



# NEW ZEALAND TRANSPORT STATISTICS

JULY 2009



## Foreword

The *Transport Monitoring Indicator Framework (TMIF)* provides a national and, where possible, regional framework for the monitoring of the New Zealand transport system. The role of the TMIF is to monitor trends over time. The data are intended to be durable enough to allow for continued monitoring in times of change. The high-level indicators monitor multi-modal trends in the economic, environmental and social areas related to transport.

The TMIF is designed to be a sector-wide applicable framework which can be used to provide information on trends to other transport agencies and local regions. The framework is a tool which can be used to inform and evaluate transport-related policies and strategies. Although the indicators within the TMIF may be used to inform policy, it is not the role of the TMIF to make policy decisions, or to be used to imply strategic direction.

The Ministry updates indicator data on an ongoing basis and publishes an annual report based on data which are available from the indicators. There are indicators which currently do not contain data, and these have been identified in Appendix 1.

This is the first edition of the annual report, and it uses the indicators included in the Transport Monitoring Indicator Framework (TMIF) Version 1: 2008. Further versions of the framework will be produced, and it is anticipated that the framework will continue to develop as a monitoring tool. The TMIF Version 2 will be released later this year.

To make the data contained in the TMIF easily accessible, a TMIF section of the Ministry of Transport website has been produced to provide access to all available data from the indicators. The website is [www.transport.govt.nz/](http://www.transport.govt.nz/)

An updated version of this TMIF section of the Ministry website, which will contain Version 2 of the TMIF, is due to be launched in the next financial year.



**Martin Matthews**  
Chief Executive  
Ministry of Transport

## **New Zealand Transport Statistics**

This report is a discussion of the recent trends in the transport sector, using the TMIF Version 1 indicators. The report is divided into the following chapters:

**Chapter One: Transport and the economy**

**Chapter Two: Safety and security**

**Chapter Three: Access and mobility**

**Chapter Four: Public health and the environment**

**The TMIF consists of ‘indicator sets’. Each indicator within the framework is assigned to a relevant indicator set.**

**The TMIF indicator reference number listed on the graphs denotes which indicator set the indicator is classed under.**

**The indicator sets in the TMIF are:**

**Transport volume (TV)** – Shows the volumes of people and freight using the transport system, reflecting the intensity of use of both motorised and non-motorised modes. It also shows how the age of the transport fleet is changing, and indicates the makeup of the road vehicle fleet by vehicle type. This contributes to the efficiency and effectiveness of the transport system.

**Network reliability (NR)** – Describes the performance and reliability of the network in terms of people and freight movements. It includes road congestion and travel time variability, traffic flows and the reliability of the transport system.

**Transport contribution to economic transformation (ET)** – Shows the relationship between freight demand (domestic and international) and Gross Domestic Product (GDP), and the contribution of the transport and storage industry to GDP in New Zealand.

**Access to the transport system (AM)** – Shows how accessible the transport system is to a range of transport users. It includes indicators relating to the affordability of transport, social connectivity, and access to motor vehicles, travel perceptions and the accessibility of public transport.

**Travel behaviour (TB)** – Relates to the use of various transport modes, including active modes such as walking and cycling for journeys to work and school, and the use of travel plans in workplaces.

**Transport safety and security (SS)** – Shows how transport safety is performing in terms of deaths, injuries, accidents and the social cost of accidents, personal security, resilience and security of the transport system.

**Public health effects of transport (PH)** – Shows how transport contributes to noise levels and air quality that impact on public health.

**Life-cycle management of transport vehicles and infrastructure (LM)** – Shows how resources are used and managed during their lifetimes and how they are disposed of at the end of their lifetime.

**Environmental impact of transport (EI)** – Includes climate change-related emissions, road water run-off and oil spills.

**Transport system resource use (RU)** – Shows the energy and land-use demands of the transport sector.

## **Executive summary**

### **Transport and the economy**

In the period 1999/00 to 2007/08, the ratio of road freight tonne-km per GDP increased. Road freight accounts for 70% of all domestic freight movements. The volume of overseas cargo loaded increased by 22% for the period 1998/99 to 2007/08, while the volume of overseas cargo unloaded increased by 52% for the same period. Changes in congestion rates vary among the main centres of Auckland, Tauranga, Wellington and Christchurch. The amount spent within the National Land Transport Fund increases annually.

### **Safety and security**

Since 1990, there has been a large decrease in the number of Police-reported accidents. The road fatality total for 2008 was 366, a 49-year record low.<sup>1</sup> Since 2000, the number of deaths for rail, road and maritime has decreased. Over 90% of travellers on trains and buses in Auckland and Wellington feel safe and secure on these modes of transport.

### **Access and mobility**

People have a higher level of mobility now than they had in the past. New Zealanders are flying more, travelling longer distances by road and using public transport in higher numbers. Being a driver in a vehicle is the most common mode by which trips are undertaken. Both the number and proportion of children who are driven to school continues to grow, and this is a trend seen for both younger children (5 -12 years) and teenagers (13-17 years). An increase in the number of vehicle trips correlates with a decrease in walking and cycling trips, for both school and work journeys. Public transport boardings are increasing in number. There has been a 30% increase in public transport boardings since 2000/2001. Public transport, in the major metropolitan areas, is generally perceived as a good-value transport choice, which is reliable and frequent.

### **Public health and the environment**

The monitoring of public health and the environment within the TMIF is currently limited, because of a lack of comprehensive national noise and air-quality monitoring programmes. Ad hoc data are available for some of these areas and have been used in this report. Strong reliance on vehicles as a primary mode of transport has seen a drop in the average times people spend walking and cycling. There has been an increase in the average engine size, and age of the vehicles in New Zealand's fleet remains the relatively old.

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<sup>1</sup> This number is currently provisional.



## Chapter one: Transport and the economy



## Chapter 1: Transport and the economy

This chapter discusses the key indicators that can be used to illustrate the links between transport and the economy. It also contains additional information which provides context and support to interpret the headline TMIF indicators covered in this chapter.

### Overview

Transport is important to the economy because it facilitates economic transactions and social interactions through the movements of goods and people. An efficient and effective transport network aids economic growth and development.

Improved transport and transport infrastructure contribute to productivity growth in the New Zealand economy through increased reliability and reductions in the time and cost of moving goods and people.

Productivity is a measure of how efficiently inputs are being used within the economy to produce outputs. Productivity is commonly defined as a ratio of a volume measure of output (such as value added in constant prices) to a volume measure of input. Growth in productivity means that a nation can produce more output from the same amount of input. Productivity growth is an important contributing factor to a nation's long-term standard of living.

### Key findings:

