview and Whitecourt areas; continued construction of the Winterburn Road/Yellowhead Trail

Interchange in Edmonton; and a kickstart in preliminary engineering on the Ellerslie Road Interchange in Edmonton and the Deerfoot Trail Extension and Interchanges in Calgary.

In September 1998, the department implemented the early tendering of 1999 Primary Highway Construction and Rehabilitation Projects. This initiative will allow the department and the consulting engineering and road building industries to benefit from advanced planning and scheduling for the 1999 construction season.

British Columbia

Major construction initiatives in B.C. during 1998 included continuation of the Vancouver Island Highway project and completion of high occupancy vehicle lanes on the province's busiest highway section, the Trans-Canada Highway through Burnaby and Coquitlam. A major policy initiative to transfer responsibility for some highway sections to local government was highlighted by the impending creation of the Greater Vancouver Transportation Authority, which in April 1999 will assume responsibility for much of the regional road system as well as transit, including a planned major extension of the SkyTrain system.

Northwest Territories

In the Northwest Territories, work continued on the reconstruction and paving of the 530 kilometre long Highway 1 and 3 route between the Alberta Border and Yellowknife. In 1998, the NWT Department of Transportation will spend $11.8 million on this project including a design-build contract. To date 440 kilometres of the route have been completed at a total cost of $117 million.

The Territorial Department of Transportation is also undertaking a $2 million initiative to assemble background information related to four new road corridors. The four road projects to be studied are the Slave Geologic Province Transportation Corridor, Mackenzie Valley Highway Extension, Inuvik to Tuktoyaktuk Road, and Highway 3 Accelerate Reconstruction Rae to Yellowknife. Studies will be undertaken in the areas of economic impact, financing, engineering and environmental with the hope of attracting new public and private sector investment in new road development.

Yukon

Work on the US funded Shakwak Project to reconstruct 520 kilometres of the Haines Road and Alaska Highway continued in 1998. Expenditures of over $8 million produced 14 kilometres of reconstruction, an additional 14 kilometres of bituminous surface treatment and other related work such as seeding and design. Approval of the US Transportation Equity Act for the 21st Century (TEA-21) legislation provided an additional $94 US million for the 160 kilometres remaining to be reconstructed over the next five years.

National Highway Policy

On December 16, 1998, the Council of Ministers Responsible for Transportation and Highway Safety released *"The National Highway System: Condition and Investment Needs Update 1997"*.

The study, undertaken jointly by the federal, provincial and territorial transportation departments, updates work originally undertaken in the early 1990s to determine the costs of improving the condition of, and reducing congestion on, the 25,000-kilometre network of key interprovincial and international road linkages. To maintain comparability with previous work, no changes were made to the routes originally designated in 1988 as part of the National Highway System. Table 12-6 shows the cost estimates to correct national highway deficiencies.

The key findings of the study are:

- Governments have invested over $8 billion in capital improvements and $3 billion in the maintenance of the National Highway System since 1988; annual expenditures on the system are currently twice the levels reported in 1988.
- While increased investment has corrected some of the deficiencies in the system, overall, the state of the National Highway System has not improved since 1988. When measured against the minimum design and operational criteria proposed in 1988, the length of the system with deficiencies in the areas of pavement roughness, operating speed/capacity has increased about 30 per cent.
- The estimated cost of correcting all current deficiencies of the National Highway System is $17.4 billion (1997 dollars). Departing from the procedure used in 1989, this updated estimate includes costs associated with required capacity improvements on existing freeways which have 4 or more lanes.
- While estimated needs have dropped slightly in eastern Canada, cost estimates in central and western Canada are generally 30 to 50 per cent higher than the estimates prepared in 1989.

TABLE 12-6
COST ESTIMATES TO CORRECT NATIONAL HIGHWAY SYSTEM DEFICIENCIES

	Cost Estimates in Millions of Dollars ($1997)						
Work Type	*Resurfacing*	*Reconstruction*	*New Construction*	*Twinning New 4 lanes*	*Interchanges*	*Structures*	*Total*
British Columbia	$ 231.8	$ 697.0	$ 205.9	$ 805.6	$ 33.0	$ 967.8	$ 2,941.1
Alberta	91.3	114.1	567.2	380.7	1,396.0	480.7	3,030.0
Saskatchewan	105.7	126.2	91.5	163.8	241.0	103.0	831.2
Manitoba	111.6	35.9	134.8	105.1	161.4	27.8	576.6
Ontario	258.6	25.7	283.0	2,874.2	-	204.0	3,645.5
Quebec	152.5	108.8	20.4	1,480.3	102.9	1,022.1	2,887.0
New Brunswick	25.9	-	550.0	1,213.7	-	-	1,789.6
Nova Scotia	71.4	-	215.1	105.4	91.0	54.6	537.5
Prince Edward Island	5.8	7.7	25.9	-	14.6	39.4	93.4
Newfoundland	9.5	47.4	39.7	9.0	7.0	23.5	136.1
Yukon	156.9	176.0	-	33.0	-	4.2	370.1
Northwest Territories	47.3	146.2	-	-	-	60.0	253.5
Federal	52.2	226.6	-	-	-	-	278.8
Total	**$1,320.5**	**$1,711.6**	**$2,133.5**	**$7,170.8**	**$2,046.9**	**$2,987.1**	**$17,370.4**

Source: Council of Ministers Responsible for Transportation and Highway Safety

- The impacts and benefits that would be associated with an upgraded National Highway System (NHS) have increased significantly, due in large part to increasing congestion on key linkages in the system. Over a 25 year horizon, the expected present value of benefits of the NHS investment program were estimated to exceed $30 billion, comprising:
  - $22.0 billion in travel time savings
  - $5.8 billion in highway safety improvements
  - $2.9 billion in reduced vehicle operating costs
  - $1.3 billion in network benefits.
- The study estimated that the reduced congestion and improved highway standards could be expected to reduce the number of fatal traffic accidents by up to 247 per year and injury accidents by up to 16,000 per year.
- It also calculated that reducing congestion and improving the level of service provided by the NHS could be expected to reduce fuel consumption by up to 236 million litres per year.

FEDERAL CONTRIBUTION PROGRAMS

In fiscal year 1998/99, through federal contribution programs, the government contributed $198.9 ($197.2 million + $1.7 million under CAIP[6]) to provincial and territorial highway improvements, as well as repairs to federally financed structures.

A large portion of the funding for highway improvement projects came from the 1993 - 1999 Strategic Highway/Transportation Improvement Programs, part of the government Strategic Capital Investment Initiative. This $845 million initiative earmarked funding for cost-shared improvement projects across the country, the rehabilitation of the federally owned Jacques-Cartier and Champlain bridges in Montreal, the upgrading of the Trans-Canada Highway through the Banff, Yoho and Terra Nova national parks, and improvements to the Alaska Highway.

In addition, Highway Improvement Programs (1987 - 1999) are providing more than $300 million to create a more efficient and effective transportation system in New Brunswick and Nova Scotia, while the Newfoundland Transportation Initiative (1987–2002) is providing $640 million for upgrades to the Trans-Canada Highway and regional trunk roads, following the closure of the Newfoundland Railway.

Also on the east coast, the Atlantic Freight Transition Program was instituted following the elimination of the Atlantic Region Freight Assistance Act and the Maritime Freight Rates Act. This 1995 - 2001 program provides $326 million to the four Atlantic provinces and Quebec for improvements to their freight transportation systems.

6 The CAIP program includes expenditures for infrastructure items other than road; the $1.7 million is the estimated share of CAIP spending that went towards roads.

TABLE 12-7
CURRENT TRANSPORT CANADA HIGHWAY CONTRIBUTION PROGRAMS
1987/88 to 2002/03

Program	Total	Spent in previous years	1998/99	1999/2000	2000/2001	2001/2002	2002/2003
	Millions of Dollars		Forecast				
Newfoundland							
Trans-Canada Highway Program	405.00	235.15	34.22	34.00	34.00	34.00	33.63
Regional Trunk Road	235.00	148.96	28.16	20.00	20.00	15.50	2.38
Strategic Highway Improvement Program	10.00	10.00	0.00	0.00	0.00	0.00	0.00
Atlantic Freight Transition Program	21.00	10.87	5.02	4.00	1.11	0.00	0.00
Sub-total	**671.00**	**404.98**	**67.40**	**58.00**	**55.11**	**49.50**	**36.01**
Prince Edward Island							
Fixed Link Highway Improvement Program	21.45	21.18	0.27	0.00	0.00	0.00	0.00
Atlantic Freight Transition Program	21.00	7.92	9.83	3.25	0.00	0.00	0.00
Sub-total	**42.45**	**29.10**	**10.10**	**3.25**	**0.00**	**0.00**	**0.00**
Nova Scotia							
Highway Improvement Program	73.50	68.50	3.02	1.98	0.00	0.00	0.00
Highway Improvement Program SCII	30.00	30.00	0.00	0.00	0.00	0.00	0.00
Strategic Highway Improvement Program	70.00	56.76	10.91	3.33	0.00	0.00	0.00
Atlantic Freight Transition Program	85.00	48.26	28.22	8.52	0.00	0.00	0.00
Sub-total	**258.50**	**202.52**	**42.15**	**13.83**	**0.00**	**0.00**	**0.00**
New Brunswick							
Highway Improvement Program	338.80	183.14	19.99	33.70	50.00	51.97	0.00
Highway Improvement Program SCII	20.00	20.00	0.00	0.00	0.00	0.00	0.00
Strategic Highway Improvement Program	130.00	130.00	0.00	0.00	0.00	0.00	0.00
Fixed Link Highway Improvement Program	21.59	21.58	0.006	0.00	0.00	0.00	0.00
Atlantic Freight Transition Program	121.00	110.42	10.03	0.55	0.00	0.00	0.00
Sub-total	**631.39**	**465.14**	**30.03**	**34.25**	**50.00**	**51.97**	**0.00**
Québec							
Henri-Bourassa	21.00	21.00	0.00	0.00	0.00	0.00	0.00
Strategic Highway Improvement Program	75.00	74.70	0.30	0.00	0.00	0.00	0.00
Atlantic Freight Transition Program	78.00	46.25	14.12	17.63	0.00	0.00	0.00
Québec Outaouais Roads Agreement	273.00	179.90	6.30	4.70	5.00	5.00	72.10
Sub-total	**447.00**	**321.85**	**20.72**	**22.33**	**5.00**	**5.00**	**72.10**
Ontario							
Strategic Highway Improvement Program	**96.54**	**69.89**	**26.65**	**0.00**	**0.00**	**0.00**	**0.00**
Manitoba							
Strategic Transportation Improvement Program	**35.00**	**35.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Saskatchewan							
Strategic Highway Improvement Program	**35.00**	**35.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Alberta							
Strategic Highway Improvement Program	**30.00**	**30.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
British Columbia							
Strategic Highway Improvement Program	**30.00**	**29.81**	**0.19**	**0.00**	**0.00**	**0.00**	**0.00**
Yukon							
Strategic Highway Improvement Program	**10.00**	**10.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
N.W.T							
Strategic Transportation Improvement Program	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
TOTALS	**2,286.88**	**1,633.29**	**197.24**	**131.66**	**110.11**	**106.47**	**108.11**

Source: Transport Canada

Finally, the $43-million Fixed Link Agreement (1994–1999) is assisting Prince Edward Island and New Brunswick cope with increased traffic on their highways resulting from the new Confederation Bridge.

As part of the $300 million Western Grain Transportation Adjustment Fund, $140 million was allocated to help improve agricultural road infrastructure across Western Canada. Under the Canada Agri-Infrastructure Program (CAIP), it was provided to the following provinces according to the miles of grain-dependent branch line per province:

B.C.	$ 0.5 M
Alberta	$ 29 M
Saskatchewan	$ 84.6 M
Manitoba	$ 25.9 M

Marine Transportation Infrastructure

Ports

Canada's major ports are vital links in the national transportation system that supplement the railways and roads that serve Canadians travelling on business or for pleasure, and that are essential for transporting the nation's goods for export or import. The infrastructure that supports the ports portion of this system includes marine terminals that contain a variety of facilities and organizations related to the loading and unloading of vessels berthed at the wharf. Port authorities operate some of these marine terminals, but often they are owned and operated by independent companies that rent space from the port.

TABLE 12-8
PORTS NO LONGER UNDER THE ADMINISTRATION OF TRANSPORT CANADA, 1996 – 1998

Year	Transferred	De-proclaimed	Demolished[1]	Total
1996	78	199	0	277
1997	32	0	2	34
1998	11	0	0	11

1 Numbers include remote ports.

Source: Transport Canada

The Port System

At the end of 1998, Canada's ports system was made up of a variety of facilities that fell under different jurisdictions, including Ports Canada, Harbour Commissions, Transport Canada, the Department of Fisheries and Oceans, and municipal governments and private interests.

Under the National Marine Policy announced in December 1995, Canada's ports system and the operation of the St. Lawrence Seaway are being commercialized. The federal government is moving out of direct operation of ports, giving local users more say in the port services they pay for and receive. The National Marine Policy is implemented under the *Canada Marine Act*, which received royal assent on June 11, 1998. The policy calls for three categories of ports:

- Canada Port Authorities,
- regional and local ports, and
- remote ports.

Transport Canada began commercializing ports under its control in 1996, prior to the introduction of the Act, because legislative authority was not required for this process to begin. The coming into force of the Act was delayed beyond the prescribed date of January 1, 1999. On March 1, 1999, Part I of the Act came into force for the ports of Halifax, Montreal and Vancouver, creating the first three Canada Port Authorities.

When Part I is applied to the remaining ports in Schedule 1 of the Act, there will be 18 Canada Port Authorities. The authorities are considered self-sufficient ports that are critical to domestic and international trade. They will include Ports Canada local port corporations, major Canada Ports Corporation divisional ports, and most harbour commissions.

On March 1, 1999, Part II of the *Canada Marine Act* also came into force for existing public ports. This event consolidated the second category of ports, the regional and local ports, with other public ports. When all sections of the Act are in force, this category will include Transport Canada facilities not considered to be remote facilities, as well as any Canada Ports Corporation facilities or harbour commissions not incorporated as Canada Port Authorities.

Regional and local ports are being transferred to other federal departments or to provincial governments, municipal authorities, community organizations or private interests. The transfer of ports began in 1996 under the National Marine Policy with the devolution of 277 sites, and continued in 1997 with the devolution of 34 sites. In 1998, Transport Canada divested a

TABLE 12-9
STATUS OF TRANSPORT CANADA'S PORTS BY PROVINCE AND YEAR, 1996 – 1998

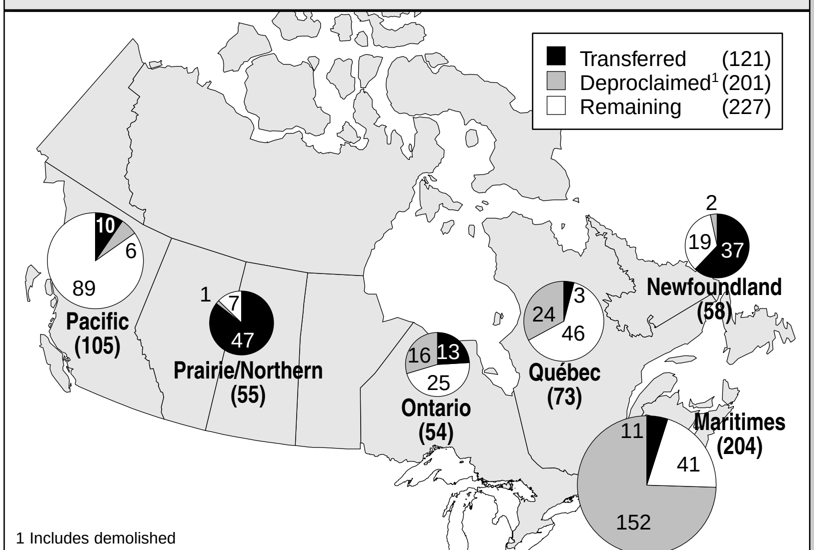
(Transport Canada Administered Public Port Sites[1])

Year	*1995*[2]	*1996*	*1997*	*1998*
Newfoundland	57	39	19	18
New Brunswick	45	9	7	6
Nova Scotia	128	35	35	31
Prince Edward Island	31	4	4	4
Quebec	73	48	46	46
Ontario	56	39	32	27
Manitoba	2	2	2	2
Saskatchewan	4	4	4	4
Alberta	3	1	1	1
British Columbia	105	91	88	88
Northwest Territories	45	0	0	0
Total	**549**	**272**	**238**	**227**

1 Numbers include remote ports.
2 Last year prior to the National Marine Policy.

Source: Transport Canada

FIGURE 12-4
DIVESTITURE STATUS OF PORTS
REGIONAL / LOCAL / REMOTE



1 Includes demolished

Source: Transport Canada

further 11 facilities including one to the Province of New Brunswick, one to the Province of Ontario, two to municipal authorities, five to other local private interests, and two to other federal departments. By the end of 1998, a total of 322 public ports had been transferred, de-proclaimed or demolished.

Table 12-8 summarizes the changes that have taken place in responsibility for ports operations since 1996.

A total of 227 remain under federal control. Table 12-9 summarizes the regional distribution of the ports administered by Transport Canada from 1995 to 1998. The federal government will continue to maintain remote ports that serve the basic transportation needs of isolated communities unless local interests express a willingness to assume ownership of such port facilities. While 14 remote ports were divested in 1996 and a further 12 in 1997, there were no divestitures in 1998. Transport Canada continued to administer 34 remote ports in Quebec, Ontario, Manitoba and British Columbia. A growing number of "other" ports are to be operated by provincial or municipal governments and private interests as Transport Canada divests itself of its facilities.

Figure 12-4 shows the Divestiture Status of Regional, Local and Remote Ports showing which have been transferred or deproclaimed as well as the number of ports remaining.

At the end of 1998, the Department of Fisheries and Oceans administered approximately 1,682 harbours used for commercial and recreational boating under the *Fishing and Recreational Harbours Act*. At the end of 1998, there were an additional 85 of these "other" ports, including 35 private, 34 provincial and 18 municipal ports.

Financial Performance

Ports Canada

In 1997, Ports Canada posted total revenues of $245 million, with a net income of $35 million and operating cash flows of $92 million. The seven major ports handled 83 per cent of the volume and generated roughly 76 per cent of the total revenues of Ports Canada ports. Audited financial statements for 1998 were not available.

Table 12-10 illustrates 1997 revenues, expenses and some key

TABLE 12-10
FINANCIAL PROFILE, PORTS CANADA PORTS, 1997
($ 000)

(Millions of dollars)

Item	Vancouver	Montreal	Halifax	Quebec	Saint John	St. John's	Prince Rupert	Divisional Ports*	Total All Ports
	Major Ports								
Operating revenues	71.5	56.6	15.0	13.3	12.1	3.2	13.2	59.6	244.5
Operating expenses	56.5	49.8	12.0	13.6	11.0	2.8	11.0	32.0	185.4
Operating income	**15.0**	**6.8**	**3.0**	**0.3**	**1.1**	**0.4**	**2.2**	**27.6**	**59.1**
Ratio: Expenses/Revenues	**0.79**	**0.88**	**0.80**	**0.77**	**0.91**	**0.89**	**0.83**	**0.54**	**0.76**
Net income	5.1	12.4	3.1	0.3	1.5	0.6	2.7	8.8	34.5
Net fixed assets	430	157.9	63.2	49.8	57.0	11.4	92.4	109.8	971.6
Ratio: Net income/Net fixed assets	**0.01**	**0.08**	**0.05**	**0.01**	**0.03**	**0.05**	**0.03**	**0.08**	**0.04**
Funds from operations	23.5	24.4	5.6	3.5	4.6	1.2	4.0	25.4	92.3
Investment income	3.0	5.6	0.3	0.5	0.4	0.2	0.5	3.7	14.2
Total assets	533.1	260.8	76.3	62.9	71.3	18.1	105.3	287.9	1415.7
Net capital expenditures	23.8	9.9	8.1	2.2	0.7	0.3	0.2	11.2	56.4
Retained earnings	215.8	86.6	20.1	1.2	3.7	7.2	18.8	(136.4)	216.9
Contributed capital	150.3	153.9	50.9	58.2	61.7	10.1	84.6	64.9	634.5

* Ridley Terminals is included in Divisional Ports, yet is operated independently of Divisional Ports.
Source: *Annual Reports*

ratios for Ports Canada ports and for divisional ports as a whole.

The overall operating ratio for Ports Canada ports was 76 per cent in 1997. Taken together, the major ports had a ratio of 83 per cent, with individual ratios ranging from 77 to 91 per cent. Except for Quebec and Vancouver, ratios for all major ports were above 80 per cent. For divisional ports, the operating ratio as a whole was 54 per cent.

The return on assets for Ports Canada ports was four per cent in 1997. Montreal had the highest return on assets with eight per cent, with its investment income almost as large as its operating income. Taken together, the major ports' return was three per cent, compared with eight per cent for divisional ports.

From 1994 to 1997, the financial profile of most ports consistently improved. Revenues rose from $232 million to $245 million, an increase of six per cent. All this growth occurred at major ports.

Operating costs at major ports remained relatively stable, increasing only one per cent during this period. At the divisional ports, operating revenues and operating expenses have both decreased slightly. With expenses decreasing slightly more than revenues, the operating income increased by two per cent. Overall, operating income for all ports improved from $47.9 million to $59.1 million, an increase of 23 per cent.

Total 1997 net income of all ports, major and divisional, has more than tripled, moving from $9.2 million in 1994 to $34.5 million in 1997. These financial changes occurred as traffic volumes grew more than five per cent between 1994 and 1997. During this period, revenue per tonne remained relatively stable at $1.31. Expenses per tonne however, dropped from $1.04 in 1994 to $0.99 in 1997, a decrease of almost five per cent.

Table 12-11 shows revenues, expenses and incomes for all Ports Canada ports from 1994 to 1997.

Harbour Commissions

With the exceptions of Toronto and Oshawa, all harbour commissions reported positive net incomes in 1997. The Hamilton and Fraser harbour commissions posted the largest net incomes at $1.7 and $1.2 million, respectively. Total revenues were $52.3 million and expenses $50.2 million, creating an operating ratio of 96 per cent. Net income of $10 million provided a return on total assets of 2.9 per cent.

A review of the financial data of harbour commissions' between 1993 and 1997[7] shows both revenues and expenses declining during this period. Expenses declined by 0.8 per cent, revenues by 4.4 per cent. Consequently,

7 As of 1995 all harbour commissions operate on a calendar year basis (January to December). Prior to that, the Toronto Harbour Commission operated on a fiscal year basis (April to March).

TABLE 12-11
FINANCIAL RESULTS OF MAJOR AND DIVISIONAL PORTS
1994 – 1997

(Millions of dollars)

		Operating				Net Income	Net Income/ Net Fixed Assets
		Revenues	Expenses	Income	Ratio		
Major Ports	1994	170.7	149.8	20.9	0.88	3.8	0.00
	1995	169.8	148.3	21.4	0.87	24.3	0.03
	1996	175.9	143.4	32.9	0.81	18.3	0.02
	1997	184.9	153.4	31.5	0.83	25.7	0.03
Divisional Ports	1994	60.8	33.8	27.0	0.56	5.3	0.05
	1995	60.1	33.9	26.2	0.56	11.3	0.11
	1996	59.0	33.3	25.8	0.56	13.2	0.12
	1997	59.6	32.0	27.6	0.54	8.8	0.08
Total – All Ports	1994	231.5	183.7	47.9	0.79	9.2	0.01
	1995	229.9	182.3	47.6	0.79	35.6	0.04
	1996	235.0	176.6	58.7	0.75	31.5	0.03
	1997	244.5	185.4	59.1	0.76	34.5	0.04

Note: With the exception of ratios, the measurement unit is millions of dollars.
Net fixed assets does not include value of projects under construction included in audited statements.

Source: *Annual Reports*

TABLE 12-12
HARBOUR COMMISSIONS FINANCIAL RESULTS
1997

(Millions of dollars)

Item	*Port Alberni*	*Fraser*	*Hamilton*	*Nanaimo*	*North Fraser*	*Oshawa*	*Thunder Bay*	*Toronto*	*Windsor*	*Sum Harbour Commissions*
Operating revenues	4.0	9.4	11.1	7.1	4.4	0.6	3.2	10.9	1.6	52.3
Operating expenses	3.7	8.2	9.4	7.8	3.8	0.8	3.2	12.3	1.0	50.2
Operating income	**0.3**	**1.2**	**1.7**	**-0.6**	**0.5**	**-0.2**	**0**	**-1.4**	**0.6**	**2.1**
Ratio:										
Expenses/Revenues	**92.5%**	**87.2%**	**84.7%**	**109.9%**	**86.4%**	**133.3%**	**100.0%**	**112.8%**	**62.5%**	**96.0%**
Net income	0.6	5.0	2.4	0.1	0.7	-0.2	1.2	-0.4	0.6	10.0
Total assets	15.9	102.3	74.6	34.1	11.2	6.8	26.7	67.6	8.1	347.3
Ratio:										
Net income/Total assets	**3.8%**	**4.9%**	**3.2%**	**0.3%**	**6.3%**	**-2.9%**	**4.5%**	**-0.6%**	**7.4%**	**2.9%**

Source: *Transport Canada*

operating income has been almost halved to $2.1 million, although the operating ratio has improved to 96 per cent. Traffic volume was 45.4 million tonnes in 1997. Tonnage handled at harbour commission ports rose by 18 per cent over the five-year period (with year-to-year fluctuations). Comparing 1997 with 1993, revenues and expenses expressed on a per-tonne basis were about 19 per cent and 16 per cent lower respectively. Net income declined over the same period.

Table 12-12 details financial results for all harbour commissions for 1997.

Transport Canada Ports

Of the ports remaining under Transport Canada's control, approximately ten per cent generated three-quarters of the total revenues for 1997/98.

For this fiscal year, the gross revenues of these facilities were $20.7 million, while expenses were $27.4 million. This left an operating revenue shortfall of $6.7 million, with an operating ratio of 132 per cent. Capital expenditures for the year were $1.9 million. An additional

$1.5 million came from grants and contributions related to transfers associated with ports divestitures.

Revenues increased by 58 per cent during this time, mostly in the last three years. Traffic growth and fee increases since 1994/95 contributed to the rise in revenues. Expenses fluctuated over this period.

Between 1993 and 1997, revenues per tonne have increased from $0.15 to $0.25, or by 67 per cent, while expenses per tonne[8] have remained relatively stable at $0.33 per tonne.

Table 12-13 summarizes the financial details of ports and harbours remaining under Transport Canada's control from 1993/94 to 1997/98.

TABLE 12-13
FINANCIAL RESULTS FOR TRANSPORT CANADA PORTS
1993/94 – 1997/98

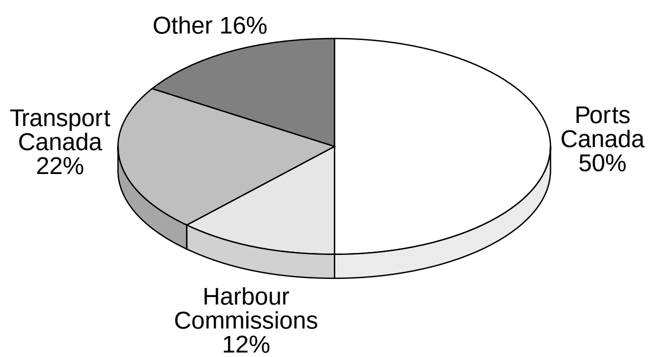
($ Millions)

	1993/94	*1994/95*	*1995/96*	*1996/97*	*1997/98*
Revenue[1]	13.1	12.9	17.1	20.3	20.7
Expenses[2]	28.5	28.7	33.6	28.5	27.4
Operating income	-15.4	-15.8	-16.5	-8.2	-6.7
Capital expenditures	**23.8**	**23.1**	**11.3**	**11.9**	**1.9**
Grants & contributions[3]			10.0	13.1	1.5
Ratio: Expenses/Revenues	**218%**	**222%**	**196%**	**140%**	**132%**

1 This represents gross revenues
2 This represents operating and maintenance expenses including commissions
3 This item represents transfers related to the devolution of port facilities

Source: Annual Reports, and Transport Canada

FIGURE 12-5
TRAFFIC SHARES BY PORT GROUPS
1997



Other = Department of Fisheries and Oceans and provincial and municipal governments

Source: Transport Canada

Port Traffic

The following preliminary traffic data for 1998 shows that:

- The Port of Vancouver handled 72 million tonnes and 873,102 passengers.
- The Port of Prince Rupert handled 12.5 million tonnes.
- The Port of Montreal reported total traffic of 21 million tonnes
- Halifax Port Corporation handled 13.2 million tonnes.
- The Port of Saint John handled more than 19 million tonnes.

Port Traffic Statistics

Based on Statistics Canada data (available only up to 1997), Canada's ports handled a total of 376.4 million tonnes of cargo in 1997, a slight increase from the 357.7 million tonnes handled in 1996.

Figure 12-5 shows traffic shares by port groups in 1997.

Ports Canada ports handled the largest share at 50 per cent, with 12 per cent transported through harbour commissions' ports. Another 22 per cent of the cargo was moved through Transport Canada facilities. The remaining 16 per cent was handled by other facilities, including those managed privately and those managed by or on behalf of the Department of Fisheries and Oceans and provincial and municipal governments.

Ports Canada ports and harbour commissions saw traffic increase by 4 per cent from 1996 to 1997, while Transport Canada ports saw an increase of 15 per cent. "Other" ports saw a decrease of one per cent. Overall, total tonnage increased by five per cent.

At those declared public ports where Transport Canada has no facilities and cargo is transported across private wharves, cargo shipped totalled 29.5 million tonnes, or 36 per cent of the total traffic handled by Transport Canada's ports. In total, 61.5 million tonnes crossed "other" ports. In the "other" category, Port Cartier, with 20.9 million tonnes, handled the most cargo.

8 Tonnage statistics include cargos moved across private facilities within Transport Canada public harbours.

TABLE 12-14 TOTAL TONNAGE HANDLED IN CANADA'S PORT SYSTEM 1996 – 1997 (in thousands of tonnes)			
Port System	*1996 Total*	*1997 Total*	*% Change*
Ports Canada*	180,207	187,279	4
Harbour Commissions	43,487	45,355	4
Transport Canada*	71,820	82,237	15
Other	62,234	61,536	-1
Total	**357,748**	**376,407**	**5**

* Tonnage statistics include cargos shipped across private facilities

Source: Statistics Canada, Cat. 54-205 XPB

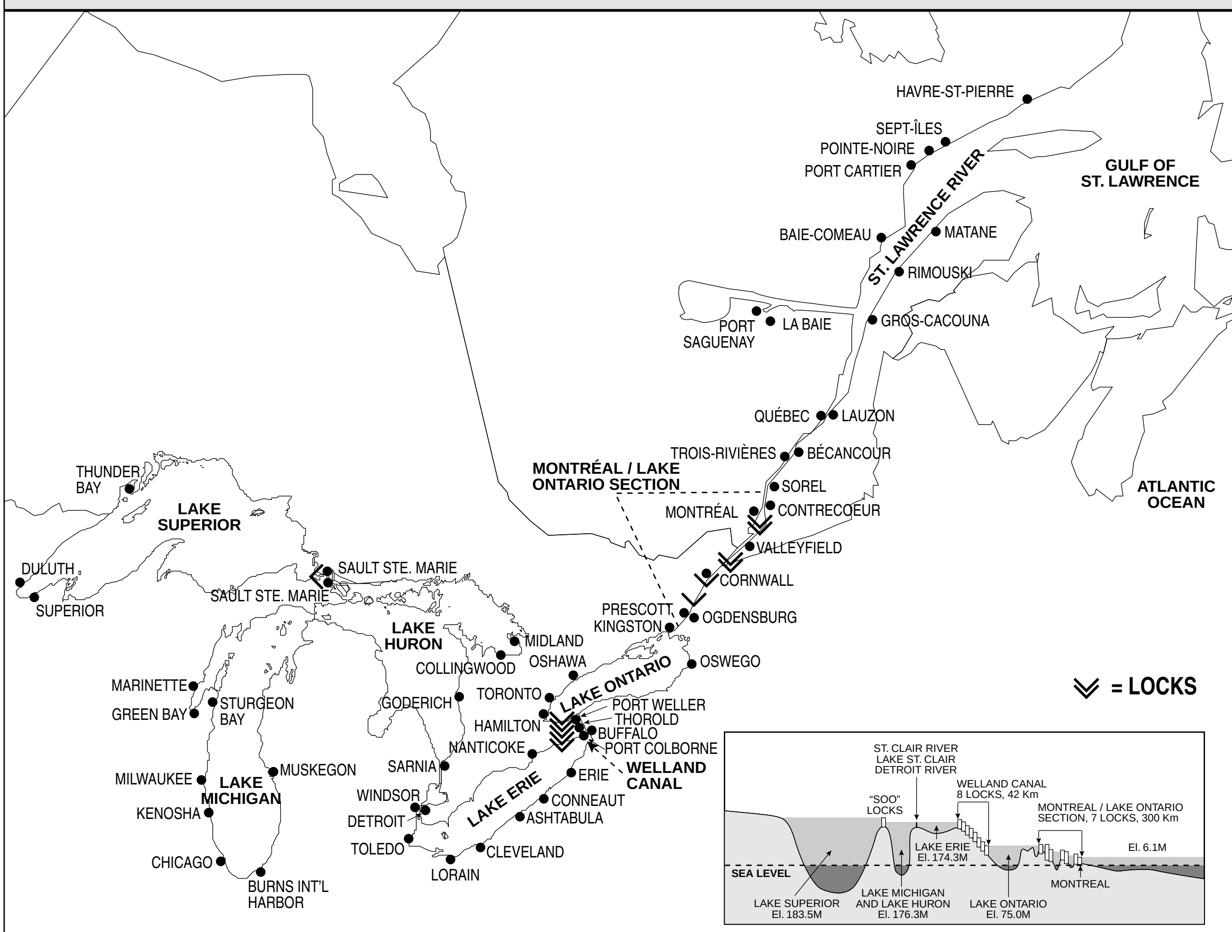
Table 12-14 provides details of tonnage handled at Canada's ports, harbour commissions, and selected Transport Canada and "other" facilities.

St. Lawrence Seaway

Background

The St. Lawrence Seaway waterway connecting the Port of Montreal and Lake Erie is a joint responsibility of Canada and the United States. Canada is responsible for the eight locks of the Welland Canal and five of the seven locks between Montreal and Lake Ontario, while the American Saint Lawrence Seaway Development Corporation

FIGURE 12-6
GREAT LAKES / ST. LAWRENCE
SEAWAY SYSTEM



Source: St. Lawrence Seaway Authority, Annual Report 1997-1998

(SLSDC) operates the remaining two locks.

The Seaway can accommodate vessels 225.5 metres in length, 23.8 metres in beam and 8 metres in draft subject to water levels. As a ship travels west through the Seaway from the Port of Montreal, the locks eventually raise the ship to the height of a 60-storey building above the water level at Montreal. The Seaway is closed to traffic during the winter months, usually from the end of December through to the end of March. Figure 12-6 shows the St. Lawrence Seaway system.

TABLE 12-15
ST. LAWRENCE SEAWAY COMMODITY SHARES
1993 – 1997

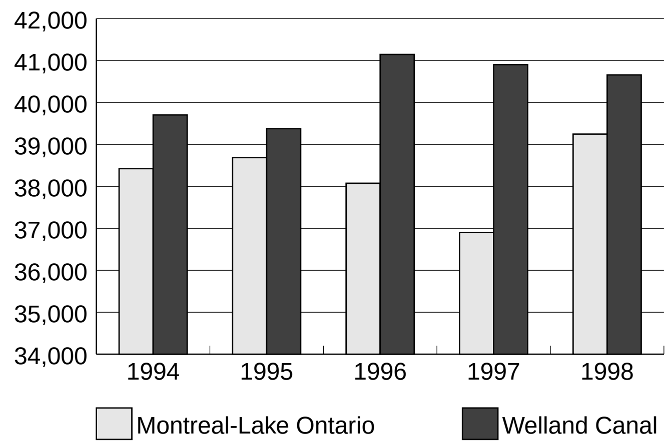
(Percentage)

Year	*Grain*	*Iron Ore*	*Iron & Steel*	*Coal & Coke*	*Other*	*Total*
1993	25.8	26.6	10.8	10.8	26.0	100.0
1994	25.5	25.8	14.4	9.3	25.1	100.0
1995	30.1	24.7	10.1	10.4	24.8	100.0
1996	24.3	26.8	12.1	10.9	25.8	100.0
1997	27.2	24.6	11.1	11.3	25.7	100.0

Source: St. Lawrence Seaway Authority/St. Lawrence Seaway Management Corporation

FIGURE 12-7
ST. LAWRENCE SEAWAY CARGO MOVEMENTS
1994 – 1998

(Thousands of Tons)



Source: St. Lawrence Seaway Authority/St. Lawrence Seaway Management Corporation

Seaway Commercialization

The year 1998 saw major changes in the management of the Seaway as the St. Lawrence Seaway Authority (SLSA), which had been responsible for the Seaway since its opening in 1959, ceased to exist. On October 1, 1998, following more than three years of complex negotiations, management of the operations and maintenance of the navigational aspects of the Seaway passed to a not-for-profit private sector corporation, the St. Lawrence Seaway Management Corporation (SLSMC), controlled by Seaway users. Major bridges not related to navigation, including the Montreal bridges and the two international bridges, formerly the responsibility of the SLSA, were handed to a new Crown corporation, the Federal Bridge Corporation Ltd. The SLSA and the SLSA Act were dissolved on December 1, 1998.

Transfer of Seaway operations to a not-for-profit corporation proceeded under Part III of the *Canada Marine Act*. This Act provided the Minister of Transport with the authority to complete the transaction with the SLSMC.

Many of the required initiatives to meet the objectives of the new corporation were actually put in place before it officially took over the Seaway on October 1, 1998. This was made possible by a Users' Group transition team that worked with government to develop the complete management agreement, while also working with the SLSA to develop implementation strategies for cost reductions.

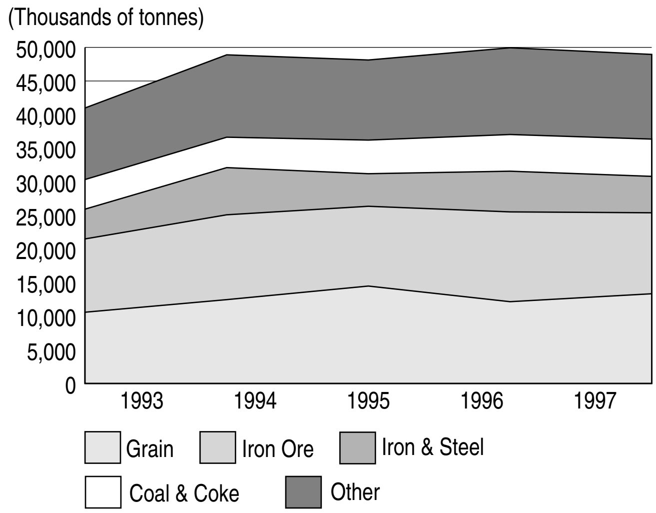
Traffic in 1997 and 1998[9]

The total value of cargo – both Canadian and US – transiting the Seaway was estimated by the SLSA at $6.7 billion for the 1997 season.

The main commodities moved in the Seaway are grain, iron ore, steel products and coal. In the "other" group are important movements of

9 It is important to note that the statistics reported herein for traffic relate to a different time period than that for the financial results. The latest traffic results reported are for the calendar year 1998. However, with respect to financial results, the latest available data relate to the 1997/98 fiscal period, which ended March 31, 1998. Since the Seaway is closed to traffic for the winter (usually from late December to the end of March), the traffic that relates to the 1997/98 fiscal year would be that recorded for the 1997 calendar year.

FIGURE 12-8
ST. LAWRENCE SEAWAY TRAFFIC BY COMMODITY
1993 – 1997



Source: St. Lawrence Seaway Authority/St. Lawrence Seaway Management Corporation

petroleum products, salt, potash, and low-value bulk construction materials such as limestone, cement and gypsum. While tonnage does fluctuate somewhat, in 1997 the above four commodities accounted for 36.4 million tonnes, or 74.3 per cent of total cargo. Table 12-15 shows the shares of each commodity group from 1993 to 1997.

Traffic passes through the two sections of the Seaway, the Montreal/Lake Ontario (MLO) section, and the Welland Canal. It moves either through one or both sections on the way to the final port. Using total tonnage as a proxy for transits in 1998, the MLO section increased by about six per cent to 39.2 million tonnes, while total traffic on the Welland Canal declined by less than one per cent to 40.7 million tonnes. Figure 12-7 summarizes cargo movements through each section of the St. Lawrence Seaway from 1994 to 1998.

After a period of decline, traffic turned around in 1994. It rose 20 and 25 per cent on the MLO and Welland sections respectively between 1993 and 1994. Tonnage has remained fairly stable in the last five years, increasing 1.1 per cent on the MLO, and 1.7 per cent on the Welland, since 1994. (While the references here are to tonnage on each section of the Seaway, it is important to note that because the tonnage can move through both sections, it is not cumulative.)

In 1998, Canadian grain shipments on the MLO section decreased by 24 per cent to 6.7 million tonnes; shipments on the Welland Canal also decreased 24 per cent to 6.8 million tonnes.

US grain shipments, meanwhile increased by 34 per cent to 6.1 million tonnes on the MLO section, and by 32 per cent on the Welland Canal to 6.2 million tonnes.

Iron ore shipments on the MLO were up 9.7 per cent to 11.1 million tonnes; shipments on the Welland Canal decreased by 17.4 per cent to 6.5 million tonnes. This reflects a greater reliance by Canadian steel mills on iron ore originating from Quebec–Labrador in 1998.

In 1998, shipments of general cargo, including steel, increased dramatically on both sections of the system. On the MLO, shipments increased 37.2 per cent to reach 7.0 million tonnes; on the Welland Canal, shipments were up 34.4 per cent to 5.5 million tonnes.

The tonnage of all commodities rose from 1993 to 1997 by 19.4 per cent in total. However, this followed a period of declining traffic on the Seaway. Also, total tonnage has changed very little since 1994. The principal commodities of grain (+seven per cent) and coal (+22.5 per cent) have increased, while iron ore (-4.5 per cent) and iron and steel (-22.8 per cent) have declined.

Figure 12-8 shows SLSA traffic by commodity from 1993 to 1997.

Rates and Tariffs

On June 1, 1998, the Canadian government implemented a two per cent toll increase for the Canadian section of the Seaway, as per the terms of the agreement negotiated with Seaway users. Tolls were last increased in 1993.

Discussions with the US took place before toll increases were applied. While the US administration as well as other US interests raised objections, Canada asserted that the increase was minimal, that it would have a negligible effect on traffic, and that it was consistent with the terms of the 1959 Treaty on Tolls and with the past practice of the parties under that Treaty.

Financial Profile

Operating expenses in 1997/98 reached $85.5 million, an increase of 6.8 per cent over 1996/97. While toll revenues decreased by $1.3 million, operating revenues increased by $1.2 million to $84.6 million due to an offsetting increase in revenues from leases and licenses.

Operating income in 1997/98, before unusual items, and excluding investment income, was - $1.0 million, compared with $3.3 million in 1996/97. Unusual charges of $6.5 million were incurred to cover the Departure Incentive Program (staff levels are expected to be reduced by 119 employees, or 17 per cent, between March 1997 and March 1999) and the costs of commercialization. After these extraordinary items, and adjusting for investment income and taxes, a net loss of $3.7 million resulted for the year.

The SLSA was able to fund 1997/98 capital expenditures of $10.2 million from its internal funds. SLSA reserve funds were drawn down by $700,000 to $45.9 million at the end of the fiscal period.

A review of financial results for the last five fiscal years indicates that revenues have risen 21.6 per cent, faster than expenses, at 9.6 per cent. Traffic in total increased by 19 per cent between 1993 and 1994, rebounding to previous levels, and revenues are relatively stable when comparing 1997 with 1994. Nevertheless, net losses have been reduced over the period by more than one half, and net income has been positive in three of the five years. Table 12-16 shows the St. Lawrence Seaway's financial performance for the fiscal years 1993/94 to 1997/98.

TABLE 12-16
ST. LAWRENCE SEAWAY'S FINANCIAL PERFORMANCE
1993/94 – 1997/98

($ millions)

	Operating Revenues	*Operating Expenditures*	*Operating Income*	*Net Income*
1993/94	69.6	78.0	-8.4	-6.1
1994/95	83.9	74.1	9.9	15.5
1995/96	78.1	80.6	-2.4	1.9
1996/97	83.4	80.1	3.3	0.2
1997/98	84.6	85.5	-1.0	-3.7

Source: St. Lawrence Seaway Authority, Annual Report

Marine Pilotage

Legislative Framework

Marine pilotage in Canada is governed by the *Pilotage Act* of 1972, which established four regional pilotage authorities: Atlantic (APA), Laurentian (LPA), Great Lakes (GLPA) and Pacific (PA). All authorities report directly to the Minister, although they are not considered agents of the Crown. Each authority is responsible for providing safe and efficient pilotage services that respond to their clients' particular requirements.

As part of the Marine Policy announced in December of 1995, the federal government is putting many of its activities on a more commercial footing, including marine pilotage. The more efficient pilotage operation is now expected to be completely self-sufficient and self-financing.

Figure 12-9 shows the respective territories covered by each of the four pilotage authorities.

Canada Marine Act

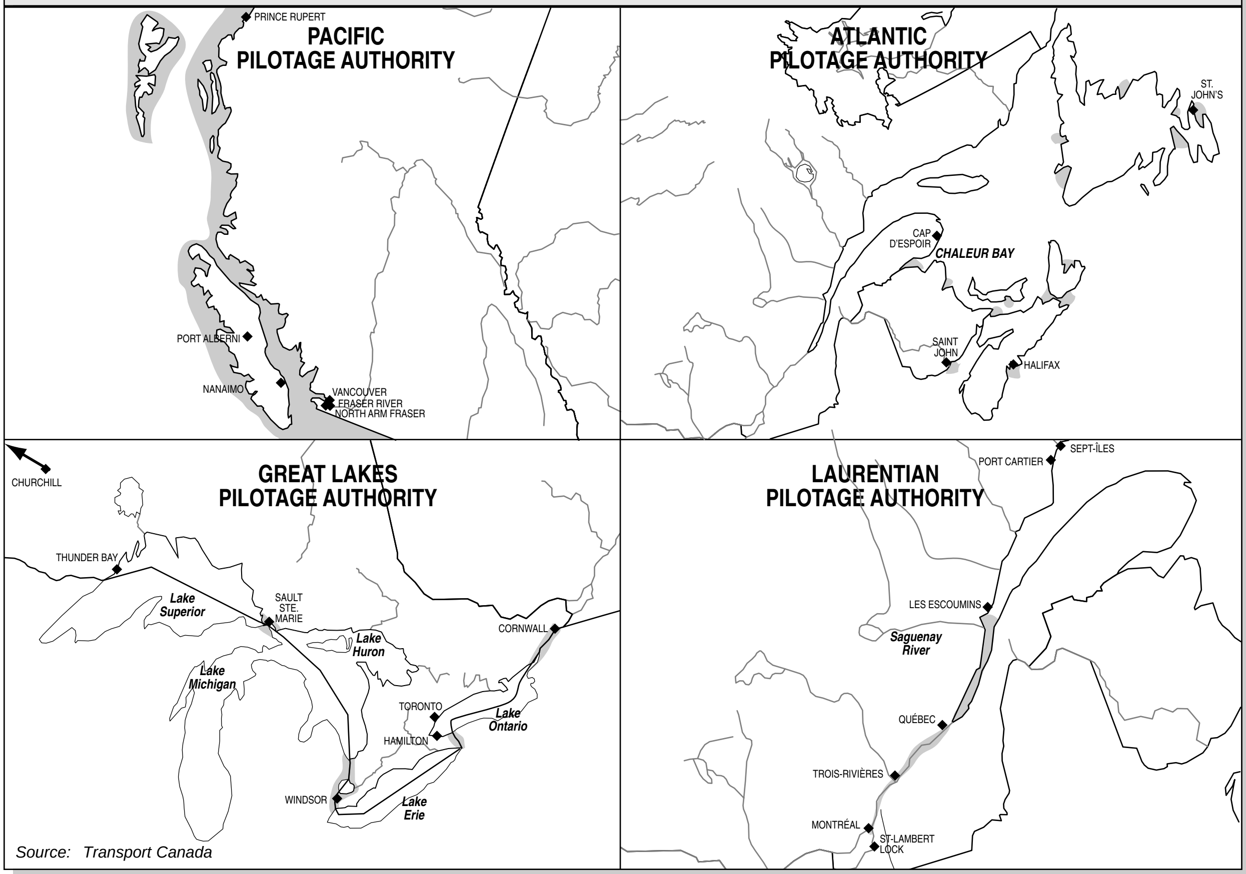
Changes to the *Pilotage Act* (part of the *Canada Marine Act*) were proclaimed in October 1998. These changes will put further downward pressure on pilotage costs and require greater financial accountability from the authorities. Key amendments relating to pilotage include denying the authorities access to parliamentary appropriations and setting limits on the amounts the authorities can borrow elsewhere.

In accordance with the legislation, the Minister of Transport has tasked the Canadian Transportation Agency (CTA) with undertaking a review of specific outstanding pilotage issues and reporting back to him by September 1, 1999. The CTA review will form the basis of a report to Parliament that the Minister must table no later than 30 House-sitting days after October 1, 1999.

Financial and Operating Performance

In 1998, pilotage revenues, on a nationwide basis, once again exceeded expenditures, with three authorities enjoying modest surpluses. Although the Laurentian Pilotage Authority incurred a loss of $273,000, it reduced its deficit by 67 per cent from the previous year (see Table 12-17). Current policy prohibits parliamentary appropriations, so the authority financed its loss with a commercial loan from a financial institution.

FIGURE 12-9
CANADA'S PILOTAGE AUTHORITIES



Source: Transport Canada

Table 12-17 shows the financial results for the four pilotage authorities in 1998.

The results for 1998 represent an improvement over 1997 and a continuation of the trend toward positive net incomes over the last few years.

Table 12-18 shows the financial results for each pilotage authority from 1994 to 1998.

Total revenues have risen by 20 per cent while expenses, except for the Great Lakes Authority, have increased more slowly by 14 per cent. GLPA expenses have risen 47 per cent over the 5 year period. Nevertheless, Figure 12-18 shows the trend toward improvement of the bottom line, as total net income of pilotage authorities has more than doubled.

Figure 12-10 shows the upward trend in the total net income of pilotage authorities.

Table 12-19 shows the number of assignments for each Pilotage Authority and the total for all authorities between 1994 and 1998. The variation among the authorities is influenced by the nature of their territories and fluctuations over the period is likely a response to changing traffic levels. However, overall the total assignments after an initial decline in the first year have grown by 8.4 per cent since 1995.

CANADIAN COAST GUARD

Responsibilities

Over the past three years, the Canadian Coast Guard has undergone a major reorganization, designed both to refocus its role within a newly merged Department of Fisheries and Oceans and to ensure service delivery that is responsive to client needs and consistent with the department's oceans mandate. The Coast Guard's mandate now focuses more on sustainable ocean management that permits a safe, environmentally sustainable marine transportation system. It advances the oceans mandate both through its internal partnership with DFO sector counterparts and through its primary role of ensuring safe and environmentally responsible use of Canada's waterways. The Coast Guard organization splits into five business lines delivered across the five DFO Regions: marine navigation services; marine communications and traffic services; icebreaking operations; rescue, safety and environmental response activities; and fleet management.

The Coast Guard delivers a broad range of marine programs, policies and services and, in doing so, deals with several sectors within the marine community. It delivers services to a cross-section of clients, including commercial shipping interests, recreational boaters, the fishing industry, ferry services, tug and barge re-supply operations in the North, cruise lines, private sector shippers, and provincial, municipal and territorial governments as well as federal government departments. The Coast Guard also serves the general public through its role in protecting their interest in preserving ecosystems, ensuring that water supplies remain unpolluted by oil and chemical spills, and protecting recreational resources.

Marine Navigation Services

The Marine Navigation Services (MNS) group provides, operates and maintains a system of aids to navigation to help mariners in determining their position in relation to land and hidden dangers. Its objective is to reduce navigation risk and transit time in support of an environmentally sound transportation system. The group also provides water-level monitoring services and protection of navigation rights.

The group's navigational infrastructure consists of 262 automated light stations, 52 of which are staffed; five LORAN C communication stations; 18 DGPS transmitter sites; over 6,000 land-based fixed marine aids; and more than 13,000 floating aids.

TABLE 12-17
PILOTAGE AUTHORITY FINANCIAL RESULTS
1998

($ 000's)

	Revenues	*Expenditures*	*Net Income (Loss)*
Atlantic	9,425	8,755	670
Laurentian	41,407	40,943	464
Great Lakes	17,250	15,549	1,701
Pacific	34,441	37,056	385
Totals	**105,523**	**102,303**	**3,220**

Source: Pilotage Annual Reports (preliminary)

TABLE 12-18
PILOTAGE AUTHORITY FINANCIAL RESULTS
1994 – 1998

($ millions)

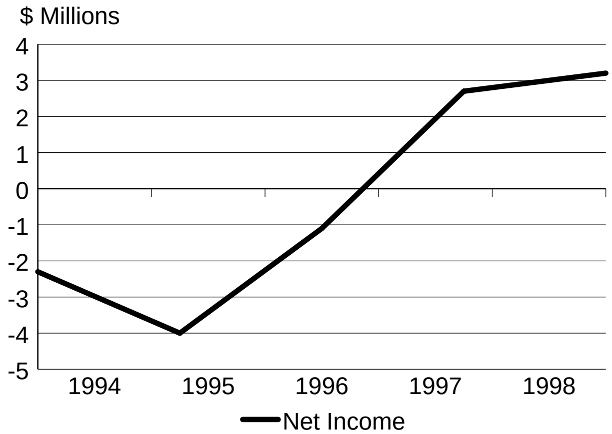
Region	*Year*	*Revenues*	*Expenditures*	*Net Income (Loss)*
Atlantic	1994	6.9	7.6	-0.7
	1995	7.6	7.6	0.1
	1996	8.0	7.5	0.5
	1997	9.6	8.6	1.0
	1998	**9.4**	**8.8**	**0.7**
Laurentian	1994	33.4	36.5	-3.2
	1995	34.4	38.5	-4.2
	1996	36.0	38.8	-2.8
	1997	38.2	39.1	-0.8
	1998	**41.4**	**40.9**	**0.5**
Great Lakes	1994	13.9	10.6	3.3
	1995	11.2	10.0	1.2
	1996	12.7	11.6	1.0
	1997	13.3	12.0	1.2
	1998	**17.3**	**15.6**	**1.7**
Pacific	1994	33.7	35.3	-1.6
	1995	34.2	35.4	-1.1
	1996	36.0	35.9	0.2
	1997	39.8	38.5	1.3
	1998	**37.4**	**37.0**	**0.4**
Total Pilotage	1994	87.8	90.1	-2.3
	1995	87.5	91.5	-4.0
	1996	92.7	93.9	-1.1
	1997	101.0	98.3	2.7
	1998	**105.5**	**102.3**	**3.2**

Source: Pilotage Authorities Annual Reports (1998 Preliminary)

Marine Communication & Traffic Services

Marine Communication & Traffic Services provides communications and traffic services for the marine community and for the benefit of the general public to ensure: safety

FIGURE 12-10
PILOTAGE AUTHORITY TOTAL NET INCOME
1994 – 1998



Source: Pilotage Authorities Annual Reports (1998 Preliminary)

TABLE 12-19
TOTAL PILOTAGE ASSIGNMENTS AND ASSIGNMENTS PER PILOT
1994 – 1998

Pilotage Authority	*Indicators*	*1994*	*1995*	*1996*	*1997*	*1998*
Atlantic (APA)	Total Assignments	8,655	8,668	8,576	9,760	9,725
	Assignments per Pilot	188	180	186	212	203
Laurentian (LPA)	Total Assignments	22,550	21,937	21,342	20,941	22,018
	Assignments per Pilot	125	127	123	120	121
Great Lakes (GLPA)	Total Assignments	7,787	6,091	6,901	7,192	9,085
	Assignments per Pilot	148	107	121	113	142
Pacific (PPA)	Total Assignments	14,053	13,199	13,403	14,212	13,267
	Assignments per Pilot	128	115	113	124	121
Total All	**Total Assignments**	**53,045**	**49,895**	**50,222**	**52,105**	**54,095**

Note: LPA assignments per pilot for 1994-97 may differ from the 1997 Annual Report on Transportation because of a change by the authority in the methods for counting pilots

Source: Pilotage Authorities, Annual Reports

TABLE 12-20
COAST GUARD
1998 VESSEL, AIRCRAFT AND FACILITY ASSETS

Vessels and Aircraft	*CCG Facilities*
132 major ships	24 bases and sub-bases
small craft in excess of 500[1]	11 helicopter hangars
28 inshore rescue boats	2 hover craft facilities
4 air cushion vehicles	
29 rotary wing aircraft	
3 fixed wing aircraft[2]	

1 Includes lifeboats, surf boats, self-propelled barges, small craft carried on larger ships, shore-based work boats, floating spill boats, oil slick-lickers, and other small craft at CCG bases and light stations.
2 Two owned by Transport Canada and one Chartered.

Source: Department of Fisheries and Oceans

of life at sea in response to international agreements; protection of the environment through traffic management; efficient movement of shipping; and information for business and national interests.

The group's supporting infrastructure includes staffed communications centres and remote transmitter and receiver sites. The federal government's Program Review, which is nearing completion, has reduced operational centres from 44 to 22.

Icebreaking Operations

Icebreaking permits the safe and efficient movement of marine traffic through the ice-covered Arctic and southern waters, which include the Great Lakes and East Coast of Canada. It also reduces the risk of flooding in areas prone to or threatened by it as a result of ice build-up. This ensures that northern settlements and military sites are re-supplied annually.

The Icebreaking Program is in a period of transition. It is evolving from its historical role of providing a wide range of services at no direct cost to the user, toward a more client-focused, demand-driven operation where commercial users pay a percentage of the service's allocated costs. This evolution is necessary in view of the government's recent downsizing activities, which also recognize that there must be a balance between the needs of commercial and other user groups, and the public interest, such as flood control and support to northern or remote sites.

Rescue, Safety and Environmental Response

The objective of the Rescue, Safety and Environmental Response (RSER) group is to save lives and protect the marine environment. This group provides maritime search and rescue and emergency preparedness capabilities; promotes boating safety to the marine public; and responds to pollution incidents from shipping through oversight of private-sector clean-up or direct spill response management, depending on the incident's severity.

This group has done substantial work to promote boating safety/loss of life prevention. In January, 1999, the Minister of Fisheries and Oceans unveiled improved regulations for safe boating in Canada. The new framework establishes, among other things, minimum age limits for the use of pleasure boats for recreational purposes and a requirement that those operating such boats be able to demonstrate proof of operator competency.

The group's supporting infrastructure includes 22 search and rescue stations with in-shore rescue boats, 31 regular search and rescue stations, and 63 spill-response equipment depots.

Fleet Management

The Coast Guard is responsible for managing a large, integrated, multi-tasked fleet that provides efficient sea and air support to several DFO programs. These programs include fisheries management, hydrography, and fisheries and oceans science, as well as the four business lines mentioned above.

This work includes acquiring, scheduling and maintaining the department's vessel and air fleet, and augmenting fleet capabilities when necessary with additional sea and air support from other government departments and the private sector.

TABLE 12-21
CANADIAN COAST GUARD
REVENUES AND EXPENDITURES, 1995/96 to 1998/99

($ millions)

	1995/96	*1996/97*	*1997/98*	*1998/99*
Revenue (1)	11.5	27.3	37.3	52.4
Gross Expenditures (2)	533.4	540.2	522.8	523.5
Net Expenditures (1)-(2)	521.9	512.9	485.5	471.1

Source: Source: Department of Fisheries(Canadian Coast Guard), Includes MNS - Marine Navigation Services, MCTS - Marine Communication & Traffic Services, ICE - Ice breaking Services, RSER - Rescue, Safety and Environmental Response, and Fleet Management

TABLE 12-22
CANADIAN COAST GUARD
REVENUES AND BUDGETED EXPENDITURES, 1998/99

($ millions)

Business Line	*MNS*	*MCTS*	*ICE*	*RSER*	*Fleet Mgmt.*	*CCG Total*
Revenues (1)	28.2	0.5	23.6	0.1	0.0	52.4
Gross Expenditures (2)	130.3	72.4	64.1	111.0	145.7	523.5
Net Expenditures ((1)-(2))	102.1	71.9	40.5	110.9	145.7	471.1

Source: Department of Fisheries(Canadian Coast Guard), MNS - Marine Navigation Services, MCTS - Marine Communication & Traffic Services, ICE - Ice breaking Services, RSER - Rescue, Safety and Environmental Response

Table 12-20 lists the Coast Guard's 1998 assets in terms of vessels, aircraft and facilities.

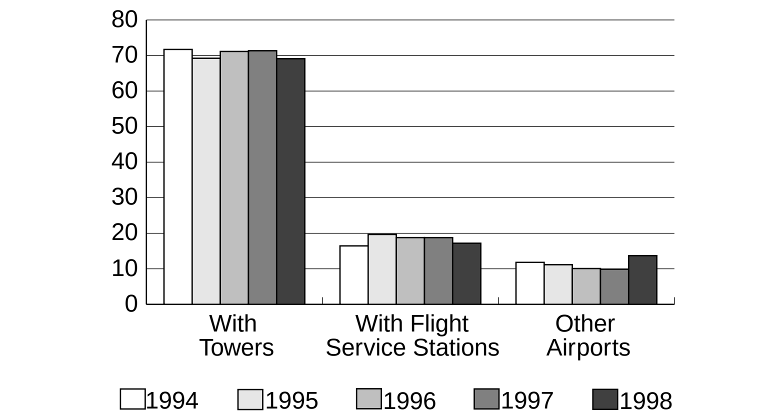
Financial Performance

Through a combination of efficiency measures and reduced operations, resulting in lower expenses, the Coast Guard has permanently reduced its net expenditures on the services described above by $140 million, or 30 per cent, over the four-year period ending 1998/99. While the net expenditures reflect a reduction of $50.8 million, or ten per cent, there are factors that distort the numbers and give this lower appearance. Reductions had been made since 1994/95, which was prior to CCG's merger with the DFO. In 1996/97, DFO's fleet of vessels was merged with Coast Guard's fleet and became part of Coast Guard's overall expenditures. This resulted in a higher net expenditure that distorted the reductions already made by Coast Guard. In addition, 1998/99 reflects expenditure forecasts to year-end and will not be finalized until the end of the fiscal year.

Table 12-21 shows the Canadian Coast Guard's revenues and expenditures for the fiscal years 1995/96 to 1998/99.

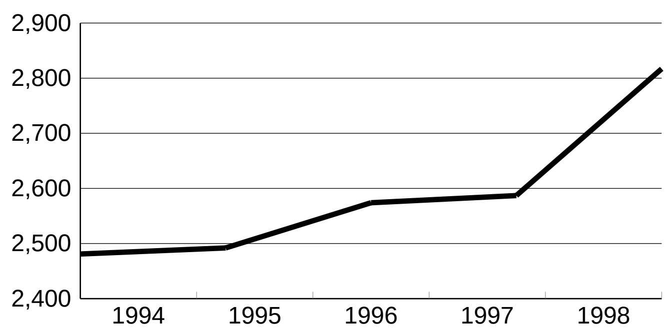
The Coast Guard also implemented user fees for some programs. The objective behind user fees is to obtain a fair contribution from users for

FIGURE 12-11
PER CENT OF AIRCRAFT MOVEMENTS BY AIRPORT CATEGORY
1993 – 1998



Source: Transport Canada, Aircraft Movement Statistics, TP577

FIGURE 12-12
NUMBER OF AIRCRAFT FLIGHTS[1] PER TRAFFIC CONTROLLER[2]
1994 – 1998



1 Flights include (IFR + VFR + Runway 88's [for towers and FSS] + Overflights + 7% Oceanic)
2 Licensed operational controllers

Source: Nav Canada

programs from which they directly benefit. Initially, the Marine Navigation Services Fee was introduced in June 1996. It offsets, on average, 27 per cent of the full costs of providing marine navigational services to the commercial shipping industry.

In September 1997, a Maintenance Dredging Services Tonnage Fee for the St. Lawrence Ship Channel came into effect. The current fee schedule is effective September 1, 1998 until August 31, 1999. This fee is only an interim measure to cover the total costs incurred by the Coast Guard to provide these maintenance dredging services. The Coast Guard is currently working with representatives of the commercial marine transportation industry to arrive at a long-term arrangement, including discussions on the transfer of responsibilities to industry for these dredging services.

Following the government's March 1997 announcement, the Minister of Fisheries and Oceans outlined on December 4, 1998, the elements of a revised ice-breaking services fee (ISF) proposal that would generate $6.65 million annually plus administrative costs. The proposal is built around a transit-based ice-breaking fee. The fee will be uniformly applied to each transit to, from, or within the ice zone during the ice season.

Table 12-22 shows the breakdown of the Coast Guard's revenues and expenditures by its five main services for the fiscal year 1998/99.

AIR TRANSPORTATION INFRASTRUCTURE

AIR NAVIGATION SYSTEM

The Canadian Air Navigation System (ANS) consists of seven area control centres (ACC) and over 100 airport control towers and flight service stations. These facilities are supported by a network of 1,400 navigational and landing aids. One of the safest and most extensive networks of air infrastructure in the world, this system delivers air traffic control, flight information, weather briefings, airport advisory services and electronic aids to navigation.

NAV Canada, a private, non-share capital corporation, assumed responsibility for all civil air navigation services in Canada on November 1, 1996. NAV Canada shares responsibility for air navigation safety with the Minister of Transport. The Minister retains the mandate to oversee the safety of NAV Canada's operations by ensuring that the corporation continues to meet all safety and regulatory requirements.

Air Navigation Operations

NAV Canada continued to fine-tune its operations in 1998 by reducing duplication and administrative costs. During the fiscal year, the corporation consolidated its Central and Western Region administrations. It is continuing with additional consolidations in regional offices and area control centres.

The air navigation system supported some 7.6 million aircraft arrivals and departures at Canadian Airports in 1998.

Figure 12-11 shows the distribution of aircraft movements by category of airport from 1993 to 1998.

Figure 12-12 charts the number of aircraft flights per traffic controller from 1994 to 1998.

The data indicates a slight shift from airports with towers to those with flight service stations and other airports. The annual number of controlled flights has risen from 4.9 million in 1994 to 5.5 million in 1998, an increase of 13.2 per cent (see Table 12-23). Flights per air traffic controller have risen slightly more by 13.5 per cent over the five-year period. Note, however, that the latter is a broad indicator only, and that to truly reflect workloads, calculations must be done on a site-by-site basis.

System Improvements

NAV Canada has invested approximately $300 million since November 1996, with many projects coming on stream in the fiscal year 1997/98. These projects include

- new air traffic control towers in Halifax and Toronto;

TABLE 12-23
CANADA'S AIR NAVIGATION WORKLOAD INDICATORS
1994 – 1998

	Annual Flights[1]	*Air Traffic Controllers*[2]	*Flights/* Controller
1994	4,857,003	1958	2481
1995	4,881,158	1959	2492
1996	4,960,219	1927	2574
1997	5,059,590	1956	2587
1998[3]	5,498,100	1952	2817

1 Flights include (IFR + VFR + Runway 88's(for towers, and FSS) + over flights + 7% oceanic)
2 Licensed operational controllers
3 Includes preliminary statistics for December 1998

Source: Nav Canada

- extensive work on navigational facilities associated with the expansion of Lester B. Pearson International Airport, in conjunction with the Greater Toronto Airport Authority;
- implementing reduced vertical-separation criteria over the North Atlantic to permit increased traffic flow at the same levels of safety;
- installing new power systems and computer display technology at all Area Control Centres;
- installing new Instrument Landing Systems (ILS) at major locations such as Vancouver International Airport;
- expanding the Technical Systems Centre in Ottawa, now the main focus of NAV Canada’s national engineering activities; and
- making significant progress on a major addition to our Area Control Centre in Montreal, in conjunction with the Department of National Defence.

NAV Canada’s major capital project, the Canadian Automated Air Traffic System (CAATS), also reached a milestone. 83 per cent of the CAATS system software has been delivered. Factory acceptance testing will take place early in 1999, with pilot sites in Western Canada to follow. It is expected that once CAATS becomes operational, it will be among the most advanced and comprehensive air traffic control systems in the world.

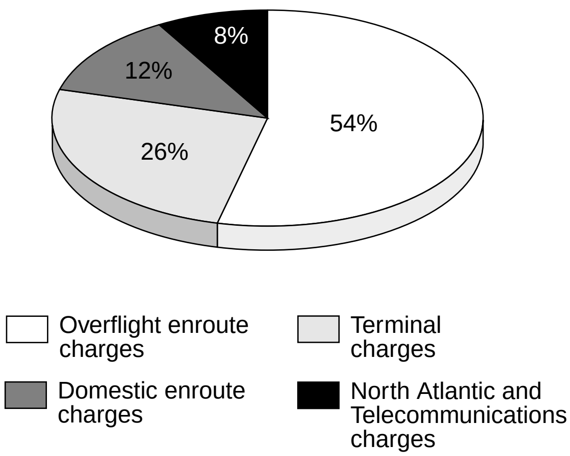
Financial Performance

Proposed Service Fees

Since November 1998, NAV Canada has been a self-funded organization that charges fees for services provided to its customers. In 1998, the corporation developed:

- a new billing system;
- a fee structure in consultation with users and other stakeholders, combined with a new system for charging new terminal and en-route fees beginning March 1998;
- a pricing policy that permits exemptions, with the vast majority of general aviation users to pay a $60 annual fee;
- deferral of the implementation of the Phase II fee schedule to March 1, 1999, from November 1998, resulting in an estimated $72 million in savings to the flying public; and
- a rate-stabilization reserve account to minimize the impact of unforeseen fluctuations in air traffic volumes.

FIGURE 12-13
NAV CANADA FEE SHARES
1998



Source: Nav Canada

TABLE 12-24
FINANCIAL SUMMARY FOR NAV CANADA
1997 and 1998

Total revenue ($ millions)	*1998*	*1997*
Total Revenue	892,490	776,284
Total Expenses	714,682	584,487
Operating Income	**177,808**	**191,797**
Operating Ratio	80.1%	75.3%
Net Income	5,981	13,404
Capital expenditures	126,488	176,102

Source: Nav Canada Annual Report 1998

As a not-for-profit corporation, NAV Canada prices its services to recover all costs from users, including any debt-servicing costs. Before the creation of NAV Canada, air navigation services were funded mainly through the Air Transportation Tax (ATT). As of November 1, 1998, NAV Canada must recover its costs through user fees only. During the year, the corporation introduced new user charges for en route and terminal control services and increased existing oceanic and overflight fees. These fees received statutory approval from the Minister of Transport, under the guiding principles of the *Civil Air Navigation Services Commercialization Act*, and the ATT was repealed. Together, the overflight fee and terminal charges contribute 80 per cent of NAV Canada's revenues.

Figure 12-13 shows the fee sources of NAV Canada in percentage terms for 1998.

Table 12-24 compares financial results for 1997 and 1998 ending August 31, 1998.

For the year ending August 31, 1998, NAV Canada reported $892 million in revenues and $715 million in operating expenses. Other items, such as a total $171 million in interest payments, depreciation and restructuring expenses, resulted in a net income of $5.9 million.

Compared with the ten-month period in the previous year, revenues increased by 15 per cent, while expenses rose 22 per cent. This resulted in an elevated operating ratio of 80 per cent. Increases in interest and depreciation charges also contributed to a reduction in net income of 55 per cent.

AIRPORTS

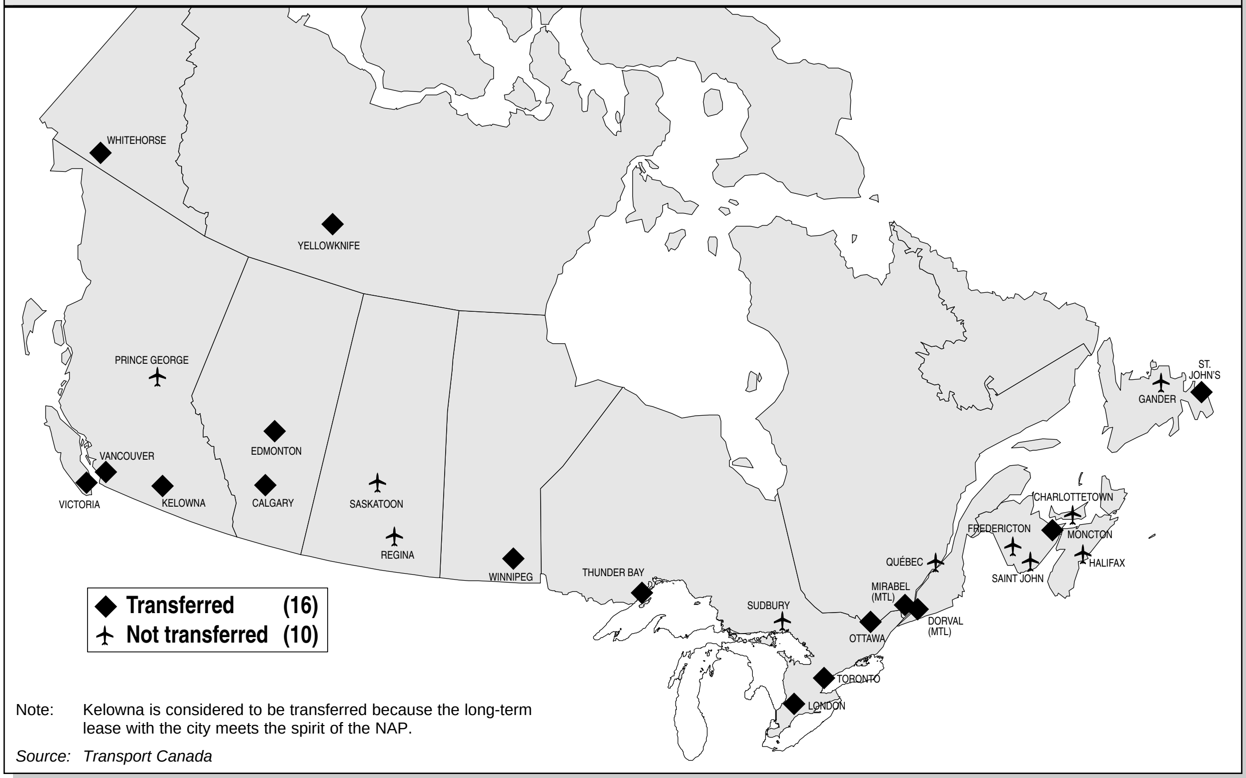
Canada has approximately 1,800 aerodromes (the generic name for facilities registered with Transport Canada as aircraft landing and take-off sites), of which 631 are certified (as either airports for fixed-wing aircraft, heliports for helicopters, or water-ice bases for float- and ski-planes).[10]

The majority of certified airports are owned by municipalities, provincial or territorial governments, or the federal government. Most of Canada's commercial aviation activity takes place at certified airports.

The federal government's 1994 National Airports Policy (NAP) announced its intent to commercialize most federally owned airports by March 31, 2000. This policy shifts the costs of

10 This represents the latest count for 1998. Figures for the number of certified airports in Canada are dynamic due to the changes or clarification in the criteria for certified airports as established in the Canadian Aviation Regulation (CAR), Part III - Aerodromes and Airports (October 1996). Application of the new regulations has resulted in a decline of certified airports due to the elimination of the criteria "main base for flight training unit" while the number increases due in part to a clarification of the criteria "within a built-up area" premise and the new criteria where the Minister determines that an airport certificate would be in the public interest and for safety reasons.

FIGURE 12-14
MAP OF AIRPORTS DIVESTITURE, 1998
NATIONAL AIRPORT SYSTEM AIRPORTS



Note: Kelowna is considered to be transferred because the long-term lease with the city meets the spirit of the NAP.

Source: Transport Canada

operating Canada's airports from all federal taxpayers to only those people who use the facilities.

Under the new policy, the federal government continues to own the airports that make up the National Airport System (NAS), but will divest the airports' operations to not-for-profit airport authorities under long-term leases (with the exception of Yellowknife and Whitehorse, which have been transferred to the territorial governments). Ownership of regional, local and small airports is being transferred to local interests by way of sale. Those remote airports[11] providing year-round access to isolated communities will continue to receive federal assistance.

Figures 12-14, 12-15 and 12-16 show the location of each airport considered under the NAP, the airport's designation (whether NAS, Regional/local, Small, Arctic, or Remote), and its divestiture status as of December 31, 1998.

Table 12-25 illustrates how the airport-divestiture program has evolved. Of the 136 airports designated for divestiture under the NAP, only 39 remain to be transferred at the end of 1998.

In 1998, airports in London, Ontario, and St. John's, Newfoundland, were transferred to Canadian Airport Authorities, bringing the total number of NAS airports transferred to 15.

Ninety-five per cent of commercial air travel passes through airports run by independent airport authorities or operators.

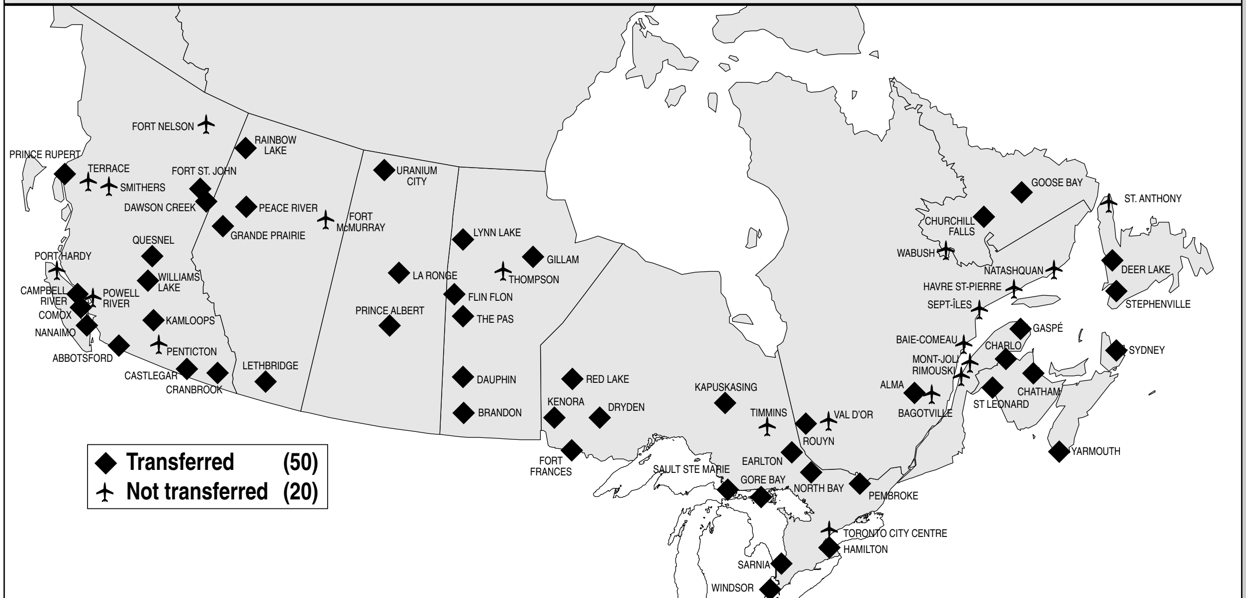
Major Developments

Over the past year, airport authorities actively pursued improvements to the infrastructure, operations and customer service at their airports.

- Vancouver Airport Authority has undertaken extensive renovations to the domestic terminal and has begun work on a major expansion of the international terminal.
- The Victoria Airport Authority announced plans to expand the airport's cargo capacity.

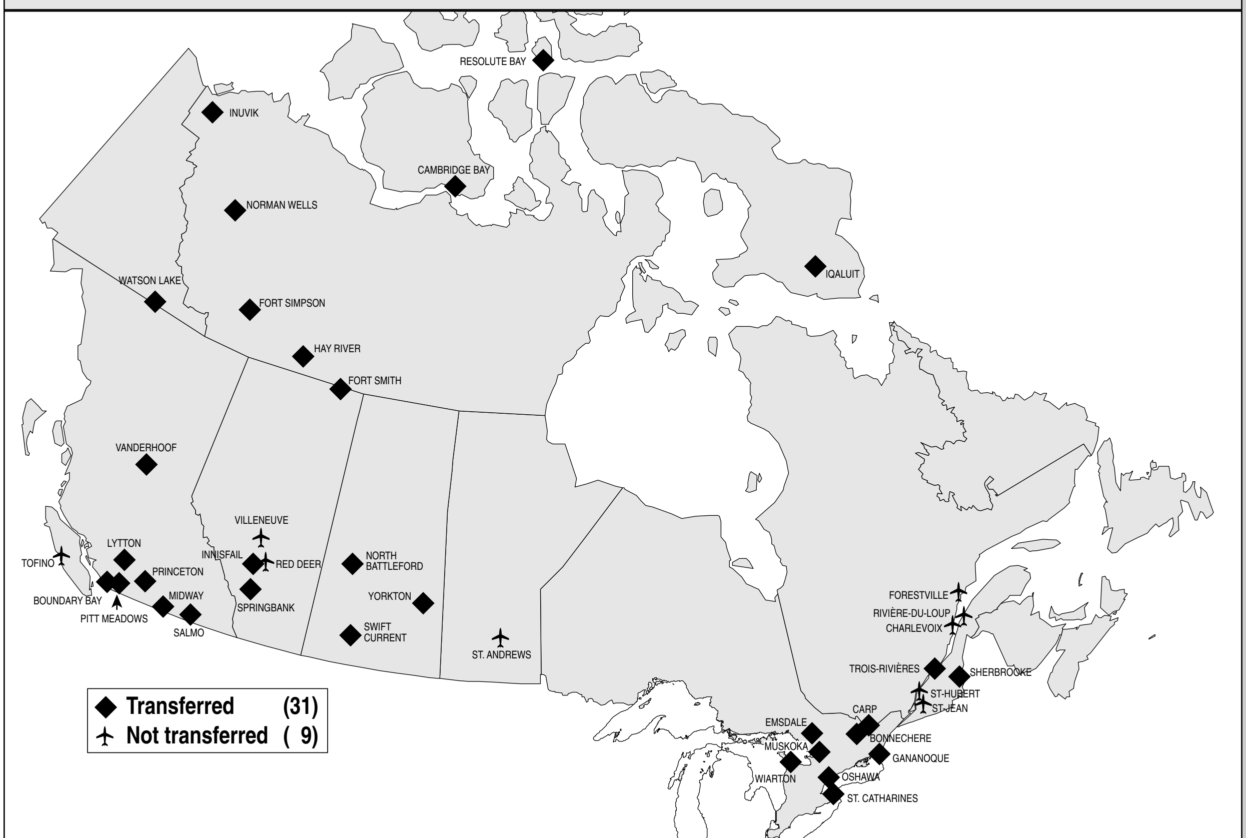
11 The 1997 report mistakenly indicated 12 remote airports. There are 13. They are Sandspit, B.C.; Fort Chipewyan, Alta.; Churchill, Man.; Norway House, Man.; Moosonee, Ont.; Iles-de-la-Madeleine, Que.; Lourdes-de-Blanc-Sablon, Que.; Kuujjuaq, Que.; Waskaganish, Que.; Chevery, Que.; Wemindji, Que.; Schefferville, Que.; Eastmain River, Que.

FIGURE 12-15
MAP OF AIRPORTS DIVESTITURE, 1998
REGIONAL / LOCAL AIRPORTS



Source: Transport Canada

FIGURE 12-16
MAP OF AIRPORTS DIVESTITURE, 1998
SMALL AND ARCTIC AIRPORTS



Source: Transport Canada

TABLE 12-25
ANNUAL STATUS OF FEDERAL AIRPORT DIVESTITURES
AS OF DECEMBER 31, 1998

	Transfers Completed					Completed	Remaining
Airport Category	*Total to Transfer*	*Prior Years*	*1995-1996*	*1996-1997*	*1997-1998*	*1998-1999*	*1998-2000*
National Airport System (NAS)	26	Vancouver Calgary Edmonton Mirabel Dorval	Yellowknife[1]	Whitehorse[1] Ottawa Toronto(PIA) Winnipeg	Moncton Thunder Bay Victoria	Kelowna[2] London St. John's	Charlottetown Fredericton Gander Halifax Prince George Québec Regina Saint John Saskatoon[3] Sudbury
Regional/ Local	70		Brandon Campbell River Charlo Dawson Creek Dryden Flin Flon Fort Frances Gillam Gore Bay Kenora Prince Albert Rainbow Lake Red Lake	Abbotsford Alma Castlegar Chatham Churchill Falls Comox Dauphin Fort St. John Grande Prairie Hamilton Lethbridge Lynn Lake Nanaimo Peace River Pembroke Rouyn St.Leonard The Pas Williams Lake Cranbrook	Earlton Gaspé Kamloops Kapuskasing La Ronge North Bay Prince Rupert Quesnel Sarnia Sault Ste Marie Stephenville Sydney Uranium City Yarmouth	Deer Lake Goose Bay Windsor	Baie Comeau Fort Nelson Havre St.Pierre Mont Joli Powell River Port Hardy Rimouski St. Anthony Sept Îles Smithers Timmins (07.99) Terrace Thompson Toronto Island Natashquan (2000+) Wabush Bagotville Penticton Val d'Or Fort McMurray
Small	31	Trois-Rivières	Emsdale Lytton Midway Princeton Swift Current Vanderhoof Yorkton	Bonnechere Carp Gananoque Innisfail Muskoka North Battleford Oshawa St.Catharines Wiarton	Boundary Bay[4] Pitt Meadows[4] Salmo Sherbrooke Springbank[4]		Red Deer Tofino Charlevoix Forestville Rivière-du-Loup St. Andrews[4] St. Jean Saint-Hubert[4] Villeneuve[4]
Arctic	9		Cambridge Bay Fort Simpson Fort Smith Hay River Inuvik Iqaluit Norman Wells Resolute Bay	Watson Lake			
TOTAL	**136**	**6**	**29**	**34**	**22**	**6**	**39**

1 These are considered Arctic airports as well.
2 Kelowna is considered to be transferred because the long-term lease with the city meets the spirit of the NAP.
3 Saskatoon transferred on January 1, 1999.
4 Satellites.

Source: Transport Canada

TABLE 12-26
1997 AIRPORT AUTHORITIES FINANCIAL PERFORMANCE
($ 000)

Financial Information	*Calgary*	*Vancouver*	*Edmonton*	*Montreal*	*Toronto*	*Winnipeg*	*Ottawa**	*TOTAL*
Aeronautical Revenues	26,390	70,971	13,889	47,556	153,457	11,291	13,384	336,938
Non-Aeronautical Revenues	31,684	90,910	14,179	67,205	121,079	10,984	13,405	349,446
Airport Improvement Fee	2,460	51,699	10,262	4,721	0	0	0	69,142
Sub-Total Revenues	**60,534**	**213,580**	**38,330**	**119,482**	**274,536**	**22,275**	**26,789**	**755,526**
Expenses (less Interest Charges)	47,844	148,228	25,454	106,478	224,930	18,324	23,531	594,789
Income	**12,690**	**65,352**	**12,876**	**13,004**	**49,606**	**3,951**	**3,258**	**160,737**
Interest Charges	0	21,208	758	288	30,277	0	331	52,862
Net Income	**12,690**	**44,144**	**12,118**	**12,716**	**19,329**	**3,951**	**2,927**	**107,875**
Acquisition of capital assets	30,789	50,987	13,568	157,880	881,501	7,233	8,377	1,150,335
Enplaned / Deplaned Passengers (000)	7,295	14,041	3,628	8,696	24,809	3,130	2,997	64,595
Ratios								
Operating	79.0%	69.4%	66.4%	89.1%	81.9%	82.3%	87.8%	78.7%
% Aeronautical Revenues of Total	43.6%	33.2%	36.2%	39.8%	55.9%	50.7%	50.0%	44.6%
% Non-Aeronautical Revenues of Total	52.3%	42.6%	37.0%	56.2%	44.1%	49.3%	50.0%	46.3%
% AIF of Total Revenues	4.1%	24.2%	26.8%	4.0%	0.0%	0.0%	0.0%	9.2%
Total Revenues per passenger	**8.30**	**15.21**	**10.56**	**13.74**	**11.07**	**7.12**	**8.94**	**11.70**
Total Expenses per passenger	**6.56**	**10.56**	**7.02**	**12.25**	**9.07**	**5.85**	**7.85**	**9.21**

* Financial data is reported for 11 months from February 1, 1997

Source : Airport Authority 1997 annual reports, and Statistics Canada

- Calgary Airport Authority's 10-year capital expansion program is advancing. Projects currently underway include an extension to parking facilities, the addition of four new aircraft positions, and additional aircraft parking and taxiways. Additional projects are in the design stage.
- Edmonton Regional Airports Authority commenced work on a new parking facility at the Edmonton International Airport. The facility will be connected by an enclosed walkway to the terminal building's departures level and by covered walkways on the arrivals level.
- The Winnipeg Airports Authority announced planned improvements ranging from the installation of new elevators and construction of covered walkways to aircraft, to various upgrades at the terminal building. The authority opened a new observation lounge and replaced the previous food and beverage services with nine new concessions throughout the air terminal building.
- The Greater Toronto Airport Authority is moving forward with a major redevelopment plan that proposes such work as a new terminal, a new infield cargo area, improved de-icing capacity, two additional runways, fuel tank facilities and road improvements. New fire-fighting and fire-training facilities were opened, and additional emergency-response vehicles and fire fighters were added to the airport's Emergency Services department.
- The Ottawa Macdonald-Cartier International Airport Authority has also completed upgrades to the air terminal building, restaurants, bookstore, newsstand and gift shops. Other work undertaken in 1998 included a new gate to accommodate more passenger jets and a new baggage carousel to increase capacity by 33 per cent.
- Aéroports de Montréal continued to renovate and improve its facilities at the Dorval Airport. A new international concourse is planned.
- At Moncton, major runway reconstruction work began and will be completed in 1999.
- Halifax International Airport, the largest of the airports still operated by Transport Canada, is also undergoing major renovations and expansion. This includes centralized and expanded ticket counter space, improved baggage handling areas, and barrier-free access. The work will complement renovations undertaken by the airlines for check-in, second-level departure and covered walkways.

Financial Performance

In 1997/98, Transport Canada spent $227.6 million on the operation of airports, including operating costs, subsidies and capital, while taking in revenues of $84.4 million. It received an additional $69.2 million in rent from the airport authorities. For fiscal year 1998/99, Transport Canada forecasts $179 million in spending, $78.3 million in revenues and $191.1 million in rent.

Airport Authorities Revenues and Expenses

The federal government expects National Airports System (NAS) airports to be financially self-sufficient. Consequently, airport authorities, incorporated as not-for-profit organizations with no equity shareholders, fund their operations and any expansions or improvements with revenues derived from airport users, such as airlines, concessionaires, passengers, and private investors. Rent is paid by the airport authorities to the federal government, as the owner of the airport.

In recent years, AIFs have become an important and growing source of funds for major airport improvements. Vancouver was the only airport to have charged the AIF for all of 1997.

The Calgary and Winnipeg airport authorities have reached agreements with the Air Transportation Association of Canada whereby the airlines include the AIFs in their ticket prices. The other airport authorities use a different process, collecting the fees directly from passengers as they leave the terminal.

TABLE 12-27
AIRPORT IMPROVEMENT FEES AT CANADIAN AIRPORTS AT DECEMBER 31, 1998

	Airport Improvement Fee		*Amount Collected ($000)*
Airport	*Charge per Passenger* [1]	*Date* [2]	*1997*
Vancouver	$5 - $15 [3]	May 1993	51,699 (full year)
Calgary	$5	Oct. 1997	2,460 (3 months)
Edmonton	$5 - $10 [4]	Apr. 1997	10,262 (9 months)
Montreal (Dorval)	$10	Nov. 1997	4,721 (2 months)
Winnipeg	$5	July 1998	
Thunder Bay	$10	Mar. 1998	
Moncton	$10	Oct. 1998	

1. Amount collected per enplaned passenger
2. Commencement of fee
3. For destinations within B.C. and Yukon, $5; other North America, Mexico and Hawaii, $10; other international - $15.
4. For destinations within Alberta, $5; outside Alberta, $10

Source: Revenue data from Airport Authority Annual Reports

Table 12-27 lists the airports having AIFs, when they were started and the amount collected in 1997.

The divested NAS airports that issued annual reports for a full year in 1998 included Calgary, Edmonton, Montreal, Toronto (Pearson), Vancouver and Winnipeg. The Ottawa Airport Authority also issued an annual report, but one that covered only 11 months.

In 1997, these seven airport authorities generated total revenues of $755.5 million, with total expenses (before interest) of $594.8 million. The operating ratio of the group as a whole was 78.7 per cent, with individual ratios ranging from 66.4 to 89.1 per cent. Revenues from aeronautical sources of $336.9 million represented 44.6 per cent of their total revenues as a group. Individually, the percentage of total revenues generated from aeronautical sources ranged from 33.2 to 55.9 per cent.

Non-aeronautical revenues (excluding airport improvement fees) totaled $349.5 million, or 46.3 per cent of all revenues generated by these airport authorities. On a site-by-site basis, the percentages ranged from 37.0 per cent in Edmonton to 56.2 per cent in Montreal.

Airport improvement fees (AIFs) generated $69.1 million, or 9.2 per cent of total revenues in 1997, with Vancouver contributing 75 per cent of the AIF total.

The seven airport authorities spent $1.2 billion in 1997 on the acquisition of capital assets. The Greater Toronto Airports Authority represented 77 per cent of this total, which includes the purchase of Terminal 3 at Lester B. Pearson International Airport. Other major expansion projects continued at Montreal, Calgary and Edmonton. Vancouver Airport Authority invested mainly in airport infrastructure, renovating facilities, enhancing the level of service and expanding the existing facilities to meet increasing demand.

TABLE 12-28
PROJECTS APPROVED UNDER THE AIRPORTS CAPITAL ASSISTANCE PROGRAM BY SITE AND PROVINCE, 1998

($ 000)

Province/Site	Project Description	Date Approved	Amount	Total Site	Total Province
Newfoundland			0		0
Prince Edward Island			0		0
Nova Scotia					
Sydney	Heavy Mobile Equipment	03.07.98	499		
	Various Airside Improvements	15.09.98	3,054	3,552	3,552
New-Brunswick					
Bathurst	Various Airfield Improvements	22.05.98	64	64	
Miramichi	Non-Directional Beacon	25.11.98	25	25	89
Québec					
Gaspé	Système d'effarouchement d'oiseaux	04.11.98	32	32	
Rouyn	Réfection d'installations aéroportuaires	07.08.98	4,450	4,450	4,482
Ontario					
Big Trout Lake	Gravel Crushing Project	21.09.98	672	672	
Cat Lake	Purchase and Crush Gravel - ***Protected***	12.11.98	568	568	
Dryden	Rotating Beacon	06.10.98	10	10	
Hamilton	Security Fencing	06.10.98	802		
	Airfield Lighting Control Panel	06.10.98	25		
	Airport Security Equipment	25.11.98	67	894	
Hearst	Mobile Equipment	09.06.98	556	556	
Moosonee	Mobile Equipment - Loader	12.01.98	148		
	Airport Pavement Rehabilitation	06.08.98	2,591	2,739	
Red Lake	Selective Restoration of Runway 08-26	30.06.98	48		
	Heavy Airside Mobile Equipment - Sweeper	21.09.98	154		
	Airfield Lighting Power Centre	06.10.98	100		
	Mobile Equipment - Front End Loader	06.10.98	142	444	5,883
Manitoba					
Brandon	Replace Furnaces & Water Heater	27.08.98	5		
	Replace Roll-over Plow & Wing Assembly	31.08.98	40	45	
Pine Dock	Airport Security Fence	09.04.98	22	22	67
Saskatchewan					
Fond du Lac	Refurbish Electrical Systems	28.08.98	242		
	Replacement of Heavy Mobile Equipment	01.09.98	409	651	
Prince Albert	Replacement of Heavy Mobile Equipment	26.05.98	207	207	
Stony Rapids	Refurbish Apron Lighting & Beacon	10.07.98	79		
	Replacement of Heavy Mobile Equipment	01.09.98	381	460	
Uranium City	Replace Mobile Equipment	09.03.98	412		
	Rehabilitate Airside Surfaces & Lighting	20.10.98	1,070	1,482	2,800
Alberta					
Fort Chipewyan	Rehabilitation of Airfield Lighting	10.07.98	801	801	
Lethbridge	Rehabilitate Taxi “B” & Apron	21.01.98	269	269	
Rainbow Lake	Airside & Groundside Pavement rehab.	13.05.98	1,142	1,142	2,212
British-Columbia					
Campbell River	Replace Security Fence	01.12.98	27	27	
Castlegar	Heavy Mobile equipment - Runway Sweeper	26.03.98	153	153	
Fort St. John	Pavement rehabilitation	27.04.98	1,430	1,430	
Prince Rupert	Replace Runway Sweeper	01.12.98	165	165	1,774
Northwest Territories			0		0
Yukon			0		0
TOTAL			20,858	20,858	20,858

Source: Transport Canada

With 64.6 million enplaned/deplaned passengers in total, these airport authorities generated on average $11.70 per passenger in revenues and incurred expenses of $9.21 per passenger.

Table 12-26 summarizes these airports' financial results for the calendar year 1997, the latest year for which figures are currently available.

Review of Airport Authority Leases

Transport Canada is presently conducting a comprehensive five-year review of the first four Local Airport Authorities (LAAs): Vancouver, Montreal (Dorval and Mirabel), Calgary and Edmonton. As public institutions, the LAAs are held to a high standard of public accountability, and the review will assess the extent to which the public interest is being served and protected. The review is expected to be completed in 1999.

Airport Capital Assistance Program

An integral part of the National Airports Policy is the Airport Capital Assistance Program (ACAP). Transport Canada established this contribution program in April 1995 to help eligible airports finance capital projects related to safety, asset protection and operating-cost reduction. To be eligible, the airports must receive a minimum of 1,000 regularly scheduled passengers annually, meet airport certification requirements and not be owned by the federal government.

TABLE 12-29
AIRPORTS CAPITAL ASSISTANCE PROGRAM EXPENDITURES BY PROVINCE, 1996 – 1998

($ 000)

Province	*1995/96*	*1996/97*	*1997/98*	*Total*
Newfoundland	-	-	-	-
Prince-Edward-Island	-	-	-	-
Nova Scotia	-	-	-	-
New Brunswick	509	885	1,087	2,481
Québec	-	-	3,203	3,203
Ontario	909	3,233	13,465	17,607
Manitoba	151	172	970	1,294
Saskatchewan	-	2,877	452	3,328
Alberta	90	815	1,129	2,034
British Columbia	33	1,417	880	2,330
Northwest Territories	-	-	-	-
Yukon	-	-	-	-
Total	**1,693**	**9,399**	**21,186**	**32,277**

Source: Transport Canada

In 1998, 36 projects at 25 airports were approved for funding. The total approved funding for 1998 was $20.9 million. Approved projects included the rehabilitation of runway, taxiway and apron pavements; the purchase of mobile equipment, such as runway sweepers and snow blowers; the purchase and installation of visual aids; and the installation of security fencing.

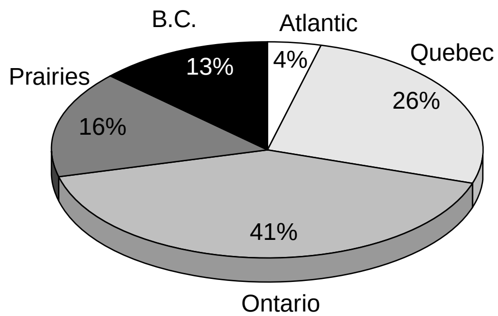
Table 12-28 lists the projects receiving funding approval under the Airport Capital Assistance Program, by site and province, in 1998.

A total of $32.3 million has been spent since the program's inception, with 55 per cent being spent at Ontario sites up to 1997/98.

Transport Canada is evaluating the ACAP to meet the Treasury Board's requirement to assess and report on the program's performance.

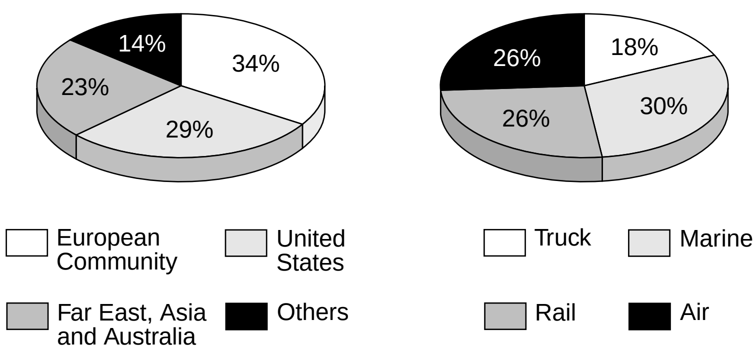
Table 12-29 summarizes ACAP expenditures in each of the last three fiscal years by province. (Appendix 12-1 provides additional site-specific information for the latter period.)

FIGURE 12-17
CANADIAN DISTRIBUTION
FREIGHT FORWARDER FIRMS



Source: Industry Canada, Estimates from Industry sources

FIGURE 12-18
MARKETS AND MODAL USE
FREIGHT FORWARDER FIRMS



Source: Industry Canada, Estimates from Industry sources

Freight Forwarders

The freight-forwarding industry consists of companies that arrange transportation and other services for the delivery of goods. Among the services they provide are packaging, storage, handling, export credits, insurance, documentation, and customs clearance.

Forwarders can often realize economies of scale by consolidating shipments, thereby providing the owner or shipper of the goods with lower transport costs. Forwarders are important for trade because they can create low-cost transportation linkages. Large multinational and integrated firms that control a substantial portion of the Canadian forwarding market can route shipments to take advantage of the lowest transportation rates and border processing efficiencies in the US and Canada.

Most firms (about two thirds) are located in Ontario and Quebec. The use of modes is fairly evenly split between air, rail and marine, with a somewhat lower share moving by truck.

Figures 12-17 and 12-18 show the distribution of firms, their use of transport modes, and the markets they serve, according to the most recent data available from Industry Canada.

WAREHOUSES

Just as transportation and trade are inextricably linked, so are trade and customs. All traded goods must be carried across borders, which involves the consideration and application of customs regulations. In Canada, an infrastructure component that facilitates this is the customs warehouse.

Customs Sufferance Warehouses (CSWs) are privately owned and operated facilities licensed by Revenue Canada for the control, short-term storage and examination of in-bond goods until they are released by them or exported from Canada. Licences tend to be mode-specific or multi-modal.

CSWs are an integral part of the customs clearance process, directly supporting the international trade interests of the Canadian business community. It is estimated that close to 5.6 million shipments were processed at CSWs in fiscal 1997/98.

It is expected that the trend toward facilities with multimodal licences will probably increase, because it minimizes handling and thereby improves the efficiency of transporting goods to their ultimate destination.

Table 12-30 summarizes the attributes of the estimated 1,200 licenced CSWs, their transport modes' affiliations, and the type of organization that operates them.

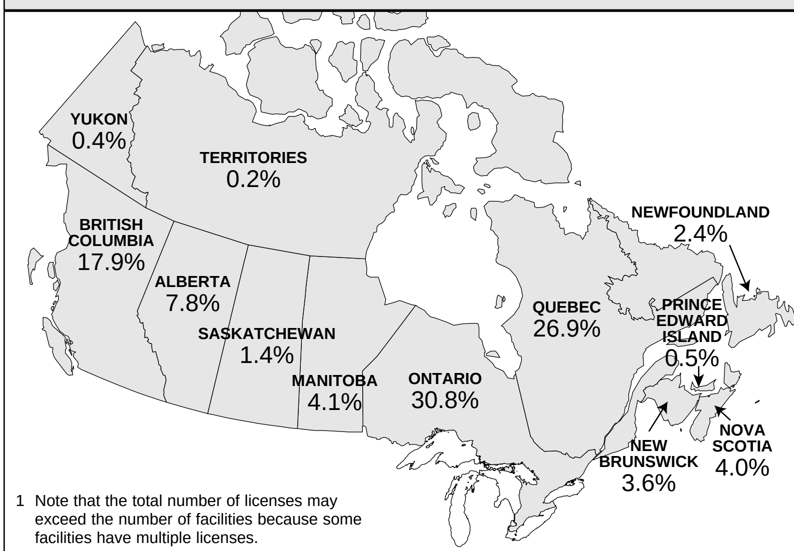
Figure 12-19 indicates the percentage of and location of CSW licences by province.

TABLE 12-30
CANADA SUFFERANCE WAREHOUSES BY MODE, 1998

Mode	*Quantity*	*Operated by*
Air	125	Airline Companies
Marine	10	Marine Companies
	51	Harbour Commissions, Stevedoring Companies, etc.
Rail	170	Railway Companies (includes Rail yards and bonded tracks)
	97	Private railway siding operated by importers of carload goods
Air/Marine/Rail	37	Cargo handlers for any of the above
Highway	128	Third party, for goods arriving in highway mode. This type of sufferance warehouse is restricted to one per city, with the exception of Montréal and Toronto where there are three at each location.
	52	Highway carrier leasing space in a Sub-type BW sufferance warehouse
All Modes	336	Consolidator, De consolidator, Freight forwarder, etc.
	114	Third party, for household goods and personal effects
	6	Operators of fresh fruit and vegetable terminals
	79	Publicly and privately operated for the storage of other specific commodities (bulk products, lumber, etc.)

Source: Revenue Canada(Customs Warehousing)

FIGURE 12-19
NUMBER AND LOCATION OF CSW LICENCES BY PROVINCE



1 Note that the total number of licenses may exceed the number of facilities because some facilities have multiple licenses.

Source: Revenue Canada(Customs Warehousing)

APPENDIX 12-1
AIRPORTS CAPITAL ASSISTANCE PROGRAM
EXPENDITURES BY SITE AND PROVINCE, 1995/96 – 1997/98

($ 000)

Province/Site		*1996*	*1997*	*1998*	*Site Total*	*Province Total*
British Columbia	Campbell River	-	8	838	846	
	Qualicum Beach	-	371	42	413	
	Bella Coola	33	1,038	-	1,071	**2,330**
Alberta	Fort Chipewyan	-	63	-	63	
	Grande Prairie	-	-	33	33	
	Medicine Hat	90	753	336	1,179	
	Peace River	-	-	621	621	
	High Level	-	-	138	138	**2,034**
Saskatchewan	Prince Albert	-	-	101	101	
	Stony Rapids	-	2,877	171	3,048	
	Wollaston Lake	-	-	180	180	**3,328**
Manitoba	Dauphin	-	-	265	265	
	Gillam	-	-	421	421	
	Swan River	-	-	9	9	
	God's River	151	172	19	342	
	Pine Dock	-	-	257	257	**1,294**
Ontario	Wapekeka/Angling Lake	631	18	-	648	
	Hamilton (Mount Hope)	-	-	5,533	5,533	
	Moosonee	-	1,073	120	1,193	
	Nakina	-	-	263	263	
	Pelee Island	-	563	1,206	1,769	
	Sarnia	-	-	152	152	
	Kingston	279	504	-	782	
	Kirkland Lake	-	-	150	150	
	Chapleau	-	-	374	374	
	Marathon	-	-	250	250	
	Manitouwadge	-	252	257	509	
	Sioux Lookout	-	-	401	401	
	Fort Frances	-	-	281	281	
	Elliot Lake	-	393	-	393	
	Cochrane	-	-	262	262	
	Geraldton	-	-	388	388	
	Wawa	-	-	2,905	2,905	
	Hornepayne	-	431	924	1,355	**17,607**
Quebec	Roberval	-	-	9	9	
	Alma S.B.	-	-	739	739	
	La Grande	-	-	807	807	
	Chisasibi (Fort George	-	-	1,648	1,648	**3,203**
New Brunswick	Charlo	-	51	350	401	
	Chatham	-	-	380	380	
	Bathurst	509	834	19	1,363	
	St. Leonard	-	-	338	338	**2,481**
TOTAL		**1,693**	**9,399**	**21,186**	**32,277**	**32,277**

Source: Transport Canada

13

INDUSTRY STRUCTURE

The changes to the transportation industry structure came from divestiture of a portion of a carrier's operations; sales and acquisitions; mergers; or simply from carriers ceasing to operate or going bankrupt.

The evolution of the market structure of each mode of transportation is shaped, to a large extent, by competitive forces. The structure of each modal transportation industry is one of a number of factors that come together to explain the evolution of Canada's transportation system.

The number of carriers, their relative size, the markets they served, the relative importance of their presence in the market place, are important determinants of the level and degree of competition in the market place. Price changes, financial results, and even carrier's specific changes in traffic levels have, at their outset, the industry structure and the factors that are modifying it.

Each mode has some unique economic characteristics. These characteristics call for different organizational arrangements, delimit the number of different firms sustainable by the market. Competition in transportation, within and between modes, is closely connected to the question of consolidation and integration. For each mode, consolidation presents different issues.

This chapter presents an overview of Canada's transportation industry structure in the five modes — rail, trucking, bus, marine and air. It highlights the services each mode provides, at the national, regional and international levels and looks at the major events for the year, including legislative and regulatory changes.

RAIL TRANSPORTATION INDUSTRY

RAIL FREIGHT TRANSPORTATION

Canada's railways provide the most economical method of moving containers and bulk commodities over great distances.

TABLE 13-1
MAJOR SHORTLINE OPERATIONS IN CANADA
1998

Corporation	*Owned/Leased Trackage (Kilometres)*	*Number of Canadian Railways Controlled*
RaiLink	2,175	5
OmniTRAX	1,830	3
SCFQ[1]	1,026	5
Genesee Rail-One	796	3
Railtex	707	3
Iron Road[2]	393	3

1 Société des Chemins de fer du Québec
2 Does not include Northern Vermont which does not own track in Canada or the Bangor and Aroostock which only comes a short distance into Canada.

Source: Transport Canada

The two Class I[1] freight railways, CN and CP Rail, continue to dominate the Canadian rail network (and rail activity in general). The relative importance of their privately owned network has declined from 78.1 per cent of the national network in 1997 to 73.3 per cent in 1998 (as measured by route-kilometres) with the transfer of lines to other operators.

Since the passage of the *Canada Transportation Act* in July 1996, the number of railways providing rail services in Canada has increased significantly. Some 23 new rail carriers have sprung up,[2] increasing the ranks of the regional and shortline railway community. In 1998 alone, eight new railways came into being, while additional amounts of track were transferred to existing carriers.

The extent of the rail network that these newly created railways operate over has also increased significantly since mid-1996. In addition to the Class I railways (including VIA Rail) and the regional and shortline carriers, there are a significant number of carriers with relatively limited infrastructure and/or operations in Canada. These include the subsidiaries of US carriers that travel into Canada, terminal railways and railway bridge companies. Appendix 13-1 gives a full listing of railways operating in Canada and the regions in which they operate.

Although about 50 shortline and regional carriers presently operate in Canada, most of the shortlines formed in the past several years are controlled by a group of six corporations. In aggregate, these corporations account for about 89 per cent of regional and shortline trackage transferred and 71 per cent of all regional and shortline carriers created since 1996.

Almost all of the trackage transferred in 1998 was to railways controlled by these corporations, three of which are US-based (OmniTRAX, Railtex and Iron Road). Quebec-based Genessee Rail-One is backed financially by US-based Genessee-Wyoming. The other corporations are Canadian-based, with RaiLink headquartered in Alberta, and Société des chemins de fer du Québec (SCFQ) headquartered in Quebec. The activities of the Canadian-based corporations are for the most part concentrated in the areas in which they are headquartered. RaiLink also has a 25 per cent financial interest in SCFQ, but presently has no operational linkages. This could change in the near future as a result of recent acquisitions in Ontario, which have created physical linkages between the carriers.

Table 13-1 summarizes the nature of concentration within the Canadian shortline industry.

Rail Passenger Transportation

VIA Rail operates four passenger services: the Quebec-Windsor corridor, western transcontinental service (between Toronto and Vancouver), eastern transcontinental service (Montreal–Halifax and Montreal–Gaspé) and northern services (in Quebec, Ontario, Saskatchewan and British Columbia).

In addition to VIA Rail, there are a number of regional, commuter and tourist railways that make up the passenger rail service network in Canada. Of these, BC Rail operates the largest non-VIA service.

Three carriers offer passenger services in remote or isolated regions: the Algoma Central Railway, the Ontario Northland Railway, and the Quebec North Shore & Labrador Railway. They have all operated under contract with Transport Canada since the *Canada Transportation Act* came into effect in 1996. Previously, they were directly subsidized by the federal government.

1 Class I railways are generally defined to include CN and CP Rail as well as VIA Rail Canada. Class II railways include those known variously as regional and shortline railways, while Class III railways encompass those activities that are principally confined to terminals or bridges.

2 Several of these railways do not have separate operations from other railways operating under the same corporate umbrella.

The Algoma Central operates between Sault Ste. Marie and Hearst, Ontario; the Ontario Northland runs between Toronto and Cochrane (with only the portion between Toronto and North Bay receiving federal government subsidies); and the Quebec North Shore & Labrador runs between Sept Îles, Schefferville and Labrador City.

Table 13-2 provides route length and total government subsidies for the three non-VIA remote passenger services in 1997.

TABLE 13-2
NON-VIA RAIL REMOTE PASSENGER SERVICES
1997

	Algoma Central Railway	*Ontario Northland Railway*	*Quebec North Shore and Labrador Railway*
Route Length	296 miles (Sault Ste. Marie to Hearst)	472 miles (Toronto to North Bay to Cochrane)	260 miles (Sept Îles to Labrador City) 129 miles (Ross Bay Junction to Schefferville)
Annual Passengers	**15,950**	**45,952**	**16,046**
Government Subsidy	**$1.6 million**	**$1.6 million**	**$1.6 million**

Source: Transport Canada

In 1988, VIA inaugurated a seasonal daylight service between Vancouver, Calgary and Jasper called the Rocky Mountaineer in response to requests from tour operators for a day train through the mountains. When VIA was directed in 1990 to privatize its operations wherever possible, the Rocky Mountaineer route was sold to the Great Canadian Railtour Company. The company operates along CP and CN lines through the Rocky Mountains from early May through October.

There are two US passenger rail services operating in Canada. Amtrak, the American equivalent of VIA Rail, provides passenger rail services between New York City and Montreal, as well as services between Vancouver and Seattle, while the White Pass and Yukon railways operate a tourist train service between Skagway, Alaska, and Bennet, Yukon, during the summer season.

TRUCKING INDUSTRY

The trucking industry plays a large role in Canada's economy, accounting for significant revenues and jobs. Recent estimates indicate annual revenues of approximately $38.5 billion in 1997 (See Figure 13-1) There are 3.7 million trucks registered in Canada; many of these trucks are pickups, vans and other small vehicles. Roughly 700,000 of these trucks are estimated to be large trucks, that is, trucks with a registered weight of 4.5 tonnes or more.

Approximately 420,000 trucks in Canada haul freight commercially, with equipment ranging from 2- and 3-axle straight trucks to 18-wheel tractor trailers. An additional 280,000 trucks are used in non-commercial trucking, including farming, government operations, and a wide variety of utility and service functions.

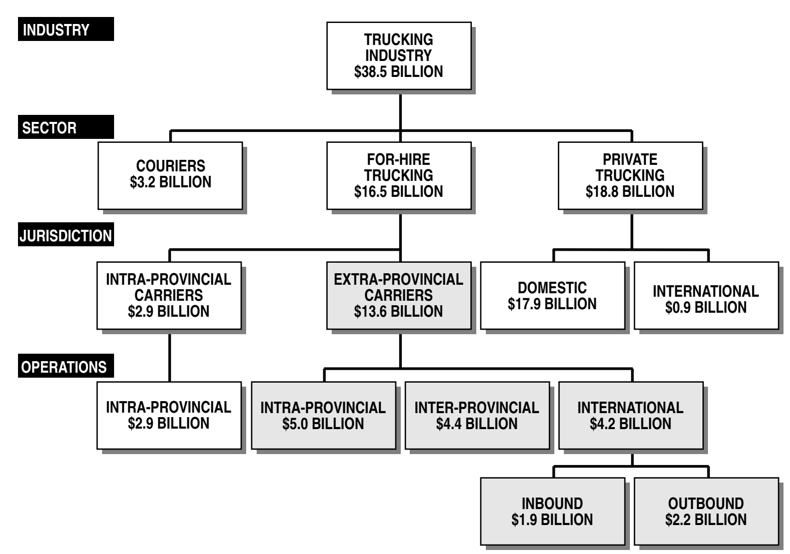
Trucking is a highly diversified industry. Based on recent estimates, there are approximately 10,600 for-hire carriers (with annual revenues exceeding $30,000), 450 private carriers (with annual operating expenses exceeding $1 million), and 2,400 courier companies, for a total of 13,500 carriers.

In addition, there are 40,000 owner-operators, with annual revenues exceeding $30,000, who sell their services to either private or for-hire carriers, or a combination of the two. There are also small private carriers, as well as organizations such as farms, utility companies and municipalities that own and operate trucks.

Trucking companies can be further differentiated according to their operating characteristics, such as:

- size, ranging from the single unit owner-operator to large firms operating several hundred power units;
- equipment used, whether its specialized logging trucks, hopper-bottom grain trailers, general purpose vans, or flat-deck trailers;
- geographic coverage of the service offered, including operating locally within the province (intraprovincial carriers); into other provinces (interprovincial carriers); or into the United States and Mexico (extra-provincial carriers);
- type of services offered, from truckload services (full load / single shipper) to less-than-truckload services (multiple shipments from multiple shippers); and
- alliances, including handling general freight in one region, while interlining with other

FIGURE 13-1
TRUCKING INDUSTRY STRUCTURE AND REVENUES
1997



Source: *Transport Canada from Statistics Canada, Cat. 53-222-XPB; "Profile of Private Trucking in Canada", L. P. Tardiff Associates, Jan. 1998. Market Outlook, 1998, Infobase Marketing Inc.*

carriers to serve other regions, or other countries.

Figure 13-1 shows trucking industry structure and revenues for 1997.

MAJOR TRUCKING EVENTS IN 1998

Legislative and Regulatory

Review of the Motor Vehicle Transport Act, 1987

Transport Canada pursued its consultation with provinces and stakeholders on proposed changes to the *MVTA*. The federal Minister of Transport issued a Position Paper in February 1998 outlining a series of proposed changes intended to establish a regulatory framework which focuses on carrier safety performance and ensures consistent regulatory treatment of extra-provincial motor carriers.

Both the federal government and the provinces have constitutional jurisdiction of some aspects of motor carriers operations in Canada. The proposed changes being considered would maintain the existing framework for provincial regulation of extra-provincial motor carriers.

Consultations also focused on the need to ensure consistency in the application to extra-provincial carriers of provincial regulations on conditions of carriage.

Internal Trade and National Harmonization

Each year, federal and provincial transportation ministers report on progress with the implementation of the transportation chapter commitments in the Agreement on Internal Trade. In 1998, the third annual report stated that the transport sector was generally meeting its harmonization objectives in the implementation of the national safety code, among other things.

Vehicle Weights and Dimensions

Vehicle weights and dimensions have a profound effect on trucking costs, productivity, competitiveness and infrastructure costs. Because of their importance, an interjurisdictional task force, the Task Force on Vehicle Weights and Dimensions Policy, reports to the Council of Deputy Ministers Responsible for Transportation and Highway Safety, co-ordinates policy through collective action, and acts as a forum for the exchange of information on provincial initiatives.

In 1997, task force consultations with industry stakeholders led to 16 recommendations that called for greater national uniformity in vehicle weight and dimension regulations. Nine of the 16 recommendations were implemented in July 1998. They standardize dimensions for box length, tractor-trailer connections, spacing between axles and axle-load limits. Most reflect current usage and conditions, while others represent changes that jurisdictions are willing to make to promote harmonization.

Discussions with stakeholders continued in 1998 on the remaining seven recommendations, which are primarily related to axle group load limits. These, and a number of additional recommendations for special permit conditions for oversize and overweight vehicles, remain under discussion as possible future amendments.

Work also continued on a number of regional initiatives designed to improve the compatibility of requirements and conditions applicable to loads or vehicles that move between jurisdictions. These initiatives concern uniformity of definitions;

and rules and policies for special equipment, such as snowplows and emergency vehicles, auto carriers, hay balers, and combines. The intention is to establish regional agreements as a stepping stone to eventual national uniformity.

NAFTA

NAFTA's Land Transportation Standards Subcommittee and Transportation Consultative Group continued to work toward compatible technical standards and to overcome barriers to efficient cross-border truck traffic in Canada, Mexico and the US. In 1998, the groups focused on motor carrier safety assessment processes, exchanging motor carrier data, vehicle weight and dimension compatibility, and developing a North American dangerous goods code.

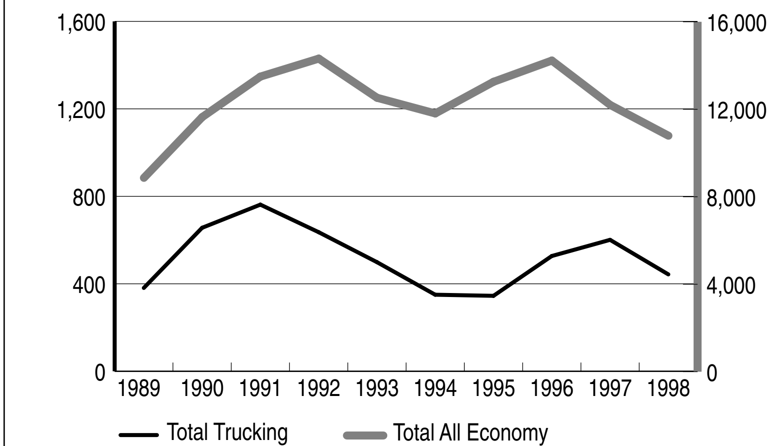
On the North American front, compatibility of vehicle size and weight regulations presents a major challenge, given the wide range of technical, economic, and policy issues of each country. In 1998, the trilateral working group on vehicle weight and dimension standards reached an agreement on the principle of employing vehicle performance criteria as a key consideration in the pursuit of regulatory harmonization.

Industry Events

As in previous years, 1998 had its share of mergers and acquisitions of motor carriers. Examples involving some of the larger Canadian carriers, include:

- the acquisition of less-than-truckload carrier Atomic Transportation System of Manitoba by Alberta-based Prime-Link Group Ltd. to combine their operations and conduct business under Atomic TCT (May 1998);

FIGURE 13-2
NUMBER OF BANKRUPTCIES
TRUCKING vs TOTAL ECONOMY, 1989 – 1998



Notes: "All Economy" include Business Bankruptcies reported in the calendar year.

Source: Industry Canada, Office of the Superintendent of Bankruptcy

- the acquisition of Christie Transport of Ontario by Ontario-based Contrans Corp. to expand its dry van, flatbed and bulk hauling services in Canada and the US (May 1998);
- the acquisition of Economy Carriers Ltd. of Alberta, which specializes in chemical hauling transportation, by Alberta-based Trimac Transportation (June 1998);
- the acquisition of Quebec-based Enterprises de Transport, a truckload carrier, Transport Lebon Inc., a carrier specializing in bulk merchandise (April 1998), and Transport M. Courchesne of Quebec, a carrier specializing in the transport of bulk merchandise, by Cabano Kingsway of Quebec (July 1998);
- the purchase of a 40 per cent interest in Ontario-based Mill Creek by Mullen Transportation of Alberta to jointly market their trucking and logistics services throughout North America (July 1998); and
- the acquisition of Ontario-based Concord Transportation Inc. by Clarke Inc. of Ontario to expand its expedited freight services in Canada and the US (August 1998).

In transborder operations, Canadian carriers use partnerships with US-based carriers to penetrate the US market. These alliances allow carriers to offer overnight, next-day and second-day delivery services over a much broader territory. In addition, such alliances can lead to the integration of the carriers' information systems and the sharing of invoicing and inventory control systems. In 1998, there were numerous mergers, acquisitions and alliances on both sides of the Canada–US border, some examples include:

- the continued expansion of Ontario-based Vitran Corporation Inc. into the US with its purchase of Quast Transfer Inc. of Minnesota, which in combination with its existing US subsidiary, Overland Transportation Systems Inc., will form one of the largest less-than-truckload carriers in the Central States;

TABLE 13-3
ANNUAL TRUCKING BANKRUPTCIES BY REGION
1987 – 1998

Year	Atlantic Prov.	Quebec	Ontario	Prairie Prov.	B.C. and Territories	Total
1987	17	32	59	136	78	322
1988	22	40	77	163	92	394
1989	27	65	58	143	88	381
1990	57	142	147	213	97	656
1991	98	107	191	223	143	762
1992	70	119	188	171	88	636
1993	70	91	152	130	56	499
1994	37	67	88	125	33	350
1995	31	81	58	141	34	345
1996	74	90	107	197	59	527
1997	82	119	164	178	58	601
1998	39	71	121	158	54	443

1 "Truck Transport industries" include General freight, Used goods moving & storage, Bulk Liquids, Dry bulk materials, Forest products and Other truck transport industries.

Source: Industry Canada, Office of the Superintendent of Bankruptcy

TABLE 13-4
FOR-HIRE TRUCKING FIRMS[1] REVENUES BY MARKET SEGMENT
1997

	Revenue ($ millions)	Percentage of Total
General freight	8,363.0	58.6
Liquid Bulk	1,235.0	8.7
Dry Bulk	971.0	6.8
Forest products	794.1	5.6
Household goods	523.2	3.7
Other Specialized freight[2]	2,385.0	16.7
Total:	**14,271.2**	**100.0**

Note: 1 For-hire trucking firms earning annually at least $1 million;
2 Other Specialized freight include heavy machinery, automobiles, etc. and other revenue.

Source: Statistics Canada, Annual Supplement (Q5) to the Quarterly Motor Carriers of Freight Survey -QMCF

- the merger of Trimac Transportation's Oregon and Washington-based petroleum-hauling operations with Harris Transportation Co. of Portland Oregon;
- the marketing agreement between Clarke Inc. of Ontario and Landstar Logistics of Florida;
- the acquisition of Ontario-based Gerth Transport, one of Canada's leading truckload carriers serving Mexico, by Celadon Group Inc. of Indianapolis (Gerth will continue to operate independently under the Celadon Group to truckload carriers); and
- the sale of Ontario-based Challenger Motor Freight's US truckload division to M.S. Carriers of Memphis.

Bankruptcies

The number of bankruptcies in the trucking industry follows a pattern similar to that of the whole economy. Trucking bankruptcies dropped rapidly between 1991 and 1994, stabilized in 1995, then increased in 1996 and 1997. In 1998, there was a significant decline in the level of bankruptcies in the trucking industry.

Figure 13-2 compares the number of bankruptcies in the trucking industry with those in the Canadian economy from 1987 to 1998.

Table 13-3 shows the number of trucking industry bankruptcies by region between 1987 and 1998.

TRUCKING SERVICES

For-Hire Trucking

The trucking industry can be divided into two major components: for-hire trucking and private trucking. For-hire trucking companies carry freight for a fee providing either truckload or less-than-truckload services, or a combination of the two in domestic and/or international markets.

For-hire trucking firms can be further categorized according to the types of freight they carry:

- general freight carriers handle many different types of freight in semi-trailers and general-freight trailers;
- household goods carriers use specialized trailers to transport furniture and other personal household possessions;
- liquid bulk carriers use tanker trucks to transport liquids, such as petroleum, milk and chemicals;
- dry bulk carriers use dump or hopper-bottom trailers to haul goods, such as grain, fertilizer and gravel;
- specialty freight carriers use special equipment such as logging trucks to transport logs, special trailers to transport automobiles and trucks, etc.

Table 13-4 describes for-hire revenues by the type of freight carried. For-hire carriers earning annually $1 million or more account for 86 per cent of the total for-hire trucking revenues. General freight carriers dominated the for-hire sector in 1997, accounting for near 60 per cent of for-hire revenues.

Table 13-5 shows the major for-hire trucking carriers in 1998 by the size of their fleet and the type of service offered.

Figure 13-3 presents the number of for-hire carriers earning annual revenues of $1 million or more between 1990 and 1997. The increase in the number of carriers is partly due to a new frame used by Statistics Canada to conduct its trucking survey. The number of very large carriers fluctuated between 55 and 70 firms over this period.

Table 13-6 shows the percentage share of total for-hire revenues for each size of carrier from 1991 to 1997. Very large (top) carriers are those that earn $25 million or more annually; large carriers earn between $12 and $25 million; and medium carriers earn between $1 and $12 million.

The degree of concentration between large, medium and small for-hire carriers is often a good indicator of the level of competition in the marketplace. From 1991 to 1995, revenues of very large carriers, as a percentage of total revenues, steadily decreased, suggesting a reduced level of concentration in the industry. The proportion of their revenues to total industry revenues declined from 33 per cent in 1991, to 25.4 per cent in 1997. This decrease was offset by an increase of ten per cent over the same period in the share of trucking industry revenues generated by large-sized carriers.

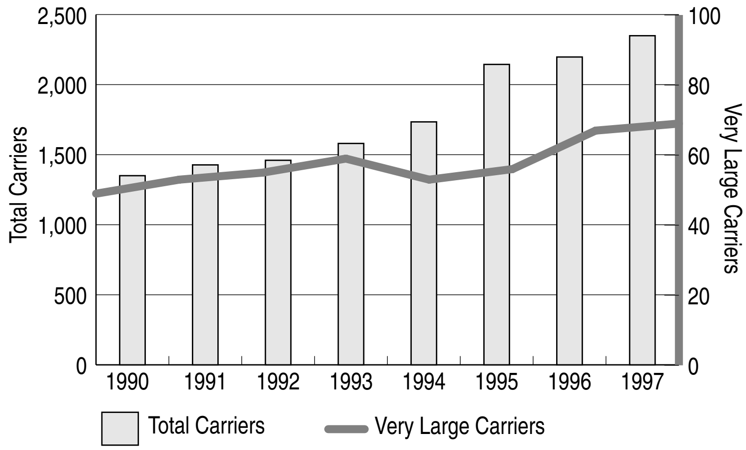
TABLE 13-5
MAJOR FOR-HIRE CARRIERS, BY SECTOR
1998

Total Vehicles	*Name of Carrier*	*Province*	*Sector*
4,322	Trimac Transportation Services	AB	B,O
3,198	J.D. Irving Ltd.	NB	LTL, TL, B,C,R,O
3,050	Transx	MB	TL,R
2,961	Day & Ross Tranportation	NB	TL,LTL,R,O
2,880	Robert Transportation	PQ	LTL,TL,B,C,H,R'
2,822	Paul's Hauling	AB	LTL,B
2,655	Mullen Transportation	AB	LTL, TL, B,O
2,517	Westminster Holdings	ON	LTL,TL,C,O
2,494	SLH	ON	TL,LTL
2,450	Schneider National Carriers	ON	TL,B,O
2,380	Reimer Express Lines (Roadway Express)	AB	LTL,O
2,325	Cabano Kingsway	PQ	LTL,TL,B,C
2,174	Contrans	ON	LTL,TL,B,C,R,O
2,150	Highland Transport (Westminster)	ON	TL,C
2,128	Auto Haulaway	ON	O
1,956	Armour Transportation System	NB	LTL,TL,B,C,R,O
1,900	CF Group of Companies	AB	LTL,TL
1,829	Tri-Line Freight Systems	AB	LTL,TL
1,821	Challenger Motor Freight	ON	LTL,TL,C,O
1,685	Arnold Bros. Transport	MB	TL
1,683	TST Solutions	ON	LTL,TL,O
1,665	Midland Transport (Irving)	NB	LTL,TL,C,R,O
1,632	TNT Logistics	ON	TL,O
1,610	Kindersley Transport	SK	LTL,TL,C,R,O
1,610	FTI Inc. Canada	ON	TL
1,566	TST Overland Express (TST Solutions)	ON	LTL,TL
1,473	Landtran Systems	AB	LTL,TL,R
1,428	Canadian Freightways (CF)	AB	LTL,TL
1,415	Kleysen Transport	MB	LTL,TL,B,C,R,O
1,402	Wilson's Truck Lines	ON	TL
1,365	Clarke Transport	ON	LTL,TL,C
1,360	Gerth Transport	ON	LTL,TL
1,359	Trans Western Express	ON	LTL,TL
1,357	Bruce R. Smith Ltd.	ON	TL
1,353	Groupe Papineau	PQ	LTL,TL,C,R
1,342	SGT 2000	PQ	TL,C,R,O
1,307	N. Yankee Transfer	SK	LTL,TL,C,H,R,O
1,295	Canada Cartage System	ON	LTL,TL,B,O
1,280	XTL Transport	ON	TL
1,220	Manitoulin Transport Group	ON	LTL,TL
1,190	Cooney Group	ON	TL,B,C,O
1,185	Guilbault Transport Group	PQ	LTL,TL,C,H
1,150	Westcan Bulk Transport (Paul' s)	AB	B
1,135	Mackie Moving Systems	ON	LTL,TL,H,O
1,133	Laidlaw Carriers (Contrans)	ON	TL,B,O
1,114	Verspeeten Cartage	ON	TL,C
1,110	Erb Transport	ON	LTL,TL,R
1,100	Sunbury Transport (Irving)	NB	TL,B,C,R,O
1,041	Brookville Carriers (Contrans)	NB	LTL,TL,C,R,O
1,036	Mullen Trucking	AB	LTL,TL,O
1,022	Purolator Courier	ON	LTL,O
1,017	Thibodeay Transport Group	PQ	LTL,TL,C
1,013	Canadian American Transportation	PQ	TL
1,002	BLM Group Inc.	ON	LTL,TL,B,H,R,O

* Total vehicles include trucks, tractors and trailers, as well as owner-operator equipment domiciled in Canada.
Sector Legend: LTL - Less than Truckload; TL - Truckload; B - Dry or Liquid Bulk; C - Container; H - Household Goods; R - Agricultural or Refrigerated; O - Other

Source: Today's Trucking March 1998 "The 1998 Top 100 for-Hire Fleets"
Major for-Hire Trucking Firms By Size and By Type of Activities - 1998

FIGURE 13-3
NUMBER OF FOR-HIRE TRUCKING CARRIERS EARNING ANNUAL REVENUES OF $1 MILLION OR MORE, 1990 – 1997



Note: * Including motor for-hire carriers of freight earning annual revenues of $1 million or more.

Source: Statistics Canada, Annual Motor Carriers of Freight Survey -AMCF- (1990-93); Annual Supplement (Q5) to the Quarterly Motor Carriers of Freight Survey -QMCF- (1994-97)

The share of total industry revenues earned by medium carriers fluctuated between 40.3 and 39.6 per cent between 1991 and 1997. Small carriers' share of industry revenues dropped to 13.4 per cent in 1997.

Couriers

Couriers are another important segment of the trucking industry. They specialize in delivery of envelopes and small packages, primarily door-to-door, within Canada and around the world. This type of service often requires a combination of different transportation services, including intercity bus companies, air cargo operators and less-than-truck-load services. The domestic courier industry accounts for most of the Canadian courier business, with 95 per cent of total courier volume and 81 per cent of its total revenues in 1997.

A recent study[3] estimates the total revenues of the courier industry in 1997 at $3.2 billion, on an average daily volume of 1.5 million packages delivered.

The industry is highly concentrated among nine major carriers — Canada Post, Canpar, Federal Express, Loomis, Purolator, RPS, TNT Express Worldwide and United Parcel Service. Together, they account for just over 81 per cent of all courier traffic and revenues of this segment of the trucking industry.

Private Trucking

Private trucking companies maintain a fleet of trucks and trailers to haul their own freight and to occasionally haul goods for others. In this second area, private trucking companies compete with for-hire trucking firms, and at times, they also employ for-hire carriers for some of their own freight transportation needs.

Companies with private trucking operations tend to be retail distributors of consumer goods, chemical products producers, pulp and paper companies, beverage distributors, or wholesale distributors of agricultural

TABLE 13-6
DISTRIBUTION OF TOTAL FOR-HIRE TRUCKING REVENUES BY SIZE OF CARRIER, 1990 – 1997

	Medium Carriers ($1 - 12 million)		Large Carriers ($12 - 25 million)		Top Carriers (Over $25 million)		Small Carriers (Less than $1 million)		Grand Total
Year	Revenue ($millions)	Share (% of Total)	Revenue ($millions)	Share (% of Total)	Revenue ($millions)	Share (% of Total)	Revenue ($millions)	Share (% of Total)	Revenue ($millions)
1991	4,028.8	40.3	1,107.6	11.1	3,298.2	33.0	1,562.4	15.6	9,997.0
1992	4,217.4	41.8	1,072.2	10.6	3,256.1	32.3	1,537.3	15.2	10,082.9
1993	4,542.9	41.0	1,268.0	11.4	3,411.1	30.8	1,868.2	16.8	11,090.2
1994	5,212.8	40.4	2,208.5	17.1	3,541.4	27.5	1,929.9	15.0	12,892.6
1995	5,460.6	38.3	3,090.0	21.7	3,576.9	25.1	2,113.4	14.8	14,240.9
1996	5,731.8	37.6	3,453.2	22.7	3,917.7	25.7	2,127.1	14.0	15,229.8
1997	6,530.4	39.6	3,553.1	21.6	4,187.7	25.4	2,200.0	13.4	16,471.2

Sources: Statistics Canada, Annual Motor Carriers of Freight Survey -AMCF- (1990-93); Annual Supplement (Q5) to the Quarterly Motor Carriers of Freight Survey - QMCF- (1994-97); 1997 small carriers' revenues estimated by Transport Canada

3 Courier Industry Market Sizing Study, Infobase Marketing Inc.

products. Some of the larger private truck fleet owners include Canadian Tire, Labatts, Molson, Home Hardware, Liquid Air, Kraft, General Foods, Loblaws, 3M, Ault, Brewers Retail, Consumers Distributing, DuPont, Dominion Textiles, General Electric, K-Mart and Tim Horton Donuts.

According to a recent study,[4] private trucking is as important to the Canadian economy as for-hire trucking, contributing almost $19 billion annually. Private trucking dominates the movement of freight within Canada's urban areas, accounting for approximately 85 per cent of the trucks that move goods within Canadian cities. Overall, there are twice as many private fleets as there are for-hire fleets; however, they are generally much smaller, with 90 per cent having 10 vehicles or less, and many with as few as 1 or 2 trucks. Along with smaller fleets, the private trucking industry also tends to use smaller trucks, especially for pick-up and delivery services within urban centres.

As haul distance increases, the nature of private trucking changes dramatically. At distances of 500 kilometres, private trucking accounts for about 25 per cent of all trucking movements. For these trips, private trucking operators use tractor-trailers much more frequently than the straight trucks that dominate the movement of goods within urban areas. On distances between 500 and 1,000 kilometres, private trucking accounts for about ten per cent of all trips.

The value of interprovincial, intraprovincial and transborder private trucking has been derived, on a regional basis, by applying market share percentages established by the Canadian Council of Motor Transport Administrators Roadside Surveys. However, these percentages are for longer distance trips only, and may understate short-distance private trucking movements.

Private trucking accounts for 22 per cent of total interprovincial truck movements. Interprovincially, private trucking operations are very similar to for-hire trucking; however, private trucking operators make greater use of straight trucks and have a tendency to use more specialized vehicles such as tankers and flatbeds.

Private trucking accounts for 41 per cent of all intraprovincial truck movements. Ontario and Quebec account for 75 per cent of intraprovincial private trucking movements in Canada. Private trucks are less likely to be fully loaded, use fewer owner-operators compared with for-hire trucks, and are more likely to move food, feed and beverages.

In the transborder market, private trucking accounts for about 28 per cent of all truck movements. Ontario accounts for over 50 per cent of the national total of long-distance transborder trips by private fleets, while Quebec accounts for about 25 per cent of such trips. Private trucking makes substantially more use of straight trucks than for-hire trucking on these trips

Owner-operators

Owner-operators work under contract for either for-hire or private carriers, typically using their own trucks. In 1996, there were over 40,000 owner-operators operating in Canada, with almost half them employed in Ontario and Quebec, and a further one-third concentrated in Alberta and British Columbia. Approximately two-thirds of owner-operators are employed by for-hire carriers.

Table 13-7 shows the number owner-operators hired by carrier type, as well as revenues by province for 1996.

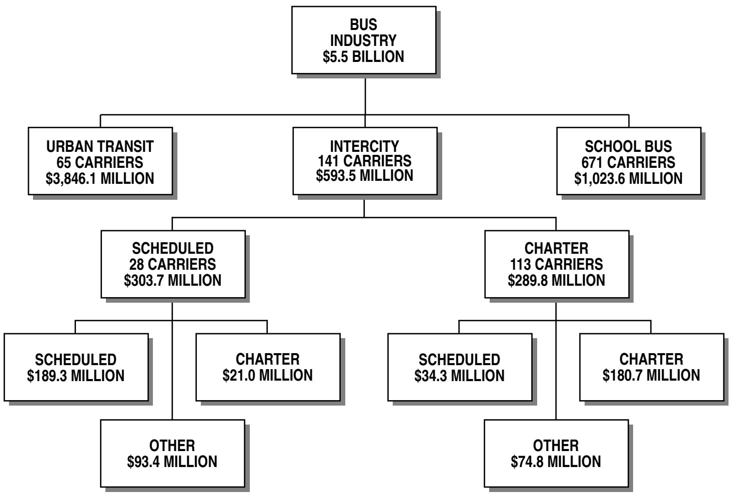
TABLE 13-7
NUMBER OF OWNER-OPERATORS HIRED BY CARRIER TYPE
1996

	For-Hire Carriers	*Private Carriers*	*Both*	*Total*	*Revenues ($ milllions)*
Newfoundland	317	81	41	439	58.9
Prince Edward Island	82	41	18	141	17.8
Nova Scotia	588	173	115	876	120.8
New Brunswick	990	478	189	1,657	235.9
Quebec	4,713	1,351	521	6,585	840.6
Ontario	9,027	3,303	956	13,286	1,653
Manitoba	1,265	548	211	2,024	277.1
Saskatchewan	1,180	466	188	1,834	264.8
Alberta	4,164	1,670	828	6,662	890.2
British Columbia	4,301	1,305	920	6,526	859.4
Yukon	20	7	4	31	
Northwest Territories	17	10	2	29	9.8
Canada	**26,664**	**9,433**	**3,993**	**40,090**	**5,228.3**

Source: Statistics Canada, Annual Motor Carrier Freight Survey, Surface and Marine Bulletin Vol. 15 No. 1, Cat. 50-002

4 L.P. Tardif Associates, "Profile of Private Trucking in Canada," January 1998.

FIGURE 13-4
BUS INDUSTRY STRUCTURE AND REVENUES
1997



Source: Statistics Canada, Cat. 53-215-XIB and Transport Canada

TABLE 13-8
SUMMARY OF REVENUES BY SOURCES OF REVENUE
1997

	Intercity Bus Operators	*Charter[1] Bus Operators*	*School Bus Operators*	*Urban[2] Transit Operators*	*Total*
Number of establishments	28	113	671	65	877
Sources of revenues ($ millions)					
Scheduled services	189.3	34.3	17.6	-	241.3
Charters, sightseeing and shuttle services	21.0	180.7	110.9	3.6	316.2
School/commercial contracts	3.5	19.6	799.2	3.4	825.7
Urban and suburban services	3.6	6.4	41.5	1,620.8	1,672.2
Other passenger services	3.9	26.6	29.9	6.9	67.4
Parcels, subsidies and other	82.4	22.1	24.5	2,211.4	2,340.4
Total	**303.7**	**289.8**	**1,023.6**	**3,846.1**	**5,463.1**

Note: Totals may not add due to rounding.
1 Consists of Statistics Canada's category of "other passenger bus establishments excluding school bus operators"
2 Includes capital subsidies for urban transit operators

Source: Statistics Canada, Cat. 53-215-XPB

BUS TRANSPORTATION INDUSTRY

The Canadian bus industry is made up of three main lines of business: intercity carriers, urban transit and school bus operators.

Figure 13-4 shows the structure and revenues of the bus industry in Canada in 1996. Table 13-8 summarizes revenues by source of revenue for the same year.

MAJOR BUS EVENTS IN 1998

Legislative and Regulatory Changes

Motor Vehicle Transport Act, 1987 Review

The MVTA currently allows each province to apply its own legislation and regulations to extra-provincial bus operators. Until the late 1980s, all provinces applied economic controls to most intercity and charter bus operations. A few provinces still do so, while others have relaxed their economic controls. Several have completely deregulated, or have announced their intention to do so as summarized in Table 13-9.

As a result of these developments, an extra-provincial bus carrier can be subject to different regulatory rules for its extra-provincial operations in different parts of the country, despite the fact that such operations all come under the authority of the *MVTA*. This situation resulted in discussions of industry deregulation at a national level. Between 1994 and 1996, a federal-provincial-industry task force sought consensus on the future of bus regulation in Canada, but was unable to agree whether to deregulate scheduled intercity service.

The federal government has proposed to amend the *MVTA* as part of the national implementation of a motor carrier safety performance regime based on the standards of the National Safety Code for Motor Carriers. The safety aspects of the proposed amendments are discussed in the trucking section of this chapter as the *MVTA* safety regime would apply to extra-provincial bus operators, as well as extra-provincial truckers.

Transport Canada has also proposed that the *MVTA* amendments be used to co-ordinate national bus regulation for extra-provincial carriers, and to re-establish consistency in the regime for extra-provincial operators. In addition, the department has proposed to use the amendments to deregulate the interprovincial and international bus operations of extra-provincial carriers, while allowing each province to decide how it wants to regulate the intraprovincial operations of these carriers for an additional period. Transport Canada expects to proceed with these amendments in 1999.

TABLE 13-9
REGULATORY STATUS OF EXTRA-PROVINCIAL BUS OPERATORS BY PROVINCE

Province	*Current Status*
Newfoundland.	Deregulated, except for scheduled service on the Trans-Canada Highway
Prince Edward Island	Completely deregulated
Nova Scotia	Regulated
New Brunswick	Modified regulation (reverse onus entry test*)
Quebec	Regulated
Ontario	Relaxed economic regulation
Manitoba	Regulated
Saskatchewan	Regulated
Alberta	Streamlined economic regulation of scheduled service
British Columbia	Regulated
Northwest Territories	Completely deregulated
Yukon	Modified regulation (reverse onus entry test)

* A test whereby the objector must demonstrate that issuing a licence would be detrimental to the public interest.

Source: Transport Canada

TABLE 13-10
LARGEST SCHEDULED INTERCITY CARRIERS BY NUMBER OF COACHES

Carrier	*Province*	*Number of Coaches*
Greyhound Lines of Canada (Laidlaw)	Alberta	353
Pacific Western Transportation Inc.[1]	Alberta	300
Transtario Bus Lines	Ontario	108
Trentway-Wagar (Coach USA)	Ontario	151
Penetang Midland Coach Lines	Ontario	135
Limocar (Boisbriand)	Quebec	74
SMT(Eastern) Ltd.	New Brunswick	71
Vancouver Island Coach Lines (Laidlaw)	British Columbia	66
Orleans Express	Quebec	60
Grey Goose Bus Lines (Laidlaw)	Manitoba	60

1 Pacific Western Transportation Inc. has operations in Ontario and British Columbia.

Source: Bus Industry Directory, 1999; Motor Coach Canada Presentation - Aug. 98

Industry Events

In June 1998, Laidlaw Inc. became a minority shareholder in Penetang Midland Coach Lines Ltd., an Ontario-based provider of scheduled, charter, urban transit and school bus services. In December 1998, Greyhound Canada Transportation Corporation, a subsidiary of Laidlaw, purchased Voyageur Colonial, an Ottawa-based scheduled intercity and charter operator.

In addition, Laidlaw placed a bid to purchase Greyhound Lines Inc. of Dallas, Texas, a company without any ties to Greyhound Canada. While Greyhound Lines Inc. has a very limited presence in Canada, this proposed purchase, if finalized, would make Laidlaw Inc. the largest scheduled intercity bus company in North America.

BUS SERVICES

Scheduled Intercity Operators

Intercity bus services are the smallest segment of the industry, but provide the bulk of long-distance bus transportation. They are sub-divided into two groups — scheduled intercity operators and charter operators — with the latter also operating tour and

TABLE 13-11
SCHEDULED INTERCITY CARRIERS BY PROVINCE
1998

Province	*Number of Carriers*	*Number of Coaches*
British Columbia	10	151
Alberta	6	729
Saskatchewan	2	41
Manitoba	1	60
Ontario	14	628
Quebec	11	182
New Brunswick	1	71
Nova Scotia	4	35
Prince Edward Island	n/a	n/a
Newfoundland	3	22
Northwest Territories	1	4
Yukon	3	10
Canada	**56**	**1,933**

Source: Bus Industry Directory, 1999

TABLE 13-12
CHARTER BUS COMPANIES BY PROVINCE
1998

Province	*Number of Carriers*	*Number of Coaches*
British Columbia	35	724
Alberta	30	352
Saskatchewan	6	54
Manitoba	3	52
Ontario	34	342
Quebec	25	261
New Brunswick	4	48
Nova Scotia	4	2
Prince Edward Island	1	0
Newfoundland	2	12
Northwest Territories	3	10
Yukon	2	1
Canada	**149**	**1,858**

Source: Bus Industry Directory, 1999

airport services. Most of the larger operators in these two groups provide a combination of both intercity and charter services.

Table 13-10 lists the 10 largest scheduled intercity carriers ranked by the number of coaches in operation. Three of the top 10 operators are owned by Laidlaw Inc., which operates approximately 520 coaches through its subsidiary companies.

Table 13-11 shows the number of scheduled intercity carriers by province in 1998. The large number of coaches based in Alberta is due to the presence of the Greyhound and Pacific Western Transportation bus lines. The number of coaches does not include school or transit buses, or other smaller vehicles used by these operators in their day-to-day operations.

There is no national scheduled intercity bus carrier in Canada; however, scheduled intercity bus services allow passengers to travel from coast to coast by interlining. Most operating authorities give carriers exclusive rights to individual bus routes. Carriers that operate regularly across provincial boundaries (extra-provincial) come under federal jurisdiction. This includes all major intercity and charter operators. However, the federal government does not actually regulate the operation of extra-provincial bus companies, having allowed the provinces to do so under the authority of the *Motor Vehicle Transport Act, 1987 (MVTA)*. Most school and urban transit operators in Canada fall under provincial jurisdiction.

Charter Operators

Charter services are generally characterized by a group trip where all passengers embark and disembark at the same point. Generally, charter operators are granted the right to operate trips out of a given location or city and are allowed open-ended access to destinations. Operators have the flexibility to offer a broad spectrum of services ranging from a half-day school trip to a three-week excursion. They can also offer return or one-way trips. Local sightseeing tours are also considered a form of charter service.

In 1996, 103 charter operators with annual revenues exceeding $200,000, reported to Statistics Canada total annual operating revenues of $270 million and operating expenses of $261 million. Data on the number of passengers carried is not collected; however, 3,300 vehicles travelled a total of 157 million kilometres in 1996.

Table 13-12 shows the number of charter bus companies by province in 1998. British Columbia, Alberta, Ontario and Quebec account for almost 85 per cent of the total number of carriers. It is important to note that this list of carriers includes only those responding to the survey conducted for the Bus Industry Directory. In addition, as was the case for scheduled intercity operators, the number of coaches does not include school buses, transit buses or other smaller vehicles used in daily operations.

Table 13-13 lists the largest charter bus companies by number of coaches in operation in 1998. More than half of these carriers are based in British Columbia.

TABLE 13-13
LARGEST CHARTER BUS COMPANIES BY NUMBER OF COACHES
1998

Carrier	*Province*	*Number of Coaches*
Autocar Connaisseur Inc	Quebec	112
Kunkel Bus Lines	Ontario	102
Gray Line of Victoria (Laidlaw)	British Columbia	100
Brewster Transportation &Tours	Alberta	86
Autocars La Capitale Inc	Quebec	75
Charter Bus Lines of BC	British Columbia	69
Vancouver Island Coach Lines (Laidlaw)	British Columbia	66
Canamera Tours Ltd. (Int'l Coach tours)	British Columbia	65
International Stage Lines	British Columbia	60

Source: Bus Industry Directory, 1999

Urban Transit

All major Canadian cities have some form of urban transit service. In terms of revenue, urban transit is the largest component of Canada's bus industry. This type of service, however, is typically subsidized by both municipal and provincial governments. Some transit operators also offer school bus and charter services, as well as service for the elderly and disabled.

MARINE TRANSPORTATION INDUSTRY

Canada's marine industry includes a domestic fleet of operators providing domestic and transborder shipping services, as well as an international marine trade calling at major ports for import and export traffic overseas. The year was marked by a number of important events and some significant legislative changes.

MAJOR MARINE EVENTS IN 1998

Legislative and Regulatory Changes

Canada Marine Act (Bill C-9)

The *Canada Marine Act* (Bill C-9) received Third Reading in the Senate on May 28, 1998, and Royal Assent was signed on June 11, 1998. The main objective of the legislation is to ensure the Canadian ports system is competitive, efficient, commercially oriented and locally responsive by establishing Canada Port Authorities at 18 of Canada's major ports and divesting certain harbours and ports.

Part III of the Act establishes a new framework for the management of the St. Lawrence Seaway. Other sections of the Act provide for amendments to the *Pilotage Act*. The sections of the Act dealing with pilotage and the Seaway came into force during 1998, while the sections relating to the establishment of Canada Port Authorities will be implemented in 1999.

Amendments to the Canada Shipping Act (Bill S-4)

Bill S-4, *An Act to amend the Canada Shipping Act*, was introduced in the Senate in October 1997, and in the House of Commons on February 11, 1998. It received Royal Assent on May 12, 1998.

The new legislation implemented the provisions of the 1976 Convention on Limitation of Liability for Maritime Claims and its 1996 Protocols, which increase the amount of compensation available to private and public claimants for all maritime claims, with the notable exception of claims for oil pollution damage. These provisions came into force on August 10, 1998.

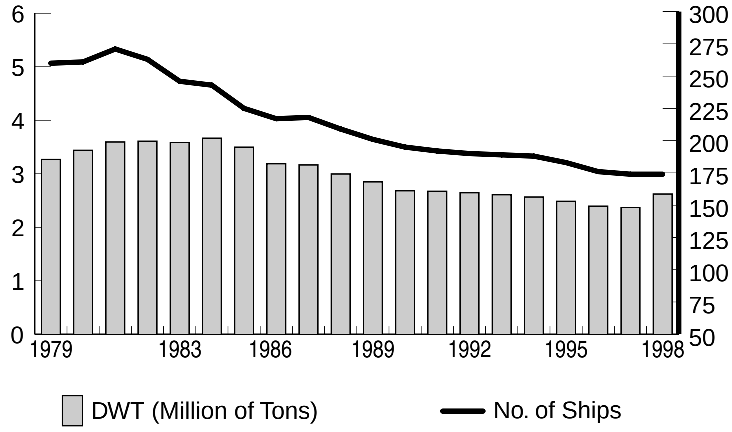
The remaining provisions, which relate to claims for oil pollution damage, will come into force on May 29, 1999, 12 months from the date on which Canada deposited its instrument of accession to the 1992 Protocols with the International Maritime Organization.

1998 Developments in Liner Shipping

In October 1998, the United States passed the *Ocean Shipping Reform Act* of 1998 to replace the

FIGURE 13-5
CANADIAN REGISTERED FLEET
1978 – 1998

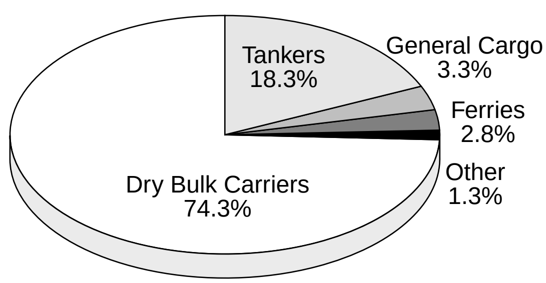
(Ships of 1,000 Gross Tons and Over)



Source: Canadian Transportation Agency and Transport Canada

FIGURE 13-6
CANADIAN REGISTERED FLEET* BY TYPE
1998

(Thousands of DWT)



* Ships of 1,000 gross tons and over.

Source: Canadian Transportation Agency and Transport Canada

existing *Shipping Act* of 1984. The new Act will take effect on May 1, 1999. The Act includes several significant changes: an end to tariff filing with the Federal Maritime Commission (to be replaced by publicly available tariff information offered through automated electronic means, such as the Internet); the introduction of confidential service contracts between individual conference lines and shippers (only essential terms,[5] will be publicly available); a reduction of the notification period before Independent Action can be taken; and a decision that states conferences will only be able to set voluntary guidelines for confidential service contract negotiations by member lines.

In September 1998, the European Commission issued its ruling on the Trans-Atlantic Conference Agreement. In its interpretation of European Council regulations governing competition rules on maritime transport and joint inland rate-setting activities, the EC found that the Agreement was in violation of EC regulations by engaging in joint inland (intermodal) rate setting, joint service contracts, and joint setting of freight forwarders' commissions. TACA members, who were fined as a result of the decision, are appealing. Despite this, the EC decision clarified how the regulation governing liner shipping conferences is to be applied and resulted in changes to conference operations.

Industry Events

In 1998, there were many important changes in the marine sector. Among the most notable:

- Canadian Pacific Ltd. (CP Ships) acquired South American operator Ivaran Lines, and purchased, subject to regulatory approval, Australia New Zealand Direct Line.
- Gearbulk Holdings bought the Canadian Transport Co. Ltd., a British Columbia-based forest products company, from Northern Navigation International. This purchase came just 18 months after Northern Navigation bought Canadian Transport from MacMillan Bloedel, a Canadian forest company.
- The Washington Marine Group announced that its subsidiary, Seaspan Coastal Intermodal Company, purchased the assets of Canadian Pacific Railways' west coast marine transportation business, Coastal Marine Operations. The company

5 Essential terms include origin and destination port ranges; commodity or commodities involved; minimum volume or portion; and duration of the contract.

carries trailers and containers, as well as railcars between the British Columbia mainland and Vancouver Island.

- The management of St. Lawrence Seaway operations was transferred to the St. Lawrence Seaway Management Corporation on October 1, 1998, from the St. Lawrence Seaway Authority. A new Crown corporation, the Federal Bridge Corporation Ltd., was created to manage the major bridges not related to navigation, which were formerly the responsibility of the St. Lawrence Seaway Authority.
- Maersk Inc. and Sea-Land Services Inc. short-listed the Port of Halifax as a possible site for the location of their new super terminal, which will handle post-panamax container vessels.
- Bay Ferries Ltd. introduced a high-speed catamaran service on its Yarmouth–Bar Harbor ferry route.
- On the west coast, BC Ferries carried out sea trials on the first of its new high-speed catamarans.

Marine Freight Transport Services

Domestic Services

Figure 13-5 shows the number of Canadian-registered merchant fleet vessels as of December 1998. The preliminary data indicate the Canadian-registered merchant fleet consisted of 174 self-propelled vessels (more than 1,000 gross tonnage) with a total dead-weight tonnage of 2.6 million tonnes.

These figures represent an increase of 10 per cent in terms of deadweight tonnage over 1997. Dry bulk carriers are the backbone

TABLE 13-14
EAST COAST CANADIAN-FLAG CARGO FLEET
1,000 GRT AND OVER, 1998

Companies	*Type*	*Vessel Number*	*GRT*	*Area of Operation*
Algoma Central Corporation	Bulker	10	183,106	Great Lakes/St. Lawrence
	Self-Unloader	14	263,720	Great Lakes/St. Lawrence
	Tanker	5	38,115	Great Lakes/St. Lawrence
	Total:	**29**	**484,941**	
Black Creek Shipping Co. Ltd.	Self-Unloader	1	10,532	Great Lakes/St. Lawrence
	Total:	**1**	**10,532**	
C.A. Crosbie	Other	2	5,700	Maritimes
	Total:	**2**	**5,700**	
Canada Steamship Lines Inc.	Self-Unloader	11	235,813	Great Lakes/St. Lawrence /Maritimes
	Total:	**11**	**235,813**	
Canarctic Shipping Ltd.	Bulker	1	25,418	Canadian Arctic from May to November
	Total:	**1**	**25,418**	
Canship Ltd.	Tanker	2	248,700	Maritimes
	Total:	**2**	**248,700**	
EnerChem	Tanker	3	16,003	Great Lakes/St. Lawrence / Maritimes
	Total:	**3**	**16,003**	
Groupe Desgagnés	Bulker	3	23,276	St. Lawrence/Great Lakes /Arctic
	Tanker	2	5,999	Great Lakes/St. Lawrence / Maritimes
	Other	3	14,893	St. Lawrence/Great Lakes / Arctic
	Total:	**8**	**44,168**	
Imperial Oil	Tanker	3	29,056	Great Lakes
	Total:	**3**	**29,056**	
Irving / Kent Line	Tanker	3	51,141	Maritimes
	Total:	**3**	**51,141**	
N.M. Paterson & Sons	Bulker	7	113,814	Great Lakes/St. Lawrence
	Total:	**7**	**113,814**	
Oceanex	Other	3	49,182	Maritimes
	Total:	**3**	**49,182**	
P & H Shipping	Bulker	2	32,570	Great Lakes/St. Lawrence
	Total:	**2**	**32,570**	
Shell	Tanker	1	2,758	St. Lawrence
	Total:	**1**	**2,758**	
Secunda Marine Services	Other	6	7,466	Maritimes
	Total:	**6**	**7,466**	
Transport Nanuk	Other	2	17,396	Great Lakes/St. Lawrence / Maritimes
	Total:	**2**	**17,396**	
Upper Lakes Group	Bulker	14	266,495	Great Lakes/St. Lawrence
	Self-Unloader	7	143,210	Great Lakes/St. Lawrence
	Total:	**21**	**409,705**	
TOTAL:		**105**	**1,784,363**	

Source: Fairplay World Shipping Directory 1998 - 1999 and Transport Canada data.

TABLE 13-15
WEST COAST CANADIAN-FLAG CARGO FLEET 1,000 GRT AND OVER, 1998

Companies	*Type*	*Vessel Number*	*GRT*	*Area of Operation*
Seaspan International	Tug	29	7,271	West Coast of North America
	Barge	11	51,851	
	Total:	**40**	**59,122**	
Rivtow Marine Ltd.	Tug	12	3,519	West Coast of British Columbia
	Barge	1	9,043	
	Total:	**13**	**12,562**	
Kingcome Navigation Company	Tug	2	383	Pacific Coast
	Barge	3	20,192	
	Total:	**5**	**20,575**	
Pacific Towing Services	Tug	5	1,362	Pacific Northwest Coast
	Total:	**5**	**1,362**	
The JJM Group	Tug	3	403	Coastal British Columbia
	Total:	**3**	**403**	
C.H. Cates & Sons Ltd.	Tug	3	376	Port of Vancouver
	Total:	**3**	**376**	
Blue Band Navigation	Tug	2	697	Coastal British Columbia
	Total:	**2**	**697**	
Lafarge Construction Materials (Marine Division)	Tug	2	273	British Columbia / Washington
	Total:	**2**	**273**	
Island-Sea Marine Ltd.	Tug	1	271	West Coast of North America
	Total:	**1**	**271**	
Minette Bay Ship Docking Ltd.	Tug	1	125	West Coast of British Columbia
	Total:	**1**	**125**	
TOTAL:		**75**	**95,766**	

Source: Lloyd's List of Shipowners 1997-1998, Harbour & Shipping, December 1998 and Transport Canada data.

of this fleet, with 41 per cent of total vessels and 74 per cent of total deadweight carrying capacity. Liquid bulk carriers ranked second with 18 percent of total carrying capacity up from ten per cent in 1997.

The Canadian Transportation Agency estimated that the Canadian fleet of tugs and barges (100 gross tons and over) in 1998 included 239 tugs and offshore supply ships (90,227 GRT) and 1,291 barges, and other non self-propelled vessels (1.16 GRT).

Eastern Canada

Table 13-14 provides information on vessel type, gross registered tonnage (GRT), and area of operation, of companies operating Canadian-flag vessels of 1,000 GRT or above in Eastern Canada. Algoma Central Corporation and Upper Lakes Group are the two largest operators in the area. Algoma Central Corporation, with 27 per cent of eastern Canada's fleet capacity, is the largest inland shipping company in Canada.

Traditionally, Algoma Central operated in the dry bulk trades; however, in 1998, it bought five tankers from Imperial Oil Ltd., the Canadian subsidiary of Exxon Corp. Upper Lakes Group, with 23 per cent of the fleet capacity in eastern Canada, is also one of the country's largest shipping companies. Its cargoes consist mainly of grain, iron ore, coal, salt, cement and gypsum.

The largest portion of eastern Canada's domestic cargo fleet operates on the Great Lakes–St. Lawrence Seaway system. In 1998, the eastern Canadian cargo fleet included 30 straight-deck bulkers, 33 self-unloader bulkers, 26 tankers and 16 other vessels.

From 1989 to 1998, the number of straight-deck bulkers decreased from 48 to 30 vessels, a 38 per cent drop. This was the result of various factors, including ships being operated under another flag (flagged out), sold to foreign interests or for scrap, and converted to self-unloaders. Algoma Central Corporation and Upper Lakes Group control 24 of the straight-deck bulkers through a pooling agreement and operate under the name Seaway Bulk Carriers. Straight-deck bulkers mainly carried grain downbound to St. Lawrence ports and iron ore as backhaul cargo for upbound destinations.

The fleet of self-unloader bulkers remained relatively stable between 1989 and 1998, with vessels that were flagged out or scrapped balanced by new entries, primarily conversions from straight-deck bulk vessels. In 1998, Algoma Central Marine and Upper Lakes Shipping operated 21 self-unloaders through a pooling agreement (Seaway Self-Unloaders), while Canada Steamship Lines Inc. operated

11 vessels in the fleet and Black Creek Shipping Company Ltd. operated the remaining vessel. Self-unloader bulkers serve a more diversified market than straight-deck bulkers, moving coal, iron ore, stone, salt, gypsum and other cargoes.

Other vessels operating in Eastern Canada include 26 tankers, owned by Algoma Central Corporation, Canship Ltd., EnerChem Transport Inc., Groupe Desgagnés, Imperial Oil, Irving and Shell; and 16 general cargo and other vessels, owned by C.A. Crosbie, Groupe Desgagnés, Oceanex, Secunda Marine Services and Transport Nanuk.

In addition to the cargo fleet, a significant fleet of ferry vessels operates on the Atlantic coast. At the end of 1998 the fleet included 12 ferries.

Western Canada

There is a significant tug and barge fleet on the west coast as well as an important fleet of ferry vessels. Most of the tug and barge fleet operate in domestic trade, but some also trade internationally between Canadian and US ports.

Table 13-15 shows the top ten tug and barge operators (operating vessels of 100 GRT and over) on Canada's west coast. Together these ten firms account for 70 per cent of the West Coast fleet of tugs and 13 per cent of the fleet of barges (in terms of GRT). Three of the top ten companies are owned by Montana businessman Dennis Washington. They include Seaspan International Ltd., with a total fleet capacity of 59,122 GRT; C.H. Cates & Sons Ltd., with 376 GRT; and Kingcome Navigation Company, with 20,575 GRT. These companies account for 84 per cent of the top ten operators' fleet capacities. Seaspan International Ltd. is Canada's largest tug and barge operator. Serving primarily the west coast of North America, Seaspan's main areas of business include tug and barge transportation, log barging and ship docking.

Northern Canada

The Northern Transportation Co. Ltd. is the major operator in Northern Canada, which encompasses the Mackenzie River and the Arctic Ocean. In 1998, the company owned 81 vessels, including 72 oil barges and 9 tugs, for a total capacity of 72,877 GRT. The average age of the fleet is approximately 27 years.

International Services

Bulk Shipping

For international marine services, Canadian shippers' needs delimit the type of services they use. For bulk commodities, such as grain, coal, iron ore and potash, shippers use bulk shipping operators.

Bulk shipping freight rates are normally set in the global open market, which is highly competitive. The market is generally divided between time charters (term contracts) and the spot market. The terms of charter contracts typically range from one to five years, depending on the volatility of prices. Longer contracts usually prevail during periods of greater predictability in transportation rates, while shorter contracts are more common when prices are unstable. Most of Canada's exports and imports are moved under these types of marine service arrangements. The spot or "tramp" market is made up of short-term contracts covering a specific number of voyages, days or given quantity of cargo. Spot prices are set in open markets and exchanges. Price levels depend on supply and demand factors such as vessel size, equipment, trade route and timeliness of the service requirement.

Liner Shipping

Liner services are offered according to published schedules and on specific trade routes with fixed itineraries. Liner carriers generally handle containerized and/or break-bulk cargoes, such as electronics, manufactured goods or frozen produce.

The international liner trade is dominated by large fleets of specialized container vessels operating on major trade routes around the world. A large proportion of the world fleet is controlled by Pacific Rim and Western European interests. Canada controls a relatively small fleet in comparison with these major players; however, this presence has been widening through the acquisition of lines.

Shipping lines calling at Canadian ports may provide conference liner and non-conference liner services. Ocean carriers providing liner services on a common trade route often elect to form a conference and collectively agree on rates and/or conditions of service. Shipping lines that do not operate within a shipping conference are referred to as "independents" or "non-conference operators," and may also provide liner services.Contrary to conference carriers, non-conference lines are not required to file a tariff with the Canadian Transportation Agency. Today, non-conference liner carriers often offer services that are fully comparable to conference operators in terms of level of service. In recent years, roughly half of Canada's liner trade travelled on non-conference lines.

TABLE 13-16
SHIPPING CONFERENCES SERVING CANADA IN 1998

American West African Freight Conference (E)
Australia/Canada Container Line Association (E & W)
Canada/Australia-New Zealand Association of Carriers (E & W)
Canada/Australia-New Zealand Discussion Agreement (E)
Canada Caribbean Shipowners Association (E)
Canada Transpacific Stabilization Agreement (E & W)
Canada - United Kingdom Freight Conference (E)
Canada Westbound Rate Agreement (E & W)
Canadian Common Tariff Conference (E)
Canadian Continental Eastbound Freight Conference (E)
Canadian North Atlantic Westbound Freight Conference (E)
Continental Canadian Westbound Freight Conference (E)
East Canada - South America Rate Agreement (E)
Japan - East Canada Freight Conference (E)
Japan - West Canada Freight Conference (W)
Mediterranean Canadian Freight Conference (E)
Mediterranean North Pacific Coast Freight Conference (W)
New Zealand/Canada Container Line Association (E & W)
The "8900 Lines" Rate Agreement (E)

E = East Coast; W = West Coast.

Source: Canadian Transportation Agency

Lines that are conference members on one route are not necessarily members on all of the routes or points served. Also, where a conference agreement applies only to Canadian cargo, shipping lines that solicit cargo from US-based shippers (such as North Atlantic operators calling at Montreal) could carry non-conference cargo on the same vessels that operate in the conference service.

Services Available to Canadian Shippers

Table 13-16 lists the 19 tariff-filing shipping conferences serving Canada in 1998. Seventeen serve the east coast and seven the west coast. During 1998, the Canada/Australia-New Zealand Discussion Agreement started filing as a conference.

Shippers benefit not only from competition between conference and non-conference carriers, but also from competition within conferences through the independent action provision contained in the *Shipping Conferences Exemption Act, 1987*. This provision permits individual conference lines to offer a rate or services different from that which is published as part of the conference tariff. Further, shipping conference rates paid by shippers can be negotiated and signed as a confidential "service contract" between a conference and a shipper. Service contracts must be filed with the Canadian Transportation Agency to comply with the Act.

In 1998, the Agency accepted filings for 163 service contracts from seven shipping conferences. These contracts apply to both inbound and outbound traffic and to origins/destinations on both the east and west coasts of Canada. The 163 contracts filed is comparable to filings in recent years: 181 in 1997; 140 in 1996; and 175 in 1995.

Recent trends in the world of international liner shipping continued through 1998: mergers and acquisitions of shipping lines, construction and delivery of post-panamax[6] size ships (ships too large to pass through the Panama Canal), and depressed freight rates on many international trade routes. In some cases, overall freight rates between Canada and northern Europe were frozen for the coming year at 1998 levels. Weakened Asian currencies, depressed exports to Asia, and falling bunker fuel costs have generally prevented freight rates from rising in trade lanes between Canada and Asia.

CP Ships continued to strengthen its position as a major player in the global container shipping business. During 1998, it acquired the South American operator Ivaran Lines, announced a joint venture with Transportation Maritima Mexicana, and purchased, subject to regulatory approval, Australia New Zealand Direct Line. As a result, CP Ships is expanding its trade lanes beyond its traditional North Atlantic routes into Central and South America and to Australia and New Zealand.

Other examples of mergers and acquisitions in 1998 include the P&O Nedlloyd Ltd. acquisition of Blue Star Line Ltd. (completed April 1998), the Evergreen purchase of Lloyd Triestino, and the Hamburg-Sud acquisitions of South Seas Shipping Co. and Alianca Lines.

6 Post-panamax container vessels generally include vessels of 5000 or more Twenty-foot Equivalent Units. Thirty of these ships were ordered in 1998.

MARINE PASSENGER TRANSPORT SERVICES

Ferry Services

Canada's ferry services vary widely in terms of ownership (from small private operators to provincial governments and federal Crown corporations), vessel types (small cable ferries to large cruise-type vessels and fast ferries) and operations (seasonal to year-round schedules). Terminal and docking facilities are variously owned, leased and operated by ferry companies, municipalities, provincial and federal governments or other private companies.

The Canadian Ferry Operators Association (CFOA) counts among its membership all the major ferry operators in Canada. Collectively, these operators employ approximately 7,650 persons.

FEDERAL ROLE IN FERRY SERVICES

In accordance with the National Marine Policy announced in December 1995, the federal government is looking at ways to reduce costs and increase efficiency through new vessel management and procurement practices, commercial operation of vessels and the streamlining of ferry services. The commercialization initiatives are consistent with the government's objective to make Canada's transportation system responsive to future commercial challenges by reducing its involvement in the direct delivery of transportation services and allowing the private sector to provide some of these services.

The federal government continues to focus on the safety and security of ferry services through regulation. In addition, the federal government continues to subsidize constitutionally guaranteed ferry services and services to remote communities. Federally supported ferry services in Atlantic Canada are limited to those provided by Marine Atlantic Inc., a federal Crown corporation, and by three private-sector operators — Northumberland Ferries Limited, Bay Ferries Limited, and C.T.M.A. Traversier ltée. Federally subsidized ferry services in Western Canada, in the form of a grant, will continue to be provided to the Province of British Columbia.

Cruise Ship Industry

The cruise industry is recognized as a growth sector by many levels of government in Canada. The federal government has encouraged cruise activity in the Great Lakes–St. Lawrence Seaway system through changes to regulations governing casino operations on board cruise ships in Canadian waters. The Atlantic Canada Opportunities Agency has also contributed financially to an Atlantic Canada Cruise Association initiative to market Atlantic Canada ports as destinations for international cruise vessels over the next three years.

Foreign-based companies provide the vast majority of extended cruise operations that call at Canada's east and west coast ports. There are two basic categories of extended cruises – the luxury cruise and the pocket cruise, distinguished by vessel capacity of more or less than 150 passengers.

Most luxury cruise vessels sailing to Alaska use the Port of Vancouver as their home port (where passengers embark and/or disembark). Alaska has become the third largest cruise market in the world, after the Caribbean and Europe. Vancouver has benefited from the provisions of the *US Passenger Vessel Act*, which prohibits foreign-flag vessels from carrying passengers between US ports (i.e. embarking passengers at one US port and disembarking them at another). Trips between Vancouver and Alaska also fit conveniently into a seven-day time frame.

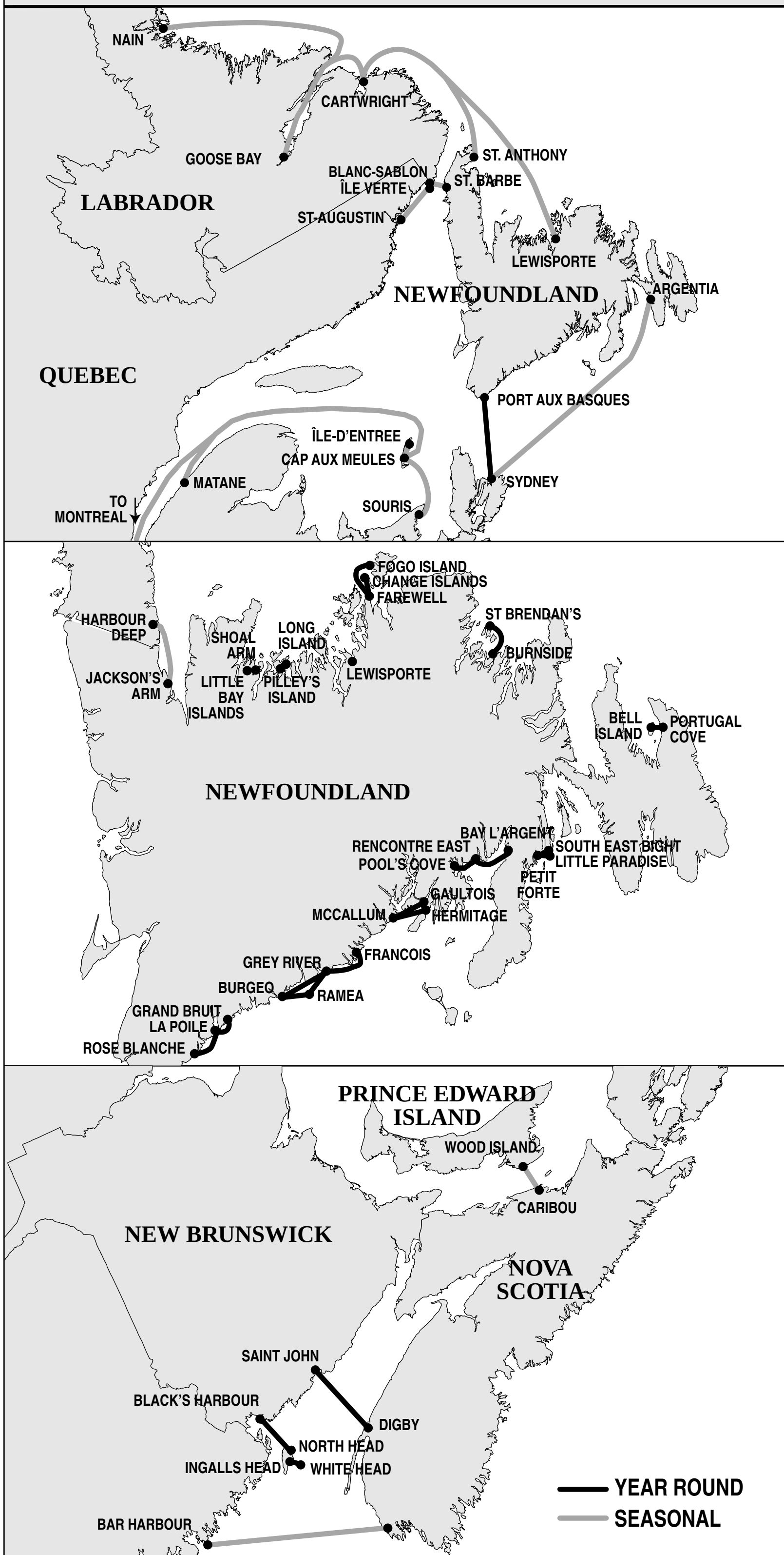
In eastern Canada, luxury cruise ships regularly travel along the eastern seaboard and up the St. Lawrence River to Québec City and Montreal. They also sail out of New York, northward to Halifax, Saint John and other Atlantic ports. Many of these cruises have traditionally been scheduled for the fall colour season, but summer visits are becoming increasingly popular as well. Pocket cruises travel the St. Lawrence River between Montreal or Quebec City, and Kingston or Rochester, as well as along the Erie Canal and Hudson River to Warren, New York.

The 420-passenger luxury cruise ship, *M/S Columbus*, was back in the Great Lakes for a second season in 1998. Its arrival in 1997 marked the first visit by a luxury cruise vessel to the Great Lakes in over two decades.

CANADA SHIPPING ACT

Under the *Canada Shipping Act,* passenger vessels with a capacity of more than 12 passengers or over five gross tonnes must obtain a Certificate of Inspection to operate, and are submitted to regular Coast Guard inspections.

FIGURE 13-7
FERRY SERVICES
EASTERN CANADA



Source: Transport Canada

Local Canadian operators also offer a multitude of lock, harbour and river cruises, as well as excursions such as those for whale watching.

According to Canadian Passenger Vessel Association, there are at least 160 companies across Canada that operate inspected vessels in the passenger-carrying tourism business.

Federal Subsidies

Under the National Marine Policy, the federal government has concluded numerous commercialization initiatives that transfer responsibility for ferry services to provincial authorities or the private sector. These initiatives ensure that ferry services are delivered as cost-effectively as possible.

On April 1, 1997, the Province of Newfoundland assumed responsibility for ferry services to Labrador in exchange for a one-time grant of $340 million.

In 1997, the federal government also privatized Marine Atlantic's Yarmouth, Nova Scotia–Bar Harbor, Maine, and Saint John, New Brunswick–Digby, Nova Scotia ferries. The new operator, Bay Ferries Limited, will receive a subsidy for the first three years of a five-year contract, after which the operator will continue to provide service with no further federal assistance. After two years of operation, Bay Ferries has increased ridership and is reporting a profit. In 1998, the company acquired and introduced a high-speed catamaran for the Yarmouth–Bar Harbor service.

Marine Atlantic has been undergoing a major transformation, divesting four of its six ferry services. Employee severance and restructuring costs

OVERVIEW OF MAJOR FERRY SERVICES AND CHANGES

Marine Atlantic Inc. (MAI), a federal Crown corporation, operates the constitutionally guaranteed year-round ferry link between North Sydney, Nova Scotia, and Port aux Basques, Newfoundland, and the seasonal alternative between North Sydney, Nova Scotia, and Argentia, Newfoundland. In 1998, Marine Atlantic relocated its corporate headquarters from Moncton, New Brunswick, to North Sydney, Nova Scotia, and Port aux Basques, Newfoundland.

Coastal Transport Limited operates the year-round passenger/vehicle ferry service to the islands of Grand Manan and White Head, New Brunswick, under contract with the Province of New Brunswick. The ferry to Grand Manan leaves daily from Black's Harbour, New Brunswick, while White Head Island ferry departs several times a day from Grand Manan at Ingalls Head.

Northern Cruiser Ltd. (NCL) operates a single passenger/vehicle ferry service between Blanc Sablon, Quebec, and St. Barbe, Newfoundland, from May to January, under contract with the Province of Newfoundland.

Northumberland Ferries Limited (NFL) provides seasonal passenger/vehicle ferry transportation (May 1 to December 20) between Caribou, Nova Scotia, and Wood Islands, Prince Edward Island, under contract with the federal government.

Bay Ferries Limited provides yearly passenger and vehicle ferry service between Saint John, New Brunswick, and Digby, Nova Scotia, and seasonal service (June 1 to mid-October) between Yarmouth, Nova Scotia, and Bar Harbor, Maine, under contract with the federal government.

C.T.M.A. Traversier Ltée provides federally subsidized passenger/vehicle ferry service between Cap-aux-Meules, Magdalen Islands, Quebec, and Souris, Prince Edward Island, during the ice-free period from early April until late January. C.T.M.A. also provides a passenger/cargo ferry service from Cap-aux-Meules to Montreal from April to December and from Cap-aux-Meules to Matane during the winter, under contract with the Province of Quebec.

Newfoundland and Labrador's Department of Works, Services and Transportation provides all of the intraprovincial and coastal ferry services under contract with private operators.

Quebec's transportation ministry subsidizes **la Société des traversiers du Québec (STQ)**, which operates five year-round passenger/vehicle ferry services across the St. Lawrence River within the Province of Quebec. STQ also has responsibility for three other provincially subsidized ferry services, which are operated by private companies. These routes include Rivière-du-Loup to Saint-Siméon (operated by CFOA member **La Traverse Rivière-du-Loup/Saint-Siméon Ltée**), Montmagny to Île-aux-Grues, and Cap-aux-Meules to Île-d'Entrée.

In addition to subsidizing STQ and the three private companies under STQ's responsibility, the **Quebec Ministry of Transportation** also subsidizes a fourth private operator servicing Isle Verte and a water taxi service in St. Augustin. The Ministry is also responsible for the adjudication of contracts for transporting supplies to native communities in Northern Quebec.

The **Ontario Ministry of Transportation** provides financial support to five year-round ferry operations in eastern Ontario. The Province of Ontario operates the Glenora, and the Wolfe Island to Kingston ferries, while ferry services to Amherst, Howe and Simcoe islands are operated by their respective township authorities.

The **Owen Sound Transportation Company (OSTC)** provides seasonal passenger/vehicle ferry services on Lake Huron between Tobermory, Ontario, and South Baymouth, on Manitoulin Island, from early May until mid-October. OSTC also manages transportation services on Lake Erie between Leamington/Kingsville and Pelee Island, Ontario, and Sandusky, Ohio, from April through December on behalf of the Ontario Ministry of Transportation.

The **Manitoba Department of Highways and Transportation** operates seven passenger/ vehicle ferries, three motor vessels and four cable ferries.

The British Columbia government receives a federal grant for the provision of ferry services in coastal waters. **British Columbia Ferry Corporation (BC Ferries)**, a provincial Crown corporation, is the largest ferry operation in North America, with a fleet of 40 vessels on 24 routes serving 42 ports.

British Columbia's **Ministry of Transportation and Highways** is responsible for the operation and maintenance of British Columbia's inland ferry service, and contracts with a private operator for the provision of a tug and barge ferry service. The Ministry also subsidizes **a private ferry service** on one of the province's interior lakes.

FIGURE 13-8
FERRY SERVICES
CENTRAL CANADA

Source: Transport Canada

had a significant impact on its financial requirements in 1997/98 and will continue to be a draw on government funding in future years. Forecasts place operational subsidies at an average of $27.5 million from 2000 to 2003, limiting them to the amount required for the North Sydney–Newfoundland ferry services.

As a result of the 1997 acquisition of the *MV Madeleine*, C.T.M.A. Traversier Ltée operating subsidy requirement will be temporarily higher due to start-up costs. The subsidy is expected to level off at approximately $2.6 million in the near future.

In April 1998, the federal government extended the subsidy operating agreement with Northumberland Ferries Limited (NFL) to March 31, 2003, to eliminate any uncertainty about the government's commitment to this service. The extension will also provide NFL with a five-year planning horizon, allowing the company to invest in its human resources and make strategic business decisions.

Transport Canada remains committed to managing the remaining subsidized ferry services as efficiently as possible, and to responding to changing operating conditions to make the best use of equipment and minimize costs.

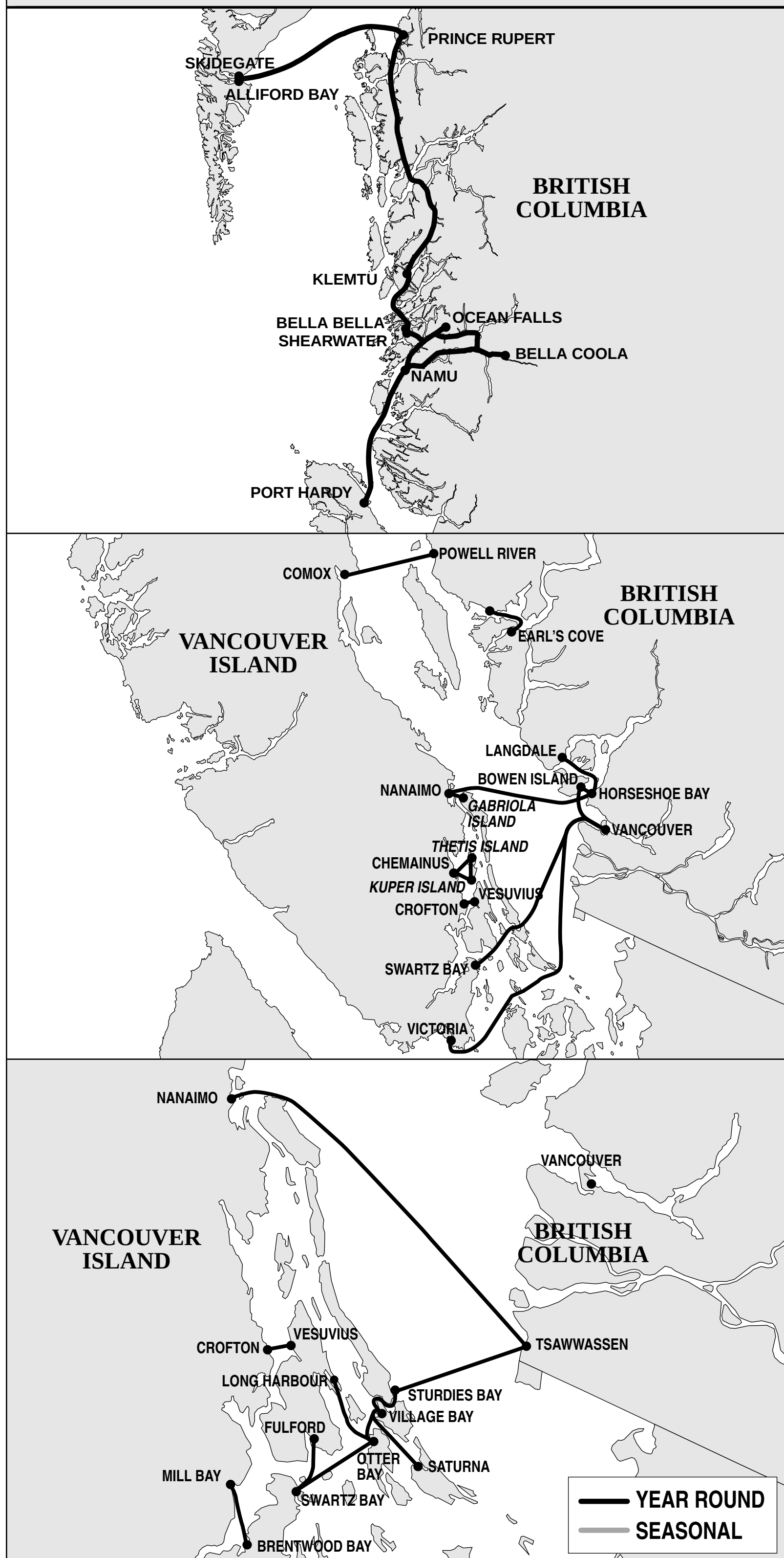
AIR TRANSPORTATION INDUSTRY

MAJOR AVIATION EVENTS IN 1998

Industry Changes

During 1998, there were a number of changes in the airline industry. Inter-Canadien was acquired from Canadian Regional Airlines by Quebec-based Canadian Investors Corporation. Air Atlantic, a commercial partner of Canadian Airlines owned by the IMP Group that served Atlantic Canada, ceased to operate. The services of Canadian North were assumed by Air NorTerra of NorTerra Inc., an investment holding company of the Inuvialuit Development Corporation of the western Arctic and the Nunasi corporation of the Eastern Arctic which acquired Canadian North from its parent, Canadian Airlines.

FIGURE 13-9
FERRY SERVICES
WESTERN CANADA



Source: Transport Canada

TABLE 13-17
GLOBAL AIRLINE ALLIANCES
1998

STAR	*oneworld*	*Wings*
Air Canada	Canadian Airlines	KLM Royal Dutch Airlines
United Airlines	American Airlines	Northwest Airlines
Lufthansa	British Airways	Alitalia
Thai Airways International	Qantas	Continental Airlines
VARIG	Cathay Pacific	Kenya Airways
SAS Scandanavian Air System		Braathens
Associated:	*Associated:*	*Associated:*
Singapore Airlines	Japan Airlines	Air China
All Nippon Airways	Asiana Airlines	Japan Air System
Ansett Airlines	EVA Airways	Malaysia Airlines
Air New Zealand	Pakistan International Airlines	
China Airlines	China Eastern Airlines	
China Southern Airlines	Ansett New Zealand	
Mandarin Airlines	Air Niugini	
Korean Air	Air Pacific	
Mexicana	Phillipine Airlines	
	Finnair	

Source: Web sites

TABLE 13-18
AIRCRAFT OF SELECTED CANADIAN CARRIERS
IN PASSENGER SERVICES

	Wide-bodied	*Narrow-bodied*	*Propeller driven*	*Total*
Air Canada	46	109	-	155
AC Affiliates[1]	-	10	67	77
Canadian Airlines International	25	56	-	81
CAI Affiliates[2]	-	33	43	76
Air Transat[3]	13	7	-	20
Canada 3000	2	14	-	16
First Air[4]	-	6	32	38
Kelowna Flightcraft[5]	-	-	3	3
SkyService	1	5	-	6
Royal	4	8	-	12
WestJet	-	9	-	9
Total	91	257	145	493

Notes:
1. Air Nova, Air Alliance, Air Ontario and Air BC.
2. Air Atlantic (ceased operations as of October 25, 1998) Inter-Canadien, Canadian Regional and Calm Air.
3. Air Transat fleet includes 2-737's which are leased only for the winter season
4. First Air fleet includes Air Inuit & NWTAir which was acquired from Air Canada.
5. Since cessation of operations as Greyhound Air in September 1997, passenger carriage limited.

Source: Carrier Websites, JP Airline-Fleets International, 98-99

In November 1998, two of Air Canada's regional subsidiaries, Air Alliance and Air Nova, began consolidating their operations under a single management group but with two operating divisions; Air Alliance which will remain based in Quebec City and Air Nova in Halifax. This initiative marked a change for Air Canada which had announced earlier in the year that it would attempt to sell Air Alliance.

Commercial Aviation Air Transport Services

Canada's air service industry has two major carriers whose scope and scale of operations are more extensive than any others – Air Canada and Canadian Airlines International. Each airline has comprehensive domestic and international route networks and affiliations with regional carriers that link all parts of the country to transcontinental, transborder and international route systems.

Both carriers strengthened their international reach through strategic global alliances during 1998. Air Canada reinforced its commercial ties within the Star Alliance™, formed in 1997. Canadian Airlines announced its intent to join four other international carriers to form oneworld™. The international scope of the airlines' operations are further enhanced through code-sharing agreements with a large number of foreign air carriers outside these two global alliances. Under code-sharing agreements, passengers are ticketed under one airline but travel on another airline sharing the code of the ticketing carrier.

Table 13-17 shows the airlines partnered in global alliances.

A second group of independent carriers operating jet aircraft – Air Transat, Canada 3000, Royal Airlines, SkyService, WestJet and First Air – offer inter-regional, transcontinental, transborder and international services, scheduled and/or charter, on a smaller scale.

Table 13-18 shows aircraft used by Canadian air carriers for passenger service.

Regional and Local Air Services

There are three groups providing regional or local air services in Canada. The first group, including Air BC, Air Ontario, Air Alliance Air Nova and Canadian Regional are operating subsidiaries of either Air Canada or Canadian Airlines. These airlines provide regional domestic or transborder services within the service networks of Air Canada or Canadian Airlines using a mix of jet and large turboprop aircraft. As with their larger corporate parents, there is extensive competition between the operating subsidiaries along network lines. Although the operations of these regional carriers are integrated into their networks, Air Canada and Canadian Airlines sought in 1998 to divest their ownership interests in them (e.g. sale of Canadian North to Air NorTerra, and of Inter-Canadien to Canadian Investors Corp. by Canadian Airlines; and Air Canada's attempt to sell Air Alliance). Table 13-19 shows the affiliation between this group of regional carriers and the major carrier.

Recently, a second group of regional airlines has emerged which are not owned, either in whole or in part, by Air Canada or Canadian Airlines. These regional airlines do however, have code-sharing or other commercial arrangements

TABLE 13-19
AIR CANADA AND CANADIAN AIRLINES REGIONAL-CODE SHARE PARTNERS

Large Regionals	*Other Partners*
Air Canada	
Air BC	Air Creebec
Air Ontario	Alberta Citylink
Air Alliance	Aviation Québec-Labrador
Air Nova	Central Mountain Air
Northwest Territorial[1]	
Canadian Airlines	
Air NorTerra[2]	Air Alma
Calm Air	Ontario Regional
Canadian Regional	Pacific Coastal Airlines
Inter-Canadien	Region Air
Air Labrador	

1 affiliated with First Air
2 doing business as Canadian North

Source: Transport Canada, Air Policy

TABLE 13-20
CANADIAN CARRIERS OPERATING FOR US BASED COURIER ENTITIES

Courier Operator	*Contracted Air Carrier*
Airbourne Express	Regency Airlines Knighthawk Air Express
BAX Global	All Canada Express
DHL	All Canada Express Western Express Airlines
Emery Air Freight Corp.	Bradley Air Services d.b.a. First Air ICC Canada
Federal Express	Knighthawk
United Parcel Service	Skylink Express All Canada Express

Source: Transport Canada, Air Policy

TABLE 13-21
LICENCE AUTHORITIES
HELD AS AT DECEMBER 31, 1998

Type:	Canadian Small	Canadian Medium	Canadian Large	Canadian All-Cargo	US	Other Foreign
Classification						
Domestic	871	26	13	27	-	-
International						
Scheduled	13	26	73	3	66	51
Non-Scheduled	404	22	12	22	764	78
Total Type	1,288	74	98	52	830	129
Total Canadian	**1,512**					
Total US					**830**	
Total Other Foreign						**129**

Source: Canadian Transportation Agency

TABLE 13-22
SUMMARY OF PERSONNEL LICENCES
AS OF DECEMBER 1998

	In Force	Issued in 1998	Male	Female
Aeroplanes				
Private Pilots	27,891	2,832	26,281	1,610
Commercial Pilots	9,274	1,075	8,795	479
Airline Transport Pilots	10,629	664	10,350	279
Total	**47,794**	**4,571**	**45,426**	**2,368**
Helicopters				
Private Pilots	324	43	311	13
Commercial Pilots	2,777	224	2,713	64
Airline Transport Pilots	668	50	658	10
Total	**3,769**	**317**	**3,682**	**87**
Permits				
Glider Pilot	5,922	395	5,204	718
Gyroplane Pilot	22	4	21	1
Balloon Pilot	265	18	243	22
Ultra-Light Pilot	2,634	198	2,558	76
Recreational Pilot	835	305	780	55
Total	**9,678**	**920**	**8,806**	**872**
Other Licences				
Flight Engineers	538	25	528	10
Air Traffic Controllers	2,142	76	1,987	155
Aircraft Maintenance	10,617	538	10,534	83
Total	**13,297**	**639**	**13,049**	**248**
Total Licences & Permits	**74,538**	**6,447**	**70,963**	**3,575**

Source: Transport Canada Safety & Security

with the two major carriers, and operate on routes some of which formerly served by the first group of larger regional airlines, using smaller turboprop aircraft. Some airlines in this second group specialize in providing air services to the more remote regions of Canada. As is the case with the first group and the two major carriers, there is competition among them along network lines.

A local tier of regional airlines, operate independently of Air Canada and Canadian Airlines, providing scheduled and charter services with a variety of turboprop and propeller aircraft (e.g. Bearskin Lake and Lab Air). They are most prevalent in remote regions of Canada and are more reliant on air cargo business. Competition among this group is not as strong as among the other regional carriers.

In addition to offering passenger and cargo service, a number of carriers provide all-cargo services using jet or non-jet equipment. These include First Air, Kelowna Flightcraft, Air Charter Ltd., Royal Airlines, All Canada Express, and International Charters Canada (ICC) operated all-cargo services. A new Calgary-based, all-cargo carrier, Canada West Airlines, attempted to enter the all-cargo sector with jet aircraft in 1998, but ceased operations before carrying out any business.

Canadian carriers, including Regency Airlines, Knighthawk Air Express, All Canada Express, Western Express Airlines, First Air, Morningstar, Prince Edward Air and Sky Link Express, are active in both domestic and transborder courier services.

Table 13-20 shows the participation of Canadian air carriers in transborder courier operations.

Table 13-21 lists the economic licence authorities held in Canada in 1998, and illustrates the proportions of operations by aircraft size. It also shows the large number of US-based and other foreign carriers that have the authority to operate to or from Canada on both a scheduled and charter basis.

Specialty Air Services

The specialty air services sector of commercial aviation operates throughout Canada. Its activities encompass flight training schools; aerial forest fire management and fire-fighting; aerial inspection and construction services; aerial photography and surveying; and advertising, sightseeing, weather-altering and spraying services. In addition, this sector also provides air cushion vehicle services, glider towing, heli-logging and parachute-jumping services.

Business Aviation

The business aviation sector continued to grow in 1998, with approximately 130 private companies using a fleet of 250 privately owned and registered aircraft as an alternative to commercial scheduled or charter air services.

A new approach to gaining access to private corporate aircraft is now developing through the concept of commercially managed fleets of shared access aircraft, called fractional ownership. This has encouraged individuals and corporations, who would not purchase an aircraft alone, to share available flight time with other program participants. Fractional ownership operations in Canada are regulated as commercial air services.

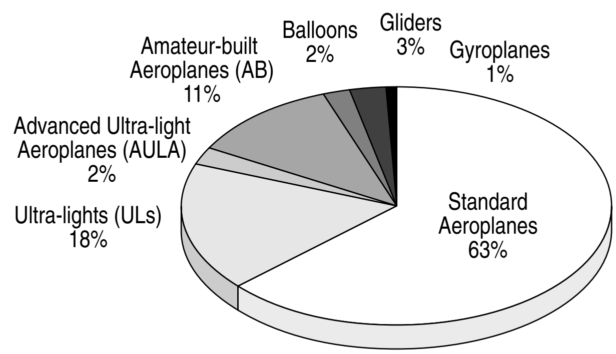
TABLE 13-23
PROPORTION OF PERSONNEL LICENCES AND PERMITS BY PROVINCE, DECEMBER 1998

	Number of Licences	*Per cent of Total*
British Columbia	14,784	19.8
Alberta	9,646	12.9
Saskatchewan	2,900	3.9
Manitoba	3,598	4.8
Ontario	23,300	31.2
Quebec	12,924	17.3
New Brunswick	1,150	1.5
Nova Scotia	1,980	2.7
Prince Edward Island	174	0.2
Newfoundland	1,331	1.8
Yukon	354	0.5
Northwest Territories	513	0.7
Other	1,919	2.6
Canada	74,573	100

Source: Transport Canada, Safety & Security

FIGURE 13-10
PROFILE OF THE RECREATIONAL AVIATION FLEET AS OF DECEMBER 31, 1998

Total Private Registered Aircraft = 21,664



Note: Of the 433 balloons on the registers, only about 25% are flown for recreational purposes. The remaining are flown primarily for commercial reasons.

Source: Canadian Civil Aircraft Register

General Aviation

General aviation describes all private-sector aviation, other than air transportation services. It encompasses business aviation using both fixed-wing aircraft and helicopters, and recreational aviation. In 1998, general aviation activities continued to represent half of the aircraft activity at airports with control towers, although much of the activity is at non-towered airports.

Recreational Aviation

Recreational aviation refers to private-sector aviation carried out primarily by aviation enthusiasts who participate for the enjoyment of flying. It continues to represent the biggest segment of civil aviation, with over two thirds of Canada's pilots and three quarters of Canada's aircraft (See Tables 13-22 and 13-23 and Figure 13-10). The large number of recreational aviators and recreational aircraft set Canada apart from many nations where aviation tends to be a purely commercial activity.

The special flight operations segment of general aviation was very active in 1998. Over 100 air shows and 50 balloon festivals took place before more than two million spectators. In 1998, Canada hosted the 6th World Hot Air Airship Championships, featuring competitors from around the world. The parachuting community also remained stable with approximately 250,000 parachute descents carried out.

APPENDIX 13-1
RAILWAY OPERATORS BY REGION
1998

	BC	*Alta*	*Sask*	*Man*	*Ont*	*Que*	*N.B.*	*N.S.*	*Nfld*
Transcontinental	CN CP	CN CP	CN CP	CN CP	CN CP	CN CP	CN CP	CN	
Regional and Local	BCR OKAN SRY	RCW RLW RMN	SRC CTR HBR	GWWD HBR	GEXR ONR AC AR[1] ROV OLO HCR RSO BC STER OCR	QNSL CFCR CFRS CDAC CFC QSR ROV CFBC CFG CFQG CFM MR CFRR SLAR NCR NV[2]	NBS NER EMR	DVR CBNS WHR	QNSL
Terminal or Switching					ETR PCHR	Arnaud			WLR
US Railways	BN UP			BN[3]	CSXT NS[2]	CR	BAR		
Passenger or Commuter	VIA[3] AMTRAK[3] BCR BC TRANSIT	VIA[3]	VIA[3]	VIA[3]	VIA[4] GO	VIA[3] AMTRAK[3] AMT[3]	VIA[3]	VIA[3]	

1 Non-operating, owned trackage only 2 Running rights, no track owned in Canada 3 Running rights 4 Running rights and owned trackage

Note: A number of bridge or terminal companies are not identified here, nor are subsidiaries of other companies. A number of rail tourist operations including the WPY, WSJR and GCRT have also not been included. Note that RMN also operate into the NWT.

Legend

AC	Algoma Central
AMT	Agence métropolitaine de Transport
AR	Arnprior & Renfrew
Arnaud	Arnaud
BAR	Bangor & Aroostock
BC	Barrie – Collingwood
BCR	BC Rail
BN	Burlington Northern
CBNS	Cape Breton and Central Nova Scotia
CDAC	Canadian American
CFBC	Chemin de fer de la Baie-des-Chaleurs
CFC	Chemin de fer Charlevoix
CFCR	Chemin de fer Cartier
CFG	Chemin de fer de la Gaspésie
CFM	Chemin de fer de la Matapédia
CFQG	Chemin de fer Québec-Gatineau
CFRR	Chemin de fer Rivière-Romaine
CFRS	Chemin de fer Roberval-Saguenay
CSXT	CSX
CTR	Carlton Trail
DVR	Devco
EMR	Eastern Maine
ETR	Essex Terminal
GCRC	Great Canadian Railtours
GEXR	Goderich & Exeter
GWWD	Greater Winnipeg Water District
HBR	Hudson Bay
HCR	Huron Central
MR	Mirabel Railway
NBS	New Brunswick Southern
NCR	Nipissing Central
NER	New Brunswick East Coast
NS	Norfolk Southern
NV	Northern Vermont
OCR	Ottawa Central
OKAN	Okanagan Valley
OLO	Ontario L'Orignal
ONR	Ontario Northland
PCHR	Port Colborne Harbour
QNSL	Quebec, North Shore & Labrador
QSR	Quebec Southern
RCW	RaiLink Central Western
RLW	RaiLink Lakeland & Waterways
RMN	RaiLink Mackenzie Northern
ROV	RaiLink Ottawa Valley
RSO	RaiLink Southern Ontario
SLAR	St. Lawrence & Atlantic (Quebec)
SRC	Southern Rail Co-operative
SRY	Southern Railway of BC
STER	St. Thomas & Eastern
UP	Union Pacific
WHR	Windsor and Hantsport
WLR	Wabush Lake
WPY	White Pass & Yukon
WSJR	Waterloo St. Jacobs

Source: Transport Canada

14

FREIGHT TRANSPORTATION

In terms of volume, bulk commodities traffic showed a decline due to the difficulties of Asian economies. Canada - US trade was a source of increase in freight traffic.

Two chapters have already reported some freight transport activities: the chapter on Transportation Infrastructure and the one on Transportation and Trade. This chapter on Freight Transportation complements the Trade chapter. It approaches the question of freight transportation from a modal perspective.

A modal landscape of freight traffic gives a sense of the relative use made of the different modes. The overview of the most recent traffic information for each mode provides some commodity level details and, when possible, a regional breakdown. The information presented gives a sense of the inter-relationships between modes and markets, but falls short of developing an intermodal/ multimodal perspective. Changes in traffic level of a mode of transportation can come from either changes in traffic volumes, modal shifts or a mix of the two.

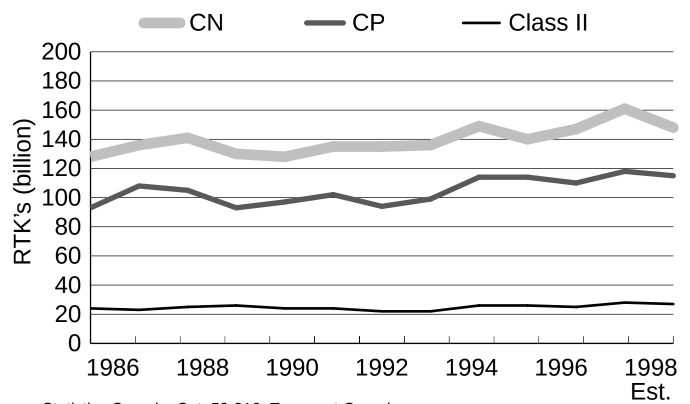
The coverage of modal freight activities is based on information available and is subject to the limitations imposed by data availability. Such limitations constrained the analysis. Yet it provides some of the background to understand the price, productivity and financial results findings presented in the last chapter of the report.

RAIL TRANSPORTATION

While rail freight traffic in 1998 did not reach the record levels of 1997, it was very strong compared with recent years. Decreased flows in key sectors, however, did lead to a drop in both tonnes and tonne-kilometres.

Aggregate traffic volumes decreased by about 3.6 per cent (compared with the over seven per cent increase in 1997). The forest product, coal, fertilizer materials and grain sectors accounted for over 50 per cent of total traffic (in tonnes) in 1998. Decreased traffic in each of these

FIGURE 14-1
RAIL REVENUE TONNE-KILOMETRES
1986 – 1998



Source: Statistics Canada, Cat. 52-216; Transport Canada

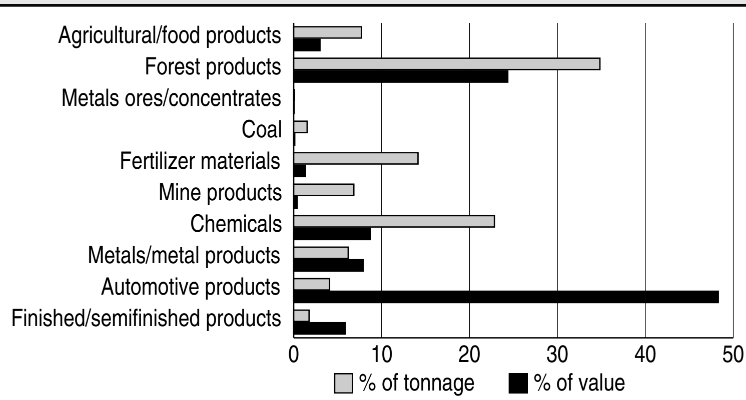
TABLE 14-1
RAIL EXPORTS AND RAIL GROWTH
TO THE U.S., BY PROVINCE

(000 tonnes)

	1997 Tonnage to US	*1987-1992 Per cent*	*1992-1997 Per cent*
Newfoundland	0.3	-100.0	-
Prince Edward Island	0.0	-28.9	-45.3
Nova Scotia	639.9	-5.4	14.7
New Brunswick	906.7	0.1	16.1
Quebec	11,900.6	1.4	6.7
Ontario	14,261.6	6.5	5.3
Manitoba	2,222.7	7.7	21.1
Saskatchewan	11,052.4	4.1	15.1
Alberta	9,686.1	7.2	5.7
British Columbia	7,595.2	3.5	-0.4
Northwest Territories	1.1	-76.6	127.6
Total	**58,266.6**	**4.3**	**6.9**

Source: Transport Canada adapted from Statistics Canada, Cat. 52-216

FIGURE 14-2
TONNAGE AND VALUE OF RAIL EXPORTS
TO THE US BY COMMODITY, 1996



Source: Statistics Canada, International Trade Division

sectors, however, eclipsed increased flows in most other sectors.

For Canadian operations in 1997 compared with 1996, output increased by almost ten per cent for CN and by nearly seven per cent for CP Rail, with the Class I carriers' revenue tonne-kilometres reaching 161 and 118 billion, respectively. Class II output reached over 28 billion revenue tonne-kilometres, an increase of close to 11 per cent over the previous year.

For their systems in 1998, CN and CP Rail reported decreases in output, with revenue tonne-kilometres down 5.8 per cent to 113 billion, and 3.5 per cent to 102 billion, respectively. Estimated output for Canadian operations in 1998 was also down (based on three quarters of data on Canadian operations and four-quarters of system data): 148 billion tonne-kilometres for CN and 115 billion for CP Rail.

In 1998, Class II railways' estimated share of revenue tonne-kilometres was relatively small at less than nine per cent. Even so, Class II carriers carried approximately 30 per cent of freight by tonnage and accounted for about 25 per cent of track operated. Over 50 per cent of Class II traffic is iron ore carried by two railways: Quebec, North Shore & Labrador Railway (QNSL) and Cartier Railway.

Figure 14-1 shows output in revenue tonne-kilometres for the two Class I carriers and the Class II industry from 1986 to 1998. The major contributor to year-to-year fluctuations in revenue tonne-kilometres has been domestic traffic, while to a large degree, the basis for the generally increasing trend has been trade with the US.

RAIL TRAFFIC - TRADE WITH THE US

In 1997, northbound and southbound traffic together reached 67.6 million tonnes, a 14 per cent increase over the previous year. US imports and exports accounted for over a quarter of the tonnage moved over the Canadian railway system.

Exports

Southbound tonnage (mostly transported by Class I carriers) reached 52 million tonnes in 1997, a 12.8 per cent increase over 1996. Of this volume, 44.6 per cent originated from the Prairie provinces, and over 20 per cent in each of Ontario and Quebec. British Columbia was the source of a further eight per cent and 3.4 per cent originated from the Atlantic region. In fact, the Prairies have contributed the most to the increase in exports, with each province approximately doubling tonnage shipped to the US from 1987 to 1997.

Most growth in rail exports took place in the recent past, with average annual growth 4.3 per cent from 1987 to 1992, and 6.9 per cent from 1992 to 1997.

Table 14-1 shows 1997 export tonnage by province, and average annual growth of exports to the US from 1987 to 1992 and 1992 to 1997.

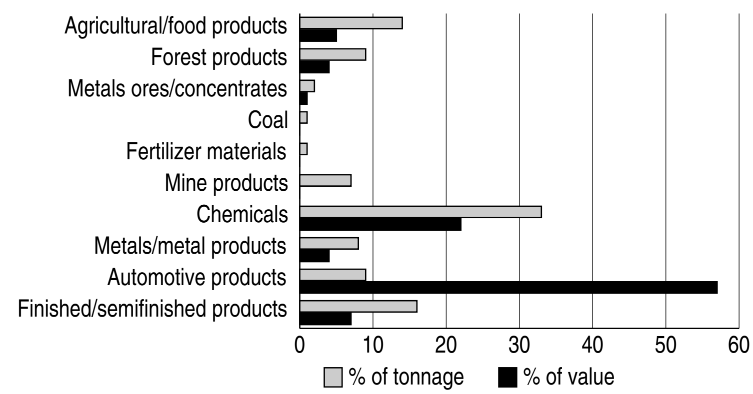
TABLE 14-2
RAIL IMPORTS, IMPORT GROWTH BY PROVINCE

(000 tonnes)

	1996 Tonnage from US	*1986-1991 Per cent*	*1991-1996 Per cent*
Newfoundland	0.2	-19.6	10.0
Prince Edward Island	0.0	-25.6	-100.0
Nova Scotia	461.8	15.5	36.5
New Brunswick	297.2	14.2	0.7
Quebec	5,249.7	6.6	8.1
Ontario	7,068.0	0.6	10.2
Manitoba	613.6	11.7	6.1
Saskatchewan	969.0	6.3	9.3
Alberta	1,736.6	11.1	16.0
British Columbia	1,953.0	-2.1	10.7
Northwest Territories	54.5	-31.4	268.7
Total	**18,403.6**	**3.6**	**10.1**

Source: Transport Canada adapted from Statistics Canada, Cat. 52-216

FIGURE 14-3
TONNAGE AND VALUE OF RAIL IMPORTS FROM THE US, BY COMMODITY, 1996



Source: Statistics Canada, International Trade Division

Forest products accounted for over 14.5 million tonnes (almost a third of the tonnage) shipped to the US in 1997. Shipments from British Columbia and Quebec accounted for about half of these exports, and Ontario and Alberta accounted for about a further 35 per cent. Fertilizer materials were the next most prominent exports (10.8 million tonnes), followed by grains (3.2 million tonnes), intermodal traffic (2.5 million tonnes) and road motor vehicles and liquid petroleum gas (about 1.5 million tonnes each).

According to trade data, the value of rail exports totalled $50.5 billion in 1996. For most of these commodity sectors, there is a disparity between the value of exports and total tonnage. For example, automotive products accounted for 48 per cent of exports by value, but only four per cent of tonnage.

Figure 14-2 compares tonnage and value for exports to the US for ten commodity sectors in 1996.

Imports

Northbound rail tonnage reached 15.6 million tonnes in 1997, up 18 per cent from 1996. Ontario accounted for 40 per cent of this total, Quebec 30 per cent, Prairies provinces over 19 per cent, with the remainder split between British Columbia and the Atlantic provinces. Since 1986, Nova Scotia,

TABLE 14-3
AVERAGE VALUE PER TONNE OF RAIL EXPORTS AND IMPORTS, BY COMMODITY, 1996

	in current $CDN	
	Exports	Imports
Agricultural and food products	394	402
Forest products	711	451
Metals ores and concentrates	356	689
Coal	83	126
Fertilizer materials	97	206
Mine products	58	34
Chemicals	389	749
Metals and metal products	1,294	579
Automotive products	12,037	7,500
Finished and semifinished products	3,402	530
Total	**1,016**	**1,164**

Source: Statistics Canada, International Trade Division

JUSTICE ESTEY REPORT
GRAIN HANDLING AND TRANSPORTATION REVIEW

In late December, the Honourable Willard Z. Estey, CC,QC submitted his report on the grain handling and transportation system in Canada after a year long review.

Justice Estey proposed a package of 15 recommendations to improve the operation of the system. Key recommendations included:

- Creation of a commercial handling and transportation system, with grain companies and railways responsible for handling and transportation and the Canadian Wheat Board responsible for marketing grain,
- Use of a commercial system for allocating grain cars,
- Removal of the existing freight rate cap for grain, conditional upon a commitment by the railways to limit revenues,
- Amend the line transfer provisions of the *Canada Transportation Act* to enhance rail competition by encouraging the creation of short line railways and allowing them to obtain running rights on the lines of the national carriers,
- An enhanced arbitration process for resolving disputes, and
- A review after the 2000/2001 crop year of the productivity gains of the industry and the flow-through of those gains to farmers.

Government is consulting with the grain handling and transportation industry to consider ways in which Justice Estey's recommendations could be implemented.

New Brunswick, Quebec, Manitoba, Saskatchewan, Alberta and the Northwest Territories have each more than doubled their imports from the US. As with exports, most growth in imports has taken place in recent years: the average annual growth in imports was 3.6 per cent from 1987 to 1992 and 10.1 per cent in the next five years.

Table 14-2 shows 1997 import tonnage by province, and average annual growth of exports from 1987 to 1992 and 1992 to 1997.

In 1997, intermodal traffic accounted for 2.2 million tonnes of imports from the US. Plastics and motor vehicle engines and parts were the next most important imports, with 0.9 million tonnes of each entering from the US.

As with exports, there is a large disparity between the value of imports and total tonnage for the ten commodity sectors. The pattern is similar to that of exports, except in the metals/metal products and finished/semi-finished categories.

Figure 14-3 compares import tonnage and value for ten commodity sectors in 1996.

In 1996, average value per tonne was greater for exports than for imports in five sectors: mine products, metals/metal products, forest products, automotive products and finished/semi-finished products. In aggregate, however, average value was 14 per cent higher for imports than for exports.

Table 14-3 shows value per tonne for ten commodity sectors in 1996.

TRAFFIC SECTORS

The majority of railway traffic transported in 1998 can be categorized into seven major commodity sectors: grain, forest products, coal, ores and mine products, fertilizers and fertilizer materials, industrial products, and intermodal traffic. Traffic in six of these sectors – the exception being industrial products – was down from 1997 levels, likely because of effects associated with the economic downturn in Asia. In industrial products, despite a drop in the automotive sector, overall traffic was buoyed up by increased traffic in petroleum products, metals and chemicals.

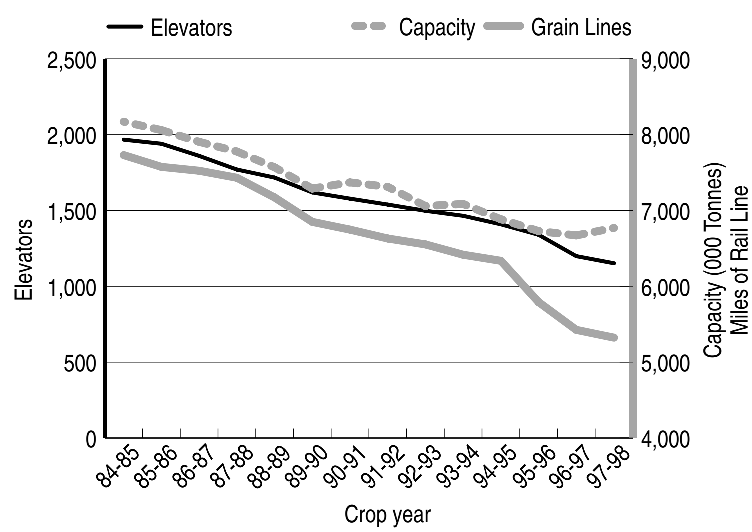
RAILWAY AND GRAIN SYSTEM RESTRUCTURING

Changes in traffic levels brought about by closure of manufacturing or processing facilities, by competition from trucking by reduced commodity demand and by fundamental reorientation of logistics systems are the principal factors influencing the economics of rail lines. Railway restructuring, like the structural changes that have been occurring in many other sectors of the economy is nothing new – only the character changes.

In western Canada, for example, the number of grain elevators and the aggregate capacity of the grain elevation system has been declining since the 1970 peak of almost 5,000 elevators located at 2,000 delivery points. In 1984 the elevator population was about 2,000 and declined by a further 42% to about 1,150 in 1997 at about 800 delivery points. During the 1984-1997 period, the grain dependent prairie rail network shrank by about 32% with a noticeable drop occurring in mid-1996 reflecting the discontinuance of light steel (low volume) lines following the passage of the Canada Transportation Act. Interestingly, grain elevator capacity, although declining by about 18% in this period, has actually stabilized in the past several years. This phenomenon reflects the closure of low capacity elevators at many locations throughout the prairies and massive strategic investments by the grain industry in high throughput facilities at a smaller number of key locations.

In fact, grain elevator closures or reductions in capacity are continuing to occur in areas which are served by rail lines with relatively low traffic volumes – lines whose economic future is questionable. Conversely, investment by grain companies in new high throughput facilities is occurring principally on high traffic volume rail lines. Essentially the same trends, then, are occurring in both the grain and rail industries (and in other sectors for that matter). Portions of both systems representing low throughput and marginal economics are being rationalized in favour of concentrating activity at a smaller number of higher volume, low unit cost facilities.

FIGURE 14-4
GRAIN DEPENDENT RAIL LINES, GRAIN ELEVATORS AND CAPACITY 1984 – 1998



Source: Transport Canada and the Canadian Grain Commission

Total traffic started out with a strong first quarter, reaching volumes six per cent higher than in 1997. It then varied between 1996 and 1997 levels in the second and third quarters. By the end of the year, total traffic reached 257 million tonnes, 96 per cent of 1997's record levels, but 104 per cent of 1996 levels.

Figure 14-5 compares total monthly traffic for 1998 with that for 1997 and 1996.

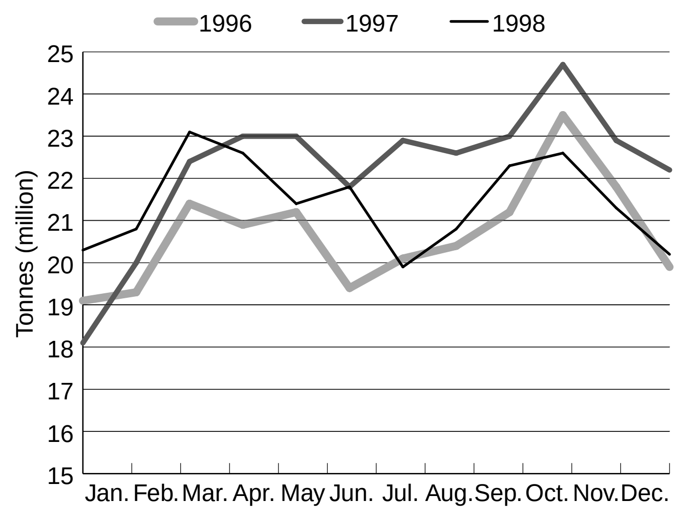
The following sections briefly describe monthly rail traffic for each of the seven major sectors.

Grain

Most grain moves from the Prairies to British Columbia to be exported. Large volumes also move to the US and to the Port of Thunder Bay to be exported via the St. Lawrence Seaway.

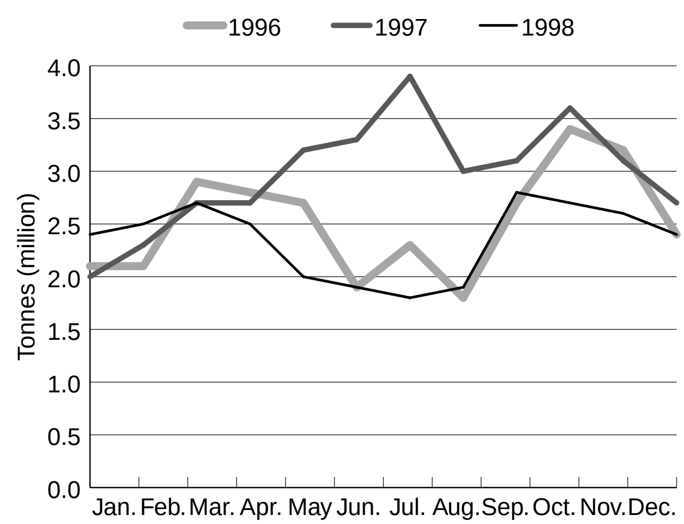
After a bumper crop and increased loadings in 1997, grain shipments in 1998 fell closer to 1996 levels. Total annual tonnage reached only 28 million tonnes, 21 per cent less than 1997 levels, and seven per cent lower than 1996 levels. Although traffic over the first four months exceeded 1997 levels by three per cent, monthly

FIGURE 14-5
TOTAL MONTHLY LOADINGS BY RAIL
1996 – 1998



Source: *Statistics Canada, Cat. 52-001, Monthly Railway Traffic Loadings*

FIGURE 14-6
MONTHLY GRAIN LOADINGS BY RAIL
1996 – 1998



Source: *Statistics Canada, Cat. 52-001, Monthly Railway Traffic Loadings*

loadings from May to August were each more than a million tonnes below corresponding 1997 levels. This drop occurred because production was not as exceptional as in 1997, and grain markets were slightly softer. Although traffic recovered in September, loadings in the last quarter were well below even 1996 levels.

While grain did account for 11 per cent of total tonnage moved in 1998, the drop in total grain shipments was the largest contributor to the drop in overall traffic.

Figure 14-6 shows monthly grain loadings since 1996.

Forest Products

In aggregate, forest products accounted for 39 million tonnes for 15 per cent of total traffic. The gains made in the processed forest products sector were offset by the traffic decrease in unprocessed forest products, resulting in total traffic almost seven per cent lower than in 1997.

Most traffic of unprocessed forest products – logs, pulpwood and pulpwood chips, woodpulp – is intraprovincial: within Quebec, within Ontario and within British Columbia. One-quarter of the traffic by tonnage is exports to the US.

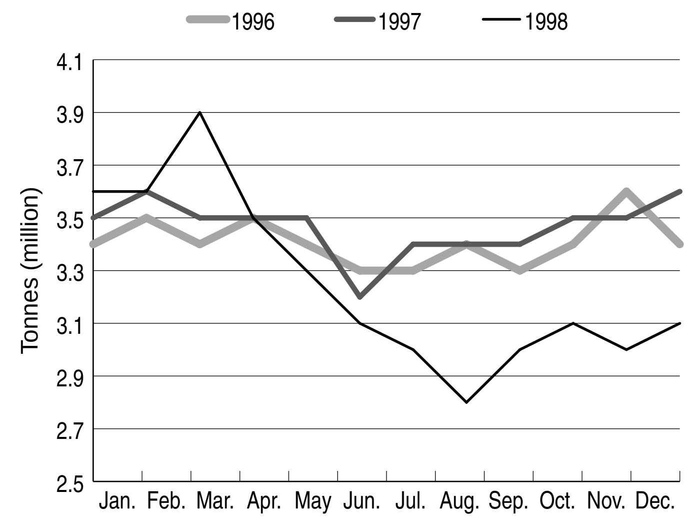
Traffic of unprocessed forest products totalled 20 million tonnes in 1998, only 82 per cent of 1997 levels. While first quarter traffic increased by almost three per cent, second, third and fourth quarter shipments were 1, 11 and 16 per cent below levels in the same quarter of 1997. (See Figure 14-6.) Over 60 per cent of this drop was in shipments of pulpwood chips in Eastern Canada. This may reflect a five-month strike at Abitibi-Consolidated between June and November. Traffic in the last quarter did not recover.

Traffic of processed forest products – lumber, plywood, paper, newsprint and packaging – is dominated by exports from Ontario, Quebec and British Columbia to the US (about 60 per cent of traffic). US-bound shipments from other provinces and bridged traffic (originating in and destined for the US) account for much of the remaining flows. Domestic traffic is dominated by flows within and between Ontario and Quebec, and flows within British Columbia.

Annual traffic of processed forest products exceeded levels of the previous four years, reaching 19 million tonnes in 1998, eight per cent higher than in 1997. Monthly loadings fluctuated generally above 1997 levels, and net figures for each quarter were higher in 1998. Softness in the Asian market and lower exports to Japan, particularly of softwood lumber, did not appear to affect rail shipments.

Figure 14-7 shows aggregate (processed and unprocessed) traffic for 1996 to 1998.

FIGURE 14-7
MONTHLY FOREST LOADINGS (PROCESSED AND UNPROCESSED) BY RAIL, 1996 – 1998



Source: Statistics Canada, Cat. 52-001, Monthly Railway Traffic Loadings

Ores and Mine Products

This sector is comprised of copper, lead, zinc, aluminum, iron and other ores, and by sand, gravel and crushed stone, crude gypsum and asbestos, salt, cement and other mine products. As a whole, the sector's performance was similar to that of 1997. Aggregate traffic was down by less than one per cent, mostly because iron ore flows in the last quarter were down 18 per cent compared to 1997. Ores and mine products were the largest contributors to total traffic, accounting for 23.5 per cent of annual tonnage in 1998.

Iron ore dominates this sector, accounting for 39 million tonnes in 1998, or about 65 per cent of tonnage in this sector. Virtually all of this traffic flows from mines in northern Quebec and Labrador to ports on the St. Lawrence via Quebec, Northshore & Labrador Railway and Cartier Railway. Shipments of iron ore in 1998 were 0.6 per cent lower than in 1997.

The other ores and mine products make up the remaining 21.4 million tonnes in this sector. Flows in 1998 were down by just over one per cent from 1997 levels.

Fertilizers and Fertilizer Materials

In aggregate, transport of fertilizers and fertilizer materials was down by over three per cent in 1998. Whereas in the two previous years, June tonnage dropped by 30 to 37 per cent from April, the decline in June 1998 was only 14 per cent. This reflected more moderate flows throughout the entire year.

Potash, produced mostly in Saskatchewan, accounts for over 50 per cent of the traffic in this sector. Operation of the new potash terminal at the Port of Portland, Oregon, did not appear to affect 1997 rail tonnage moved to Vancouver for export — marine exports totalled 4.3 million tonnes, up from 3.6 million tonnes in 1996. However, in 1998, the Port of Vancouver reported a 20 per cent drop in potash traffic, although rail tonnage dropped only two per cent to 13.9 million tonnes in that year.

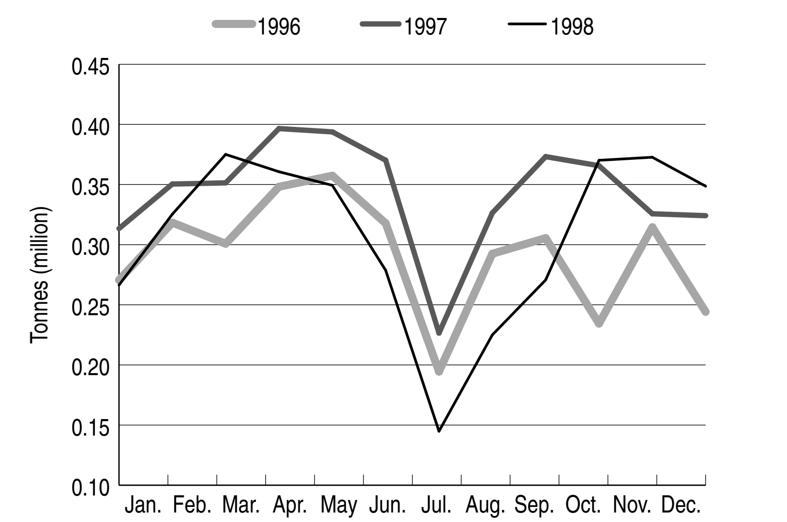
In recent years, approximately 70 per cent of sulphur traffic has been from Alberta to British Columbia, with about three quarters of this destined to ports for export. Most of the remaining tonnage flows to the US, again from Alberta, but also in smaller quantities from New Brunswick, Ontario, Quebec, Saskatchewan and British Columbia. With 1998 prices lower than the cost to market their products, producers likely chose to build inventory. As a result, sulphur traffic dropped to 6.9 million tonnes in 1998, a decrease of six per cent.

In 1998, 6.1 million tonnes of phosphate rock and other fertilizer materials were also transported in Canada, down by 2.7 per cent from 1997.

Coal

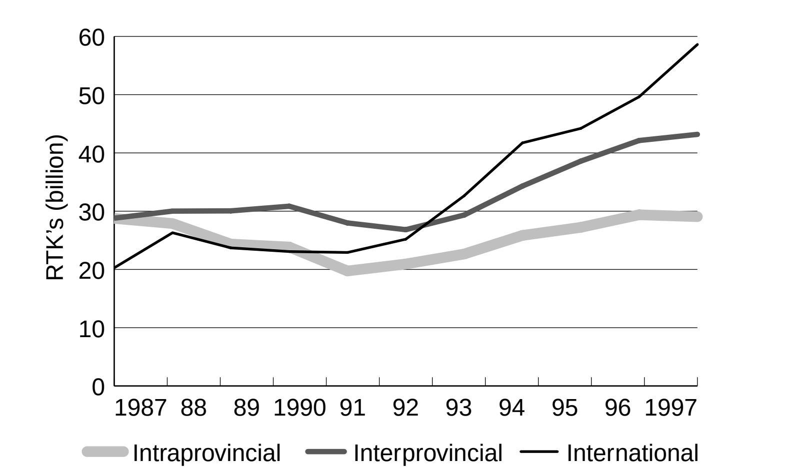
Coal and coke traffic was strong in the first quarter of 1998, with flows 14.2 per cent higher than in the same quarter of 1997. Traffic dropped in the second and third quarters, however, and finished the

FIGURE 14-8
MONTHLY AUTOMOTIVE LOADINGS BY RAIL, 1996 – 1998



Source: Statistics Canada, Cat. 52-001, Monthly Railway Traffic Loadings

FIGURE 14-9
ANNUAL TRUCK TRAFFIC GROWTH IN TONNE-KILOMETRES 1987 – 1997



Source: Statistics Canada, Cat. 52-222; Transport Canada

year at 39.1 million tonnes, seven per cent below 1997 levels. Most coal flows from western Canada to the ports of Vancouver and Prince Rupert. As about a third of this is usually exported to Japan, much of the drop in shipments in 1998 can be attributed to sagging Japanese steel production.

Coal has been accounting for a slightly decreasing proportion of total rail traffic in recent years: 16.3 per cent of the total in 1996, 15.8 per cent in 1997 and 15.5 per cent in 1998. However this sector is still second in importance to ores and mine products in terms of tonnage transported.

Industrial Products

Industrial products include automobiles and parts, refined petroleum products, chemicals and metals. In aggregate, this sector accounted for 14 per cent of total traffic in 1998, up from 11.8 per cent in 1997.

Generally, about one half of automotive traffic flows from Ontario to the US, and about one quarter consists of flows from the US to Ontario and Quebec. Much of the rest moves from Ontario to other provinces and from Quebec to the US.

Total automotive traffic reached 3.7 million tonnes, down from 4.1 million tonnes in 1997. Automotive traffic accounted for 10 per cent of industrial traffic in 1998.

Automotive traffic started relatively strong in 1998. However, GM strikes at two plants in Flint, Michigan, in June and July affected CN automotive traffic and revenue. Total automotive traffic hit a low of 64 per cent of 1997 monthly tonnage in July. CN's second-quarter revenue was down 16 per cent from 1997, while third-quarter revenues were even lower, 31 per cent lower than 1997 levels. In the fourth quarter, traffic recovered, exceeding 1997 levels by over seven per cent.

Figure 14-8 shows trends in monthly automotive traffic from 1996 to 1998.

Alberta is the major origin of chemical traffic, followed by Ontario, Quebec, and Manitoba.

Alberta shipments are destined for British Columbia and Ontario, while Quebec and Ontario shipments remain in the region. About 15 per cent of traffic originates in the US, most of which goes to Ontario and Quebec. The US, however, is the predominant destination for chemical traffic, receiving over one-third of total tonnage, mostly from Alberta, Ontario and Quebec.

Chemical traffic is the largest contributor to the industrial traffic sector, accounting for 41 per cent in 1998. Monthly traffic was consistently high and fairly moderate throughout the year. The annual tonnage reached 14.8 million tonnes, 8.6 per cent higher than in 1997.

Approximately one third of petroleum product traffic flows from the six central and western provinces to locations in the US. Other flows of significance are within and between Ontario and Quebec, and from Alberta to Ontario and British Columbia.

Petroleum products accounted for 24 per cent of industrial tonnage in 1998. The 1998 annual tonnage was 8.6 million tonnes, up from 5.2 million tonnes in 1997. Tonnage over the first five months was nine per cent higher than in 1997. In June, increased flows of liquid petroleum gas and miscellaneous refined petroleum products caused petroleum traffic to jump by over 100 per cent to 813,000 tonnes. Traffic remained at these high levels for the rest of the year.

The metals sector includes primary and manufactured metals, scrap and waste metals, and machinery and parts. One third of metals traffic is within and between Ontario and Quebec. Another third moves to the US from Quebec, Ontario, Saskatchewan, British Columbia and Manitoba. Rail imports from the US to Alberta, Ontario and Quebec make up another ten per cent.

In 1998, metals accounted for 24.8 per cent of industrial traffic. Even though traffic in the last three quarters dropped closer to 1997 levels, a strong first quarter – 18 per cent higher than in 1997 – boosted the annual tonnage to 8.9 million tonnes, a 3.6 per cent increase overall.

TABLE 14-4
REVENUES OF FOR-HIRE TRUCKING ACTIVITY BY COMMODITY GROUP, 1997

Commodities	*Domestic (millions)*	*Domestic Percent*	*International (millions)*	*International Percent*	*Grand Total (millions)*	*Grand Total Percent*
General freight	$2,616.1	41.0	$2,146.1	47.1	$4,762.1	43.5
Food products	1,120.2	17.6	539.8	11.8	1,659.9	15.2
Forest products	936.6	14.7	698.5	15.3	1,635.1	14.9
Automotive products	333.1	5.2	532.8	11.7	865.9	7.9
Steel and alloys products	444.3	7.0	355.6	7.8	799.8	7.3
Chemical products	391.2	6.1	203.9	4.5	595.1	5.4
Petroleum Products	330.4	5.2	36.1	0.8	366.6	3.4
Non-metallic minerals	181.8	2.9	39.1	0.9	221.0	2.0
Metals/ores	23.5	0.4	8.0	0.2	31.4	0.3
Total Revenues	**$6,377.1**	**100.0**	**$4,559.8**	**100.0**	**$10,936.9**	**100.0**

Source: *Transport Canada; Statistics Canada, special tabulation from For-Hire Commodity Origin-Destination Survey*

Intermodal

For intermodal traffic, origin and destination statistics are similar in terms of both volumes and geography. Quebec and Ontario generate and receive about half of intermodal traffic. Nova Scotia (port traffic), Alberta and British Columbia collectively account for about one third. Intermodal imports from and exports to the US comprise the other major flow.

Intermodal traffic throughout 1998 generally followed the same trend as in 1997, but at slightly lower levels of tonnage. This sector accounted for 6.8 per cent of total traffic, almost the same proportion as recorded for 1997.

CP reported higher intermodal revenue for 1998, whereas CN suggested that labour negotiations might have reduced its intermodal revenue for the year.

Trailer-on-flat car (TOFC) tonnage continued to decrease, following the trend of recent years. The total annual tonnage was 1.4 million tonnes, 27.9 per cent lower than in 1997. The dramatic growth of container-on-flat-car (COFC) tonnage since the early 1990s was arrested in 1998, with annual tonnage at 16.2 million tonnes, just 2.8 per cent higher than the year before.

TRUCKING TRANSPORTATION

DOMESTIC VS INTERNATIONAL TRUCK TRAFFIC

Since 1991, the number of tonne-kilometres[1] moved by for-hire

1 Tonne-kilometres is a physical measure of trucking activities used to assess trends in traffic. It captures two of the important dimensions of the freight traffic carried by truck – volume and distance.

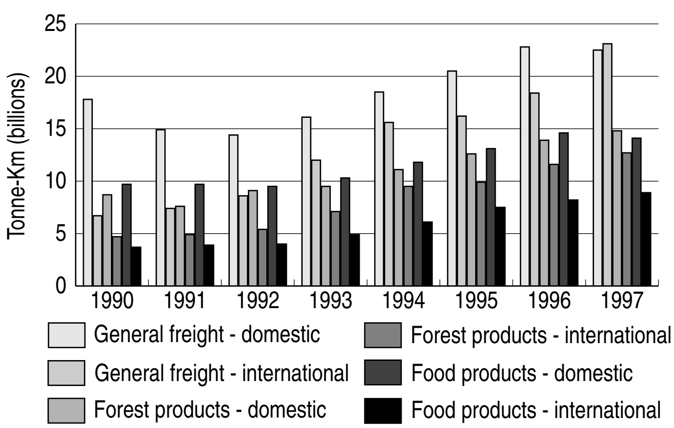
TABLE 14-5
TRAFFIC VOLUME OF FOR-HIRE TRUCKING BY COMMODITY GROUP, 1997

(Million tonne-kilometres)

Commodities	*Domestic*	*%*	*International*	*%*	*Grand Total*	*%*
General freight	22,549.7	31.2	23,137.8	39.5	45,687.5	34.9
Forest products	14,774.8	20.5	12,683.9	21.6	27,458.7	21.0
Food products	14,130.3	19.6	8,899.7	15.2	23,030.0	17.6
Steel and alloys products	5,913.5	8.2	5,205.8	8.9	11,119.2	8.5
Chemical products	4,437.9	6.1	2,574.9	4.4	7,012.8	5.4
Petroleum Products	5,408.6	7.5	668.1	1.1	6,076.7	4.6
Automotive products	1,442.0	2.0	4,522.8	7.7	5,964.8	4.6
Non-metallic minerals	3,137.0	4.3	778.5	1.3	3,915.5	3.0
Metals/ores	446.5	0.6	141.6	0.2	588.0	0.4
Total Tonne-kilometres	**72,240.2**	**100.0**	**58,613.2**	**100.0**	**130,853.3**	**100.0**

Source: Transport Canada; Statistics Canada, special tabulation

FIGURE 14-10
DOMESTIC VERSUS INTERNATIONAL FOR-HIRE TRUCK TRAFFIC FOR THREE COMMODITY GROUPS, 1990 – 1997



Source: Transport Canada, based on Statistics Canada data

trucks has increased steadily in both the domestic and international markets. Domestically, tonne-kilometres rose from 47.7 to 72.2 billion over the period 1991-97, for an average annual increase of 7.2 per cent, while internationally, the average annual growth of tonne-kilometres reached near 17 per cent (from 22.9 to 58.5 billion), over the same period.

In light of these increases, the relative importance of domestic and international markets in the total traffic of Canadian-based for-hire trucking firms has been shifting in the past decade. Since 1991, the domestic share of total tonne-kilometres has decreased by 15 per cent, resulting in a corresponding increase in the international share of total tonne-kilometres.

Figure 14-9 shows annual growth in truck traffic in tonne-kilometres from 1987 to 1997.

Truck Traffic by Commodity Group

In terms of value, general freight (primarily manufactured products and fabricated materials) accounted for a significant share of truck traffic in 1997. Domestic traffic in this commodity group generated approximately $2.6 billion, or 41 per cent of all domestic revenues, while international traffic generated approximately $2.1 billion, or 47 per cent of all international revenues. The next most valuable commodities transported — domestic and international combined — were food products at about $1.7 billion (15.2 per cent of the total) and forest products at about $1.6 billion (14.9 per cent). Collectively, these three commodities accounted for almost 75 per cent of the carriers' revenues in 1997.

Table 14-4 shows the revenues of for-hire trucking activity by commodity group for 1997.

In terms of tonnes-kilometres, general freight accounted for 22.5 billion tonne-kilometres domestically (31.2 per cent of domestic traffic) and 23.1 billion tonne-kilometres to the US and Mexico (39.5 per cent of international traffic). Combined, this represents 35 per cent of the total tonne-kilometres. In aggregate, general freight, food products and forest products accounted for almost 75 per cent of the carriers' total tonne-kilometres in 1997.

Table 14-5 shows the volume of for-hire trucking traffic by commodity group for 1997.

Three major sources were responsible for the growth in freight traffic carried by trucking: general freight, where the transborder activities have surpassed the domestic volumes in terms of tonnes-kilometres; forest products, where the growth in both domestic and transborder flows has been significant; and food products, where trucking has been handling an increasing volume of freight.

Figure 14-10 compares domestic and internationl for-hire truck traffic for the three largest commodity groups — general freight, forest products and food products — from 1990 to 1997.

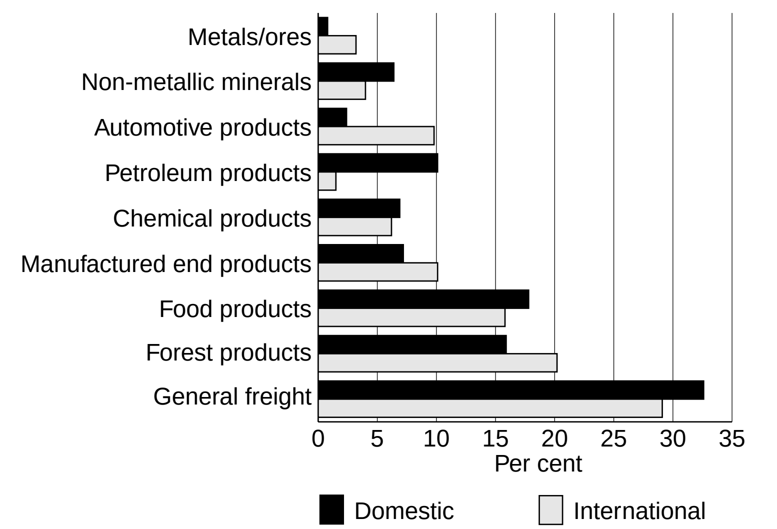
Figures 14-11 and 14-12 compare the relative share of domestic and international for-hire truck traffic for nine commodity groups in 1990 and 1997.

TRUCK TRAFFIC BY REGIONS

In 1997, four provinces accounted for 85 per cent of total tonne-kilometres moved by Canadian-based for-hire trucks. Ontario dominated in domestic and international sector, with a combined share of 38 percent of total tonne-kilometres, followed by Quebec (22 per cent), Alberta (14 per cent) and British Columbia (11 per cent). Table 14-6 shows the provincial distribution.

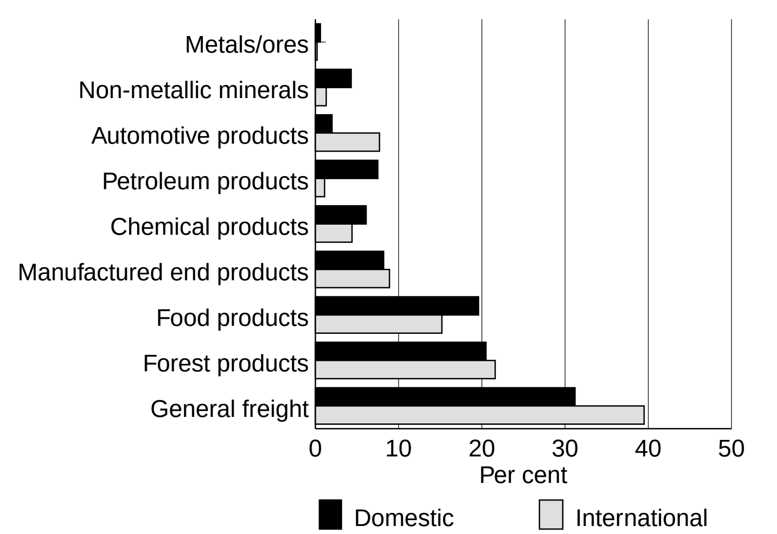
At the inter-provincial level, traffic flows between Quebec and Ontario reached 9.5 billion tonne-kilometres in 1997, including 5.1 billion on the "Quebec to Ontario" leg. Main commodity groups moved by for-hire trucks from Quebec to Ontario were forest products, iron & steel products, and other manufactured products (machinery, general freight,…). On the reverse, trucks moved food-processed products, iron & steel products, and manufactured items (machinery, equipment, general freight) from Ontario to Quebec.

FIGURE 14-11
DOMESTIC VERSUS INTERNATIONAL FOR-HIRE TRUCK TRAFFIC FOR NINE COMMODITY GROUPS, 1990



Source: *Transport Canada, based on Statistics Canada data*

FIGURE 14-12
DOMESTIC VERSUS INTERNATIONAL FOR-HIRE TRUCK TRAFFIC FOR NINE COMMODITY GROUPS, 1997



Source: *Transport Canada, based on Statistics Canada data*

TABLE 14-6
FOR-HIRE TRUCK TRAFFIC BY SECTOR AND PROVINCE, 1997

(Million tonne-kilometres)

	Intra-Prov.	*Inter-Prov.*	*International*	*Total*	*Share (%)*
Ontario	10,182	14,345	25,069	49,596	37.9
Quebec	6,181	8,385	13,925	28,491	21.8
Alberta	5,163	6,776	6,212	18,151	13.9
B.C.	4,267	4,667	5,618	14,552	11.1
Man.,Sas.&Terr.	1,714	5,506	4,271	11,491	8.8
Atlantic prov.	1,556	3,498	3,518	8,572	6.6
Total:	**29,063**	**43,178**	**58,613**	**130,853**	**100.0**

Notes: Totals may not add due to rounding; Canadian domiciled for-hire Class I and II carriers; “International” includes exports and imports; “Inter-Provincial” are loadings based; “Territories” include Yukon and Northwest Territories.

Source: Statistics Canada, Special Tabulation

TABLE 14-7
FOR-HIRE TRUCK INTERNATIONAL TRAFFIC BY SECTOR AND PROVINCE, 1997

(Million tonne-kilometres)

Province	*US Region*	*Southbound movements (“Exports”)*	*Northbound movements (“Imports”)*	*TOTAL*	*Share (%)*
Ontario	US Central	6,912	4,471	11,382	19.4
Ontario	US South	3,368	3,298	6,665	11.4
Quebec	US South	2,476	1,849	4,325	7.4
Quebec	US North-East	2,859	1,446	4,305	7.3
Prairie prov.	US Central	2,469	1,792	4,261	7.3
Ontario	US North-East	2,230	1,825	4,055	6.9
Quebec	US Central	2,592	1,338	3,930	6.7
B.C.	US West	2,111	1,621	3,733	6.4
Sub-total		**25,017**	**17,640**	**42,657**	**72.8**
Other movements		9,003	6,954	15,957	27.2
TOTAL:		**34,020**	**24,594**	**58,613**	**100.0**

Notes: US North-East includes US New England and US Middle Atlantic states; US Central includes some states bordering the Great Lakes and other central states such as North & South Dakota, Nebraska, Iowa, Kansas and Missouri. US West includes US Pacific states and US West Mountain states.

Source: Transport Canada, adapted from Statistics Canada special tabulation

Other major interprovincial flows included the Ontario/Prairie provinces traffic (7.4 billion tonne-kilometres, including 5.0 billion in the “Ontario to Prairies” direction), and the British Columbia/ Prairie provinces traffic at 6.2 billion tonne-kilometres.

At the international level, the most important traffic flows involved Ontario and the US Central states, totalling 11.3 billion tonne-kilometres (6.9 billion tkms as southbound movements and 4.5 billion as northbound shipments). Main commodity groups shippped by for-hire trucks from Ontario to US Central states were motor vehicles & accessories, forest products, and manufactured products (machinery, equipment, general freight,…) On the reverse, iron & steel products, motor vehicles & accessories and manufactured items were moved by for-hire trucks to Ontario from those same Central states (Table 14-7).

The second major traffic flows included Ontario and the US Southern states; this traffic totalled 6.7 billion tonne-kilometres in 1997 and was equally divided into southbound and northbound movements.

Truck Sales

Truck sales reflect the health of the trucking industry in Canada: strong sales levels are generally the result of a healthy period of demand for trucking services. In 1998, more than 29,000 new Class 8 trucks (vehicles with a gross vehicle weight of 15,000 kilograms or more) were sold, exceeding 1997 sales by seven per cent and establishing a new sales record. A number of factors favourable to heavy truck sales contributed to this: a sustained level of strong manufacturing and trade activities;

relatively favourable interest rates; overall sound financial performance from the industry; controlled inflation; and increased consumer spending. New truck purchases reflected pent-up demand following deferred fleet replacement during the 1990/92 recession and strong growth in demand for truck freight services since 1993.

Figure 14-13 shows the number of Class 8 trucks sold each year in Canada from 1990 to 1998.

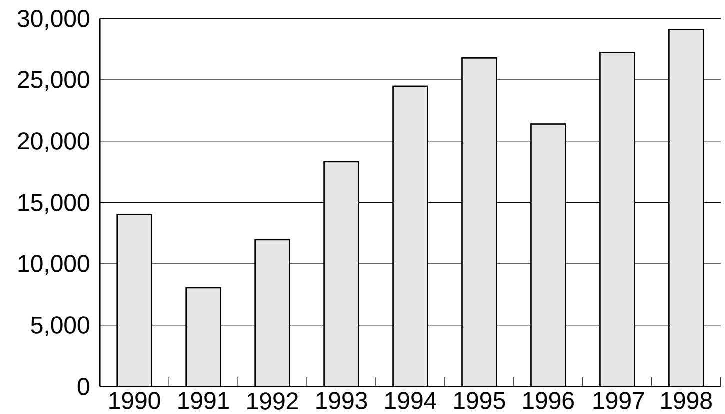
Over 75 per cent of the Class 8 trucks purchased in 1998 were in Alberta, Ontario and Quebec. Record sales in 1998 were led by Ontario, where 11,947 vehicles were sold, 2,200 more than in 1997.

Table 14-8 shows the sales of Class 8 by province in 1997 and 1998.

Over 293,000 Class 8 large trucks were registered in Canada in 1996, up from 277,000 in 1995. Three provinces, Ontario, Quebec and Alberta, accounted for 72 per cent of this total.

A recent report done for the Department estimates the total number of heavy trucks registered in Canada in 1997, by registered weight class, from information compiled by R. L. Polk, combined with data collected directly from registration agencies in the Provinces and territories. The estimates are shown in Table 14-9.

FIGURE 14-13
ANNUAL SALE OF CLASS 8 TRUCKS IN CANADA
1990 – 1998



Source: Canadian Vehicle Manufacturers' Association

TABLE 14-8
SALES OF CLASS 8 BY PROVINCE
1997 and 1998

	1997		*1998*	
Commodities	*Sales*	*% of Total*	*Sales*	*% of Total*
British Columbia	2,401	8.8	2,265	7.8
Alberta	5,185	19.0	4,402	15.1
Saskatchewan	1,315	4.8	1,168	4.0
Manitoba	1,491	5.5	1,615	5.6
Ontario	9,783	35.9	11,947	41.1
Quebec	5,255	19.3	5,682	19.5
New Brunswick	1,130	4.2	1,282	4.4
Nova Scotia	474	1.7	560	1.9
Prince Edward Island	32	0.1	46	0.2
Newfoundland	157	0.6	129	0.4
Canada	**27,223**	**100.0**	**29,096**	**100.0**

Source: Canadian Vehicle Manufacturers' Association

TABLE 14-9
COMMERCIAL TRUCKS
REGISTERED IN CANADA IN 1997

Truck Class	*3*	*4*	*5*	*6*	*7*	*8*	*Total*
Gross weight (kg) *min.*	*4,536*	*6,351*	*7,258*	*8,846*	*11,794*	*14,970*	
max.	*6,350*	*7,257*	*8,845*	*11,793*	*14,969*	*63,500*	
Newfoundland	863	172	120	1,135	1,647	3,432	7,369
Prince Edward Island	292	95	86	1,134	619	2,220	4,446
Nova Scotia	1,791	488	253	2,064	2,550	7,871	15,017
New Brunswick	14,609	585	228	2,569	2,117	12,121	32,229
Quebec	20,322	7,252	4,009	20,410	15,504	57,904	125,401
Ontario	23,333	7,252	5,047	20,445	16,053	90,429	162,559
Manitoba	5,500	584	796	6,385	10,000	17,314	40,579
Saskatchewan	58,673	1,288	2,262	19,045	4,185	15,667	101,120
Alberta	32,174	25,762	7,975	8,657	23,589	63,728	161,885
British Columbia	8,608	2,726	1,811	7,184	7,693	29,388	57,410
Yukon	242	75	47	296	312	1,240	2,212
Northwest Territories	191	60	37	233	204	813	1,538
Canada	**166,598**	**46,339**	**22,671**	**89,557**	**84,473**	**302,127**	**711,765**

Source: Fred Nix: "Commercial Vehicle Program Thresholds" report to TC Rd Safety, May 24, 1998

TRANSPORTATION OF GRAIN BY TRUCK

A 1997 study sponsored by the Motor Carrier Policy Branch of Transport Canada, Review of Grain Transportation by Truck in Western Canada, noted recent increases in grain transportation by truck as the Prairie grain industry adjusts to significant changes. These changes include:

- elimination of rail transportation subsidies,
- consolidation of grain elevator and rail branchline services, and
- expansion of secondary processing.

As a result of these changes, the use of trucks to haul grain within Western Canada has increased. In the 1995 – 1996 crop year, a total of 48.0 million metric tonnes of grain was available for sale. Approximately 43.5 million metric tonnes, or 90.5 per cent of this total, was trucked locally. Local trucking includes the following types of trucking:

- from a farm to a nearby primary elevator or inland terminal;
- to a rail siding for loading in a “producer railcar”;
- for a local seeding requirement; or
- for local feeding to animals.

More secondary processing activity in western Canada and active access to US markets has enabled the for-hire grain trucking industry to enjoy significant growth in intermediate trucking activity. As a follow-up to the 1997 study, the Study of Grain Transportation Changes and Outlooks for western Canada—1998 examines the extent and nature of grain-related agricultural processing activities in western Canada and quantifies their expected effect on trucking. This report describes trucking-related activities in terms of the underlying business segments they serve to give a better understanding of the factors that give rise to changes in the trucking sector (e.g. elevator consolidation, change of vehicle configuration, length of haul).

The 1998 report investigated such key sectors as milling and oilseed crushing, alcohol distilling, the malting of barley, animal feeding and meat processing, potatoes and other agro-industrial activities.

An estimated 8.4 million metric tonnes of grain is trucked in support of the various secondary processing facilities. Current grain volumes, converted to Super B-Train equivalents (tractor-twin-trailer units) result in 195,000 truckloads of grain being transported. Plant expansions and new facilities are expected to add an additional 1.4 million metric tonnes, or 33,000 truckloads, of grain per year over the next two to three years.

In addition to grain, the 1998 report also identifies other agricultural processing movements by truck (e.g. livestock hauling, refrigerated van trailer hauling of meats). These truck movements account for 205,000 truckloads per year; an additional 90,000 truckloads are expected when new facilities come into production. Several key factors underlie this growth in trucking in western Canada. The following summary of factors to affect truck movements includes both current and projected (over next two to three years) production levels:

- Consolidation of elevators (from about 2,000 to 760) has increased the average distance of farm to elevator movement of grain from 9 to 26 kilometres. Producers are increasingly using large trucks (such as Super B-Trains) rather than single-axle farm trucks for grain movements.
- Oat processing capacity has tripled since 1987, largely due to oats being recognized as a health food in the late 1980s. Specialty milling, which involves a number of smaller, specialized grain milling facilities, is increasing
- Canola is the principal oilseed crushed. Since 1987, capacity has tripled through modernization and expansion of existing plants. Some 2.5 million tonnes (57,900 truckloads) of canola are shipped to the crushing mills. The plants produce 1 million tonnes (41,100 truckloads) of oil and margarine by-products and an additional 1.5 million tonnes of meal, which is trucked locally to feedlots located near the plants.
- There has been a general shift toward trucking for inbound feed stocks and outbound shipping of bulk alcohol products from distilling facilities.
- Two new plants in Alberta dominate beef production in western Canada. Approximately 3 million tonnes (69,500 truckloads) of grain is shipped to feedlots per year, and an additional 39,600 truckloads of cattle are moved between the feedlots and the meat packaging facilities. Outbound meat products are moved primarily in tri-axle semi-trailer refrigerated units, accounting for 33,000 truckloads per year.

- Since 1995, there have been several major plant expansions for processing pork. Approximately 27,600 truckloads of feed grain are delivered to the large commercial hog barns. This will increase to 39,500 truckloads after 1999. An additional 34,000 truckloads of hogs are moved from the farms to processing plants. Outbound pork products are moved primarily by truck, and represent 20,000 truckloads per year. This will increase to 28,700 truckloads after the Brandon plant becomes fully operational in 1999.
- Irrigation capacity in southern Alberta and Manitoba has expanded the acreage available for producing potatoes. A number of plant expansions and new facilities are under way, principally oriented to the production of french fry potatoes. Inbound movement of potatoes amounts to 7,400 truckloads, which will nearly double to 14,300 truckloads when future production is realized in the year 2000. Current outbound movement of potato products amounts to 13,200 truckloads and is expected to increase to 25,400 truckloads by 2000.
- The use of straw from cereal grain production to create strawboard as a building material is expanding. A pilot plant was opened in Manitoba in 1997, and there is a proposed facility in Alberta. If this technology is shown to be economically viable, other projects are expected to follow. Each plant is expected to process 300,000 tonnes (20,400 truckloads) of straw annually.
- Biotechnology research for new products is expanding. Manufacture of critical industrial products from grains will result in future markets for grains and further truck transportation support activities. University-based centres of excellence in biotechnology and agricultural engineering research have emerged in Saskatoon, Edmonton and Winnipeg.

Figure 14-14 shows the number of inbound and outbound truckloads of various products in Western Canada.

FIGURE 14-14
INBOUND AND OUTBOUND TRUCKLOADS OF VARIOUS PRODUCTS
IN WESTERN CANADA

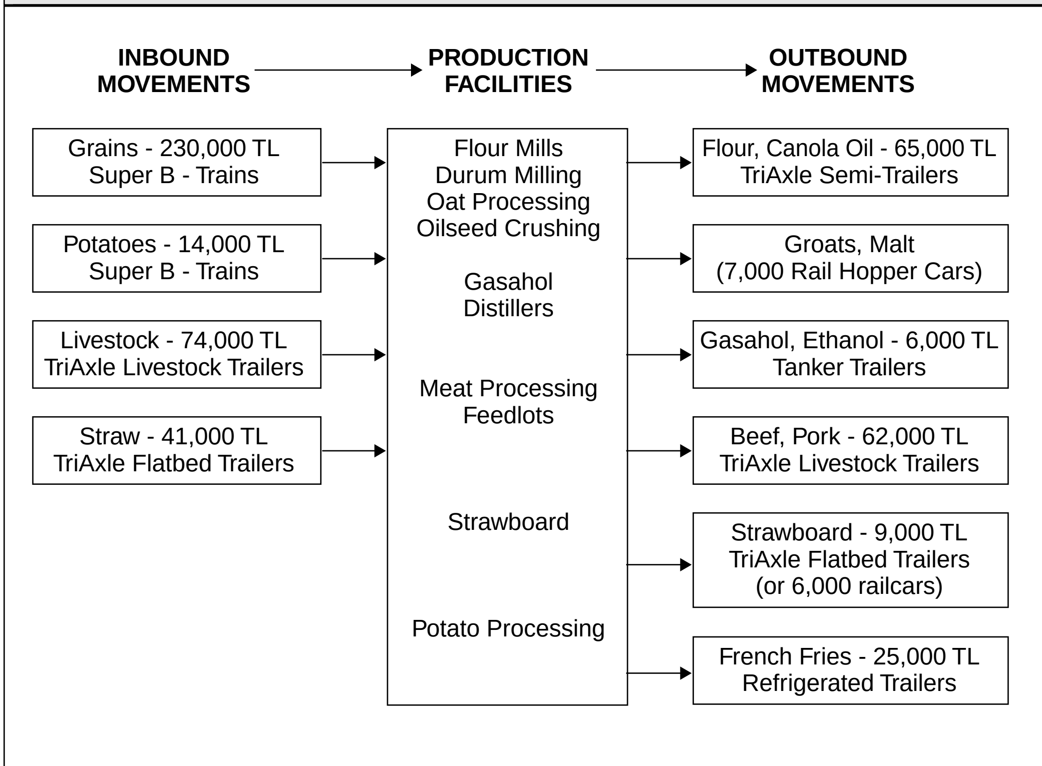
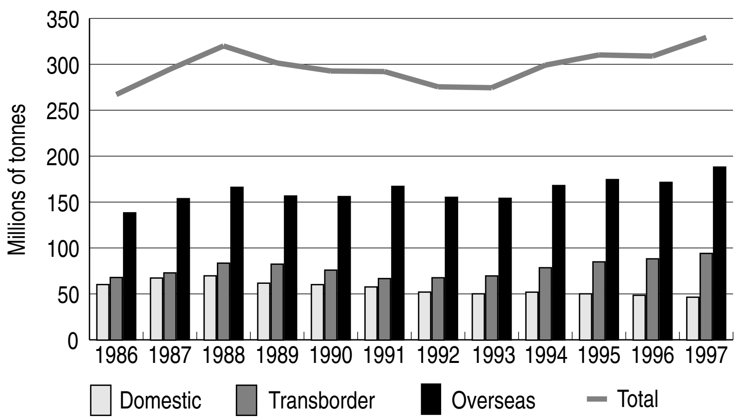


FIGURE 14-15
CANADA'S MARINE TRAFFIC FLOWS, BY SECTOR
1986 – 1987



Source: Statistics Canada, Cat. 54-205

TABLE 14-10
CANADIAN FLAG SHARE OF CANADIAN WATERBORNE TRADE
1997

Canadian Waterborne Trade	*Canadian Flag*	*Per cent*	*US Flag*	*Per cent*	*Foreign Flag*	*Per cent*	*Total Traffic*
	(millions of tonnes)						
Domestic	45.5	97.4	0.2	0.4	1.0	2.2	46.7
Canada / US	49.9	52.9	7.0	7.4	37.5	39.7	94.4
Deep-Sea	0.2	0.1	1.5	0.8	186.9	99.1	188.6
TOTAL	**95.6**	**29.0**	**8.7**	**2.6**	**225.4**	**68.4**	**329.7**

Source: Statistics Canada and Transport Canada

TABLE 14-11
MARINE DOMESTIC FLOWS BY REGION
1997

(Millions of tonnes)

Region of Origin (Loadings)	*------- Region of Destination (Unloadings) -------*				*All*
	Atlantic	*St. Lawrence*	*Great Lakes*	*Pacific*	*Regions*
Atlantic	3.6	2.1	0.4	-	6.1
St. Lawrence	1.2	5.5	4.9	-	11.6
Great Lakes	0.2	8.0	8.8	-	17.0
Pacific	-	-	-	12.0	12.0
All Regions	5.0	15.6	14.1	12.0	46.7

Source: Statistics Canada, Cat. 54-205

MARITIME TRANSPORTATION

Canada's maritime freight traffic has three components – domestic flows,[2] transborder trade with the US, and "other" international[3] (overseas) traffic. In 1997, marine freight traffic totalled 329.7 million tonnes,[4] a 6.7 per cent increase over 1996 levels. Domestic flows accounted for 46.7 million tonnes, a 4.3 per cent decline from the 48.8 million tonnes moved in 1996. Transborder traffic between Canada and the US totalled 94.4 million tonnes, a 6.7 per cent increase over 1996 volumes. Overseas traffic reached 188.6 million tonnes in 1997, a ten per cent increase.

For the ten-year period 1987 to 1997, total marine flows fluctuated from one year to the next but showed a slightly increasing trend overall. With the exception of the domestic sector, 1997 was a peak year for marine freight volumes. Total traffic volumes were 6.2 per cent higher than the peak level of 1995 (310 million tonnes), also surpassing the previous peak year volume of 1988 (320 million tonnes). Domestic traffic flows decreased from a peak of 70 million tonnes in 1988 to 46.7 million tonnes in 1997, a 33 per cent decline. Transborder (Canada–US) traffic in 1997 exceeded the previous high recorded in 1996 by almost seven per cent. Since 1987, transborder tonnages increased by 29 per cent. Overseas (other international) traffic recorded a very healthy growth of 22.6 per cent between 1987 and 1997. Overseas volumes were eight per cent higher in 1997 than in 1995.

2 Maritime traffic that originates from and is destined to a Canadian port; the concept of flows only counts traffic volume once as opposed to the concept of port loadings and unloadings, where, in the case of domestic traffic, the same volumes get counted twice.

3 Traffic to/from all foreign countries other than the United States

4 Based on traffic flows rather than tonnage handled at Canadian ports (domestic volumes are not double counted)

Figure 14-15 shows Canada's marine traffic flows, by sector, from 1986 to 1997.

Canadian maritime trade has three main components – domestic, transborder (US) and deep-sea. In 1997, these movements totalled 329.7 million tonnes. Domestic trade, also called coasting trade, accounted for 46.7 million tonnes, of which Canadian flag vessels carried 45.5 million tonnes, or 97.4 per cent. Canadian flag vessels were also active in the transborder trade between Canada and the US, carrying 49.9 million tonnes, or 52.9 per cent of the total traffic. Total Canadian deep-sea trade (excluding Canada–US trades) was 188.6 million tonnes. Of this, only 0.1 per cent was carried by Canadian flag vessels.

Table 14-10 shows Canada's flag share of Canadian waterborne trade in 1997.

Domestic Freight Traffic

Domestic cargo shipped from one Canadian port to another is handled twice by the port system (loadings and unloadings). In 1997, Canadian ports handled 93.4 million tonnes of domestic cargo, a record low in the coastal trades, following a 4.3 per cent decrease from 1996 volumes. Domestic marine cargo has been steadily decreasing since its peak in 1988, when ports handled 139.9 million tonnes. This decline is due partly to a change in the direction of Canada's international trade. In the 1980s, many commodities, such as grain, were carried as domestic cargo via the Great Lakes–St. Lawrence Seaway system and then transferred at Canada's eastern ports for shipment overseas. Currently, these commodities are increasingly being carried by rail to Canada's western ports for shipment overseas.

Preliminary data for domestic tonnage handled over the first three quarters of 1998 indicate a two per cent decrease over the same period in 1997, from 66.4 million tonnes to 64.8 million tonnes.

Table 14-11 shows flows of domestic marine traffic by region in 1997.

The bulk of domestic traffic is concentrated in the Great Lakes/ St. Lawrence Seaway system. These ports handled 58.3 million tonnes (loadings and unloadings) in 1997, or 62.4 per cent of the total domestic tonnage. The Pacific region ranked second, handling 24.1 million tonnes, or 25.8 per cent of the total. The Atlantic region handled 11.1 million tonnes of domestic traffic.

Canadian ports along the Great Lakes enjoyed a 46.5 per cent increase in domestic wheat loadings, along with a 30 per cent increase in loadings of other non-metal mineral products. These gains offset decreases in shipments of iron ore (21.8 per cent) and limestone (11.3 per cent).

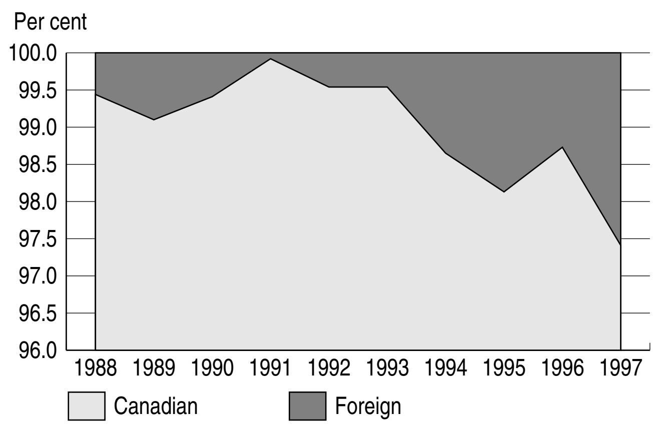
Ports along the St. Lawrence experienced a 36.7 per cent drop in shipments of fuel oil and gas, as domestic shipments of these commodities are increasingly being moved by rail. Large declines in iron ore shipments also affected domestic loadings in this region.

In 1997, Pacific coast ports handled 4.8 million tonnes less cargo than in 1996. Shipments of forest products, down by 3.3 million tonnes from 1996, accounted for 70 per cent of this decrease. Declining volumes of other metallic minerals (-77.5 per cent), fuel oil and gasoline (-27.6 per cent) and limestone (-14.9 per cent) were the significant contributors to the decreased domestic traffic volumes in this region.

COASTING TRADE ACT

Foreign-registered ship activity in Canada's domestic marine shipping is governed by the *Coasting Trade Act*. The Act reserves the transportation of passengers, cargoes and marine-related activities in Canadian waters to Canadian-registered, duty paid ships. The Act extends this reservation to Canada's continental shelf for activities related to the exploration and exploitation of non-living natural resources. Waivers are permitted to foreign registered ships to enter Canada's coasting trade when no Canadian ship is available or capable of providing a particular service. Revenue Canada, through its regional custom's offices, carries out the administration and collection of duties associated with obtaining a coasting trade licence. Duty is payable per month at the rate of 1/120th of 25 per cent of the declared fair market value of the foreign ship while involved in a coasting trade activity. An exception to this is that as of January 1998, in accordance with the Canada–US Free Trade Agreement, duty is not payable on US registered ships. The Canadian Transportation Agency is tasked with determining whether or not a Canadian-registered, duty paid ship is available to perform a particular service. The enforcement of the Act remains the responsibility of the Minister of Transport.

FIGURE 14-16
SHARE OF TONNAGE CARRIED BY FOREIGN FLAG SHIPS IN CANADIAN COASTING TRADE, 1988 – 1997



Source: Transport Canada from data supplied by Statistics Canada

TABLE 14-12
VALUE OF CANADA'S INTERNATIONAL TRADE, MARINE SHARE 1997

($ Billion)

	Marine	*All Modes*	*Marine's Share*
Transborder			
Exports	6.7	245.1	2.7
Imports	2.8	183.9	1.5
Total US	**9.5**	**429.0**	**2.2**
Other Countries			
Exports	39.2	54.0	72.6
Imports	35.4	88.2	40.2
Total Other Countries	**74.6**	**142.2**	**52.5**

Note: For exports, mode of transport means the mode by which the international boundary is crossed. For imports, the mode of transport represents the last mode by which the cargo was transported to the port of clearance in Canada. This may not be the mode of transport by which the cargo arrived at the Canadian port of entry in the case of inland clearance. This led to some underestimation of Canadian imports by the marine and air transport modes.

Source: Statistics Canada, Cat. 65-202 and 65-203; Special tabulations for total exports

Across Canada, the primary commodities handled in the domestic trade in 1997 were:

- wheat (14.2 million tonnes, up 46.4 per cent from 1996);
- pulpwood and chips (11.9 million tonnes, down 11.1 per cent);
- iron ore and concentrates (11.4 million tonnes, down 19.1 per cent);
- fuel oil (8.9 million tonnes, up 2.2 per cent); and
- logs, bolts and other wood (6.1 million tonnes, down 12.7 per cent).

These five commodities accounted for 56.2 per cent of all domestic tonnage handled at Canadian ports in 1997.

In 1997, 2.6 per cent of Canada's domestic marine shipping activities was handled by foreign ships. (See *Coasting Trade Act* text box for an explanation of the regulatory framework in place in Canada's domestic marine shipping.) Prior to 1997, the share of foreign ships in Canada's domestic shipping was always below two per cent of the total. While 1998 traffic information is not available, it is possible to report that during 1998, 100 applications for a coasting trade licence were received by Revenue Canada, down from the 106 in 1997. Of these, 84 were granted. The greatest proportion of the licences was granted to US flagged ships (37), followed by Panama (10) and Japan (6).

A number of coasting trade applications in 1998 were related to Canada's offshore oil and gas activity: the movement of products from Hibernia and Cohasset oil development fields, as well as activities associated with the exploration and development of the Sable Island gas fields. In 1998, 11 licences were granted for seismic research ships, operating mainly on the east coast.

Figure 14-16 indicates the actual tonnage and percentage of total cargo carried by foreign registered ships involved in Canadian domestic shipping from 1988 to 1997.

International Freight Traffic

In 1997, international marine traffic volumes totalled 283 million tonnes, an 8.8 per cent increase over 1996 levels. Of all the international tonnage handled at Canadian ports, 66.4 per cent are export-oriented (including intransit and re-export traffic).

According to international trade data, the value of Canadian international marine trade in 1997 was in the order of $84.1 billion (excluding shipments via US ports). Marine exports were valued at $45.9 billion and imports at $38.2 billion. Total trade value was 1.3 per cent greater than in 1996. The value of exports increased by 4.3 per cent, while the value of imports decreased by two per cent.

Table 14-12 shows the value of marine share of Canada's international trade in 1997.

Canada’s main deep-sea trading partners — Japan, China, South Korea, the United Kingdom and other western European nations – together accounted for over 61 per cent of total Canadian international marine trade (exports and imports) in 1997.

In terms of value of exports, Japan was Canada’s primary trading partner in 1997, at $10.3 billion. The US, at $6.7 billion, ranked second.

Japan and the other Asia-Pacific Economic Cooperation (APEC) countries (excluding the US) accounted for 51.1 per cent of the total value of marine exports in 1997. If the US is included, then these countries accounted for over 43 per cent of the total.

For more detailed information on Canada’s trade, see Chapter 9, Transportation and Trade.

Table 14-13 shows the value of Canadian exports by water according to main destinations in 1997.

Japan and the other APEC countries (not including the US) accounted for 40.3 per cent of the total value of marine imports in 1997. When the US is included, this block of nations accounts for 37.4 per cent of all of Canada’s marine imports.

TABLE 14-13
VALUE OF CANADIAN EXPORTS BY WATER, MAIN DESTINATIONS, 1997

Destinations	*Value ($ Million)*	*Share Percent*
Japan and Other APEC[1]	**20,048**	**51.1**
Japan	10,302	26.3
South Korea	2,115	5.4
China P. Rep.	1,875	4.8
Taiwan	1,098	2.8
Hong Kong	878	2.2
Other	3,780	9.6
E.U. & Other Europe	**12,412**	**31.7**
U.K.	2,465	6.3
Germany	1,919	4.9
Netherlands	1,426	3.6
Italy	1,315	3.4
Belgium	1,311	3.3
Other	3,976	10.1
Other countries	**6,754**	**17.2**
Total Canadian Exports by water	**39,214**	**100.0**

1 Excluding the US; including domestic exports and re-exports

Source: Statistics Canada, Cat. 65-202 and Special Tabulation

TABLE 14-14
VALUE OF CANADIAN IMPORTS BY WATER, MAIN COUNTRIES OF ORIGIN, 1997

Origins	*Value ($ Million)*	*Share Percent*
E.U. & Other Europe	**15,115**	**42.7**
Norway	2,940	8.3
Germany	2,814	7.9
U.K.	2,111	6.0
France	1,408	4.0
Italy	1,269	3.6
Other	4,573	12.9
Japan & Other APEC[1]	**14,261**	**40.3**
Japan	5,458	15.4
China, P. Rep.	3,142	8.9
South Korea	1,018	2.9
Taiwan	1,015	2.9
Australia	809	2.3
Other	2,819	8.0
Other countries	**6,053**	**17.1**
Total Canadian Imports by Water	**35,429**	**100.0**

1 Excluding the US

Source: Statistics Canada, Cat. 65-203

SHIPPING CONFERENCES EXEMPTION ACT, 1987

The *Shipping Conferences Exemption Act, 1987* (SCEA) allows shipping conferences to set ocean freight rates and services collectively. It also requires that the rates be published in a tariff filed with the Canadian Transportation Agency (CTA). To promote intra-conference competition and provide shippers with additional pricing options, the Act incorporates provisions for independent action on rates and for confidential service contracts. Further, it exempts shipping conference agreements from certain provisions of Canada's Competition Act and thereby allows liner shipping conferences to operate to and from Canada without fear of violating competition laws.

The Act provides for the Minister of Transport to designate a shippers group to represent the interests of shippers. The Canadian Shippers' Council (CSC) has been so designated. Under the Act, conferences are required to meet with the designated shippers group when requested to do so and are to provide information for the satisfactory conduct of a meeting. In 1998, the CSC met with most of the tariff filing conferences to discuss the conferences' proposed business plans, including rates, surcharges and ancillary charges.

TABLE 14-15
CONFERENCE/NON-CONFERENCE SHARES OF CANADIAN LINER TRADE, 1994 – 1997

(Millions of tonnes)

	1994	*1995*	*1996*	*1997*
Conference				
Exports	5.6	5.6	5.9	5.9
Imports	5.0	4.4	4.7	4.3
Total	**10.6**	**10.0**	**10.6**	**10.2**
Non-conference				
Exports	5.3	6.5	6.8	6.5
Imports	3.6	3.6	3.7	5.3
Total	**8.9**	**10.0**	**10.5**	**11.8**

Source: Statistics Canada. International Database; Transport Canada

TABLE 14-16
LINER TRAFFIC BY REGION
1997

(Millions of tonnes)

	Liner Imports		*Liner Exports*		
Region	*Conference*	*Non-conference*	*Conference*	*Non-conference*	*Total*
Europe	4.1	2.1	3.9	1.1	11.2
Asia	0.2	2.0	2.0	3.5	7.6
Central America	-	0.3	-	0.5	0.8
South America	-	0.4	-	0.3	0.7
North America	-	0.2	-	0.4	0.6
Middle East	-	0.1	0.0	0.5	0.5
Oceania	-	0.1	0.0	0.2	0.3
Africa	-	0.2	0.0	0.1	0.3
Total	**4.3**	**5.3**	**5.9**	**6.5**	**22.0**

- means "Nil"

Source: Statistics Canada. International Database; and Transport Canada.

Table 14-14 shows the value of Canadian imports by water according to main countries of origin in 1997.

All of Canada's non-bulk oversea commodity trade is handled by liner shipping services. Canada's approach to international liner shipping has been to maintain a balance with Canada's major trading partners through the *Shipping Conference Exemption Act* (SCEA) (see Text Box on SCEA). The expectation is that Canadian shippers will have access to competitive, efficient and economic ocean liner shipping service options. With recent legislative developments affecting liner shipping in other parts of the world, consultations were initiated by the Department at the beginning of 1999 that invited stakeholders to submit their views on the Canadian liner conference legislation. (Such recent developments include changes to the *US Shipping Act* of 1984, which defines the regulatory framework for shipping conferences serving the US.)

Conference/Non-conference Market Shares

Shipping lines offering scheduled liner services can operate either as a member line of a shipping conference or as an independent (non-conference) line. While non-conference traffic has grown consistently in recent years, conference traffic has declined somewhat. The decrease in conference traffic in 1997 was due largely to the dissolution of the Asia North America Eastbound Rate Agreement (ANERA) late in 1996. Thus in 1997, independent operators carried a larger share of both liner imports and exports than conference lines.

Table 14-15 compares the conference and non-conference shares of the Canadian liner trade from 1994 to 1997.

A breakdown of liner traffic by region is also useful to show the relative shares of conference and non-conference operators on different routes.

Table 14-16 compares conference and non-conference liner traffic by region in 1997.

Conference carriers tend to concentrate almost exclusively on containerized traffic with 10.1 million tonnes out of the total of 10.2 million tonnes they carried moving in containers. Non-conference traffic is also characterized by a large percentage of cargo in containers (70 per cent), but includes significant amounts of general cargo and neobulk traffic as well.

Transborder Freight Traffic

Canada's marine traffic with the US increased by 29 per cent between 1987 and 1997, fueled by both exports and imports. In 1997, transborder traffic reached a peak of 94.4 million tonnes, up 6.7 per cent from 1996.

Preliminary data for the first three quarters of 1998 indicate that this upward trend is continuing, with transborder tonnage at 71.5 million tonnes compared with 65.5 million tonnes over the same period in 1997, a nine per cent increase. In 1997, exports[5] (loadings to US destinations[5]) led the growth in marine traffic between the two nations. In 1998, imports[5] (unloadings[5]) were the most dynamic, increasing 11.7 per cent to 28 million tonnes, compared with 25 million tonnes recorded over the same period in 1997.

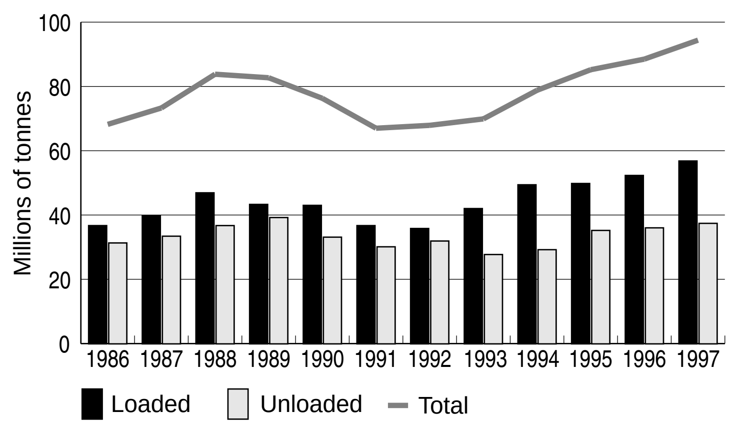
TABLE 14-17
CANADA'S MARITIME TRADE WITH THE US
1986 – 1997

(Millions of tonnes)

	Loaded	*Unloaded*	*Total*
1986	36.8	31.4	68.2
1987	39.8	33.5	73.3
1988	47.0	36.8	83.8
1989	43.4	39.3	82.7
1990	43.1	33.2	76.3
1991	36.8	30.2	67.0
1992	35.9	32.0	67.9
1993	42.1	27.8	69.9
1994	49.5	29.3	78.8
1995	49.9	35.3	85.2
1996	52.4	36.1	88.5
1997	56.9	37.5	94.4

Source: Statistics Canada, Cat. 54-205; Transport Canada

FIGURE 14-17
CANADA'S MARITIME TRAFFIC WITH THE US
1986 – 1997



Source: Statistics Canada, Cat. 54-205; Transport Canada

Table 14-17 shows Canada's maritime trade with the US from 1986 to 1987.

Figure 14-17 shows Canada's Maritime trade with the US from 1986 to 1997.

Marine traffic with the US was valued at $9.5 billion in 1997, driven by exports of $6.7 billion. This value, however, represented only 2.2 per cent of total Canada–US trade. The bulk of the traffic was handled by surface transport modes, such as trucking and rail. For further details on the value of Canada's traffic with the US, see Chapter 9, Transportation and Trade.

5 Including intransit and transshipment cargo.

TABLE 14-18
CANADA'S MARITIME TRAFFIC TO THE U.S.
1997

(Millions of tonnes)

Canadian Region of Origin	*US Region of Destination* US Atlantic	*US Great Lakes*	*US Pacific*	*Total*
Atlantic	24.5	0.0	0.1	24.6
St. Lawrence	6.2	6.6	0.0	12.8
Great Lakes	0.0	11.3	0.0	11.3
Pacific	0.8	0.0	7.4	8.2
Total	**31.5**	**17.9**	**7.5**	**56.9**

Source: Statistics Canada, Cat. 54-205; Transport Canada

TABLE 14-19
CANADA'S MARITIME TRAFFIC FROM THE US
1997

(Millions of tonnes)

Canadian Region of Destination	*US Region of Origin* US Atlantic	*US Great Lakes*	*US Pacific*	*Total*
Atlantic	2.3	0.3	0.0	2.6
St. Lawrence	3.3	3.2	0.4	6.9
Great Lakes	0.1	24.2	0.0	24.3
Pacific	0.2	0.0	3.5	3.7
Total	**5.9**	**27.7**	**3.9**	**37.5**

Source: Statistics Canada, Cat. 54-205; Transport Canada

TABLE 14-20
CANADA'S MARITIME OVERSEAS TRADE
1986 – 1997

(Millions of tonnes)

	Loaded	*Unloaded*	*Total*
1987	119.2	34.6	153.8
1988	124.1	42.1	166.2
1989	115.7	41.0	156.7
1990	116.0	40.1	156.1
1991	131.3	35.9	167.2
1992	118.0	37.3	155.3
1993	110.4	43.8	154.2
1994	120.5	47.6	168.1
1995	126.6	47.9	174.5
1996	121.9	49.7	171.6
1997	131.1	57.5	188.6

Source: Statistics Canada, Cat. 54-205; Transport Canada

Exports

In 1997, loadings at Canadian ports destined to the US were 57 million tonnes, up 8.6 per cent from 1996. Seven commodities accounted for 75 per cent of marine export volumes. They included (in million tonnes): iron ore (10.7), crude petroleum (8.0), gypsum (6.2), stone and limestone (5.1), fuel oil (5.1), gasoline (4.0), and salt (3.5).

There were significant fluctuations in the amounts of major commodities exported to the US in 1997 (compared with 1996). Volumes of crude oil exports jumped by 162 per cent. Exports of iron ore and fuel oil decreased by 2.8 and 2.0 per cent, respectively. Gasoline and salt shipments were stable, while exports of gypsum and stone and limestone increased by 13 per cent.

There were two main flow corridors in 1997: the Canadian Atlantic to the US Atlantic route with 24.4 million tonnes (42.9 per cent of total loadings to the US) and the Canadian Great Lakes to US Great Lakes route with 11.3 million tonnes (20 per cent of total loadings).

Table 14-18 details traffic flows from Canada to the US in 1997.

Imports

Unloadings at Canadian ports originating in the US rose from 36.1 million tonnes in 1996 to 37.4 million tonnes in 1997, a 3.8 per cent increase. Significant commodities, in terms of volume, included (in million tonnes): coal (13.7), iron ore (6.5), stone and limestone (3.1), fuel oil (2.4), other petroleum products (1.6) and alumina and bauxite (1.0). Together, these six commodities accounted for 75.5 per cent of all marine imports from the US.

As with exports, there was considerable instability in the volumes of marine imports from the US compared with 1996 volumes. Imports of coal and fuel oil were up 18.1 and 26.3 per cent, respectively. Stone and limestone showed a nine per cent drop. Volumes of iron ore and other petroleum products also increased by 3.2 and 2.6 per cent, respectively. Shipments of alumina and bauxite were relatively stable at -0.6 per cent.

The bulk of all marine imports from the US, just under 65 per cent of the total volume, originated at ports located along the US Great Lakes area. Ports along the US Atlantic and Gulf accounted for 15.7 per cent, with US Pacific ports making up the remainder of 10.4 per cent.

Table 14-19 shows the traffic flow from the US to Canadian ports in 1997.

Overseas Freight Traffic

In 1997, Canadian marine trade with overseas countries (excluding Canada–US trade) totalled 188.6 million tonnes, up 8.1 per cent from the 1995 peak of 174.5 million tonnes. This trade has been strongly export-oriented, with the loading share oscillating between 70 and 79 per cent over the last 10 years. Over 62 per cent of total loadings to overseas countries took place at west coast ports. In contrast, over 90 per cent of overseas imports were unloaded at Canada's eastern ports.

Table 14-20 shows Canada's maritime overseas trade from 1986 to 1997.

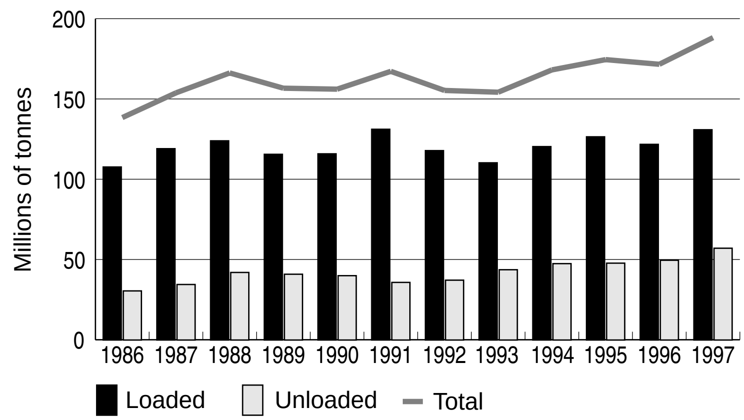
Preliminary data for the first three-quarters of 1998 indicate a three per cent decrease in tonnage handled in the Canada-overseas marine trades over the same period in 1997. Loadings show a 7.1 per cent decline in volumes, largely due to the economic crisis that unfolded in many Pacific Rim and other Asian countries. This crisis resulted in depressed demand in Asia for Canadian bulk commodities such as grain, coal, iron ore and potash. Unloadings indicate a five per cent increase over 1997 volumes.

Figure 14-18 shows Canada's maritime overseas trade from 1986 to 1997.

In 1997, the Canadian marine trade with overseas countries (excluding Canada–US trade) was valued at $74.6 billion, with exports estimated at $39.2 billion and imports at $35.4 billion. Marine transport was the dominant mode for shipping overseas freight, accounting for 52.5 per cent (value basis) of all overseas trade.

For more detailed information concerning Canada's offshore trade, see Chapter 9, Transportation and Trade.

FIGURE 14-18
CANADA'S MARITIME OVERSEAS TRADE
1986 – 1997



Source: Statistics Canada, Cat. 54-205; Transport Canada

TABLE 14-21
CANADA'S MARITIME TRAFFIC TO OVERSEAS
1997

(Millions of tonnes)

Foreign Region of Destination	*Canadian Region of Origin* Eastern ports	Western ports	*Total*
Asia and Oceania	6.5	57.2	63.7
Europe	30.6	9.1	39.7
South and Central America	6.4	8.1	14.5
Middle East and Africa	5.7	7.4	13.2
Total	**49.3**	**81.8**	**131.1**

Note: Table may not add up due to rounding.

Source: Statistics Canada, Cat. 54-205; Transport Canada

TABLE 14-22
CANADA'S MARITIME TRAFFIC FROM OVERSEAS
1997

(Millions of tonnes)

Foreign Region of Origin	*Canadian Region of Destination* Eastern ports	*Western ports*	*Total*
Europe	25.8	0.3	26.1
Middle East and Africa	12.8	1.1	14.0
South and Central America	10.8	1.0	11.7
Asia and Oceania	2.9	2.8	5.7
Total	**52.3**	**5.2**	**57.5**

Note: Table may not add up due to rounding.
Source: Statistics Canada, Cat. 54-205; Transport Canada

TABLE 14-23
GOODS CARRIED BY CANADIAN AIR CARRIERS
BY SECTOR, 1993 – 1997

(Tonnes)

Year	*Domestic*	*Transborder*	*Other International*	*Total*
1997	513,719	77,387	222,452	813,558
1996	447,313	80,389	195,584	723,286
1995	416,171	87,663	183,743	687,577
1994	443,601	70,882	169,102	683,585
1993	422,147	68,238	163,108	653,493

Note: For 1995 to1997, Levels I-III cariers; for 1993 and1994, Levels I-IV carriers.
Source: Statistics Canada, Cat. # 51-206

Exports

In 1997, Canadian marine loadings destined for countries other than the US generated 131.1 million tonnes of traffic, up more than 7 per cent from 1996 levels. Major commodities shipped from Canada included (in million tonnes): coal (35.7), iron ore (22.2), wheat (19.5), containerized freight (10.6), woodpulp (6.0), sulphur (5.5) and potash (5.4). Eight per cent of outbound loadings were containerized.

Some of the major commodities loaded in 1997 showed significant increases over 1996. Iron ore and wheat were both up 20 per cent. Containerized freight volumes increased by over 10 per cent, potash and sulphur shipments were both up by 8 per cent, and coal shipments increased by 6.6 per cent.

In 1997, over 60 per cent of Canadian loadings for overseas destinations came from western Canadian ports, while ports along the Great Lakes–St. Lawrence Seaway system handled most of the eastern share. Predictably, the direction of trade was highly polarized, with the western ports dominating the Asia and Oceania trade routes, while the Eastern ports handled a high proportion of tonnage shipped to Europe.

Table 14-21 shows Canada's maritime traffic to overseas in 1997.

Imports

In 1997, marine unloadings at Canadian ports from overseas origins reached 57.5 million tonnes, a resounding 15.7 per cent increase over the 49.7 million tonnes recorded in 1996. At 29.8 million tonnes (51.8 per cent of all tonnage unloaded from offshore origins), crude petroleum dominated imports[6]. Other major commodities unloaded included (in million tonnes): alumina/bauxite (5.2), containerized freight (7.8), iron and steel (2.9), fuel oil (1.6), iron ore (1.6) and gasoline (1.5). Well over 13 per cent of the inbound traffic was containerized.

Over 90 per cent of inbound overseas shipments were unloaded at eastern Canadian ports. The Europe and the Middle East-Africa regions were the principal origins of overseas cargo.

Table 14-22 shows Canada's maritime traffic from overseas markets in 1997.

AIR TRANSPORTATION

AIR CARGO

Domestic air cargo transportation is provided within a deregulated economic framework that does not restrict routing, capacity or pricing. Cargo is carried in the belly-hold of passenger aircraft, on passenger/cargo combination aircraft and in aircraft dedicated to cargo carriage (all-cargo). Scheduled and non-scheduled (charter) transborder and international air cargo carriage are offered within a framework of bilateral air agreements and international agreements as well as national policies. It is the

6 Includes transshipment of North Sea crude petroleum.

prerogative of the Minister of Transport to designate the Canadian carriers that will exercise the international all-cargo rights which have been acquired by Canada through bilateral negotiations.

Policy initiatives

In January, the Minister issued designation guidelines for scheduled all-cargo services that allowed for open all-cargo designations in international markets where Canada has open air rights or at least sufficient rights to satisfy foreseeable requests. Where Canada lacks sufficient rights to satisfy expressed demand, the guidelines specified that the federal government will, where consistent with its negotiating priorities and bilateral relationships, enter into air negotiations to seek those rights. Where sufficient additional rights can not be obtained, the government will seek to accommodate the interests of as many carriers as possible.

Two all-cargo designations were made under the new scheduled all cargo guidelines during 1998. In February, the Minister designated Kelowna Flightcraft International to provide all-cargo scheduled air services to the People's Republic of China. Kelowna Flightcraft International Air Cargo Ltd. doing business as Winniport operates air services for Winnipeg-based Winnport Logistics Limited, a company with expertise in transportation, electronic data interchange, finance, freight forwarding and customs. In August, Canada West Airlines of Calgary was selected to offer scheduled all-cargo services from Toronto to France and Germany. Canada West Airlines terminated business, however, during December 1998 without exercising its entitlement.

TABLE 14-24
OPERATING GOODS REVENUES OF CANADIAN AIR CARRIERS BY SECTOR, 1993 – 1997

($ 000)

Year	*Domestic*	*International**	*Total*
1997	660,799	357,301	1,018,100
1996	655,271	350,461	1,005,732
1995	694,247	292,272	986,519
1994	562,694	296,384	859,078
1993	588,835	224,876	813,711

* Includes transborder and other International.

Source: Statistics Canada, Cat. # 51-206

TABLE 14-25
VALUE OF CANADIAN INTERNATIONAL TRADE'S AIR SHARE 1997

($ Billion)

	Air	*All Modes*	*Air (%)*
Transborder			
Exports	12.2	245.1	5.0
Imports	16.8	183.9	9.1
Total US	**29.0**	**429.0**	**6.8**
Other Countries			
Exports	8.9	54.0	16.4
Imports	19.4	88.2	22.0
Total	28.3	142.2	19.9

Note: For exports, mode of transport means the mode by which the international boundary is crossed. For imports, the mode of transport represents the last mode by which the cargo was transported to the port of clearance in Canada. This may not be the mode of transport by which the cargo arrived at the Canadian port of entry in the case of inland clearance. This led to some underestimation of Canadian imports by the marine and air transport modes.

Source: *Statistics Canada, Cat. 65-202 and 65-203; Special tabulations for total exports*

In May 1998, the Minister announced a new policy for international all-cargo charter air services. The new policy allows several shippers or charter services to charter space on an all-cargo aircraft. Freight forwarders are also allowed to act as charter services. This entitlement is a distinction from past policy, which had reserved multiple shipper and freight forwarder cargo for scheduled international air services. For a one-year period, the CTA will seek to ensure that all-cargo charter services do not impair the ability of Canadian carriers to maintain scheduled services.

Domestic Services

The domestic air cargo industry includes: passenger air carriers that carry cargo in their aircraft belly-hold for incremental revenue; all-cargo carriers; and freight forwarders and consolidators of shipments.

Table 14-23 shows the volume of goods carried by Canadian air carriers on all air cargo services, by sector from 1993 to 1997.

Table 14-24 shows the operating revenues generated by goods carried on Canadian air carriers on all air cargo services, by sector from 1993 to 1997.

TABLE 14-26
VALUE OF CANADIAN EXPORTS BY AIR BY MAIN DESTINATIONS, 1997

Destinations	*Value ($ Million)*	*Air (%)*
Western Europe	**3,997**	**45.1**
U.K.	1,218	13.8
Germany	656	7.4
France	640	7.2
Switzerland	254	2.9
Other	1,229	13.9
Pacific Rim	**3,069**	**34.7**
Hong Kong	749	8.5
Japan	520	5.9
Taiwan	415	4.7
South Korea	355	4.0
Other	1,030	11.6
Other Countries	**1,788**	**20.2**
Total Canadian Exports by Air	**8,854**	**100.0**

* Excluding the US; Including domestic exports and re-exports.

Source: Statistics Canada, Cat. 65-202 and Special Tabulation

TABLE 14-27
VALUE OF CANADIAN IMPORTS BY AIR MAIN COUNTRIES OF ORIGIN, 1997

Origins	*Value ($ Million)*	*Air (%)*
Western Europe	**9,745**	**50.2**
France	3,005	15.5
U.K.	2,004	10.3
Germany	1,233	6.3
Italy	790	4.1
Sweden	496	2.6
Other	2,217	11.4
Pacific Rim	**6,910**	**35.6**
Japan	1,921	9.9
Malaysia	930	4.8
Taiwan	925	4.8
South Korea	838	4.3
China, P. Rep.	548	2.8
Other	1,748	9.0
Other Countries	**2,763**	**14.2**
Total Canadian Imports by Air	**19,418**	**100.0**

* Excluding the US

Source: Statistics Canada, Cat. 65-203

New services by air carriers in 1998 included Air Nova's introduction of a Dash-8 Combi aircraft into service in April. Unlike the 37-seat all-passenger configured Dash-8, the Dash-8 Combi has only 21 seats but can hold 4,000 kilograms of cargo. It was used on flights serving Labrador from St. John's, Newfoundland. Also in April, Knighthawk Express began flying for Federal Express between St. John's and Moncton, New Brunswick. ICC Canada, based in Farnham, Quebec, was granted a licence in November to operate domestic, all-cargo services.

Food security and nutrition continued to be major issues in isolated, northern communities. Under the Northern Air Stage, or "food mail," program, the Department of Indian Affairs and Northern Development provides funds to Canada Post for the cost of transporting food to isolated communities. This funding helps keep down the cost of food down for communities that rely on air transport and that lack year-round access by road, rail or boat. About 150 communities containing 90,000 people were eligible for assistance from the program, including isolated communities in Labrador, Quebec's Côte-Nord region, Northern Ontario, Manitoba, Saskatchewan, Alberta, the Northwest Territories and the Yukon.

Canada–US Transborder Services

In 1997, air transport accounted for $29 billion, or close to seven per cent of the $429 billion total transborder trade. Of this, $16.8 billion were imports and $12.2 billion were exports. The top import commodities were telecommunications equipment ($3.6 billion), electronic computers ($3.0 billion), transportation equipment ($2.4 billion), and other equipment ($2.1 billion). The top export commodities carried by air were aircraft equipment ($2.8 billion), office machine equipment ($2.2 billion) and telecommunications equipment ($2.0 billion). It should be noted that a significant portion of cargo moving on air waybills is actually trucked between Canada and the US.

Table 14-25 shows Canada's trade with the US carried by air for 1997.

Table 13-20 in the previous chapter showed the participation of Canadian air carriers in transborder courier operations.

Ontario dominated in terms of the provincial share of Canadian trade carried by air to the US, while Quebec and the western provinces ranked second and third.

In terms of activity by carriers during 1998, UPS opened a new handling facility in Hamilton in June. Five of its B727 fleet and an additional eight feeder services operate out of this facility.

ICC Canada began to operate a A300 freighter in transborder service (Vancouver-Calgary-Dayton, Ohio) for Emery Worldwide, a large US based courier operator

International Services

In 1997, air transport carried 20 per cent of Canada's $142 billion in trade with countries other than the United States (see Table 14-25). Of the total of $28.3 billion carried by air, $19.4 billion was accounted for by imports and $8.9 billion was accounted for by exports. Ontario and Quebec dominate trade by air with other countries, with shares of 59 and 24 per cent.

The main destinations for Canada's exports by air to other countries were the Western European countries ($4.0 billion) and the Pacific Rim countries ($3.1 billion). Imports by air from other countries mainly originated in Western Europe ($9.7 billion) and the Pacific Rim ($6.9 billion).

Table 14-26 shows the value of Canadian exports by air, by main destination, for 1997.

Table 14-27 shows the value of Canadian imports by air, by main countries of origin, for 1997

In terms of carrier activity, there were several notable events during 1998. In March, Air Canada and Emirates Airlines cooperated to introduce a Toronto-Dubai air cargo service via London (Heathrow), U.K. This service caters especially to the oil industry. In April, Winniport/Kelowna Flightcraft International Air Cargo Ltd. doing business as Winniport began three times weekly service with a leased B747 between Winnipeg and the Chinese cities of Nanjing and Shenzhen. This service was temporarily suspended in early 1999.

15

PASSENGER TRANSPORTATION

Most recent passenger traffic information showed increases in all public transport services.

Two chapters have already reported some passenger-related transport activities: the chapter on Transportation and Tourism and the one on Transportation Infrastructure. This chapter deals with passenger transportation from a modal perspective. Unlike the Tourism chapter, the focus here is solely on the level of activities of each modal transport service.

The means of travel most used by Canadians has to be the automobile as alluded to in the Tourism chapter. The coverage of this particular means of travel is severely limited by shortage of information. Nevertheless some information on the vehicles is presented to give a sense of its importance, as limited as this indicator may be.

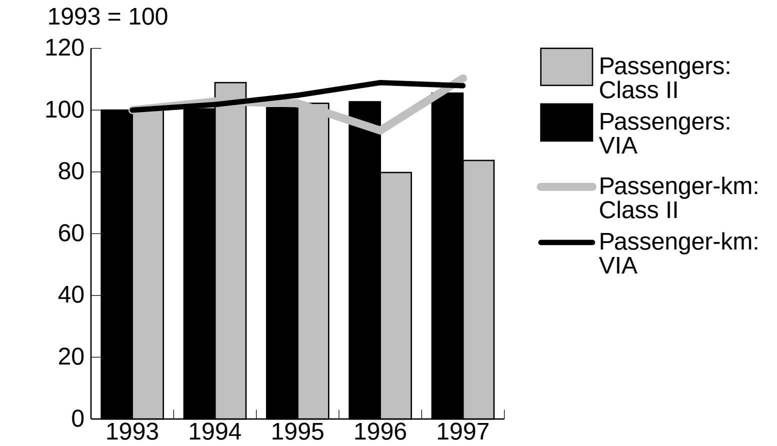
For public passenger services, a modal service overview of passenger traffic provides a sense for the relative use made of the different modes, and reflects the recent trends. The overview of the most recent traffic information for each mode is complemented, when possible, by some information on recent "service" changes of relevance to explain traffic volume evolution and by some regional breakdown. The information presented gives a sense of the roles of the modes but does not address traffic from an intermodal or multimodal perspective.

Data limitations constrained the analysis. This modal analysis of passenger traffic helps to understand the findings presented in the last chapter of the report on Price, Productivity and Financial Performance in the Transportation Sector.

RAIL TRANSPORTATION

In 1997, intercity passenger traffic increased by one per cent, with just over 4.1 million revenue passengers using services provided by VIA Rail and Class II carriers. Passenger-kilometres decreased marginally to 1.515 million from 1.519 million in 1996.

FIGURE 15-1
PASSENGERS AND PASSENGER-KILOMETRES FOR VIA AND CLASS II INTERCITY RAIL CARRIERS, 1993 – 1997



Source: *Statistics Canada, Cat. 52-216*

TABLE 15-1
SCHEDULED INTERCITY BUS SERVICE CORRIDORS

Corridor	*Carrier*
Halifax - Moncton - Quebec City	SMT
Quebec City - Montreal	Orleans
Montreal - Toronto	Trentway
Toronto - Windsor	Greyhound
Ottawa - Toronto	Greyhound
Toronto - Niagara Falls	Greyhound; Trentway
Toronto - Barrie	PMCL; GO; ONTC
Toronto - North Bay	ONTC; Northern Air
Toronto - Sudbury - Sault Ste. Marie - Winnipeg	Greyhound
Calgary - Edmonton	Greyhound; PWT
Calgary - Vancouver	Greyhound

Source: *Motor Coach Canada, August 1998*

In 1997, 92 per cent of all intercity rail passengers travelled by VIA Rail. VIA Rail carried close to 3.8 million passengers, up 2.7 per cent over 1996 numbers. At the same time, however, VIA Rail's total passenger-kilometres fell slightly to 1.423 billion.

VIA Rail operates four passenger services: the Quebec-Windsor corridor, western transcontinental service (between Toronto and Vancouver), eastern transcontinental service (Montreal–Halifax and Montreal–Gaspé) and northern services (in Quebec, Ontario, Saskatchewan and British Columbia). The Quebec-Windsor corridor accounts for a slightly increasing proportion of VIA Rail's revenue passengers. An estimated 85 per cent of VIA Rail's passengers and 70 per cent of its trains travel in the corridor. VIA Rail's remaining passenger traffic is split nearly equally between its eastern and western routes.

In aggregate, passenger traffic on Class II railways (BC Rail, Algoma Central, Ontario Northland and Quebec, North Shore and Labrador Railways) increased from 323,000 in 1996 to 339,000 in 1997. Passenger-kilometres also rose, from 77.1 million to 91.1 million. Most of the increase in traffic is attributable to BC Rail, although Ontario Northland also saw an increase in passengers volumes. Class II railways carried more than either of VIA's eastern and western routes in 1997.

From 1993 to 1997, VIA Rail traffic increased slightly, with an annualized growth rate of 1.3 per cent. Passenger traffic of other carriers declined at an annualized rate of 4.3 per cent in the same period.

Figure 15-1 shows the relative changes in passengers and passenger-kilometres for VIA Rail and Class II intercity carriers from 1993 to 1997.

Bus Transportation

Scheduled Intercity Bus Services

In 1997, 28 operators with annual revenues exceeding $200,000 reported total annual operating revenues of $303.7 million. Approximately 11.4 million passengers were carried on 1,125 motor coaches, school buses and other vehicles used in intercity scheduled bus service operations. Scheduled bus service operators used 100 main terminals and an additional 1,600 agencies for their operations.

In addition to intercity passenger services, scheduled intercity operators also provide charter bus services, school bus and other passenger bus service, as well as bus parcel express services. These other services generate a significant portion of the operators' revenues.

Greyhound is the dominant carrier in the major intercity corridors in Ontario and western Canada.

Table 15-1 lists the main corridors where scheduled intercity bus service is offered in Canada and the operator providing the service in those corridors.

Table 15-2 lists the number of intercity scheduled carriers and coaches, by province, for 1998.

From 1981 to 1997, the number of passengers using scheduled intercity bus services showed an overall decline. The number of passengers peaked in 1982 at 30 million, bottomed out in 1996 at 10.3 million, increasing to 11.3 million in 1997. This trend in passenger traffic is matched by a decline in the number of bus-kilometres recorded by scheduled carriers, from 196 million kilometres in 1982 to 118 million kilometres in 1997.

Figure 15-2 charts the trend in scheduled intercity bus services in terms of passengers and bus-kilometres from 1981 to 1997.

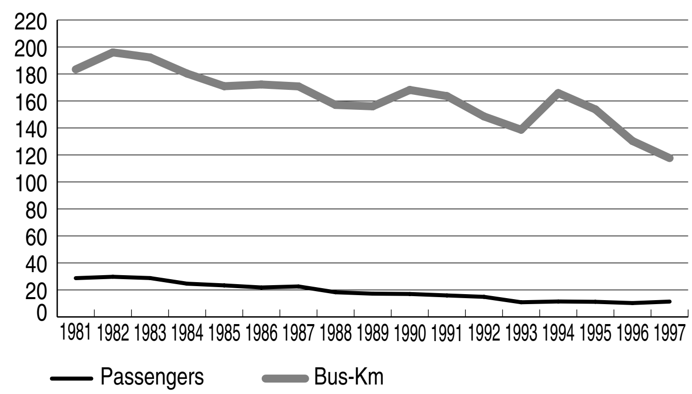
A good indication of average bus loads is the number of passengers per 100 vehicle-kilometres. This indicator has declined from almost 16 passengers per 100 vehicle-km in 1981 to fewer than seven in 1994. Since 1994, however, the number has improved to almost ten by 1997.

TABLE 15-2
INTERCITY SCHEDULED BUS SERVICE CARRIERS BY PROVINCE

	Number of Carriers	*Number of Coaches*
British Columbia	10	151
Alberta	6	729
Saskatchewan	2	41
Manitoba	1	60
Ontario	14	628
Quebec	11	182
New Brunswick	1	71
Nova Scotia	4	35
Prince Edward Island	n/a	n/a
Newfoundland	3	22
Northwest Territories	1	4
Yukon	3	10
Canada	56	1,933

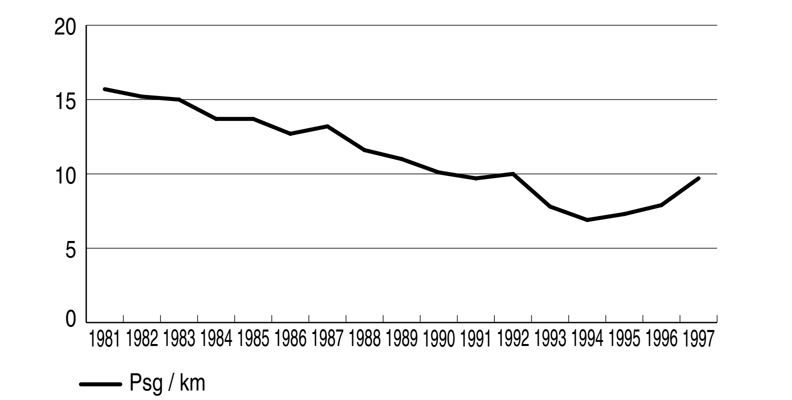
Source: Bus Industry Directory, 1999

FIGURE 15-2
SCHEDULED INTERCITY BUS PASSENGERS AND BUS-KILOMETRES, 1981 – 1997



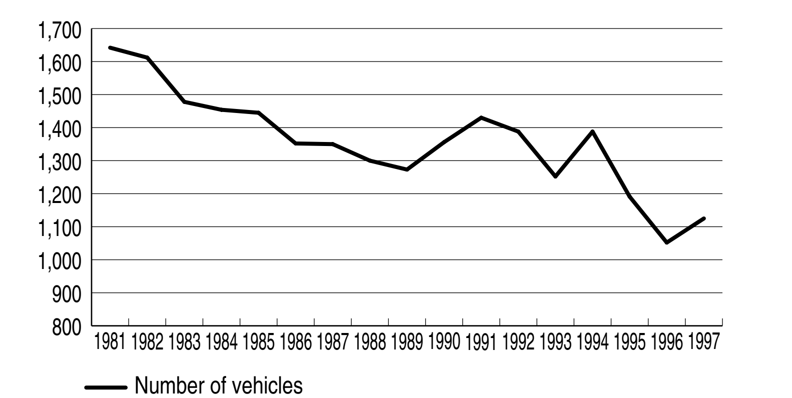
Source: Statistics Canada, Cat. 53-215

FIGURE 15-3
SCHEDULED INTERCITY BUS PASSENGERS PER 100 VEHICLE-KILOMETRES, 1981 – 1997



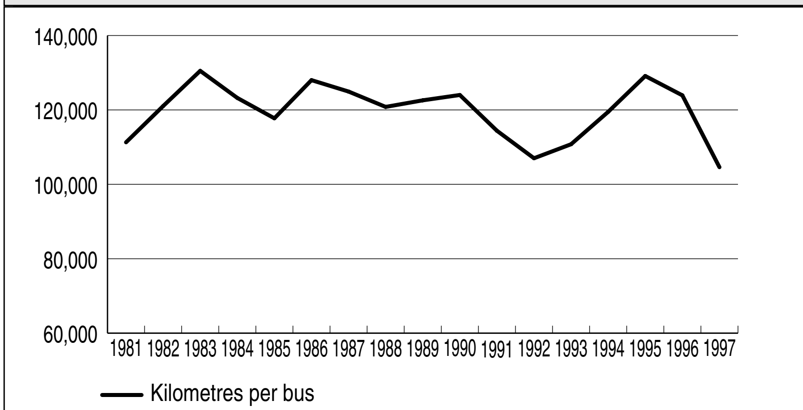
Source: Statistics Canada, Cat. 53-215

FIGURE 15-4
SCHEDULED INTERCITY BUS FLEET SIZE
1981 – 1997



Source: Statistics Canada, Cat. 53-215

FIGURE 15-5
SCHEDULED INTERCITY BUS SERVICE EQUIPMENT UTILIZATION
1981 – 1997



Source: Statistics Canada, Cat. 53-215

Figure 15-3 charts the overall decline in the number of passengers per 100 vehicle-kilometres on scheduled intercity buses from 1981 to 1997.

Except for 1990, 1991 and 1994, the number of buses operated by scheduled intercity carriers steadily declined since 1981.

Figure 15-4 shows the overall decline in the number of buses operated by scheduled intercity carriers from 1981 to 1997.

Vehicle use, as measured by kilometres per unit of equipment operated, has declined over the past 2 years to a low of 104 thousand kilometres per bus in 1997.

Figure 15-5 shows the fluctuating pattern in equipment utilization levels from 1981 to 1997.

Charter Bus Services

As stated in the Industry Structure chapter, a charter service is defined as a group trip where all passengers embark and disembark at the same point. An operator of charter bus services is generally granted the right to operate trips out of a given location or city, but has no constraints on destinations. The operator also has the flexibility to offer a broad range of services (e.g. half-day school trip, three-week excursion, one-way trips, local sightseeing tours).

In 1997, 115 operators with revenues exceeding $200,000 reported total annual operating revenues of $290 million. Data on the number of passengers carried is not collected, but 2,700 vehicles travelled a total of 160 million kilometres.

The data published by Statistics Canada on the equipment operated by charter carriers shows that fleet size declined steadily from 1981 to 1988, stabilized between 1988 and 1990, and has generally increased ever since. The number of buses in charter operations was at its highest level ever in 1996.

Figure 15-6 shows the size of Canada's charter bus fleet from 1981 to 1997.

Charter bus operations in the 1990s has been quite different from operations in the 1980s. As the number of vehicles dedicated to charter services decreased in the 1980s, the average use made of each vehicle (in thousands of kilometres travelled per vehicle) increased. In the 1990s, with one or two exceptions, the number of vehicles used in charter services increased each year, with a corresponding decline in utilization levels.

Figure 15-7 charts the use made of charter buses, in thousand kilometres per bus, from 1981 to 1997.

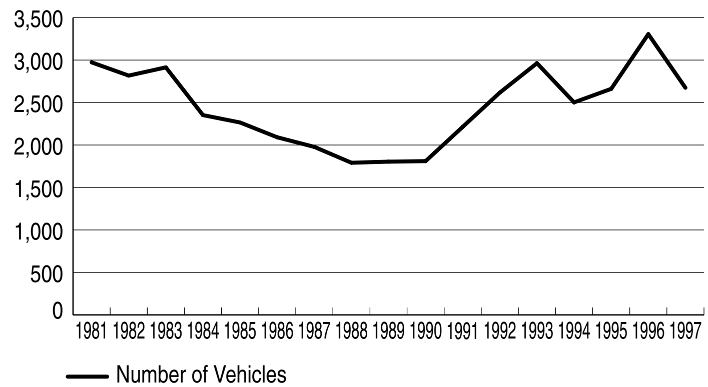
The expansion in charter business is also indicated by the increase in annual bus-kilometres. Since 1986, bus-kilometres have increased by 63 per cent for charter services and by 55 per cent for other services provided by charter operators.

Figure 15-8 charts the number of bus-kilometres travelled by charter and other bus carriers from 1981 to 1997.

URBAN TRANSIT BUS SERVICES

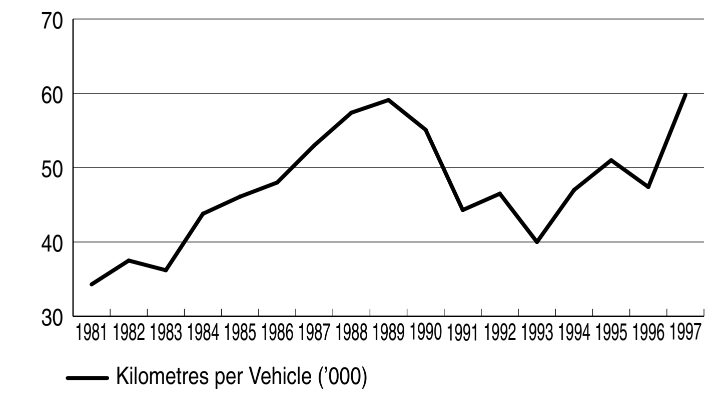
When it comes to urban transit services, the number of vehicles and the utilization rate have remained fairly stable during the 1990s, with the number of vehicles in the 13,000 to 13,500 range and a utilization rate in the range of

FIGURE 15-6
CHARTER BUS FLEET SIZE
1981 – 1997



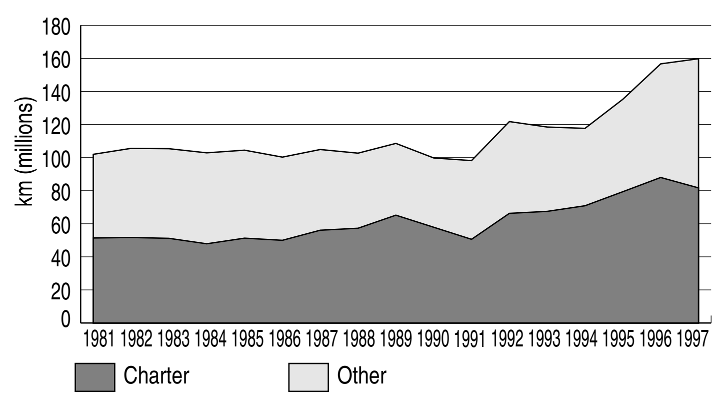
Source: Statistics Canada, Cat. 53-215

FIGURE 15-7
CHARTER BUS FLEET UTILIZATION
1981 – 1997



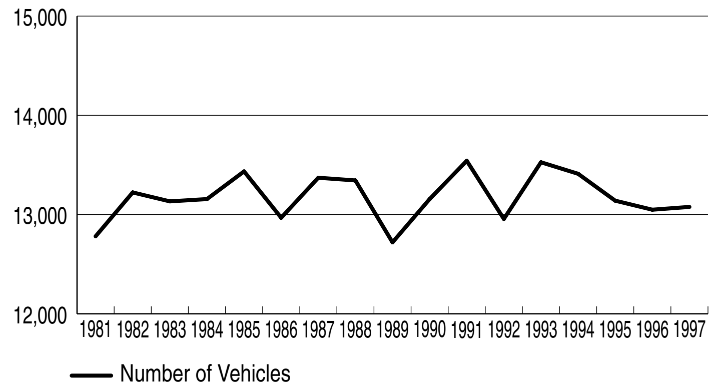
Source: Statistics Canada, Cat. 53-215

FIGURE 15-8
CHARTER CARRIERS' BUS-KILOMETRES
1981 – 1997



Source: Statistics Canada, Cat. 53-215

FIGURE 15-9
URBAN TRANSIT FLEET SIZE
1981 – 1997



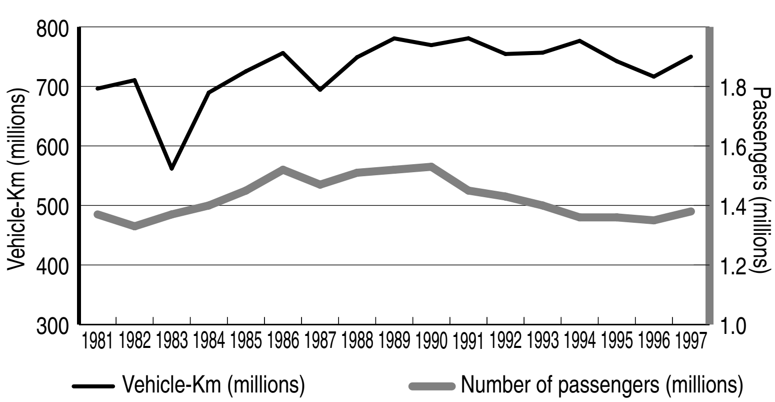
Source: Statistics Canada, Cat. 53-215

TABLE 15-3
URBAN TRANSIT FLEET COMPOSITION
1991 – 1997

	1991	1992	1993	1994	1995	1996	1997
Number of carriers reporting	65	74	74	84	80	77	65
Standard motor bus	10,474	9,757	10,196	10,085	9,855	9,622	9,030
Low floor bus		135	145	188	305	499	1,019
Trolley coach	332	358	308	344	304	319	322
Articulated bus	458	364	373	359	306	287	287
Light rail vehicle	527	500	547	547	548	520	520
Heavy rail vehicle	1,379	1,735	1,679	1,381	1,381	1,373	1,381
Commuter rail vehicle				331	359	359	336
Other	372	107	279	176	82	70	182
Total vehicles	**13,542**	**12,956**	**13,527**	**13,411**	**13,140**	**13,049**	**13,077**

Source: Statistics Canada, Cat. 53-215

FIGURE 15-10
LONG-TERM TRENDS IN URBAN TRANSIT
1981 – 1997



Source: Statistics Canada, Cat. 53-215

55,000 to 58,000 kilometres per vehicle.

Figure 15-9 shows the number of buses in Canada's urban fleet from 1981 to 1997.

Since 1993, the number of vehicles used in urban transit services has been slowly declining. In addition, the composition of the fleet has changed over the past five years, with significantly lower numbers of standard motor coaches in operation. Low-floor buses are being introduced into services and articulated buses are being gradually removed.

Table 15-3 shows the make-up of Canada's urban transit fleet by category from 1991 to 1997.

The number of passengers using urban transit has remained fairly constant since 1994 after the decline experienced in the early 1990's. The average yearly distance travelled by all vehicles in urban transit operations remained almost unchanged between 1989 and 1994, but declined in 1995 and 1996.

Figure 15-10 shows the trend in urban transit in terms of number of passengers and vehicle-kilometres from 1981 to 1997.

The number of passengers per 100 vehicle-kilometres is a good indicator of average bus load. This number has steadily declined from a high of 244 in 1983 to 169 in 1996.

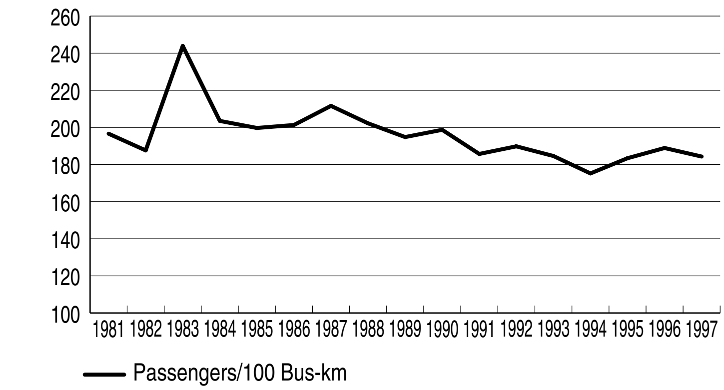
Figure 15-11 shows the number of urban transit passengers per 100 bus-kilometres from 1981 to 1997.

Automobile Transportation

The extent of private vehicle activity in Canada has unfortunately not been monitored by any routine survey, and only fragmentary information exists to show its development over time. Some of that evidence is reviewed in what follows.

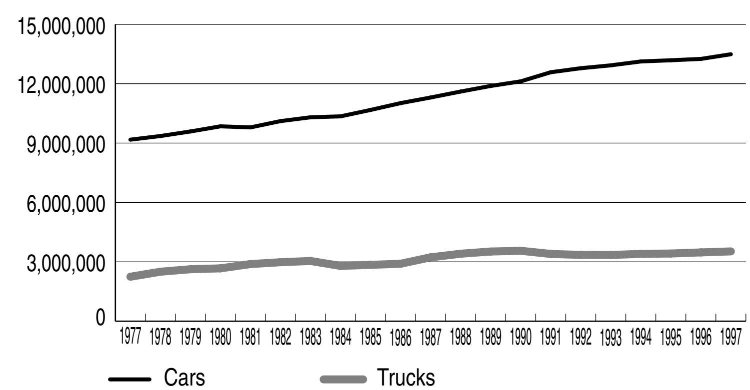
The firmest of the available indicators are the numbers of vehicles registered, compiled annually and published by Statistics Canada from reports from provinces and territories, each of which is responsible for the licensing of vehicles and regulation of their use. Registration statistics are available annually from the earliest days of motor vehicle use, in the first decade of this century. Trends in the period 1977 to 1997 in the main classes of vehicles reported are illustrated in Figures 15-12 and 15-13.

FIGURE 15-11
URBAN TRANSIT PASSENGERS PER 100 BUS-KILOMETRES
1981 – 1997



Source: Statistics Canada, Cat. 53-215

FIGURE 15-12
REGISTRATION OF "CARS" AND "TRUCKS"
1977 – 1997



Source: Statistics Canada, Cat. 53-219, Annual

Figure 15-12 shows vehicles reported by each jurisdiction as "cars" and "trucks", using distinctions between those two classes of vehicles that are unfortunately somewhat obscure, and probably have changed substantially over time. The figure shows the number of "cars" rising from 9,554,000 in 1977 to 13,487,000 in 1997, while the number of "trucks" rose from 2,442,000 to 3,527,000 over the same period. The major source of uncertainty lies in the distinction between a "car" and a "light truck", and particularly in how passenger vans and "multi-purpose vehicles" are classified by the reporting jurisdictions. It seems likely that pickup trucks and vans designed to carry freight are usually classified as "trucks", but it is also the case that vehicle manufacturers designate other passenger vans and multi-purpose vehicles as "light trucks" for the application of safety and emissions regulations, and the licensing jurisdiction might classify such vehicles either as "cars" or as "trucks" depending on their local conventions. It is not therefore clear that the "car" numbers reported by Statistics Canada, and shown in Figure 15-12, include all those vehicles designed primarily to carry passengers. And as the numbers of passenger vans and multi-purpose vehicles sold has risen fast in recent years, the reported statistics for cars probably represent a declining proportion of the true numbers of vehicles designed primarily to carry passengers.

Then the statistics reported for "trucks" include a great variety of vehicles, ranging from small vans and multi-purpose vehicles designed entirely to carry passengers, classified as "trucks"

TABLE 15-4
NATIONAL PRIVATE VEHICLE USE SURVEY RESULTS FOR Q4 OF 1995 TO Q3 OF 1996

Type	*Number of Vehicles (millions)*	*Kilometres Travelled (millions)*	*Average Km/Vehicle*
"Car"	10,408	177,886	17,092
"Light truck"	3,986	69,576	17,457
Sum	**14,393**	**247,462**	**17,193**

Source: Tremblay, Victor, STATPLUS : "Enquête sur l'utilisation des véhicules privés : 1994-1996. Résultats sommaires", report to Natural Resources Canada, 1999

due to the technicality mentioned above, through pick-up trucks that are similar in size to cars, to all of the larger freight-carrying vehicles, up to truck tractors used in hauling the largest combinations of trailers. Within these reported registration statistics, there is no distinction between trucks used for commercial or business purposes and those used only for the personal transportation of the owner; or even any simple distinction between trucks of different sizes or carrying capacities. A practical distinction exists in the federal safety standards between "light-duty" and "heavy-duty" trucks, with the latter having a Gross Vehicle Weight Rating of at least 4,536 kg. This is conventionally used to distinguish what might called "true" trucks – vehicles used exclusively for carrying freight – from the various forms of light trucks. The statistics provided as Table 14-9 in the Freight Transportation Chapter follow this definition of a heavy truck, and report that there were an estimated 712,000 such vehicles in 1997. By contrast, Figure 15-12 as noted shows that Statistics Canada reported a total of 3,527,000 "trucks" registered in that year. If both figures are accurate, the remaining 2,815,000 registered "trucks" were light trucks. As we have observed, some of those were in fact private vehicles used exclusively for private passenger transport; and of the remainder, it is likely that the great majority are used predominantly for private passenger purposes, with occasional use to haul personal property; and that only a small proportion is used primarily for commercial or business purposes.

Some of the uncertainty can now be resolved through the results of the "National Private Vehicle Use Survey" (NAPVUS), undertaken by Statistics Canada for Natural Resources Canada from the fourth quarter of 1994 to the third quarter of 1996, results of which have been recently released.[1] The survey identified vehicles available for personal use - i.e. not used exclusively for business purposes – within a sample of households, then obtained short-period logs of usage and fuel purchases for sampled vehicles. This allows estimates to be made for the first time in recent years[2] of the number of vehicles used for personal transportation; and the extent of their use. Summary results for the last 12 months of the survey, from the fourth quarter of 1995 to the third quarter of 1996, are shown in Table 15-4.

The survey suggests a total of nearly 14.4 million vehicles were used at least partially for private purposes in that year, and travelled a total of some 247 billion vehicle-kilometres, on an average of approximately 17,200 kilometres per vehicle. The table also indicates that the average was slightly greater for light trucks, at about 17,500 kilometres per vehicle, than for cars, at 17,100 kilometres.

The classification of vehicles into "car" and "light truck" in the survey was based on the vehicle type reported by the respondents, with the former category including only "2-door passenger car (including hatchback)", "4-door passenger car (including hatchback)" and "station wagon"; while all "mini vans" and "pickups" were allocated to "light trucks", together with "full-size vans" and "other trucks". By comparison, the Statistics Canada registration figures for the whole of 1996 record 13.251 million cars but only 3.476 million trucks. If it can be inferred from the numbers quoted above for heavy trucks in 1997 that they numbered approximately 700,000 in 1996, the number of light trucks registered in 1996 was only about 2.8 million. Clearly the definition of light truck being applied in NAPVUS must include a large number of vehicles classified as "cars" in the registration statistics, particularly as some of the "light trucks" in the registration statistics would have been used exclusively for business purposes, and thus not have been reported in NAPVUS. Overall from the two sets of

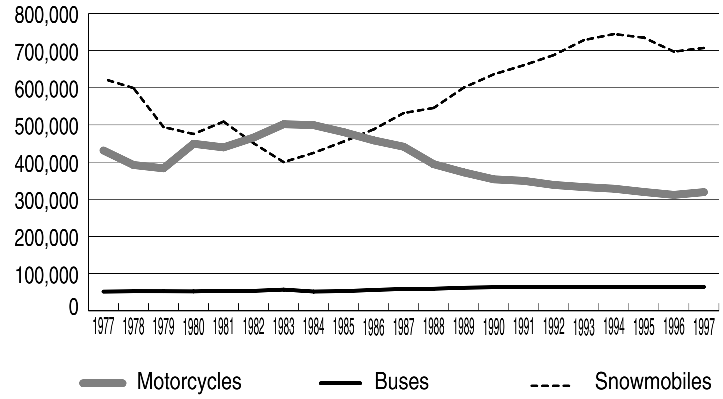
1 See Tremblay, Victor, STATPLUS: "Enquête sur l'utilisation des véhicules privés: 1994-1996. Résultats sommaires", report to Natural Resources Canada, 1999.

2 Since the Fuel Consumption Surveys, undertaken by Statistics Canada for Transport Canada between 1979 and 1988, but following a different sampling methodology, and apparently identifying a smaller proportion of total registered vehicles as "available for private use".

numbers (assuming both sets are accurate) it can be inferred that the difference between the total of about 16 million cars and light trucks from the registration statistics and some 14.4 million such vehicles in NAPVUS – i.e. about 1.6 million vehicles – were either cars or light trucks used exclusively for business purposes.

Figure 15-13 provides statistics for 1977 to 1997 for the other classes of vehicles distinguishable within the registration reports to Statistics Canada. The number of buses identified increased from approximately 51,500 to 64,300, without substantial fluctuations. On the other hand, the numbers of motorcycles and snowmobiles can be seen to have varied significantly over this period. The number of motorcycles peaked at 502,000 in 1983, but subsequently declined to only 319,000 in 1997. Meanwhile the number of snowmobiles fell by more than one-third between 1977 and 1983, to some 400,000, but has since increased to some 707,000 in 1997.

FIGURE 15-13
REGISTRATION OF MOTORCYCLES, BUSES AND SNOWMOBILES
1977 – 1997



Source: Statistics Canada, Cat. 53-219, Annual

FUTURE DATA IMPROVEMENT

The absence of routine data on road vehicle use is finally to be remedied by the new Canadian Vehicle Survey, initiated by Statistics Canada under contract to Transport Canada in January 1999. The survey obtains 7-day trip logs from owners of vehicles sampled continuously from official registration records. This will allow annual estimates to be made of vehicle-kilometres for the entire road vehicle fleet, including trucks and buses, and their distributions by characteristics of the vehicles, the drivers, and the trips. The first such annual estimates, for calendar 1999, are expected to be available in the summer of 2000.

MARINE TRANSPORTATION

CRUISE SHIP TRAFFIC

In 1998, international cruise ship traffic was up at all of Canada's major ports, with Vancouver leading the field at over 873,000 passengers embarked/disembarked. The 1998 season represents the 16th consecutive year of growth for Alaska cruises, with a 7 per cent increase (although this was not as high as the 17 per cent growth in 1997). This continuous growth has moved the Vancouver– Alaska market up to the third most popular cruise region in the world, behind the Caribbean and Europe.

Halifax, Nova Scotia, and Saint John, New Brunswick, enjoyed increased visits by cruise vessels, while other Atlantic ports also welcomed international cruise passengers in 1998. Cape Breton, Nova Scotia, enjoyed an excellent cruise season, with an estimated 25,000 passengers coming ashore at Sydney, Baddeck and Louisbourg. Corner Brook, Newfoundland, also welcomed 7,538 passengers in 1998, up from less than 3,000 in 1997. Charlottetown, P.E.I., is hoping to see increased vessel calls in 1999 now that the rules for vessels transitting under the Confederation Bridge have been clarified. Charlottetown recorded visits by only 2,115 passengers in 1998, well below the levels of earlier years and dramatically down from a high of 18,083 passengers in 1991.

Table 15-5 shows the cruise ship traffic at major Canadian ports from 1990 to 1998.

Official totals for passenger trips in domestic cruise operations are not available. The Canadian Passenger Vessel Association represents many of the larger operators. Its annual survey for 1998 indicated that 5.66 million passengers used its members' services during the year. The Association des Croisieres-Excursions du Quebec last surveyed its members in 1996, when they carried 909,000 passengers.

TABLE 15-5
CRUISE SHIP TRAFFIC AT MAJOR CANADIAN PORTS
1990 – 1998

(Passengers)

Year	*Vancouver*	*Montreal*	*Quebec City*	*Halifax*	*Saint John*
1990	388,323	30,869	34,783	24,423	1,748
1991	423,928	47,047	51,363	43,512	3,402
1992	449,239	34,872	41,141	30,112	5,500
1993	519,942	30,626	38,642	30,917	12,379
1994	591,409	33,920	36,401	37,717	23,629
1995	596,744	27,384	38,981	30,257	12,226
1996	701,547	19,078	21,464	36,584	8,543
1997	816,537	29,324	36,569	44,328	19,813
1998 (prel.)	873,102	32,583	45,000	47,798	28,418

Source: Local Port Corporations

FERRY TRAFFIC

Figures for 1998 for all members of the Canadian Ferry Operators Association (CFOA) are not yet available. The relative size of their operations is evident, however, in the traffic figures for 1997. British Columbia Ferry Corporation, by far the largest operator in Canada, carried approximately 22.3 million passengers and 8.2 million vehicles. Ferry services operated by British Columbia's Ministry of Transportation and Highways carried 5.2 million passengers and 2.2 million vehicles. La Société des traversiers du Québec carried 5.1 million passengers and 1.8 million vehicles, while Marine Atlantic carried about 1 million passengers and 0.5 million vehicles in 1997. The remaining CFOA members accounted for 4.6 million passengers and 1.7 million vehicles crossings.

AIR TRANSPORTATION

AIR TRANSPORT SERVICES

Domestic air passenger transportation is provided within a deregulated economic framework that has no limits on routing, capacity or pricing. International schedule passenger services continue to be offered within a framework of bilateral air agreements between Canada and over 60 foreign countries. It is the prerogative of the Minister of Transport to designate which Canadian carriers will exercise the route rights that have been acquired by Canada in these agreements. Each year Canada negotiates and puts into effect new and amended route rights in response to the requests of Canadian carriers and foreign governments.

Government Policy Initiatives

On April 1, 1998, the Minister announced a review of Canada's 1978 policy on international passenger charter air services. While the review is underway, the October 1997 proposal of the Canadian Transportation Agency (CTA) to amend the Air Transportation regulations that give effect to the existing policy has been suspended. As part of the policy review, extensive consultations were held with interested industry stakeholders, including scheduled and charter air carriers, tour operators and travel agents.

On December 1, 1998, Canada and the US announced an agreement on implementing intransit pre-clearance services in Canada. Under this initiative, all Canadian airports with existing US pre-clearance facilities became eligible for intransit pre-clearance services. Intransit pre-clearance is currently in place as a pilot project at Vancouver International Airport and allows arriving international passengers to proceed directly to US Customs without having to first go through Canada Customs. A Bill (S-22) was introduced into Parliament that defines the authorities for US Customs and Immigration officers in pre-clearance areas in Canadian airports and ensures travellers' rights under Canadian law. (US officials will apply US laws relating to entry into the US, but all Canadian criminal laws and the Canadian Charter of Rights and Freedoms will continue to apply.) The US government undertook to amend its law to fully reciprocate Canada's proposed legislation. As a result of these initiatives, installation of in-transit pre-clearance facilities will become possible in airports at Toronto (Pearson) and Montreal (Dorval) in 1999, at Calgary in 2001, and at Edmonton, Winnipeg and Ottawa after 2001.

On December 10, a Bill (S-23) to amend the *Carriage by Air Act* was introduced into Parliament to give Canada the authority to ratify and implement two key international aviation agreements, the *Guadalajara Convention* and *Montreal Protocol No. 4*. These two agreements are part of the Warsaw System of international conventions and protocols related to liability insurance coverage for the carriage by air of passengers, baggage and cargo. The *Guadalajara Convention* extends the application of the international liability regime to passengers (baggage and cargo) travelling on a carrier other than the one from which they purchased travel as a result of code-sharing or where another carrier has been contracted to operate on its behalf. *Montreal Protocol No. 4* amends the liability regime for cargo with stricter liability and maximum limits. It also simplifies the requirements for cargo documentation and allows for its transmission electronically.

Also in 1998, the CTA ordered Canadian Airlines, Air Canada and Air Nova to improve their services for passengers with disabilities by: enhancing the identification of accessible seating; improving the handling of wheelchairs, complete with repair and replacement procedures; and providing better information on specific check-in procedures to these passengers. Further work by the CTA in this regard led to the publication of *Taking Charge of the Air Travel Experience: A Guide for Passengers with Disabilities.*

Bilateral Initiatives[3]

On June 2, 1998, the Minister replied to international route requests from Air Canada and Canadian Airlines. Specifically, the Minister announced that the federal government would seek, through bilateral negotiations, rights for a daily Toronto–Hong Kong service for Air Canada and for a daily Vancouver–Osaka service for Canadian Airlines.

In his June 2 announcement, the Minister also recognized the growing strategic importance of commercial alliances[4] within the industry. In response to increasing global competition, the Minister also announced that new code-sharing[5] opportunities would be provided for Air Canada and Canadian Airlines. Each carrier was permitted to name up to five new country markets for code-sharing, subject to specific conditions and implementation procedures. Three of these conditions are worth noting: Air Canada's selections in South America and the Pacific region would be limited to Brazil, Thailand and New Zealand; some routing constraints were imposed on any Air Canada code-sharing services to New Zealand and Thailand; and, during the first year, all such rights would have to be exercised via an intermediate country. Air Canada selected New Zealand, Mexico, Brazil, the Netherlands and Thailand as its code-sharing destinations. Canadian Airlines selected Belgium, Switzerland, Sweden, Jamaica and South Korea. At year end, the necessary rights had been obtained from New Zealand, Mexico, the Netherlands and Thailand (February 1999), in addition to the rights from Sweden and Belgium, which were already available.

In 1998, at Air Canada's request, an examination of the Canada–Taiwan market was made to determine whether the threshold of 300,000 one-way scheduled passengers a year as stipulated under Canada's Second-Carrier Designation Policy was exceeded. If it were, the entry of a second Canadian carrier would be permitted. In his June 2 announcement, the Minister denied Air Canada's request to be designated as the second carrier because he had concluded that the threshold had not yet been reached. He did, however, note the rate of growth of that market and indicated that the department would undertake to review the situation later in the year. On January 4, 1999, the Minister announced that the threshold had been reached and that he was designating Air Canada to operate three times a week to Taiwan.

In March, the Minister announced a successful conclusion to ground handling arrangements at Keflavik Airport, Iceland. This was further to consultations with Iceland held in August 1997, when Icelandair was given the right to operate a third weekly flight to Halifax and/or Montreal. That right was granted on the condition that Icelandair and Canada 3000 Airlines could agree on a ground handling arrangement at Keflavik Airport. As a result of the new arrangement, Icelandair added the

3 During international bilateral negotiations, the interests of both countries are addressed, and understandings on the cities that can be served, the number of carriers that may operate, the flight frequency and the type of aircraft to be used are recorded to form a bilateral air transportation agreement.

4 See Table 13-7 in Chapter 13, Industry Structure.

5 Code-sharing is the ability to sell air transportation under one airline's name on the flights of another airline. In the international context, code-sharing allows carriers to sell transportation on the network of services of code-share partners as if it was their own. In addition, by coordinating their marketing efforts, alliance partners can provide a combined product to the consumer, including one-stop check-in, better coordinated connections, and priority baggage transfer.

TABLE 15-6
CHANGES IN AIR CANADA'S WESTERN ROUTES

Air Canada transferred the following routes to **Air BC:**
- Calgary - Saskatoon
- Calgary - Regina
- Winnipeg - Saskatoon
- Winnipeg - Regina
- Winnipeg - Thunder Bay

Air BC transferred the following routes to **Central Mountain Air:**
- Vancouver - Kamloops
- Vancouver - Campbell River
- Vancouver - Comox
- Calgary - Kamloops
- Calgary - Grande Prairie

Joint Air Canada/Air BC Services:
- Vancouver - Calgary
- Vancouver - Quesnel
- Vancouver - Williams Lake
- Vancouver - Prince George

Certain Non-Stop Routes now routed through Vancouver or Calgary**:**
- Edmonton - Victoria
- Edmonton - Regina
- Edmonton - Kelowna
- Kelowna - Victoria
- Victoria - Seattle

Source: Åir Canada

third flight to Halifax, and in May, Canada 3000 Airlines introduced weekly charter services from Calgary and Vancouver to Keflavik and beyond to Europe.

On August 7, the Minister designated Air Canada to provide service between Canada and Lebanon. The carrier selection was precipitated by a request from the Government of Lebanon for bilateral air negotiations. Air Canada's designation sets the stage for the first scheduled air service by a Canadian carrier between Canada and Lebanon. Air Canada was selected to provide code-sharing service to Beirut via Frankfurt with Lufthansa (three times per week) and via London with Middle East Airlines (five times per week). Canada's negotiations with Lebanon in November 1998 were successful, although no new service by the designated carrier on either side is expected in the near term.

Also on August 7, the Minister designated Canadian Airlines to serve the Canada–Chile market. Canadian Airlines proposed to provide code-sharing service via intermediate points in the US, where it would connect with the flights of LAN Chile and other partner airlines onward to Santiago.

On September 1, enhancements to the bilateral air services agreement with New Zealand were achieved. The new agreement grants Canadian Airlines the right to code-share with Air Pacific to New Zealand via Honolulu, and for Air Canada to code-share with its alliance partners, Air New Zealand and United Airlines. Under the new agreement, the designated airlines for each country are able to offer code-shared services between all cities in Canada and all cities in New Zealand. New rights for own-aircraft services have also been agreed to, which will permit the doubling of the airline capacity between the two countries.

On November 26, a code-sharing agreement with Mexico that allows for dual designation was achieved. This agreement secured rights to allow both Air Canada and Canadian Airlines to code-share to and from Mexico with Mexican designated airlines and other alliance partners. The agreement features the right for two designated airlines of each country to code-share with the designated airlines of the other country, as well as airlines of a third country. In addition, the agreement sets no limitations on the number of seats sold or the number of flights used for code-sharing, or where carriers can connect for code-sharing globally. Finally, it allows access to all cities in each other's territory for code-sharing. There are also plans to continue negotiations with Mexico in 1999 to conclude a more liberal agreement for own-equipment services.

On December 7, the Minister signed Canada's first bilateral air services agreement with the Republic of Hungary to bring it into legal effect. Air Canada initiated scheduled air services by code-sharing on the flights of its airline alliance partner, Lufthansa, between Frankfurt and Budapest in the summer of 1998, on an extra-bilateral basis pending signature of the agreement. When Malev Hungarian Airlines decides to enter the direct scheduled air services market, it will have the right to serve up to five cities in Canada with a combination of its own aircraft services and code-sharing services.

Service Disruption – The Air Canada Pilots' Strike

Air Canada's scheduled air services were suspended for 13 days in early September when its pilots went on strike. The airline used the services of other carriers primarily to bring its passengers abroad back to Canada. Air Canada's regional subsidiaries, Air BC, Air Ontario, Air Alliance and Air Nova, were not affected and continued to operate their normal scheduled services. Domestically, there was some traffic diversion to other Canadian carriers, which in some cases operated higher frequencies and additional services. For example, Canadian Airlines added up to 20 additional flights per day to accommodate increased demand. WestJet also provided additional lift. It took Air Canada approximately one week after the strike ended to resume full operations. Shortly after resuming normal operations in mid-September, Air Canada initiated deep fare discounts for a limited period to regain business that was diverted to other carriers during the strike.

TABLE 15-7
CITY PAIRS FOR DOMESTIC SCHEDULED AND CHARTER PASSENGER TRAFFIC

Top Domestic Markets, 1997

Rank 1997	*City pair*	*Scheduled Passengers*	*Charter Passengers*	*Total Passengers*	*Charter Share %*
1	Montreal-Toronto	1,181,770	104,862	1,286,632	8.2
2	Toronto-Vancouver	829,650	222,148	1,051,798	21.1
3	Ottawa-Toronto	688,880	487	689,367	0.1
4	Calgary-Vancouver	519,960	91,816	611,776	15.0
5	Calgary-Toronto	495,020	78,583	573,603	13.7
6	Toronto-Winnipeg	346,670	181,173	527,843	34.3
7	Edmonton-Vancouver	312,330	68,819	381,149	18.1
8	Calgary-Edmonton	308,020	1,107	309,127	0.4
9	Halifax-Toronto	289,380	119,260	408,640	29.2
10	Edmonton-Toronto	281,700	43,181	324,881	13.3
11	Montreal-Vancouver	193,590	91,601	285,191	32.1
12	Ottawa-Vancouver	176,520	13,639	190,159	7.2
13	Vancouver-Winnipeg	174,070	160,817	334,887	48.0
14	Calgary-Winnipeg	157,440	125,749	283,189	44.4
15	Prince George-Vancouver	146,650	558	147,208	0.4
16	Thunder Bay-Toronto	138,290	1,975	140,265	1.4
17	St John's-Toronto	127,540	50,039	177,579	28.2
18	Calgary-Montreal	125,370	10,872	136,242	8.0
19	Kelowna-Vancouver	112,090	-	112,090	-
20	Calgary-Ottawa	104,880	368	105,248	0.3

Note: Ranking is based on scheduled origin/destination traffic, excluding charter origin/destination traffic. Figures do not include passengers carried by WestJet Airlines and Vistajet.

Source: Statistics Canada - Cat. No. 51-204 & 51-207

DOMESTIC SERVICES AND TRAFFIC

After serving Winnipeg, Manitoba, for two months during 1996, WestJet returned on March 20, 1998, to serve the city. With its return to Winnipeg, WestJet provided scheduled services to major centres in B.C., Alberta, Saskatchewan and Manitoba. WestJet also operated to Grande Prairie, Alberta, on a charter basis from February 6 to June 21 inclusive. In 1998, WestJet secured access to $27 million US and later signed agreements for delivery of seven B737-200 aircraft, two of which were delivered in late 1998. Two more are to be delivered in 1999 and the remaining three before the end of the year 2000.

In April, NorTerra Inc., an investment holding company for two major Inuit groups, the Inuvialuit Development Corporation of the western Arctic and the Nunasi Corporation of the eastern Arctic, created Air NorTerra and purchased the Canadian North division of Canadian Airlines to provide the service. Based in Yellowknife, Northwest Territories, Air NorTerra assumed responsibility for marketing and sales, while operations and maintenance are provided on contract by Canadian Airlines.

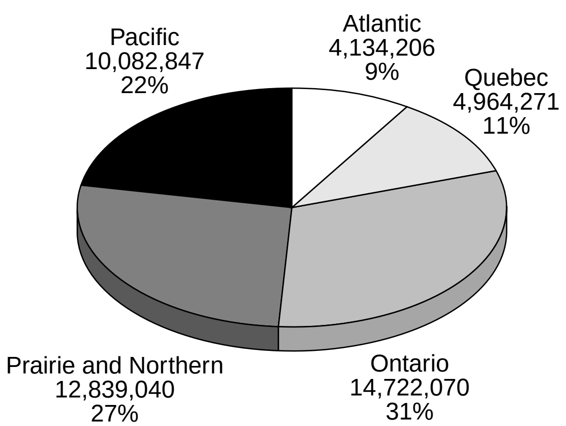
In August, Air Canada realigned its services out of Vancouver and Calgary with the objective of reducing capacity in western Canada to better match demand. It generally involved the transfer of some routes from Air Canada to Air BC and some routes from Air BC to Central Mountain Air. The changes allowed Air Canada to re-deploy nine aircraft (2 A320s, 1 A319 and 6 CRJs) from Western Canada to Central and Eastern Canada and to transborder services. At the same time, Air Canada added four DC-9s to its western network. The changes also allowed Air BC to retire one Dash-8 aircraft. The result was a reduction in the number of non-stop services and the increased use of Air Canada's partner, Central Mountain Air, which took over from Air BC routes suited to its fleet of 18-seat Beech 1900 D aircraft. These routes include Vancouver to Kamloops, Campbell River and

TABLE 15-8
DOMESTIC ENPLANED AND DEPLANED PASSENGER TRAFFIC
1988 – 1997

Year	*000s*	*Per cent change*
1997	50,482	8.0
1996	46,742	11.9
1995	41,778	5.0
1994	39,803	1.1
1993	39,353	-4.0
1992	40,999	0.2
1991	40,926	-10.2
1990	45,567	0.0
1989	45,568	-2.4
1988	46,676	

Source: Statistics Canada

FIGURE 15-14
DOMESTIC PASSENGER TRAFFIC, BY REGION
1997



Source: Statistics Canada

Comox, and Calgary to Kamloops and Grande Prairie .

Table 15-6 outlines these changes.

On October 26, Inter-Canadien assumed the air services formerly operated by IMP Group subsidiary Air Atlantic and became the nation’s largest regional air carrier east of Manitoba. Inter-Canadien, which was sold to Canadian Investor Corporation in August 1998, is a commercial partner in Canadian Airlines’ network. Although Air Atlantic ceased operating on October 25, its parent, IMP Group, remained active with the acquisition in November of Toronto-based charter air carrier Air 500.

In November, two Air Canada subsidiaries, Air Nova and Air Alliance, announced a plan to consolidate and realign their respective operations by April 1999. The consolidation would combine and re-deploy the fleet, with Air Nova using the 37-seat Dash-8 and the 77-seat BAe-146, while Air Alliance would handle all services that used the 18-seat Beech 1900D. Air Nova would remain based in Halifax and Air Alliance would continue to be based in Quebec City. The headquarters of the combined operation would be in Halifax.

Canadian Airlines also initiated a code-sharing arrangement with Helijet on service between Vancouver and Victoria.

Preliminary statistics suggest that domestic passenger traffic in 1998 increased by 2.9 per cent from 1997.

Table 15-7 lists the top 20 city pairs for domestic scheduled and charter passenger traffic.

Table 15-8 shows the changes in domestic enplaned and deplaned passengers from 1988 to 1997.

Figure 15-14 shows the regional breakdown of domestic passenger traffic.

Transborder Services and Traffic

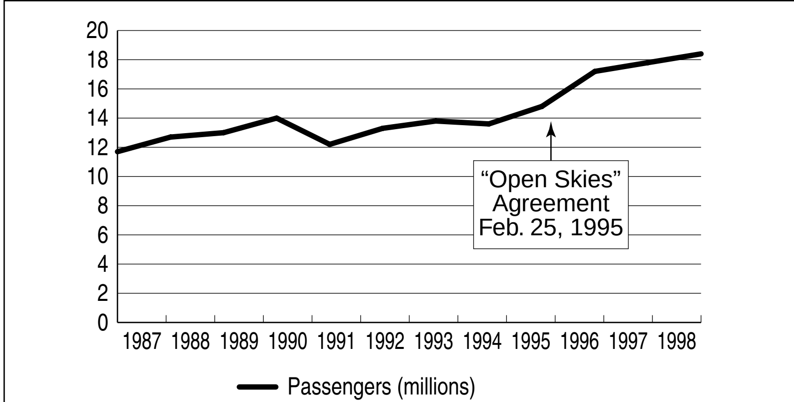
February 1998 marked the third anniversary of the 1995 Canada–US "Open Skies" Air Transport Agreement and with it, the removal of the last remaining restrictions limiting access to Toronto by US carriers. In 1998, Air Canada expanded or added new services to the US, including new non-stop services from Toronto (Pearson) to San Jose and New Orleans, from Montreal (Dorval) to Washington (Dulles) and from Ottawa to New York (LaGuardia). Canadian Airlines added new services between Toronto and Boston and between Vancouver and San Jose, California.

Fifteen of Canadian Airlines' transborder services were affected when its alliance partner, American Airlines, was forced to withdraw code shares on these services during the summer of 1998 to adhere to contractual terms with its pilots union. Code-sharing on these services was re-instated on January 1, 1999.

There has been little change in the scope and scale of specialty service operations by Canadian and American entities based on the entitlements in the North American Free Trade Agreement (NAFTA). In 1998, there were 31 Canadian companies authorized to operate in the US and 24 American companies authorized to operate in Canada.

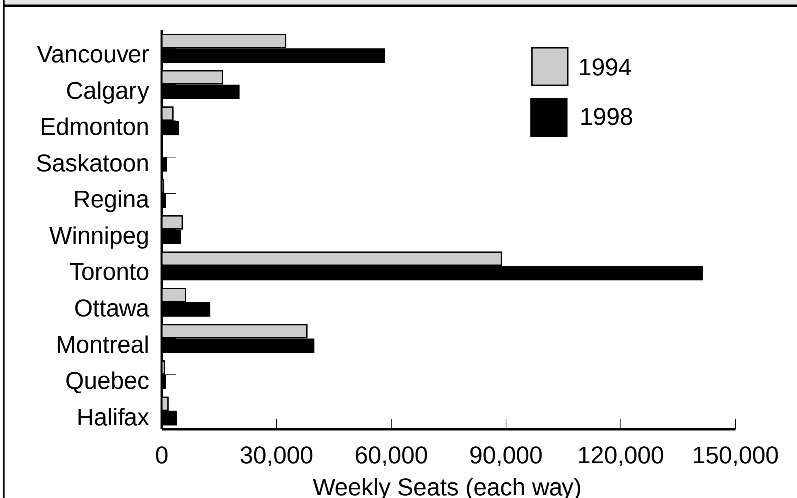
Figure 15-15 shows the growth in transborder air traffic over the

FIGURE 15-15
GROWTH IN TRANSBORDER AIR TRAFFIC
1987 TO 1998



Source: Transport Canada, Air Policy

FIGURE 15-16
NUMBER OF SEATS OFFERED
IN THE TRANSBORDER MARKET



Source: Transport Canada, Air Policy

TABLE 15-9
NEW DIRECT NON-STOP TRANSBORDER AIR SERVICES
1998

City	Route	Airline
Edmonton	Denver	Air Canada/Air BC
Halifax	New York/Newark	Continental Express
Kelowna	Seattle	Alaska/Horizon
Ottawa	New York/Newark	Continental Express
Ottawa	New York/LaGuardia	Air Canada
Toronto/City Centre	Syracuse	US Airways Express
Montreal/Dorval	Washington/Dulles	Air Canada
Vancouver	Palm Springs	Alaska
Vancouver	Seattle	United/Skywest
Vancouver	San Jose	Canadian Regional
Toronto	Boston	Canadian and Canadian Regional
Calgary	Houston	Continental
Toronto	Charlotte	US Airways Express
Toronto	New Orleans	Air Canada
Toronto	San Jose	Air Canada

Source: *Transport Canada, Air Policy*

TABLE 15-10
PASSENGER TRAFFIC FOR SCHEDULED, REGIONAL AND CHARTER OPERATIONS, CANADA - US, 1991 – 1997

Period	Canadian Carriers		U.S. Carriers		All Carriers	
Period	Passengers	Market Share %	Passengers	Market Share %	Passengers	% Annual Change
1991	5,182,000	42.3	7,057,000	57.7	12,239,000	--
1992	5,619,000	42.2	7,688,000	57.8	13,307,000	8.7
1993	5,634,000	40.9	8,146,000	59.1	13,780,000	3.6
1994	5,908,000	43.3	7,735,000	56.7	13,643,000	-1.0
1995	6,482,000	43.7	8,367,000	56.3	14,849,000	8.8
1996	7,850,000	45.7	9,317,000	54.3	17,167,000	15.6
1997	8,772,000	49.4	8,992,000	50.6	17,764,000	3.5

Notes: Excludes passengers carried by non-Canadian and non-U.S. carriers
Source: *Aviation Statistics Centre, Statistics Canada, Statements 2, 4 and 6.*

last 12 years. Figure 15-16 shows the increase in the number of seats offered in the transborder market since 1994.

Table 15-9 lists new direct non-stop air services in transborder markets.

Table 15-10 summarizes the passenger traffic for scheduled, regional and charter operations, as well as the market shares held by Canadian and US carriers.

See Appendices 15-1 and 15-2 for the entry, exit and ongoing activity in the Canada-US scheduled, regional and charter operations market by air carrier nationality and points served.

International Services and Traffic

Preliminary statistics indicate a 4.8 per cent increase in international passenger traffic in 1998 over 1997. In 1997, total traffic increased by 9.4 per cent over 1996 levels. These figures include same-plane services by scheduled, charter and regional carriers. They do not include passengers connecting to international air services in the US.

Table 15-11 shows international passenger traffic between Canada and countries other than the US from 1991 to 1997.

Appendix 15-3 lists the international air services provided to and from Canada as of the end of 1998. These include foreign markets served by Air Canada and Canadian Airlines, as well as Canadian markets served by foreign carriers. This appendix also provides a partial list of foreign markets served by Canada's charter air carriers. It shows that there are 34 countries currently receiving same-plane, scheduled services from Canada. Canadian air carriers serve 25 of these countries.

An international airspace agreement allowing North Korean airspace to be used for overflights went into effect on April 23. This agreement will help reduce flight times between Asia and North America by up to 50 minutes. This in turn will reduce fuel and crew costs.

In anticipation of traffic growth in the international sector, Air Canada opted to augment its wide-body fleet by acquiring additional Airbus A330 and A340 aircraft to be delivered over the next four years.

Air Canada augmented its services with new and expanded code-sharing arrangements with Star Alliance partners United Airlines and Lufthansa, as well as with Air New Zealand, Royal Jordanian and Singapore International Airlines.

Canadian Airlines acquired an Airbus A320 and four B767-300ER long-range aircraft, two of which were delivered in late 1998. The two new aircraft permitted the carrier to increase frequencies on its long-haul routes and to replace the capacity lost when it retired two DC-10-30 aircraft.

On September 22, Canadian Airlines announced that it had joined as a founding member a new global airline alliance, oneworld. Like Star Alliance, the oneworld alliance expands the number of destinations and options to make air travel easier by creating a system combining the services of its carrier members. Some of the features of this alliance include an integrated international schedule, blended technology, common passenger

TABLE 15-11
INTERNATIONAL AIR PASSENGER TRAFFIC (EXCLUDING US), 1991 – 1997

Period	*Atlantic*	*Pacific*	*Southern*	*Total*
1991	4,776,000	1,000,000	2,222,000	7,998,000
1992	5,221,000	1,140,000	2,353,000	8,714,000
1993	5,345,000	1,288,000	2,444,000	9,077,000
1994	5,802,000	1,478,000	2,560,000	9,840,000
1995	6,147,000	1,760,000	2,614,000	10,521,000
1996	6,413,000	1,920,000	2,574,000	10,907,000
1997	6,762,000	2,289,000	2,884,000	11,935,000
		% Change		
1991-92	9.3	14.0	5.9	9.0
1992-93	2.4	13.0	3.9	4.2
1993-94	8.6	14.8	3.9	8.2
1994-95	6.0	19.1	3.0	7.2
1995-96	4.3	9.1	-1.5	3.7
1996-97	5.4	19.2	12.0	9.4

Source: Aviation Statistics Centre, Statistics Canada, Statements 2, 4, and 6.

and baggage handling procedures, and reciprocal frequent flyer programs.

In 1998, eight Canadian air carriers (Air Canada, Air Transat, Canada 3000 Airlines, Canadian Airlines, First Air, Royal Airlines, Skyservice and WestJet) filed international charter programs with the Canadian Transportation Agency (CTA) to operate services for tour operators. Major destinations included points in Europe as well as “sunspot” areas, mainly in the southern US, Latin America and the Caribbean.

Air Canada and Skyservice provided charter flights for professional sports teams.

APPENDIX 15-1
NUMBER OF TRANSBORDER SCHEDULED AIR SERVICES BY CARRIER NATIONALITY

	Services Operated in February 1995			Pre-Agreement Services Suspended Since February 1995			Services Added Since February 1995			Services Operated as of December 1998		
Airport	*Canada*	*US*	*Total*	*Canada*	*US*	*Total*	*Canada*	*US*	*Total*	*Canada*	*US*	*Total*
Toronto/Pearson	14	23	37	1	11	12	29	12	41	42	24	66
Vancouver	6	10	16		5	5	8	16	24	14	21	35
Montreal/Dorval	7	10	17		3	3	4	5	9	11	12	23
Calgary	4	5	9	2	3	5	4	6	10	6	8	14
Ottawa	1	6	7		4	4	4	5	9	5	7	12
Halifax	2		2				1	2	3	3	2	5
Edmonton		3	3		1	1	1	1	2	1	3	4
Winnipeg	1	1	2							1	1	2
others	5	8	13	3	2	5		6	6	2	12	14
Sub-total	**40**	**66**	**106**	**6**	**29**	**35**	**51**	**53**	**104**	**85**	**90**	**175**
Charter conversions	30		30	22		22				8		8
Total	**70**	**66**	**136**	**28**	**29**	**57**	**51**	**53**	**104**	**93**	**90**	**183**

Source: Transport Canada, Air Policy

APPENDIX 15-2
STATUS OF TRANSBORDER SCHEDULED AIR SERVICES AS OF DECEMBER 31, 1998

Airport	*Current Services Introduced After February 24, 1995*	*Current Services Operated Before February 24, 1995*	*Pre-Agreement Services Suspended after February 24, 1995*	*New Services Subsequently Suspended*
Calgary	Chicago: American Chicago: Canadian*** Denver: United Houston: Air Canada Houston: Continental Los Angeles: Canadian Minneapolis: Northwest San Francisco: United Seattle: Alaska (R) Spokane: Air Canada (R)	Dallas: American Los Angeles: Air Canada Salt Lake City: Delta San Francisco: Air Canada	Chicago: Air Canada Denver: Delta Los Angeles: Delta New York/Newark: Air Canada Spokane: United	Denver: Air Canada Las Vegas: Canadian (C) Las Vegas: Delta Palm Springs: Canadian (C) Phoenix: Canadian (C)
Edmonton Intl.	Denver: Air Canada (R) Seattle: Alaska (R)	Minneapolis: Northwest Salt Lake City: Delta	Dallas: American	Las Vegas: Canadian (C)
Fredericton				Boston: Air Canada (R)
Halifax	Boston: Canadian (R) Boston: Delta (R) New York/Newark: Continental Orlando: Air Canada (C)***	Boston: Air Canada (R) New York/Newark: Air Canada (R)		Detroit: Northwest Ft. Lauderdale: Canadian (C) New York/Kennedy: American (R) Orlando: Canadian (C) St. Petersburg: Canadian (C) Tampa: Air Canada (C)
Hamilton		Pittsburgh: US Airways (R)		
Kelowna	Seattle: Alaska (R)			
Kenora	Minneapolis: Northwest (R)***			
London		Detroit: Northwest (R) Pittsburgh: US Airways (R)		
Moncton				Boston: Air Canada (R) Boston: Delta (R)
Montréal/Dorval	Atlanta: Delta Ft. Lauderdale: Air Canada (C) Hartford: Air Canada (R) Miami: American Minneapolis: Northwest New York/Kennedy: American (R) New York/Newark: Continental Orlando: Air Canada (C) San Francisco: Air Canada Washington/Dulles: Air Canada Washington/National: Air Canada	Boston: Air Canada Boston: Delta (R) Chicago: Air Canada Chicago: American Cincinnati: Delta Detroit: Northwest Los Angeles: Air Canada Miami: Air Canada New York/LaGuardia: Air Canada New York/LaGuardia: Delta (R) New York/Newark: Air Canada Philadelphia: US Airways Pittsburgh: US Airways Tampa: Air Canada***	Baltimore: US Airways Hartford: Delta (R) Miami: Delta	Atlanta: Air Canada Dallas: American New York/Kennedy: Delta Philadelphia: Air Canada (R) Washington/Dulles: ValuJet Washington/National: US Airways
Montréal/Mirabel			Boston: Northwest (R)	
Ottawa	Boston: Air Canada (R) Chicago: Air Canada Chicago: American Detroit: Northwest (R) New York/LaGuardia: Air Canada New York/LaGuardia: Delta (R) New York/Newark: Continental (R) Philadelphia: US Airways Washington/Dulles: Air Canada	Boston: Delta (R) New York/Newark: Air Canada Pittsburgh: US Airways (R)	Albany: Delta (R) Baltimore: US Airways New York/Kennedy: US Airways (R) Syracuse: US Airways (R)	New York/Kennedy: American (R) Orlando: Canadian (C) St. Petersburg: Canadian (C)
Québec		Boston: Delta (R) New York/Newark: Air Canada (R)		New York/Kennedy: American (R)
Regina	Minneapolis: Northwest (R)		Minneapolis: Canadian (R)	
Saint John		Boston: Canadian (R)	New York/Newark: Air Canada (R)	Boston: Delta (R)
Saskatoon	Minneapolis: Northwest			
Thunder Bay		Minneapolis: Northwest (R)		
Toronto/Pearson	Allentown: Air Canada (R) Atlanta: Air Canada Atlanta: Delta Boston: Canadian Boston: Delta (R) Charlotte: Air Canada Charlotte: US Airways (R) Chicago: Canadian Cleveland: Continental (R) Columbus: Air Canada (R) Columbus: US Airways (R)	Baltimore: Air Canada (R) Baltimore: US Airways (R) Boston: Air Canada Chicago: Air Canada Chicago: American Chicago: United Cincinnati: Delta (R) Cleveland: Air Canada Dallas: American Dayton: US Airways (R) Detroit: Northwest	Albany: Delta(R) Boston: US Airways Cleveland: US Airways (R) Hartford: Delta (R) Miami: Delta Nashville: American Pittsburgh: Delta Rochester: US Airways Syracuse: Delta (R) Tampa: Delta Washington/Dulles: Canadian (R)	Cincinnati: Air Canada Dallas: Air Canada Ft. Lauderdale: Canadian (C) Ft. Myers: Canadian (C) Indianapolis: Air Canada (R) Nashville: Delta (R) Saginaw: Midwest Express (R) St. Petersburg: Canadian (C) Sarasota: Canadian (C) Tampa: American Tampa: Canadian

Continued

APPENDIX 15-2: STATUS – Continuation

Airport	*Current Services Introduced After February 24, 1995*	*Current Services Operated Before February 24, 1995*	*Pre-Agreement Services Suspended after February 24, 1995*	*New Services Subsequently Suspended*
Toronto/Pearson (contined)	Dallas: Canadian Denver: Air Canada Ft. Lauderdale: Air Canada (C)*** Ft. Myers: Air Canada (C)*** Harrisburg: Air Canada (R) Houston: Continental Kansas City: Air Canada Las Vegas: Air Canada (C) Miami: American Miami: Canadian Milwaukee: Air Canada Milwaukee: Midwest Express Minneapolis: Air Canada Minneapolis: Northwest Nashville: Air Canada New Orleans: Air Canada New York/LaGuardia: Canadian New York/Newark: Continental Orlando: Air Canada (C)*** Orlando: Canadian Philadelphia: Air Canada Phoenix: Air Canada Pittsburgh: Air Canada Pittsburgh: US Airways Providence: Air Canada (R) Raleigh: Air Canada Raleigh: Canadian (R) Richmond: Air Canada (R) St. Louis: Air Canada St. Louis: Trans World San Jose: Air Canada Seattle: Air Canada Washington/Dulles: Air Canada Washington/National: Air Canada West Palm Beach: Air Canada (C)***	Grand Rapids: Midwest Express (R) Hartford: Air Canada (R) Honolulu: Canadian Houston: Air Canada Indianapolis: US Airways (R) Los Angeles: Air Canada Miami: Air Canada New York/LaGuardia: Air Canada New York/LaGuardia: American New York/Newark: Air Canada Philadelphia: US Airways San Francisco: Air Canada San Francisco: United Tampa: Air Canada	Washington/Dulles: Delta (R)	Washington/National: US Airways West Palm Beach: Canadian (C)
Toronto/City Centre	Syracuse: US Airways (R)			
Vancouver	Boston: Canadian Chicago: Canadian Dallas: American Dallas: Canadian Denver: United Detroit: Northwest*** Honolulu: Air Canada (C) Houston: Continental Kahului/Maui: Air Canada (C) Las Vegas: Alaska Las Vegas: Canadian Los Angeles: Alaska Los Angeles: United Minneapolis: Northwest New York/Kennedy: American Palm Springs: Alaska Phoenix: Alaska Phoenix: America West Portland: Canadian (R) Reno: Reno Air Salt Lake City: Delta (R) San Diego: Canadian San Francisco: Air Canada San Francisco: Alaska San Francisco: United San Jose: Canadian (R)	Chicago: United Honolulu: Canadian Los Angeles: Canadian Portland: Air Canada (R) Portland: Alaska (R) Portland: Delta (R) San Francisco: Canadian Seattle: Air Canada (R) Seattle: Alaska (R) Seattle: Canadian (R) Seattle: United (R)	Bellingham: Alaska (R) Los Angeles: Delta San Francisco: Delta San Jose: American Spokane: Northwest	Atlanta: Delta Cincinnati: Delta Denver: Air Canada Las Vegas: America West Los Angeles: Air Canada Miami: American New York/Newark: Continental Palm Springs: Canadian (C) Reno: Canadian (C) San Diego: Alaska
Victoria		Seattle: Alaska (R)	Port Angeles: Alaska (R)	Seattle: Air Canada (R)
Whitehorse	Anchorage: Alaska (R)			
Winnipeg		Chicago: Air Canada Minneapolis: Northwest		Chicago: American Las Vegas: Canadian (C) Orlando: Air Canada (C) Palm Springs: Canadian (C)
Yarmouth			Boston: Air Canada (R)	

Notes: *** Seasonal Service
(R) Denotes services operated by regional affiliates
(C) Denotes charter services operated by Air Canada and Canadian Airlines before February 24, 1995

Source: Transport Canada, Air Policy

APPENDIX 15-3
INTERNATIONAL AIR SERVICES AS OF DECEMBER 31, 1998
(EXCLUDING CANADA-US TRANSBORDER AIR SERVICES)

	Foreign Points Served by Canadian Air Carriers		*Canadian Points Served by Foreign Air Carriers*	*Major Charter Air Services*
	Air Canada	*Canadian Airlines*		
Atlantic	Delhi Frankfurt Glasgow London Manchester Paris Tel Aviv Zurich	London Rome	Aeroflot: Montreal, Toronto Air France: Montreal, Toronto Air Ukraine: Toronto Alitalia: Toronto British Airways: Montreal, Toronto, Vancouver Czech Airlines: Montreal, Toronto El Al: Montreal, Toronto Iberia: Montreal Icelandair: Halifax KLM: Montreal, Toronto, Vancouver Lufthansa: Toronto, Vancouver Olympic: Montreal, Toronto Pakistan International: Toronto Royal Air Maroc: Montreal Sabena: Montreal Swissair: Montreal	Amsterdam Frankfurt Glasgow London Manchester Paris
Pacific	Hong Kong Osaka Seoul	Bangkok Beijing Hong Kong Manila Nagoya Taipei Tokyo	Air China: Vancouver Cathay Pacific: Toronto, Vancouver Japan Airlines: Vancouver Korean Air: Toronto, Vancouver Malaysia Airlines: Vancouver Mandarin: Vancouver Singapore Airlines: Vancouver	
Southern	Antigua Barbados Bermuda Fort-de-France Kingston Montego Bay Nassau Pointe-a-Pitre Port-au-Prince Port of Spain St. Lucia	Buenos Aires Mexico City Monterrey Sao Paulo	BWIA: Toronto Cubana: Montreal, Toronto LACSA: Toronto Mexicana: Montreal, Toronto VASP: Toronto	Acapulco Aruba Cancun Ixtapa Manzanillo Montego Bay Nassau Puerto Plata Puerto Vallarta Punta Cana Santo Domingo Varadero
Other	Air Transat: Paris First Air: Kangerlussuaq		Air St. Pierre: Halifax, Montreal, St. John's, Sydney Greenlandair: Iqaluit	

Source: Transport Canada, Air Policy

16

PRICE, PRODUCTIVITY AND FINANCIAL PERFORMANCE IN THE TRANSPORTATION SECTOR

Strong productivity performance within the transportation sector has translated into cost savings that, in turn have been passed on to a significant extent to users through lower transport prices.

Transportation is strategically important to Canadian producers and consumers, and maintaining an efficient transportation system is a key national objective. Deregulation has improved efficiency in the past few years, effectively moving transportation firms into a market environment and ensuring that prices are determined by market forces rather than regulatory agencies.

This chapter reviews the performance of Canadian transport firms in terms of productivity,[1] unit cost, prices and financial performance,[2] first for the transport sector as a whole and then for each mode of transportation. More specifically, this chapter looks at the effects of changes in transportation prices; the relationship between carriers' prices and their input costs; the relationship between productivity and input cost changes; the extent to which efficiency gains are transferred; and the net effect of these factors on carriers' financial returns.

The following sections review the individual performance of each transportation sector, provide highlights of the most recent year for which data is available, and review performance indicators over the short and medium terms.

1 Productivity expresses the efficient use of assets by relating physical measures of outputs to physical measures of inputs. Labour is the most commonly used productivity indicator, but it is only a partial measurement of productivity because it measures only one factor of production. Total factor productivity is a more accurate measure because it measures the efficiency of labour, capital and other inputs combined to produce goods and services.

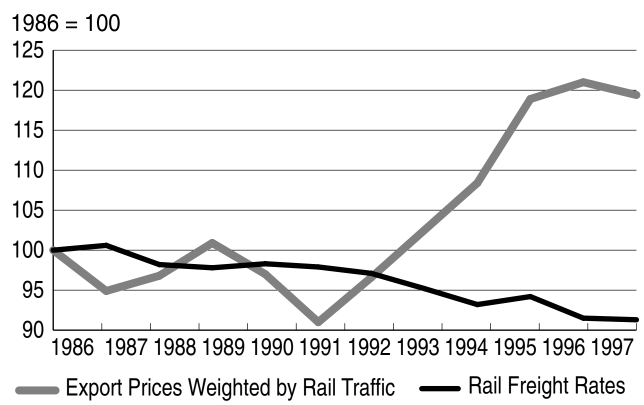
2 Financial performance compares the value of outputs, such as revenues, to the cost of inputs. Market conditions influence financial performance, so a firm with dominant market power may show high rates of return, exhibited in high prices, despite low productivity. Conversely, a firm in a highly competitive market may have high productivity, but show modest rates of return because of falling prices.

TABLE 16-1
PRICE AND OUTPUT CHANGES FOR CN AND CP RAIL
1995 – 1998

	1986/1997[1]	1995	1996	1997	1998[2]
Price Changes (%)	(0.6)	1.1	(2.6)	(0.2)	(0.4)
Output Changes (%)	1.4	(5.7)	3.0	10.4	(3.9)

1 Average Annual Growth
2 Preliminary and based on three quarters of year
Source: Transport Canada

FIGURE 16-1
PRICE CHANGES FOR EXPORTS AND RAIL FREIGHT
1986 – 1997



Source: Transport Canada

RAIL INDUSTRY

THE FREIGHT RAILWAY INDUSTRY

Total industry revenues from railway freight carriers in Canada reached a record $7.5 billion in 1997. Canadian National (CN) and CP Railways together generated a total of $6.8 billion, representing a 91 per cent market share. Other freight railways shared the remaining 9 per cent of the industry's total revenue.

In this section, the analysis of price, output, productivity and unit cost measures focuses on the performance of Canadian National and CP Rails' Canadian operations. The financial analysis also includes a brief discussion of the performance of regional and shortline railways.

Output and Price Changes

Both CN and CP Rail achieved record output growth in 1997, with an average growth rate of ten per cent. Due to a period of stagnation in the early 1990s, however, output increased by an average annual rate of only 1.4 per cent from 1986 to 1997. Freight prices declined by a total of six per cent during the same period, which was equivalent to a drop of 27 per cent in real terms.

Table 16-1 shows rail output and price changes at CN and CP Rail from 1995 to 1998.

During the first three-quarters of 1998, rail freight prices declined by 0.4 per cent and output dropped by 3.9 per cent, compared with the same period in 1997, largely due to declines in grain and other bulk commodity shipments.

Strong productivity gains have enabled railways to keep price increases below inflation rates, but market factors also played a role.

Figure 16-1 compares changes in rail shipper prices, represented by the price index of commodities exported by the rail mode,[3] with those in rail freight prices over the past decade.

Early trends show the pressure on rail freight rates from lower commodity prices. After 1991, when export prices picked up, rail freight rates continued to fall, indicating that shippers also benefited from strong productivity gains in the rail freight sector.

Cost and Productivity Indicators

At one time, rail freight operations were far more labour intensive. In 1986, labour costs represented 43 per cent of the total cost of Class I freight railways, compared with an average of 39 per cent in the transportation sector as a whole. In 1997, the labour cost share in rail freight was reduced to 36 per cent, about the same as total transportation.

Figure 16-2 compares the cost structures of CN and CP Rail in 1986 and 1997.

3 In order to reflect export prices of shippers using the rail mode, the export prices by commodity group were weighted by rail traffic to derive the aggregated export commodity price.

Labour productivity of Class I railways has more than doubled since 1986.[4] Significant gains were achieved in 1997, as average labour productivity increased by 14.6 per cent. These gains are attributable to both strong output growth and workforce reductions.

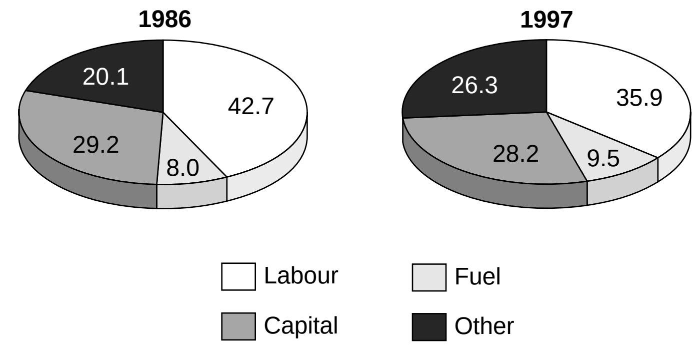
Table 16-2 shows efficiency indicators at CN and CP Rail from 1986 to 1997.

CN and CP Rail have achieved these impressive results through workforce adjustments and some streamlining of their operations over the past decade. Since 1986, employment in their Canadian operations has fallen by 34,000 employees, a 47 per cent reduction in workforce. Major workforce restructuring measures were carried out from 1991 to 1992, and from 1995 to 1996. In 1998, CN announced a further reduction of 3,000 employees to be implemented in the second half of 1998 and in 1999.

While strong labour productivity gains were observed between 1986 and 1997, average annual labour costs per employee increased over that same period: $63,000 in 1997 compared with $42,000 in 1986. Nevertheless, unit labour cost has declined at an average annual rate of 3.4 per cent since 1986.

In 1997, fuel costs represented 9.5 per cent of total costs on average for CN and CP Rail. Although fuel cost shares have changed little over the past decade, significant fuel efficiency gains (output/fuel quantity) in Canadian rail operations have been achieved since 1996 because of investments in new locomotives.

FIGURE 16-2
COST STRUCTURE OF CN AND CP RAIL
1986 and 1997



Source: Transport Canada, based on Statistics Canada files

TABLE 16-2
EFFICIENCY INDICATORS FOR CN AND CP RAIL
1986 – 1997

	1986	*1995*	*1996*	*1997*
Employees (in 000)	72.0	42.4	39.4	38.0
Average Labour Cost per employee ($000)	41.8	61.7	61.0	63.3
Productivity Change (per cent)	*1986-97*	*1995*	*1996*	*1997*
Labour	7.3	1.1	10.9	14.6
Fuel	1.4	(5.2)	6.6	2.5
Total	4.0	1.1	9.1	4.9
Unit Cost Change (per cent)				
Labour	(3.4)	5.9	(10.7)	(9.6)
Total	(1.8)	4.2	(9.9)	(0.7)

Source: Transport Canada, based on Statistics Canada files

Capital costs, including depreciation, leasing and return to financed capital, accounted for 28 per cent of total costs in 1997, which is 1 per cent lower than in 1986. A major factor of capital costs reduction is the write-down of assets by both CN and CP Rail in 1995.

Operating expenses other than fuel, labour and capital accounted for 26 per cent of railways' total costs in 1997. Major expenses in this group include materials, operating taxes, insurance and purchased services. Despite increases in the cost shares of this group from 1986 to 1997, the efficiency of using these inputs has been improved with average annual productivity gains of two per cent.

Total factor productivity of Class I freight railways improved

4 Labour inputs are measured by annual changes in the number of employees. If working hours were used to derive labour input quantity, labour productivity growth will be slightly lower with an average annual growth rate of six per cent (compared with seven per cent by employee measures) from 1986 to 1997. The difference is due to increases in average number of hours worked/paid per employee over the past few years.

TABLE 16-3
CN AND CP RAIL SPECIAL RESTRUCTURING CHARGES
1991 – 1998*

	1991	1992	1993	1995	1996	1998
Total System ($ million)	251	1,405	49	2,596	411	590
Canadian Operations ($ million)	251	1,284	41	1,846	411	494

* No significant special charges in 1994 and 1997
Source: CN and CP Annual Reports

TABLE 16-4
RAIL FREIGHT COST SAVINGS AND PRICE REDUCTIONS
1992 – 1997

	1997	1992-1997 Average
Carrier Cost Savings ($ million)	2,225	1,178
User Price Savings ($ million)	1,034	562
Cost Savings Passed to Users (per cent)	46.5	47.7

Source: Transport Canada

at an average rate of four per cent per year from 1986 to 1997. Total unit costs have declined by an average annual rate of 1.8 per cent since 1986, as a result of such strong productivity gains. Overall, lower unit costs have allowed both CN and CP Rail to reduce their prices and improve their financial performance at the same time.

Impact of Productivity Changes

In the short term, annual productivity gains may not necessarily result in higher profits, as operating margins could be adversely affected by other factors, such as depressed freight rates and rising input costs. Over the long term, however, both carriers and shippers can benefit from efficiency improvement.

In recent years, CN and CP Rail have reaped the long-term benefits resulting from the productivity gains they managed to achieve over the past decade. Between 1986 and 1997, their total factor productivity increased by 53 per cent, while operating margins improved by 58 per cent.

To achieve these productivity gains, however, both CN and CP Rail have incurred substantial restructuring charges since the beginning of 1990s, largely for workforce downsizing and write-down of assets. Table 16-3 shows special charges incurred since 1991. With such special charges included as operating expenses, railways reported significant losses in 1992 and 1995.

While productivity improvement allows firms to reduce their costs in competitive markets, at least some of the savings must be passed on to users/customers in terms of lower freight rates.

If the prices and costs of the rail freight sector had followed the general trends in the economy as a whole, both revenues (shipper's costs) and total costs of the rail sector would have been much higher than those reported.

On average, the industry had cost savings[5] of about $1.2 billion per year from 1992 to 1997, with savings reaching $2.2 billion in 1997. About one-third of these savings were due to lower labour cost increases in the industry compared with the unit labour changes in the economy as a whole. Approximately 48 per cent of these cost savings were returned to users in terms of lower prices. The average annual user saving is estimated at $562 million from 1992 to 1997.

Table 16-4 shows rail freight cost savings and price reductions from 1992 to 1997.

Financial Performance

At the corporate level, profitability at CN and CP Rail continued to improve in 1998, following a strong performance in 1997. Their joint average operating ratio,[6] including operations in both Canada and the US, declined to 77.3 per cent in 1998 from 78.5 per cent in 1997. CN and CP Rail also showed similar improvement in the financial results of their Canadian operations.

Cost reduction was the main factor behind the lower operating ratio in 1998. Rail freight revenues fell on average by 4.5 per cent, but operating costs came down by an estimated seven per cent.

5 The savings are measured as the difference between the actual revenues/costs of the carriers and the estimated revenues/costs they would have incurred if their output prices and unit cost had increased at the same pace as the one observed over the same period in the economy as a whole.

6 Due to changes in accounting practices by CN and CP Rail, operating ratios at the corporate level are reported on the basis of US generally accepted accounting practices (GAAPs). Operating ratios for their Canadian operations remain reported in Canadian GAAPs.

Apart from strong traffic growth, the financial performance of freight railways has improved in recent years because their unit costs have declined sharply through productivity gains. The decline in prices, on the other hand, was less significant.

Figure 16-3 shows rail cost and price indicators from 1987 to 1997.

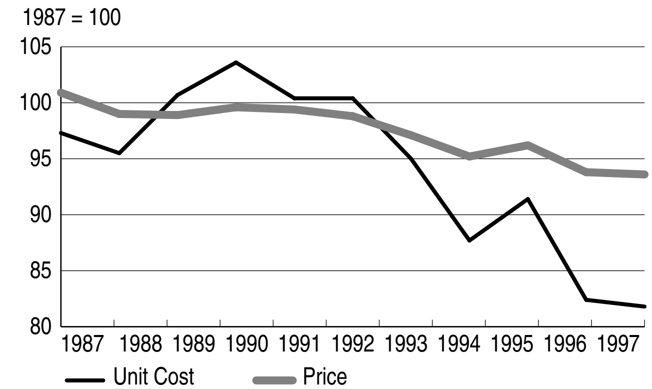
Since 1986, the Canadian rail freight industry has undergone a full business cycle. The industry faced strong revenue growth in the mid-1980s, a revenue slow down from 1988 to 1989, a financial downturn in the early 1990s, and a recovery period from 1993 to 1996. The industry finally achieved record revenues and operating profits in 1997.

Table 16-5 charts the rail industry's financial ups and downs from 1986 to 1998.

In 1997, total operating revenues generated from the Canadian operations of the Class I freight railways were only nine per cent higher than their revenue level in 1986, which was also a year of relatively good performance for railways. But the profit margin (operating income over revenues) in 1997 was seven percentage points higher than in 1986. In dollar terms, operating profits increased $486 million, reflecting higher rail profitability in recent years than a decade ago.

Regional railways also benefited from a strong Canadian economy in 1997. Their total revenues increased by 11 per cent, and their average profit margin improved by 4 per cent over 1996. These railways primarily serve local rail freight markets. Their growth is not evident because the operational and financial results of many new small railways that

FIGURE 16-3
RAIL COST AND PRICE INDICATORS IN RAIL FREIGHT
1987 – 1997



Source: Transport Canada

TABLE 16-5
FINANCIAL RESULTS FOR THE RAIL FREIGHT INDUSTRY
1986 – 1997

	1986	*1995*	*1996*	*1997*
Class I Railways - Canadian Operations				
Revenue ($M)	6,237	6,127	6,150	6,778
Expenses ($M) [1]	5,557	5,565	5,215	5,612
Operating Income ($M)	680	562	934	1,166
Operating Ratio (%)	89.1	90.8	84.8	82.8
Regional/Shortline Railways				
Revenue ($M)	673	671	652	726
Expenses ($M) [1]	550	587	608	647
Operating Ratio (%)	81.7	87.5	93.3	89.2

1 Excludes special charges

Source: Transport Canada based on Statistics Canada's files and CN and CP financial statements.

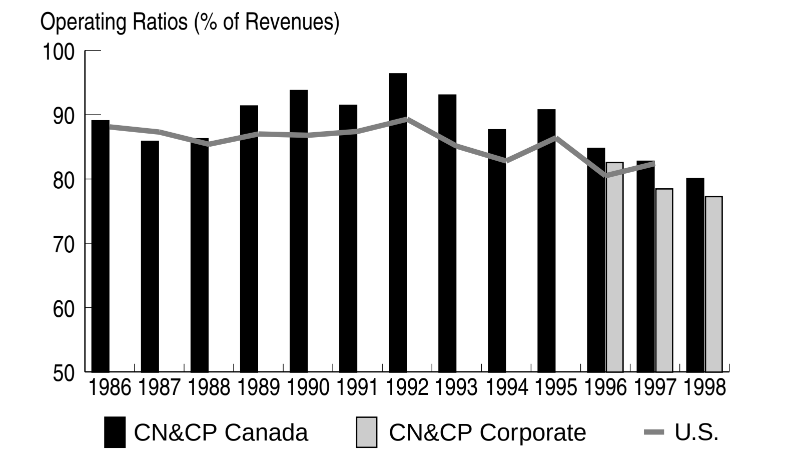
started up in late 1997 and in 1998 are not yet included in available statistics.

Comparison of Operating Ratios of Larger Canadian and US Railways'

Figure 16-4 compares average operating ratios between Canadian and US Class I railways from 1986 to 1998. Notwithstanding the differences between Canadian and US accounting principles, the historical trends show that Canadian rail operations had about the same operating ratio as US railroads in the late 1980s, but became less cost-efficient than their American counterparts in the early 1990s. Following the major cost reductions of recent years, Canadian railways achieved a level of efficiency comparable to the US railroads in 1997, with average operating ratio of 82.8 per cent, compared with 82.4 per cent for their US counterparts.

On the basis of US GAAPs,[7] the cost performance of the two

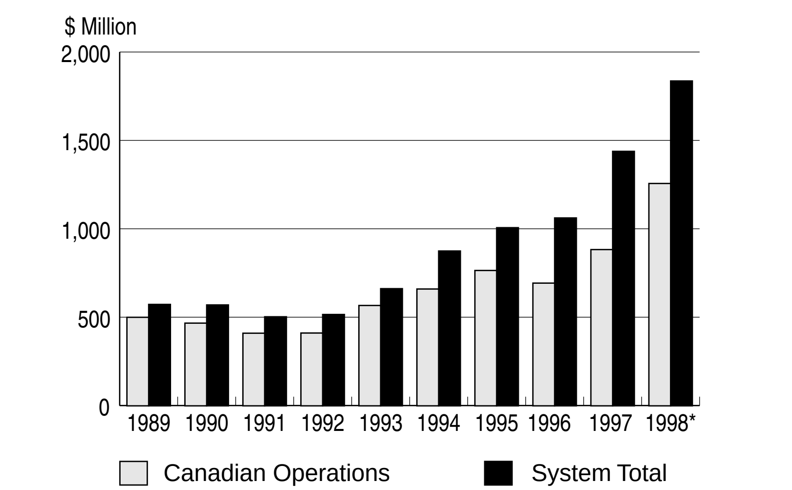
FIGURE 16-4
LARGER CANADIAN AND US RAILWAYS' OPERATING RATIOS
1986 – 1998



* Special restructuring charges are excluded from operating expenses
** CN and CP Canadian operations adopt Canadian GAAP (Generally Accepted Acounting Principles), while CN and CP corporate results are based on U.S. GAAP.

Sources: CN and CP Rail Annual Reports

FIGURE 16-5
CN AND CP CAPITAL EXPENDITURES
1989 – 1998



* Excluding CN's acquisition of Illinois Central

Sources: CN and CP Rail Annual Reports

Canadian Class I railways surpassed the average of US railroads in 1997. Under the US GAAPs, the average operating ratios of CN and CP in 1997 and 1998 were 78.5 per cent and 77.3 per cent respectively.[8]

Capital Expenditures

The recent improvement in the profitability of the rail freight industry has induced significant capital investments over the past two years. For instance, in 1998 CN made an acquisition offer for the US railroad, Illinois Central (IC), at a cost of $2.4 billion in US dollars. The acquisition is in its last stages, with a US regulatory decision to be rendered in 1999.

Beside the IC acquisition, CN's and CP Rail's total capital expenditures amounted to $1.8 billion in 1998, an increase of 28 per cent over 1997. About $1.3 billion, or 61 per cent, was invested in their Canadian operations, with the rest going to their US holdings. Capital expenditures had to do mostly with the acquisitions of new locomotives, additions to the rolling stock and roadway renewal.

Figure 16-5 shows the trends in CN's and CP Rail's capital expenditures since 1989.

7 One of the major differences in GAAPs between Canada and the United States is in reporting track replacement costs. In Canada, these cost are included in operating expenses, while in the US they are capitalized. Based on restated CN and CP Rail financial statements, the operating ratios of Canadian railways reported in the US GAAPs are on average about three points lower than those reported in the Canadian GAAPs.

8 CP Rail has adopted US generally accepted accounting principles (GAAPs) in reporting its financial results since 1997; CN started reporting on the basis of US GAAPs in 1998.

Table 16-6 shows CN's and CP Rail's identifiable assets in Canada and the US from 1995 to 1997, as reported in their respective annual reports. In 1997, CN had approximately 94 per cent of its total assets in Canada, compared with 76 per cent for CP Rail. CN's Canadian content in terms of proportion of total assets is expected to reduce substantially, however, if its IC acquisition is approved.

CN and CP Rail both showed healthy financial structures in 1998. Their financed capital consisted on average of 55 per cent equity, 37 per cent debt and eight per cent deferred taxes.

TABLE 16-6
IDENTIFIABLE ASSETS OF CN AND CP RAIL BY GEOGRAPHIC SEGMENTS, 1995 – 1997

	1995	*1996*	*1997*
CN			
Canada ($ million)	5,572	6,400	6,606
U.S. ($ million)	541	418	445
Total ($ million)	6,113	6,818	7,051
CDN/Total (per cent)	91.2	93.9	93.7
CP Rail			
Canada ($ million)	6,067	5,474	5,996
U.S. ($ million)	1,874	1,942	1,843
Other ($ million)	1,215	923	3
Total ($ million)	9,156	8,338	7,842
CDN/Total (per cent)	66.3	65.6	76.5

Sources: CN and CP Annual Reports

TABLE 16-7
PRICE AND OUTPUT CHANGES AT VIA RAIL 1991 – 1998

	1990-1997	*1995-1996*	*1996-1997*	*1997-1998*
Price Changes (%)				
Corridor	3.7	5.3	6.1	6.7
Long Haul	6.6	11.3	7.3	8.6
Remote - Regional	2.5	5.0	2.7	14.2
Total VIA Rail	4.5	7.0	6.3	7.6
Output Changes (%)				
Total VIA Rail	0.1	(4.3)	(0.2)	(1.9)

Source: Transport Canada and VIA Rail

VIA RAIL

VIA Rail Canada Inc. generated passenger revenues of $143 million during the first three-quarters of 1998, an increase of 5.6 per cent from the same period in 1997. Prices climbed by 7.6 per cent, while output declined by two per cent. The analysis in this section focuses on 1991 to 1997, following the major reorganisation and downsizing of VIA Rail's activities.

Output and Price Changes

Since 1991, VIA Rail's price increases each year have exceeded general inflation trends, with the exception of 1995. From 1991 to 1997, VIA Rail's prices rose by 30 per cent, compared with 13 per cent in the general economy. VIA Rail's long-haul services recorded the strongest price increases, with an average of 6.6 per cent per year, while remote regional services had more modest price changes. In 1998, however, the price of these services went up 14 per cent. VIA Rail's output grew until 1995, but has declined since then.

Table 16-7 shows VIA Rail's output and price changes from 1991 to 1998.

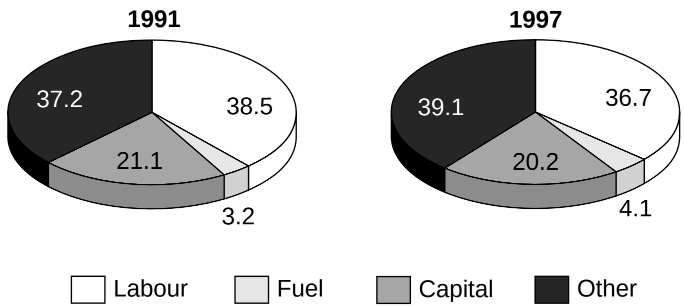
Cost and Productivity Indicators

In 1997, labour costs represented 37 per cent of VIA Rail's total costs.[9] VIA Rail's labour costs dropped by $50 million between 1991 and 1997. The year 1997 was the first one where passenger revenues exceeded labour costs. From 1991 to 1997, labour productivity increases of 42 per cent reduced unit labour costs by 23 per cent. VIA Rail's average labour cost per employee is 48 per cent higher than the average for the economy as a whole and the second highest[10] in the transportation sector.

9 It includes an estimate of the opportunity cost of the capital used by VIA Rail, based on the value of its fixed capital times the capital cost rate of the railways. Exceptional charges, such as the write-off of assets or labour restructuring charges, were excluded.

10 Per hour, VIA Rail workers make as much as CN and CP Rail workers, who receive the highest annual compensation in the transportation sector, but also work longer hours

FIGURE 16-6
VIA RAIL'S COST STRUCTURE
1991 and 1997



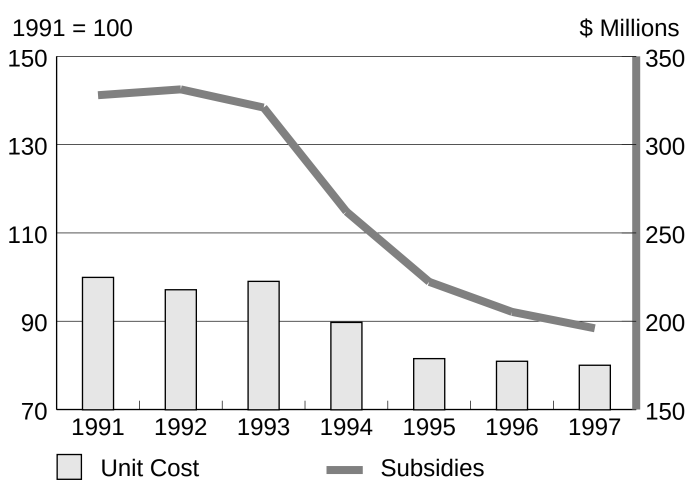
Source: Transport Canada and Statistics Canada

TABLE 16-8
EFFICIENCY INDICATORS
VIA RAIL

	1991	*1995*	*1996*	*1997*
Employees (in 000)	4.4	3.8	3.2	3.2
Average Labour Cost per employee ($000)	50.9	51.3	56.5	56.6
Productivity Change (in %)	*1991-97*	*1994-95*	*1995-96*	*1996-97*
Labour	7.2	16.1	13.4	2.7
Total	6.7	11.9	4.2	4.0
Unit Cost Change (in %)				
Labour	(4.23)	(12.65)	(2.63)	(2.57)
Total	(3.46)	(9.08)	(0.10)	(1.38)

Source: Transport Canada

FIGURE 16-7
VIA RAIL'S UNIT COSTS AND SUBSIDIES
1991 – 1997



Source: Transport Canada

Figure 16-6 compares VIA Rail's cost structure in 1991 and 1997.

In 1997, VIA Rail's fuel costs represented 4.1 per cent of its total costs, more than in 1991. Increased fuel efficiency was not sufficient to offset higher fuel prices.

In addition, capital costs remained relatively stable from 1991 to 1997, coming in at slightly over 20 per cent of total costs. VIA Rail's other main cost items are marketing at ten per cent of total costs and payments to other carriers at nine per cent.

Since 1991, VIA Rail's costs overall have fallen by $110 million, with a level of activity in 1997 that was marginally higher than it was in 1991. VIA Rail's costs came down as a result of robust productivity gains. VIA Rail's performance from 1993 to 1995 was particularly strong, increasing by more than ten per cent each year.

Table 16-8 shows VIA Rail's efficiency indicators, including employees, labour costs and productivity, from 1991 to 1997.

Financial Indicators

Although VIA Rail's operating subsidies have dropped by more than $130 million since 1991, it has adjusted by adopting strategies to increase its revenues and reduce its costs. On the revenue side, price increases were a major component of VIA Rail's strategies, generating additional revenues over the rate of inflation in the general economy totalling approximately $14 million per year since 1992. Cost declines, in constant dollars, have averaged $31 million per year.

Figure 16-7 illustrates the close link at VIA Rail between the reduction of costs and subsidies.

When the cost of capital is reflected in total costs, VIA Rail's cost recovery was more than 25 per cent in 1991 on a total system cost of $596 million. In 1997, VIA Rail's cost recovery rose to 39 per cent. Per passenger, the difference between VIA Rail total costs and its revenues was equivalent to $80 per passenger. Per passenger kilometre, VIA Rail charged 13 cents, while total costs were much higher at 34 cents. This 21-cent deficit per passenger kilometre is almost equivalent to the 25-cent average revenue per passenger kilometre for the larger regional airlines.

Table 16-9 looks at VIA Rail's financial performance results from 1991 to 1997.

TABLE 16-9
VIA RAIL'S FINANCIAL PERFORMANCE RESULTS
1991 – 1997

	1991	*1995*	*1996*	*1997*
Operating Revenues ($ million)	145	170	175	188
Operating Expenses ($ million) [1]	506	436	433	429
Total Cost ($ million)	596	507	488	487
Cost Recovery Ratio (per cent) [2]	24.3	33.6	35.9	38.6
Operating Subsidies ($ million)	328	222	205	196

1 Includes depreciation, but excludes extraordinary charges
2 Operating Revenues divided by Total Cost
Source: Transport Canada

Capital Expenditure

Since 1991, VIA Rail's capital expenditure program has averaged $34 million per year, which is less than the $45 million that VIA Rail can set aside for depreciation. Since VIA Rail's passenger revenues and subsidies barely cover its cash operating costs, VIA Rail's capital program is limited to what it sets aside for depreciation. Overall, since 1991, VIA Rail's asset base has dropped by $125 million or 20 per cent.

Table 16-10 shows changes in VIA Rail's fixed assets from 1991 to 1997.

TABLE 16-10
CHANGES IN VIA RAIL'S FIXED ASSETS
1991 – 1997

	Total	*Average (Year)*
Gross Capital Expenditure	240	34
Asset-Write Down	(48)	(7)
Depreciation	316	45
Net Investment	(125)	(18)

Source: Transport Canada based on Statistics Canada files.

TRUCKING INDUSTRY

The analysis in this section focuses on the performance of for-hire trucking firms with sales equal to or greater than $1 million. Smaller firms are not included in the analysis because comprehensive data was not available. Individual carriers whose main activity is the movement of household goods are also not included.

TABLE 16-11
PRICE AND OUTPUT CHANGES
THE TRUCKING INDUSTRY

	1987-1997 [1]	*1995-96*	*1996-97*	*1997-98* [2]
Price Changes (per cent)				
Intraprovincial	1.0	(0.3)	1.1	(3.0)
Interprovincial	0.2	(5.5)	4.5	(1.3)
Transborder	0.9	(3.4)	3.3	0.2
Total Trucking	0.8	(2.7)	2.7	(1.5)
Output Changes (per cent)				
Intraprovincial	3.0	6.1	5.6	11.3
Interprovincial	4.4	10.4	3.1	8.8
Transborder	13.0	19.4	10.4	4.7
Total Trucking	5.4	10.8	6.1	8.1

1 Data by market segment were not before 1987
2 Based on the first two quarters of the year
Source: Transport Canada based on Statistics Canada Files

PRICE AND OUTPUT INDICATORS

From 1987 to 1997, revenues increased by 6.3 per cent per year in the for-hire trucking industry. More than 85 per cent of this growth came from increased activity because prices increased only marginally over the period, at 0.8 per cent per year.

Table 16-11 shows output and price chances in the trucking industry from 1987 to 1997.

TABLE 16-12
REGIONAL INDICATORS OF TRUCKING ACTIVITY
1987 – 1997

	Trucking Revenues[1]	Economy GDP	Trucking Revenues[1]	Economy GDP
	1997 Distribution in %		1987-1996 AAG in %	
Atlantic	7.0	5.8	3.5	1.0
Quebec	19.6	21.6	5.8	1.4
Ontario	40.0	39.5	4.9	1.8
Prairies	21.4	20.3	5.8	2.5
B.C.	11.9	12.9	6.0	2.8
Total	**100.0**	**100.0**	**5.4**	**1.9**

AAG = Average Annual Growth GDP = Gross Domestic Product
1 From traffic originating and terminating in the region
Source: Transport Canada based on Statistics Canada files

TABLE 16-13
TRUCKING PRICE CHANGES AT MID-YEAR (AAG IN PERCENT)
FOR DOMESTIC OUTBOUND TRAFFIC, 1990 – 1997

	1990-1995	1995-1996	1996-1997
Atlantic	0.5	0.7	(0.4)
Canada less Atlantic	0.4	(1.8)	(0.3)

Source: Transport Canada, based on Statistics Canada's files

Preliminary results for the first half of 1998 show that revenue growth continued to be strong, gaining 6.5 per cent. The surge in trucking prices in 1997 was short lived as they returned to a pattern of decline in 1998.

When examined by markets, i.e. intraprovincial, interprovincial, or transborder, prices within the trucking industry followed a similar path as price changes varied by only a one per cent up or down.

In terms of output, however, differences were observed between markets. A major source of growth in trucking has been traffic to and from the US. Since 1987, the trucking performance in transborder markets has been phenomenal, with output growth in the two digit range. Output growth for domestic markets has been more modest, at 2.5 per cent per year. In 1998, output growth is estimated to be in the order of eight per cent, led by strong growth in domestic activities.

When trucking prices are expressed in relation to rail freight prices, they went up by 13 per cent from 1986 to 1997. Despite this relative price disadvantage, the trucking industry has continued to increase its freight market share. For example, the rail mode had an estimated 32 per cent share of the combined freight revenues of the two modes in 1997, compared with a share of 46 per cent in 1986. This suggests that shippers are prepared to pay a premium for trucking services.

Regional Indicators

The regional distribution of trucking activity follows the distribution of economic activity. Ontario dominates with a 40 per cent share, which is the same as its share of economic activity. Both Atlantic Canada (Nova Scotia, New Brunswick, Prince Edward Island and Newfoundland) and the Prairies (Manitoba, Saskatchewan and Alberta) have a trucking share that is larger than their share of economic activity. For Quebec and British Columbia, the reverse is true.

Table 16-12 shows regional indicators of trucking activity from 1987 to 1997.

Over time, British Columbia has shown the strongest trucking growth, which corresponds to the province's economic performance. Atlantic Canada, on the other hand, has exhibited the lowest performance in both trucking and the economy. Quebec's economic growth only exceeded that of Atlantic Canada, yet trucking activity in Quebec increased as fast as it did in the Prairies, where the regional economy has grown at a faster pace. The potential transfer of private[11] to for-hire trucking in Quebec could explain this apparent inconsistency. The relative growth in demand for trucking services in Ontario is consistent with that of its economy.

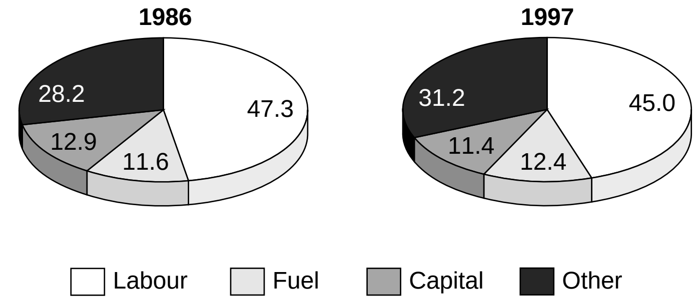
Freight assistance programs in Atlantic Canada were revoked in July 1996. The programs were designed to reduce the transportation costs for domestic outbound traffic. The effective subsidy rate of the combined intraregional and westbound programs was 13 per cent, based on 1992 traffic data. The removal of the program

11 A company that performs its own shipping of goods and services.

does not seem to have altered the pattern of price changes of outbound traffic from Atlantic Canada.

Table 16-13 shows that price changes in Atlantic Canada have continued to evolve more or less in tandem with those of the rest of the country, before and after the removal of the subsidy.

FIGURE 16-8
COST STRUCTURE OF THE TRUCKING INDUSTRY
1986 and 1997



Source: Transport Canada, based on Statistics Canada's files

Cost Indicators

In 1997, labour costs were 45 per cent of total costs in trucking industry when owner-operators were factored in. Employment increased by 36 per cent from 1986 to 1997, making trucking the best performer in job creation in the transportation industry.

Figure 16-8 compares costs in the for-hire trucking industry between 1986 and 1997.

Much of the job creation in the trucking industry occurred after 1992. Industry activity, stimulated by economic recovery and lower trucking prices (-1 per cent), grew by 70 per cent, while labour productivity advanced by 27 per cent. These productivity gains translate into higher average salaries and a faster growth rate than the economy as a whole.

Unit labour costs dropped by four per cent in nominal terms from 1986 to 1997. If labour costs had increased in trucking at the same pace as in the general economy, they would have been higher by $875 million, 16 per cent, on average. In recent years, labour productivity and unit cost performance of trucking have exceeded long-term trends.

Table 16-14 charts efficiency indicators for the trucking industry from 1986 to 1997.

TABLE 16-14
TRUCKING INDUSTRY EFFICIENCY INDICATORS
1986 – 1997

	1986	*1995*	*1996*	*1997*
Employees (in 000) [1]	104.0	128.4	134.3	141.1
Average Labour Cost per employee ($000) [1]	31.6	40.9	41.5	43.1
Productivity Change (in %)	*1986-1997*	*1995*	*1996*	*1997*
Labour [1]	3.4	6.9	6.3	1.2
Total	1.9	3.5	4.0	1.5
Unit Cost Change (in %)				
Labour [1]	(0.4)	(5.1)	(3.5)	2.6
Total	0.1	(0.9)	(1.5)	1.0

1 Adjusted to reflect the impact of owner-operators.

Source: Transport Canada based on Statistics Canada files

In 1997, fuel costs in the for-hire trucking industry accounted for 12.4 per cent of total industry cost, slightly above its 1986 share. Although data reported since 1986 does not allow for accurate measurement of productivity improvement in the use of fuel within the trucking industry, it appears that fuel efficiency has gained 14 per cent in recent years, after several years of consecutive declines between 1988 and 1993.

Besides labour, capital was a major source of cost reduction in trucking. One factor in this reduction was the decline in the amount of capital used per dollar of output. While this may represent a better utilization of assets, it may also reflect the aging of the capital stock used in the industry. Other factors include the use of more efficient power units, and changes in the fleet mix. The reduction of capital costs due to lower interest and tax rates was also a contributing factor.

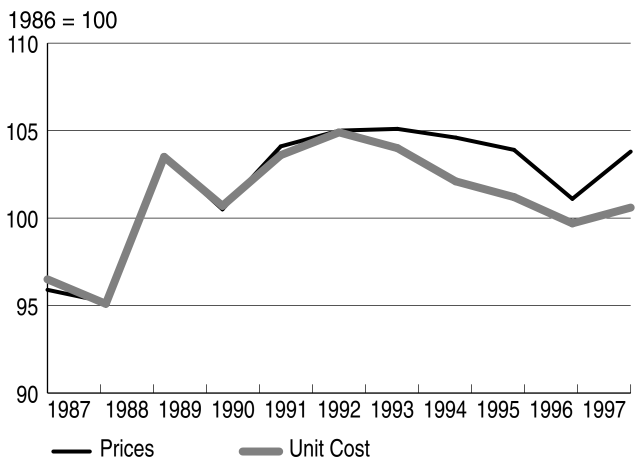
Total factor productivity in the trucking industry increased by 1.9 per cent annually between 1986 and 1997. Trucking unit costs in 1997 were about the same as they were in 1986. Again, in recent years, industry performance in terms of productivity and unit costs exceeds longer term trends.

TABLE 16-15
TRUCKING INDUSTRY COST SAVINGS AND PRICE REDUCTION
1992 – 1996

	1997	*1992-1996 Average*
Carrier Cost Savings ($ million)	1,587	803
User Price Savings ($ million)	1,191	625
Cost Savings Passed to Users (per cent)	75.0	77.9

Source: Transport Canada, based on Statistics Canada files

FIGURE 16-9
COST AND PRICE INDICATORS IN TRUCKING
1987 – 1997



Source: Transport Canada, based on Statistics Canada's files

TABLE 16-16
SUMMARY FINANCIAL RESULTS
THE TRUCKING INDUSTRY

	1986	*1995*	*1996*	*1997*
Operating Revenue ($ million)	6,846	11,659	12,602	13,748
Operating Expenses ($ million)	6,578	11,116	12,193	13,084
Operating Income ($ million)	268	544	410	664
Operating Ratio (per cent)	96.1	95.3	96.7	95.2

Source: Transport Canada, based on Statistics Canada files

IMPACT OF PRODUCTIVITY

From 1996 to 1997, Table 16-15 shows estimated cost savings for both carriers and shippers resulting from productivity gains.

Carriers' cost savings are measured as the difference between the actual costs of the carriers and the costs they would have incurred if the unit cost had increased at the same pace as in the general economy. The same methods were used to measure users' revenues.

Between 1991 and 1997, strong productivity performance allowed the trucking industry to reduce its annual costs by about $800 million on average. In 1997, the cumulative savings were equivalent to $1.6 billion or 12 per cent of the trucking industry cost base. The competitive level of the industry explains the high percentage of cost savings passed on to users in lower prices.

FINANCIAL PERFORMANCE

The trucking industry can be viable with an operating margin equal to about 4 per cent of its revenues. The rail industry requires a higher operating margin because it requires significantly more assets than the trucking industry to generate a dollar of revenue.

Trucking is a very competitive industry, into which entry is relatively easy. Under such competitive forces, the market has its own clearing-house process. To survive, a firm must adjust costs to the prices dictated by the market. Within the industry overall, trends show unit costs following the same pattern as prices between 1987 and 1997. Trucking is an industry where excessive price increases are almost impossible, as they rapidly attract competitors which in turn lower prices.

Figure 16-9 shows cost and price indicators for the trucking industry over the period 1987 to 1997.

The trucking industry's financial position remained relatively stable from 1986 to 1997. Since 1986, the operating ratio of the for-hire trucking industry has hovered around 96 per cent, even with reduced performance in the late 1980s and early 1990s, which other industries in the transportation sector also experienced.

Table 16-16 shows the trucking industry's financial indicators from 1986 to 1997.

An upward trend was evident after 1992, when the operating ratio improved by 2.4 per cent to 95.2 per cent in 1997. This translated into a 45 per cent improvement in profitability, measured by the return on fixed assets. Improved profitability seems to have continued in 1998, based on the performance of large carriers in the first three quarters of the year. The operating ratio of this group of carriers fell by close to one per cent from 95.6 per cent to 94.7 per cent between 1997 and 1998.

CAPITAL EXPENDITURE

From 1986 to 1991, net investment[12] in trucking amounted to a $70 million per year. When capital expenditures and depreciation are expressed in constant dollars, the net addition to the capital base within the trucking industry in 1991 was estimated to be seven per cent over its 1986 levels. Over that same period, the industry's output advanced by 12 per cent

From 1992 to 1997, the industry more than doubled its gross capital expenditure program to $805 million per year compared with the period from 1986 to 1991. On average, net capital expenditure amounted to $314 million per year. In constant dollars, the value of fixed assets rose by 66 per cent from 1991 levels, still lagging behind the 72 per cent growth in industry activity.

Table 16-17 illustrates capital expenditures in the trucking industry from 1986 to 1997.

TABLE 16-17
CAPITAL EXPENDITURE IN THE TRUCKING INDUSTRY

Annual Averages in $ Million

	1986-1991	1992-1997	1986-1997
M & E			
Gross	314.7	775.7	545.2
Depreciation	269.8	468.7	369.2
Net	44.9	307.0	176.0
Total			
Gross	356.4	805.3	580.8
Depreciation	285.9	491.0	388.4
Net	70.5	314.3	192.4

Source: *Special Compilation done by Statistics Canada*

TABLE 16-18
PRICE AND OUTPUT CHANGES IN THE INTERCITY BUS INDUSTRY 1986 – 1997

	1986-1997	1994-1995	1995-1996	1996-1997[1]
Price Changes (%)				
Regular Bus Services	3.6	2.4	7.4	3.0
Charter Bus Services	0.4	(4.4)	2.2	0.3
Total Bus[2]	1.7	(1.3)	1.4	(0.1)
Output Changes (%)				
Regular Bus Services	(3.7)	(14.0)	(4.9)	(4.2)
Charter Bus Services	2.5	26.0	0.9	(9.8)
Total Bus[2]	0.1	6.5	(0.9)	(2.9)

1 Revised data
2 Includes other passenger services, parcels and other activities
Source: *Transport Canada, based on Statistics Canada files*

BUS INDUSTRY

THE INTERCITY BUS INDUSTRY

The bus industry includes three segments: the intercity bus industry, which provides bus services on a scheduled or a charter basis; school bus operators; and the urban transit industry.

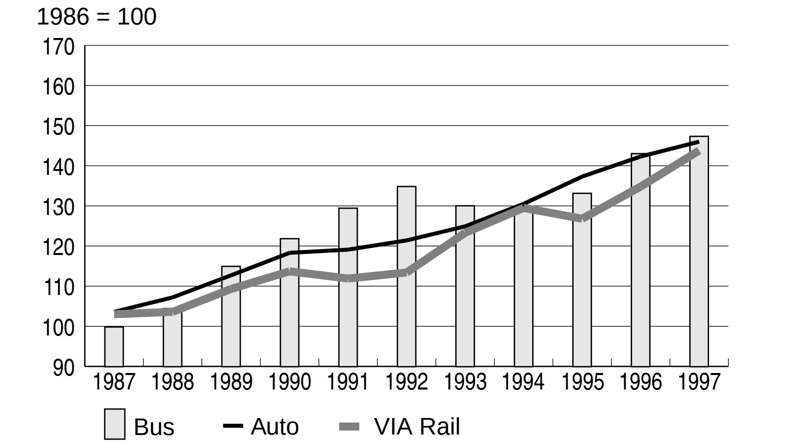
In 1997, the revenues of intercity bus carriers fell to $593 million, a three per cent decline from 1996. This segment of the bus industry accounts for 12 per cent of total bus activity. The activities of school bus operators, whose revenues exceeded $1 billion in 1997, are not covered in this chapter. The performance of transit operators is reviewed in a separate section.

Output and Price Indicators

The revenue growth of the intercity bus industry has averaged 1.8 per cent per year since 1986. Prices have been the major source of revenue changes. Table 16-18 shows price and output changes in the intercity bus industry from 1986 to 1997.

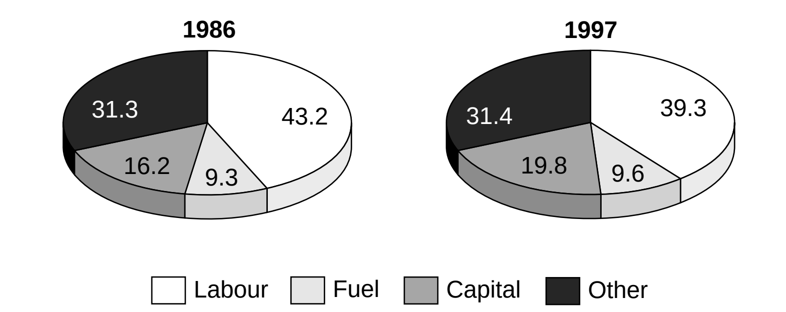
12 Includes the acquisition of fixed assets, owned or leased, excluding land, by all trucking firms.

FIGURE 16-10
INDEX OF PASSENGER SERVICE PRICES BY MODE
1987 – 1997



Source: Transport Canada

FIGURE 16-11
COST STRUCTURE OF THE INTERCITY BUS INDUSTRY
1986 and 1997



Source: Transport Canada, based on Statistics Canada's files

Total revenues of the industry can be divided as follows: 82 per cent passenger services, 12 per cent parcel services and six per cent other activities. In 1997, scheduled bus operators had a 51 per cent share of the activity compared with 68 per cent in 1986.

Although a carrier classified as a scheduled bus operator may also have generated a small percentage of its revenues from chartering services and vice versa, the slower growth of scheduled carriers can be attributed to a sluggish demand for scheduled services.

Until the 1990s, scheduled intercity bus services generated between 55 and 60 per cent of the total bus passenger revenues. In 1997, these services contributed approximately 45 per cent of passenger revenues.

When output measures are used, the decline in the share of scheduled services is even more striking. Between 1986 and 1997, the output of charter services grew by 31 per cent,[13] while the output of scheduled services declined by 34 per cent. One of the factors behind the growth of charter bus operations over the same period has been the relative stagnation of the prices of these services. Over the same period, the prices of intercity services increased by 47 per cent.

Changes in the prices of scheduled bus services track the trends observed in the price of competing services. Price changes in scheduled bus services, on the one hand, and changes in the cost of the automobile and VIA Rail services, on the other, correlate well with each other and confirm the congruity of the trends.

Figure 16-10 shows price changes for various passenger services according to mode from 1987 to 1997.

Cost Indicators

The bus industry is labour intensive. In 1997, labour costs represented about 37 per cent of the total industry costs, which was down from 43 per cent in 1986. This ratio has remained an average of three per cent higher than the rest of the transportation sector since 1986.

That said, the bus industry still has a labour cost per employee significantly lower than the economy as a whole. In 1997, it averaged 33 per cent lower than that of the economy. This differential has increased in recent years. Previously, it was less than ten per cent. This drop can be explained by the productivity performance of the industry.

Figure 16-11 compares the cost structure of the intercity bus industry in 1986 and 1997.

13 The decline of charter activity in 1997 is mainly caused by a major drop of charter services offered by scheduled carriers. It could also be the result of a reclassification of bus companies by Statistics Canada.

Between 1989 and 1992, labour productivity in the bus industry fell by 12 per cent, while the relative labour cost of the industry declined by about the same percentage. Since then, however, productivity has rebounded by 24 per cent, but the salaries in the bus industry have continued to fall in relation to the economy's average. One of the factors in this decline is the growing importance of charter carriers, whose average salaries are 55 per cent of those employed by scheduled operators. Productivity gains and reduced salary increases allowed unit labour costs to fall by 11 per cent between 1992 and 1997.

Table 16-19 shows efficiency indicators in the intercity bus industry from 1986 to 1997.

In 1997, fuel costs represented only 9.6 per cent of the bus industry cost, a shade higher than in 1986. Other operating costs, including marketing, materials other than fuel, insurance and other miscellaneous expenses, amounted to 31 per cent of total costs in 1997. This proportion has been relatively stable over time. The share of capital costs (leasing, depreciation, and financing) increased from 16 per cent to close to 20 per cent of total costs. This is indicative of increased capital intensity in the industry.

Overall, the productivity of the intercity bus industry increased by less than one per cent per year between 1986 and 1997. Charter operators have demonstrated a better productivity performance. Since 1986, their productivity has increased by 19 per cent, while the scheduled segment of the industry shows no growth.

Between 1991 and 1997, industry productivity bounced back, allowing the industry to reduce its annual costs[14] by $66 million on average. Because about $42 million was returned to users in terms of lower prices, the financial performance of the industry has improved in recent years.

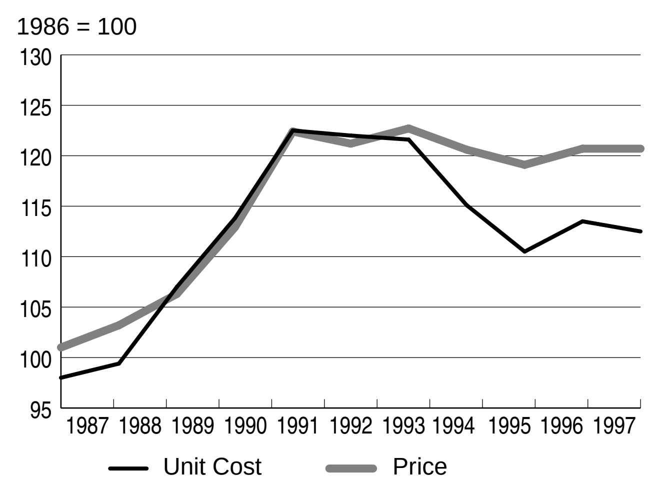
TABLE 16-19
EFFICIENCY INDICATORS IN THE INTERCITY BUS INDUSTRY
1986 – 1997

	1986	*1995*	*1996*	*1997P*
Employees (000)	7.9	8.3	8.0	7.5
Average Labour Cost per employee ($000)	24.4	25.7	25.8	25.7
Productivity Change (%)	*1986-97*	*1994-95*	*1995-96*	*1996-97P*
Labour	1.9	2.1	6.2	7.4
Total	0.6	6.9	(2.7)	2.4
Scheduled Carrier	0.0	4.1	0.2	(1.8)
Charter Carriers	1.6	11.5	(6.4)	7.7
Unit Cost Change (%)				
Labour	0.2	(0.1)	(3.3)	(3.6)
Total	1.1	(4.0)	2.7	(0.9)
Scheduled Carrier	1.5	(1.6)	(0.3)	3.5
Charter Carriers	0.5	(7.6)	6.9	(5.9)

P = Preliminary

Source: Transport Canada, based on Statistics Canada files

FIGURE 16-12
COST AND PRICE INDICATORS IN THE INTERCITY BUS INDUSTRY
1987 – 1997



Source: Transport Canada, based on Statistics Canada files

Financial Performance

In the middle of the 1980s, industry unit cost changes were stronger than its price changes. From 1989 to 1992, the industry was able to increase its prices at the same pace as its cost increases. Since 1993, industry prices have fallen but less rapidly than costs. This has resulted in an improvement in the industry's financial performance.

14 Cost savings are in real terms and are measured as the difference between the actual costs of the carriers and the costs they would have incurred if their unit cost had increased at the same pace as in economy. The same computations were performed to measure user savings on carrier revenues.

TABLE 16-20
SUMMARY FINANCIAL INDICATORS FOR THE INTERCITY SCHEDULED AND CHARTER BUS INDUSTRIES, 1986 – 1997

	1986	*1995*	*1996*	*1997[P]*
Operating revenues ($ millions)	485.9	608.7	611.3	593.5
Scheduled	331.6	368.0	341.7	303.7
Charter & other	154.4	240.7	269.7	289.8
Operating expenses ($ millions)	457.5	541.2	553.9	532.9
Scheduled	313.4	332.9	305.6	277.0
Charter & other	144.2	208.3	248.3	255.9
Operating ratio (per cent)	94.2	88.9	90.6	89.8
Scheduled	94.5	90.5	89.4	91.2
Charter & other	93.4	86.5	92.1	88.3

P = Preliminary

Source: Transport Canada, based on Statistics Canada files

TABLE 16-21
PRICE AND OUTPUT CHANGES OF TRANSIT SYSTEMS AND PRICE CHANGES OF COMPARABLE SERVICES, 1986 – 1997

	1986-1997	*1994-1995*	*1995-1996*	*1996-1997*
Price Changes (Average Annual Growth in per cent)				
Transit fare	5.5	1.8	6.4	3.5
Intercity Bus	2.0	(1.4)	2.5	(0.8)
Automobile	3.4	(2.1)	6.4	6.7
Output Changes (Average Annual Growth in per cent)				
Passengers	(0.8)	0.2	(1.1)	2.2
Vehicles-km	(0.2)	(4.7)	(3.9)	5.5

Source: Transport Canada, based on Statistics Canada files

Figure 16-12 shows cost and price indicators for the intercity bus industry from 1987 to 1997.

Following a year of strong growth in 1995, the bus industry's total revenues leveled in 1996 and receded in 1997. In the last two years, total revenues of the charter bus industry increased by 20 per cent, an increase offset by a 17 per cent decline in the scheduled bus services sector. Both industry segments showed improved profitability, compared with the mid-1980s. Their current profit margin appears to be at a level acceptable and viable for the industry.

Table 16-20 summarizes financial indicators for the intercity scheduled and charter bus industries from 1986 to 1997.

TRANSIT SYSTEMS

This section reviews the activities of transit and urban operator members of the Canadian Urban Transit Association. In 1997, the transit industry generated $1.7 billion from the users of their systems. Operating subsidies were $1.5 billion. The combined user revenues and subsidies represented two thirds of the operating revenues of the total bus industry.

Output and Price Changes

Since the mid 1980s, the patronage of transit systems has declined by 11 per cent or 1.1 per cent per year. The decline in vehicle-kilometres has been less pronounced., which may suggest a drop in load factors. One explanation for the decline in ridership has been the pace of fare increases, now at 5.5 per cent per year. This is 2.8 times the increase in intercity bus prices.

Compared with the cost of automobile use, however, the changes are not as significant. Over time, the prices of transit systems have increased by 26 per cent relative to the cost of using automobiles. It is obvious that there are factors in the decline of transit systems other than the relative cost of the services. An automobile is more convenient and flexible, for example, which offsets its higher usage costs.

Table 16-21 compares price and output changes for transit systems and price changes for comparable services from 1986 to 1997.

Regional Indicators

Increases in transit system prices between 1986 and 1997 have occurred in spite of massive subsidies. Since 1986, $23 billion has been transferred by governments to transit authorities. This amount equals $1.34 per passenger carried over that period.

Table 16-22 shows regional indicators, including subsidies, for transit systems in 1997.

By region, Ontario appears to be the better served by transit/urban systems. As much as 69 per cent of the Ontario population has access to public transit systems, compared with 46 per cent for the rest of the country.

However, Quebec has the highest number of annual trips at 58 per capita, compared with

41 for the rest of the country. Quebec users pay the lowest fare, at 84 cents per trip, compared with $1.14 for the country as whole. On a per trip basis, the highest subsidies are provided to western Canadians. A contributing factor is that in British Columbia, capital expenditures are not directly subsidized and transit authorities borrow more heavily than elsewhere. Higher debt costs are offset by higher operating subsidies.

TABLE 16-22
REGIONAL INDICATORS OF TRANSIT SYSTEMS
1997

	Passengers in per cent	*Revenues per Passenger in cents*	*Subsidies per Passenger[1] in cents*	*Population Served[2] in per cent*
Atlantic	1.6	117.3	77.1	27.0
Québec	31.7	84.4	116.5	45.2
Ontario	44.1	138.7	65.1	68.6
West	22.5	108.6	182.8	52.4
Total	**100.0**	**114.2**	**108.2**	**54.6**

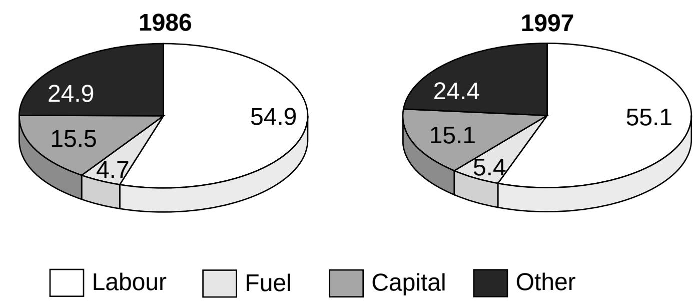
1 Total subsidies. 2 1995 data.

Source: Transport Canada based on Statistics Canada files

Cost and Productivity Indicators

The cost structure[15] of the industry has been relatively stable over time. Labour represents the largest cost component, accounting for as much as 55 per cent of total transit costs in 1997. Depreciation and capital costs are next, accounting for close to a quarter of total costs. This breakdown makes transit the second most capital-intensive industry in the transportation sector after the rail freight industry. Energy costs are not large, representing about five per cent of total costs in 1997. Fuel efficiency has been trending downwards.

FIGURE 16-13
COST STRUCTURE OF TRANSIT SYSTEMS
1986 and 1997



Source: Transport Canada, based on Statistics Canada files

Figure 16-13 shows the breakdown of total costs for 1986 and 1997.

In 1997, 38,000 workers were employed by transit authorities, up 7 per cent from 1986. Employment, however, peaked in 1993, at 41,800 and has been declining since then.

Average annual labour cost in the sector averaged $55,000 in 1997, a 43 per cent increase from 1986. This makes transit workers the best-paid employees in transportation after the rail industry.[16] Labour costs in other

TABLE 16-23
EFFICIENCY INDICATORS IN TRANSIT SYSTEMS
1986 – 1997

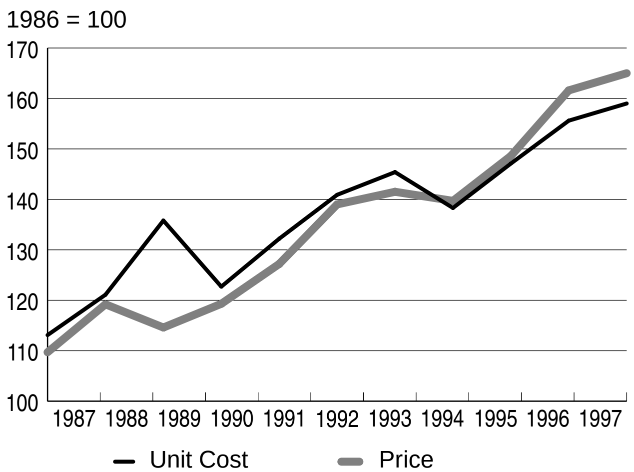
	1986	*1995*	*1996*	*1997*
Employees (000)[1]	35.8	39.0	38.4	38.0
Average Labour Cost per employee ($000)[1]	36.9	50.9	52.3	52.8
Productivity Change (%)	*1986-97*	*1994-95*	*1995-96*	*1996-97*
Labour	(0.5)	(3.6)	(2.2)	5.6
Total	(0.9)	(4.9)	(3.4)	4.1
Unit Cost Change (%)				
Labour	3.8	4.0	5.0	(4.3)
Total	3.8	6.0	6.0	(2.9)

Source: Transport Canada based on Statistics Canada files

15 Reported data on depreciation and debt charges are somewhat uncertain due to diversity of accounting systems among transit authorities. They have been substituted by Transport Canada computations based on stock of capital estimates.

16 Per hour, the salary of transit workers exceeds that of rail workers.

FIGURE 16-14
COST AND PRICE INDICATORS OF TRANSIT SYSTEMS
1987 – 1997



Source: Transport Canada based on Statistics Canada files

TABLE 16-24
SUMMARY FINANCIAL INDICATORS OF TRANSIT SYSTEMS
1986 – 1997

	1986	*1995*	*1996*	*1997*
Operating Revenues ($ million) [1]	1,041	1,545	1,621	1,712
Cash Operating Expenses ($ million)	1,835	2,752	2,790	2,788
Capital Cost ($ million) [2]	598	813	857	912
Total Cost ($ million)	2,433	3,565	3,648	3,700
Operating Subsidies ($ million)	1,238	1,584	1,561	1,495
Capital Subsidies ($ million)	371	414	450	494
Cost Recovery Ratio (per cent) [3]	42.8	43.3	44.5	46.3

1 Excludes subsidies
2 Estimated depreciation and opportunity cost of capital
3 Revenues before subsidies divided by Total Cost

Source: Transport Canada based on Statistics Canada files

transportation industries have increased by 35 per cent over the same period.

More significant are the 57 per cent productivity gains of the transportation sector, as opposed to the five per cent decline in transit systems. Per unit of output, labour cost rose 51 per cent in the 1986 - 1997 period, whereas they decreased by ten per cent in other transport industries.

Table 16-23 charts efficiency indicators, including employees, productivity and labour costs, from 1986 to 1997.

Overall, the productivity of transit systems is estimated to have declined by nine per cent since 1986. This compares with the 28 per cent gains registered by the rest of the transportation system. Unit costs have increased by 51 per cent.

The trends were reversed in 1997. Both labour and total productivity improved, while unit costs fell 2.9 per cent, thanks also to stable salaries.

The productivity problem of transit systems is not unique to Canada. It is observed in other countries, and there are many reasons for it. The decline in productivity is partly due to the urban transit mandate, which has been made more difficult by urban sprawl. As the scope of transit systems extends to suburban areas, the density of the population diminishes, and transit systems have to serve thinner markets over longer distances. The resulting operational difficulties are significant, especially when needs are also very diversified. Price increases for urban transit services in recent years have also reduced the differential with the costs of using an automobile. The resulting reduction in ridership could not be offset by the investments to maintain and upgrade the systems. The automobile is a formidable competitor, providing a more convenient form of personal transportation.

Between 1986 and 1993, transit costs increased rapidly and at a faster rate than the price of their services. On average per year, transit costs increased by $310 million in excess of inflation trends in the economy. Revenues increased at a pace faster than inflation, resulting in a net average increase of revenues of $94 million a year. In more recent years, transit unit revenues have been increasing more rapidly than unit costs, 4.3 per cent as opposed to 2.7 per cent. This was in response to changes in subsidy levels.

Figure 16-14 shows transit system cost and price indicators from 1987 to 1997.

Financial Indicators

The total cost of transit systems was estimated at $3.7 billion in 1997. Cash operating costs were $2.8 billion. Users paid 46 per cent of the total cost of the system, and their contribution to cash operating costs reached 61 per cent. The share contributed by users to total or cash costs was trending downwards until 1993 after which it started to climb slowly but steadily due to more rapid increases in fares and slowdown in unit cost increases.

Table 16-24 summarizes transit system financial indicators from 1986 to 1997.

Capital Expenditure

The capital expenditure of transit authorities averaged $528 million per year from 1986 to 1997. Net investment reached $186 million per year, which allowed transit authorities to increase the asset base of transit systems nominally by 77 per cent. In constant dollars, the capital stock in the industry rose by 23 per cent over the same period, while the number of passengers carried fell by nine per cent. (Table 16-25)

The capital expenses of transit authorities accelerated from 1992 to 1997. Average annual net investment increased 1.7 times over the period 1986-1991. In fact, most of the gains in the capitalization of the transit authorities occurred after 1991. The decline in ridership noted earlier was also evident after 1991.

TABLE 16-25
CAPITAL EXPENDITURES IN TRANSIT SYSTEMS
1986 – 1997

(Average in $ million)

	1986-1991	1992-1997	1986-1997
Total Capital Expenditure	388	666	527
Expenditure on Vehicles	168	317	243
Expenditure on Rights of Way	33	172	103
Net Investment	110	261	186

Source: Transport Canada based on Statistics Canada files

MARINE TRANSPORTATION INDUSTRY

This economic and financial analysis of the marine transportation industry focuses mainly on the performance of for-hire marine carriers domiciled in Canada. This excludes government carriers, such as Marine Atlantic or B.C Ferries. In addition, it does not include companies, such as CP Ships and Canada Maritime, which have their ships registered outside of Canada. Nor does it include transportation undertakings, such as terminal operators, port and pilotage authorities, and St. Lawrence Seaway Authorities. The analysis covers the periods from 1991 to 1997.[17]

In 1997, industry revenues totalled slightly less than $2 billion, representing a decline of four per cent from 1996. Freight revenues amounted to $1.2 million, accounting for 58 per cent of the industry's total revenues. Charter services have become a major activity in water transportation in recent years, generating revenues in the order of $400 million, or 20 per cent. Passenger transportation and other activities contributed four per cent and 16 per cent, respectively, to total industry revenues.

In freight activities, about 60 per cent of total revenues were generated from international services and 40 per cent from domestic services, mainly inland waterways and coastal shipping.

OUTPUT AND PRICE CHANGES

Table 16-26 presents price and output changes in marine transportation by three service groups: domestic freight, international freight and chartering services.[18]

Between 1991 and 1997, total output of the Canadian shipping industry increased on average by one per cent per year, which can be attributed to strong growth in chartering activities and non-shipping activities.

International marine freight, including transborder and overseas activities, were trending upward between 1991and 1996, before dropping by 18 per cent in 1997. Much of this growth has been in overseas markets, which now make up more than 85 per cent of the international activity of Canadian-domiciled carriers.

17 The period of analysis is limited to the 1991 – 1996 period because changes in the scope of industry survey make data prior to 1991 incompatible and because 1996 is the latest data available.

18 Chartering involves a contract between a shipowner and a client for the carriage of goods or the use of a vessel, with or without a crew.

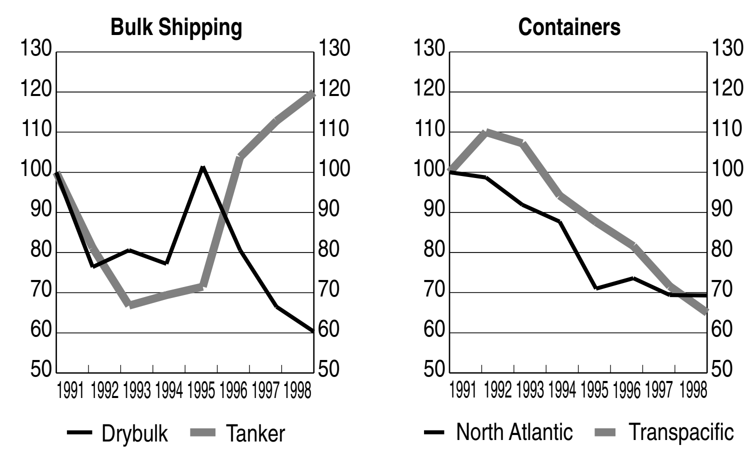
TABLE 16-26
PRICE AND OUTPUT CHANGES FOR MARINE TRANSPORT
1991 – 1997

	1991-1996	1994-1995[1]	1995-1996[1]	1997-1997[2]
Average Annual Price Changes (%)				
Domestic Services	0.7	(1.5)	(0.5)	(0.9)
International Services	3.7	2.4	3.6	2.5
Chartering	1.9	(0.1)	0.7	0.2
Total Shipping	2.1	0.5	1.5	0.8
Average Annual Output Changes (%)				
Domestic Freight	(5.5)	21.2	(8.3)	(7.5)
International Freight	(3.1)	1.3	(3.4)	(20.1)
Chartering	7.4	21.7	(11.3)	2.5
Total Shipping	1.0	12.9	(5.8)	(4.6)

1 Revised data based on new survey design 2 Preliminary

Source: Transport Canada based on Statistics Canada files

FIGURE 16-15
MARINE FREIGHT RATE INDICES
OF BULK SHIPPING AND CONTAINERS, 1991 – 1998



Source: Containerization International and Lloyds Shipping

In the domestic market, the Pacific region is the only region where the level of activity in 1997 was higher than the one observed in 1991. On every other domestic and transborder market, the output of Canadian shipping carriers declined substantially.

Shipping freight rate increases have averaged 2.5 per cent per year since 1991, more than the two per cent price increases observed in the economy as a whole over the same period.

Foreign shipping lines provide most of the shipping services used by Canadian shippers in overseas markets. Two broad types of services are provided: liner services, which are used to handle container traffic and offered by shipping lines, some of which are members of shipping conferences; and bulk shipping services, which are used to ship bulk commodities and offered by independent shipping lines.

Despite strong demand, liner services have been affected by rampant excess capacity, which has caused major erosions in freight rates on both the north Atlantic and Pacific routes since 1992. In the first half of 1998, rates on the north Atlantic container liner services remained relatively stable at their 1997 level, but rates on the Pacific routes continued to fall, a situation that can be attributed to the Asian currency crisis. Tanker rates in 1994 bottomed out to 69 per cent of 1991 levels but have since rebounded by 63 per cent. Freight rates of dry bulk carriers, despite some degree of volatility, have been trending downward: in 1997, they reached only 67 per cent of their 1991 level. In the first half of 1998, dry bulk rates fell again by nine per cent compared with the first half of 1997.

Figure 16-15 illustrates marine freight indices for bulk shipping and containers from 1991 to 1998.

Cost and Productivity Indicators

Marine is the least labour intensive sector within the transportation service industry. In 1997, the marine sector's labour costs represented approximately 19 per cent of total costs. Such a low labour factor is partly explained by the recourse to vessels chartered complete with their own crew. Carriers which do not make use of chartering services had a 29 per cent labour cost share in 1997. Purchased services, chartering being the most significant one, accounted for 22 per cent of the industry's total costs. Fuel costs represented nine per cent of total costs in the marine sector in 1997, down from 10 per cent in 1991. Among other costs, one of the most important categories is fees (including tolls, port and navigation aid fees, among others), which accounted for five per cent of total costs in 1997.

Figure 16-16 compares the breakdown of total costs in the marine shipping industry for 1991 and 1997.

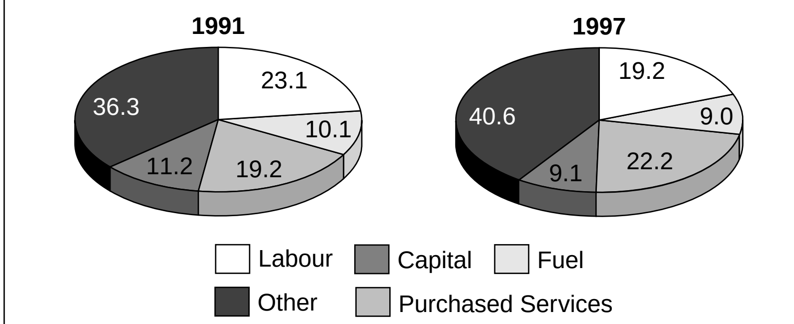
From 1991 to 1997, labour productivity of the shipping industry increased annually by 4.1 per cent, while unit labour costs decreased by 2.1 per cent. As previously mentioned, some of these gains can be attributed to an increasing reliance on chartered vessels, which provided a substitute for internal labour. In this case, the total factor productivity is a more accurate measurement of efficiency gains than labour productivity.

Despite strong growth in labour productivity measurement, total factor productivity improved only by an average annual rate of 1.8 per cent from 1991 to 1997. Such a performance needs to be compared with the average annual productivity gains of all other transport modes at 3.4 per cent over the same period. While unit costs in marine transportation increased marginally during the period, there were some modest declines since 1994.

Table 16-27 shows efficiency indicators for the marine transportation industry from 1991 to 1997.

If annual changes in the costs of the marine industry had been the same as those in the economy as a whole, it is estimated[19] that its costs would have been $30 million higher in 1997. These cost savings were not passed on to freight users since the prices of marine freight services increased more rapidly than the price increases observed in the economy.

FIGURE 16-16
COST STRUCTURE OF THE SHIPPING INDUSTRY
1991 and 1997



Source: *Transport Canada, based on Statistics Canada files*

TABLE 16-27
EFFICIENCY INDICATORS FOR THE MARINE TRANSPORTATION INDUSTRY, 1991 – 1997

	1991	*1995*	*1996*	*1997*
Employees (000)	8.6	8.7	7.2	7.3
Average Labour Cost per employee ($000)	46.3	47.9	52.4	51.1
Productivity Change (%)	*1991-96*	*1994-95*[1]	*1995-96*[1]	*1996-97*[2]
Labour	4.1	8.6	13.9	(5.1)
Total	1.8	3.5	4.4	1.3
Unit Cost Change (%)				
Labour	(2.1)	(6.3)	(1.5)	0.3
Total	1.0	(0.7)	1.7	(1.1)

1 Revised data 2 Preliminary

Source: *Transport Canada based on Statistics Canada files*

FINANCIAL PERFORMANCE

The marine transportation industry, after a period of stagnation in the early 1990s, has shown some revenue growth in both 1994 and 1995 before coming down again in the following two years. From 1991 to 1997, total revenues increased by an average of 3.2 per cent per year. Most of this growth came from chartering and residual activities. Revenues from international freight services showed significant increases from 1993 to 1996 but fell sharply in 1997.

Table 16-28 presents total operating revenues, expenses, profits and operating ratios of the industry from 1991 to 1997.[20]

19 The savings are measured as the difference between the actual revenues/costs of the carriers and the estimated revenues/costs they would have incurred if their output prices and unit cost had increased at the same pace as in economy.

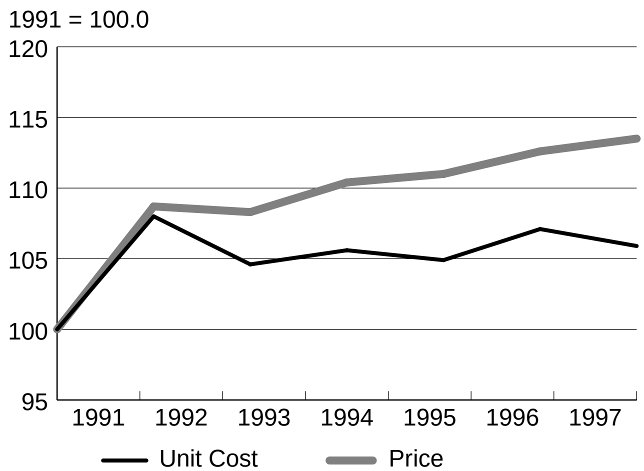
20 Due to survey changes in 1996, previous years' data were restated and may be different from those presented in the 1997 report.

TABLE 16-28
FINANCIAL INDICATORS OF THE MARINE TRANSPORTATION INDUSTRY, 1991 – 1997

	1991	*1995*	*1996*	*1997*
Revenue ($ million)	1,647	2,163	2,068	1,989
Expenses ($ million)	1,609	2,046	1,953	1,835
Gross Margin ($ million)	38	117	115	154
Operating Ratios (per cent)	97.7	94.6	94.4	92.3

Source: Transport Canada based on Statistics Canada files

FIGURE 16-17
COST AND PRICE INDICATORS OF THE MARINE TRANSPORT INDUSTRY, 1991 – 1997



Source: Transport Canada based on Statistics Canada files

Revenues in domestic freight activities have dropped by 25 per cent from 1991 to 1997 as a result of reduced level of activity and marginal price increases. Due to the yearly fluctuation in traffic and revenues, there has not been a clear trend for each region of shipping activity: inland, Pacific, Atlantic, and Arctic and Mackenzie River. The Pacific coast has been an exception as its freight revenues in 1997 were higher than in 1991.

On average, regional distribution of total domestic shipping revenues from 1991 to 1997 showed that the Pacific coast region had the highest share with 43 per cent of total domestic marine revenues, followed by the inland waterways with 40 per cent, the Atlantic region with 12 per cent, and the Arctic and Mackenzie River region with five per cent.

Since 1992, the operating ratio of the marine industry has been improving every year to reach 92.3 in 1997. The impovement in the profitability came from price increases more significant than the unit cost changes.

Figure 16-17 charts shipping cost and price indicators from 1991 to 1997.

CAPITAL EXPENDITURES

The market recovery after 1993 did not create a surge of investments. Capital expenditures in the industry remained inferior to accumulated depreciation and assets withdrawal over the 1994-1997 period. Net investments bave been consequently negative, averaging - $27 million per year over that period.

Investment trends in Canadian shipping industry are difficult to assess precisely, with capital investments shifting toward chartering rather than owning vessels. Another problem is the ownership of ships by holding companies that charter the ships to their operating subsidiaries.

AIR TRANSPORT INDUSTRY

In 1997, the Canadian airline industry generated revenues of $11 billion, an increase of 9.6 per cent over 1996.

Air Canada, Canadian Airlines International (CAIL) and their affiliates accounted for 72 per cent of industry revenues and form the basis of the productivity analysis of this section. Large independent operators such as Air Transat, Canada 3000, Royal Air and Westjet produced about ten per cent of industry revenues and are included in the analyses of market structure, price and output changes, cost structure and financial performance.

In this section, Air Canada, CAIL, their affiliates and large independent carriers will be referred to collectively as the airline industry. Other carriers, mostly Level III and Level IV, have the remaining 18 per cent market share of industry revenues. Their activities are not included in this analysis.

In 1997, approximately 89 per cent of the industry's operating revenues come from passenger transportation services. Cargo accounts for 6.7 per cent, and the remaining 3.8 per cent came from other flying services and incidental air transport services.

Domestic passenger services accounted for almost 48 per cent of the passenger market, a share that was once close to 56 per cent in the mid-1980s. Transborder and overseas markets have made gains in terms of percentage points, but the relative gains of transborder markets have been more significant.

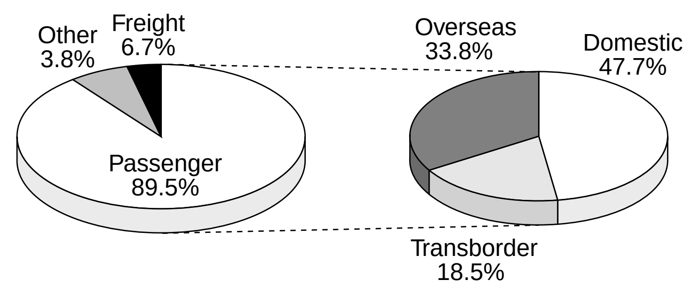
Figure 16-18 illustrates the breakdown of airline revenues in 1997.

The share of passenger charter service reached 11 per cent of total passenger revenues in 1997. This share has varied between nine per cent and 12.5 per cent since 1986. Charter activities are available only in some of the highest density domestic markets as well was in popular destinations in Europe and Central America.

Charter services are attractive to consumers because their prices are lower than prices for scheduled services. In fact, in each market, charter services yield lower revenues per passenger-kilometre than scheduled services.

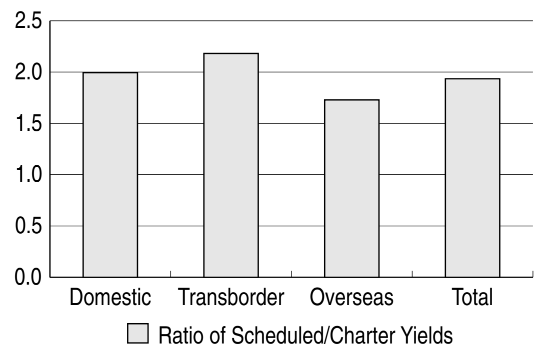
Figure 16-19 compares the yields of charter and scheduled services by market, standardizing the yields to neutralize the effect of stage-length differences.[21] In domestic and transborder markets where the market share of charter services is small, scheduled services generate revenues per passenger-kilometre at least twice as high as charter services. In overseas markets where the role of charter services is much more significant, however, scheduled services generate more revenues per passenger-kilometre, but the gap is reduced to less than 75 per cent.

FIGURE 16-18
AIRLINE REVENUES BY MARKET SEGMENT
1997



Source: Transport Canada based on Statistics Canada files

FIGURE 16-19
COMPARISON OF YIELDS FOR 1997
SCHEDULED AND CHARTER PASSENGER SERVICES



Source: Transport Canada based on Statistics Canada files

PRICE AND OUTPUT CHANGE

From 1986 to 1997, the prices of domestic services increased by 32 per cent, a rate of 2.6 per cent per year. Prices have also increased every year, except for a pause in 1992 and from 1995 to 1996, when market conditions and/or renewed competition caused prices to fall by seven per cent.

21 The average stage length flown by an airline in a market was estimated by dividing, for the said market, total annual passenger-kilometres by the number of passengers.

TABLE 16-29
PRICE AND OUTPUT CHANGES IN THE AIRLINE INDUSTRY
1986 – 1998

	1986-1997	1995-1996[1]	1996-1997[1]	1997-1998[2]
Price Changes (%)				
Domestic Passenger Services	2.6	(6.7)	0.4	6.8
International Passenger Services	0.7	(2.1)	6.2	5.6
Air Freight Services	(1.0)	(6.8)	3.3	5.0
Total Air Industry	1.5	(4.3)	3.3	5.8
Output Changes (%)				
Domestic Passenger Services	1.5	11.4	6.3	4.2
International Passenger Services	7.3	14.1	10.3	7.1
Air Freight Services	1.6	5.7	7.7	0.4
Total Air Industry	4.0	12.2	8.5	5.4

1 Revised data
2 Based on first two quarters of the year
Source: Transport Canada, based on Statistics Canada files

Air transportation demand tends to evolve as a function of price changes and economic conditions. For instance between 1986 and 1993, the price of domestic services increased by 18 per cent in real terms, and demand dropped by nine per cent. From 1993 to 1997, prices fell by 12 per cent and demand surged up by 30 per cent.

From 1986 to 1997, prices for international services declined in real terms, and demand more than doubled. During this time, transborder services were the most dynamic international market, despite price increases of some 20 per cent during the last two years. Demand was stimulated by economic conditions and the introduction of new services that resulted from the "Open Skies" bilateral air agreement between Canada and the US.

In other international markets, much of the stimulated demand came from lower prices. Since 1986, the increased usage of discount fares has contributed largely to the 20 per cent decline in real terms of prices for international air services outside the US.

Turning to freight, airline activity has been volatile since at least 1986. During this time, revenues declined for seven years and increased for seven years. Revenue growth has also been modest in this market segment, with prices declining and output increasing at less than two per cent per year.[22] These factors suggest that Canadian carriers have not been participating in the fast-growing flow of trade by air, leaving this market to be captured by foreign carriers.

Overall, however, revenue performance in the air industry was strong between 1986 and 1997. Revenues rose every year, except between 1991 and 1993, at an annual growth rate of 5.6 per cent. From 1986 to 1991, the major source of revenue growth was higher prices, as output rose by only 1.6 per cent per year. From 1991 to 1997, the reverse occurred, as output grew annually by 5.9 per cent and prices declined by 0.1 per cent.

During the first half of 1998, the prices of both domestic and international air passenger services were firming up. Despite these price increases, domestic demand continued to grow, lifted by a strong economy. While demand for transborder services continued to be strong, however, the market for other international services was soft, due to a weaker trans-Pacific market during the second half of the year.

Estimates suggest that half of the price increases that occurred in early 1998 resulted from the internalization of air navigation fees by the airlines. At one time, these fees were added to the price of air tickets in the form of the Air Transportation Tax.

In addition, during the second half of 1998, unused capacity in the trans-Pacific markets was transferred to other markets, precipitating stiffer price competition. The situation was also intensified by the end of the Air Canada pilots strike, as the company tried to win back its customers with seat sales.

In the end, the airlines' net yields for the new navigation fees fell sufficiently to offset the increases recorded during the first part of the year.

Table 16-29 shows price and output annual percentage changes in the airline industry from 1986 to 1997, looking closely at the changes in 1995/96, 1996/97 and 1997/98.

Efficiency Indicators

In 1997, airline labour costs amounted to less than 23 per cent of industry costs, down considerably from 1986 levels. Employment increased by eight per cent over the same period. This growth, however, was uneven. Employment peaked at 48,000 during a period of rapid

22 Exercise caution in interpreting these results because the quality of the available data is limited.

increase between 1986 and 1990, then fell for four consecutive years to return to its 1986 level. In recent years, employment has picked up again, increasing by 10 per cent.

Figure 16-20 compares costs in the airline industries in 1986 with costs in 1997.

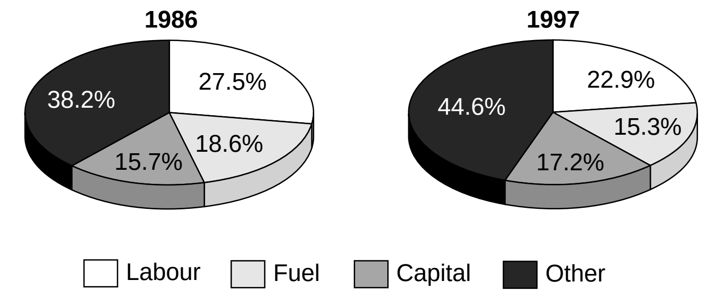
Labour productivity rose by 38 per cent between 1986 and 1997. These gains were achieved after 1991 because labour productivity fell by eight per cent between 1986 and 1991. Unit labour costs were lower in 1997 than in 1986. During the last three years, unit labour costs have dropped by 16 per cent, which equals 5.5 per cent per year.

Table 16-30 compares various efficiency indicators for the major airlines, Air Canada, Canadian Airlines International, and their affiliates, including employees, labour costs and productivity changes, from 1986 to 1997.

Fuel costs represented close to 17 per cent of total cost in the aviation sector in 1997. In recent years, the fuel cost share has risen, due to increases in domestic fuel prices. Fuel efficiency gained 18 per cent in the airline industry. As for labour, much of these gains have been recent. Other notable operating expenses are: marketing at 12.5 per cent, landing fees at three per cent, and food and beverage costs at four to five per cent.

Capital costs are on the rise in the airline industry, accounting for 17 per cent of industry costs. This reflects the impact of fleet renewal in the late 1980s and early 1990s. Per unit of output, the value of all fixed assets has increased by 41 per cent in real terms since 1986. The effect of this increase was moderated by reduced capital costs.

FIGURE 16-20
COST STRUCTURE OF THE AIRLINE INDUSTRY
1986 and 1997



Source: Transport Canada based on Statistics Canada files

TABLE 16-30
EFFICIENCY INDICATORS FOR THE MAJOR AIR CARRIERS AND THEIR AFFILIATES, 1986 – 1997

	1986	*1995*	*1996*	*1997*
Employees (000)	39.6	40.6	41.3	42.9
Average Labour Cost per employee ($000)	37.2	46.9	49.6	49.6
Productivity Change (%)	*1986-97*	*1994-95*	*1995-96*	*1996-97*
Labour	3.0	6.3	10.1	3.9
Total	1.0	2.1	8.7	1.2
Unit Cost Change (%)				
Labour	(0.1)	(8.1)	(3.9)	(3.7)
Total	1.2	0.8	(4.5)	(2.5)

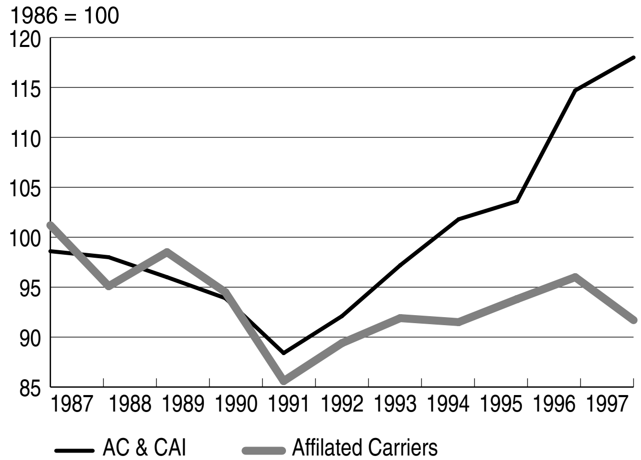
Source: Transport Canada, based on Statistics Canada files

Total factor productivity in the airline industry reached a low in 1991, registering at 13 per cent below 1986 levels. Since then, productivity has risen by 28 per cent, with particularly strong performance in 1996. In 1991, unit costs in the air transport industry were 32 per cent higher than in 1986, but they have declined since then by 14 per cent between 1991 and 1997.

The performance of the airline industry can be segmented between the two major Canadian carriers, Air Canada and Canadian Airlines International, and their affiliates, the regional airlines. As Figure 16-21 shows, their productivity performance followed basically the same trend. The exception is 1997, when a strike occurred at the regional airlines affiliated with Air Canada.

However, the performance of the regional carriers in relation to the larger carriers has been lagging since 1991. In that year, the productivity growth of the two groups of carriers was basically the same, while in 1997, the productivity of the regional

FIGURE 16-21
PRODUCTIVITY OF AIR CANADA AND CANADIAN AIRLINES INTERNATIONAL AND THEIR AFFILIATES, 1987 – 1997



Source: Transport Canada based on Statistics Canada files

TABLE 16-31
COST SAVINGS AND PRICE REDUCTIONS FOR MAJOR AIR CARRIERS AND THEIR AFFILIATES
1997 vs 1992-97 Average

	1997	*1992-1997 Average*
Carrier Cost Savings ($ million)	1,980	1,241
User Price Savings ($ million)	800	538
Cost Savings Passed to Users (per cent)	40.4	43.4

Source: Transport Canada, based on Statistics Canada files

carriers was 22 per cent below that of the larger carriers.

Impact of Productivity

Table 16-31 shows estimated cost savings from productivity gains for major carriers, Air Canada and Canadian Airlines International, and the users of their air services. The table covers 1992 to 1997.

Carriers' cost savings equal the difference between the actual costs of the carriers and the costs they would have incurred if their unit cost had increased at the same pace as the economy as a whole. Such a formulation was used to measure the impact of lower prices increases on carriers' revenues.

Between 1992 and 1997, strong productivity performance allowed the major air carriers to achieve cumulative annual savings. By 1997, these savings reached $2 billion or 15 per cent of the airline industry cost base. The carriers passed on some 40 per cent of the cost savings to the users in the form of lower prices. Instead, the carriers used the savings to make up for their poor financial performance during the early 1990s. In 1998, lower efficiency gains and higher input prices are expected to affect these gains.

Financial Performance

The profitability of the two major airline corporations, Air Canada and Canadian Airlines International, has tended to fluctuate from one year to the next. Figure 16-22 shows trends in their costs and prices, which help to explain some of the volatility in their profitability since the late 1980s.

Between 1989 and 1991, the carriers' unit costs rose sharply, significantly above price increases. While costs started to decline in 1992, prices were also depressed due to recession. Their profitability started to improve in 1994, resulting from price increases and cost reduction measures. In 1996, intensified competition in the industry depressed prices. However, this was somewhat offset by further cost reductions. Benefiting from the strong performance of the global economy, the combined revenues of Air Canada and Canadian Airlines increased sharply with strong growth in both output and prices during 1997.

Table 16-32 highlights the financial results of the air transport industry from 1990 to 1998.

The financial results of Air Canada and Canadian Airlines reflect their price, cost, output and productivity performance over the past decade. In the early 1990s, operating expenses exceeded operating revenues, with an average industry operating ratio at 102 per cent.

In 1997, Air Canada and Canadian Airlines generated a combined total operating revenue of $8.6 billion. Their operating profits rose to $465 million and average operating ratios improved to 94.6 per cent, approximately four per cent lower than in 1996. The large independent carriers also showed improved profitability in 1997.

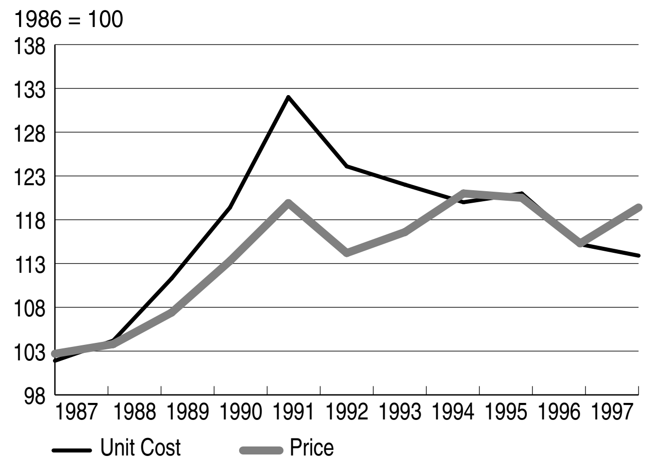
In 1998, the profitability of Air Canada and Canadian Airlines was adversely affected by a number of unexpected events, including the ice storm in eastern Canada, the economic crisis in Asia and the pilot strike at Air Canada. Partial data from other large airlines also indicated a deterioration of profit margins during the year.

Despite several negative internal and external factors, combined total corporate revenues of the two major carriers amounted to $9.1 billion, an increase of eight per cent over 1997. Both domestic and US transborder revenues showed strong growth, but international passenger revenues declined, particularly on Pacific routes.

Total operating expenses of these two airlines increased by ten per cent in 1998, higher than their revenue growth. As a result, their average operating ratio deteriorated to 98.7 per cent. Higher navigation fees were transferred to users in the ticket prices, but higher labour costs and the weaker Canadian dollar drove costs even higher. Lower Canadian currency exchange rates against the US dollar contributed to higher costs because aircraft fuel, rent and materials are partly paid in US currency.

In order to restore their profitability, both Air Canada and Canadian Airlines have announced a number of initiatives to be implemented during the coming year, including fleet capacity rationalization and workforce reduction. For instance, Air Canada plans to reduce 1,275 employees by February 1999 and a further

FIGURE 16-22
COST AND PRICE INDICATORS FOR MAJOR AIR CARRIERS AND THEIR AFFILIATES, 1987 – 1997



Source: Transport Canada based on Statistics Canada files

TABLE 16-32
SUMMARY FINANCIAL RESULTS OF THE AIRLINE INDUSTRY 1990 – 1998

	Average 1990-1993	*1994*	*1995*	*1996*	*1997*	*1998*
Air Canada and Canadian Airlines						
Revenue ($ million)	6,376	6,989	7,644	7,976	8,648	9,103
Expenses ($ million)[1]	6,496	6,690	7,395	7,856	8,182	8,981
Operating income ($ million)	(120)	299	248	121	465	122
Operating ratio (per cent)	101.9	95.7	96.8	98.5	94.6	98.7
Larger Independent Carriers[2]						
Operating ratio (per cent)	99.2	95.5	94.4	97.1	94.0	n/a

Sources: 1 Corporate consolidated results from annual reports of AC and CAIL.
2 Transport Canada based on Statistics Canada's files

TABLE 16-33
CAPITAL EXPENDITURE IN THE AIRLINE INDUSTRY
1986 – 1997

Annual Averages in $ Million	Gross	Depreciation	Net
1986-1987	380	285	95
1988-1992	1,847	677	1,170
1993-1995	788	957	(169)
1996-1997	1,414	1,046	369
1986-1997	1,197	708	490

Source: Special Compilations of Statistics Canada

450 by the end of 1999, representing a 7.5 per cent reduction in workforce. Canadian Airlines' main strategies include gaining more market shares through new customer services and forging strong global alliances with other airlines.

Capital Expenditure

From 1986 to 1997, capital expenditure[23] in the airline industry amounted to $1.2 billion per year. In constant dollars, the net assets of the airline industry increased much more rapidly than output growth during this time.

Table 16-33 illustrates the variability of capital spending in the airline industry. The periodic variation in capital expenditures is partly due to the life cycle of flight equipment. Capital spending of less than $400 million a year in the mid 1980s climbed to $2 billion per year from 1988 to 1992 . In the period following, 1993 to 1995, capital spending was more than halved. Since 1996, airlines' capital spending has picked up.

The two major airlines' total capital expenditures increased significantly in 1998. As traffic growth has slowed down, however, capital spending on flight equipment is expected to decline in 1999.

23 Includes acquisition of fixed assets, owned or leased, excluding land, by all airlines.

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ISBN-0-662-27586-1

Cat. No. T1-10/1998E
ISBN 0-662-27586-1

Également disponible en français sous le titre « Les transports au Canada 1998 »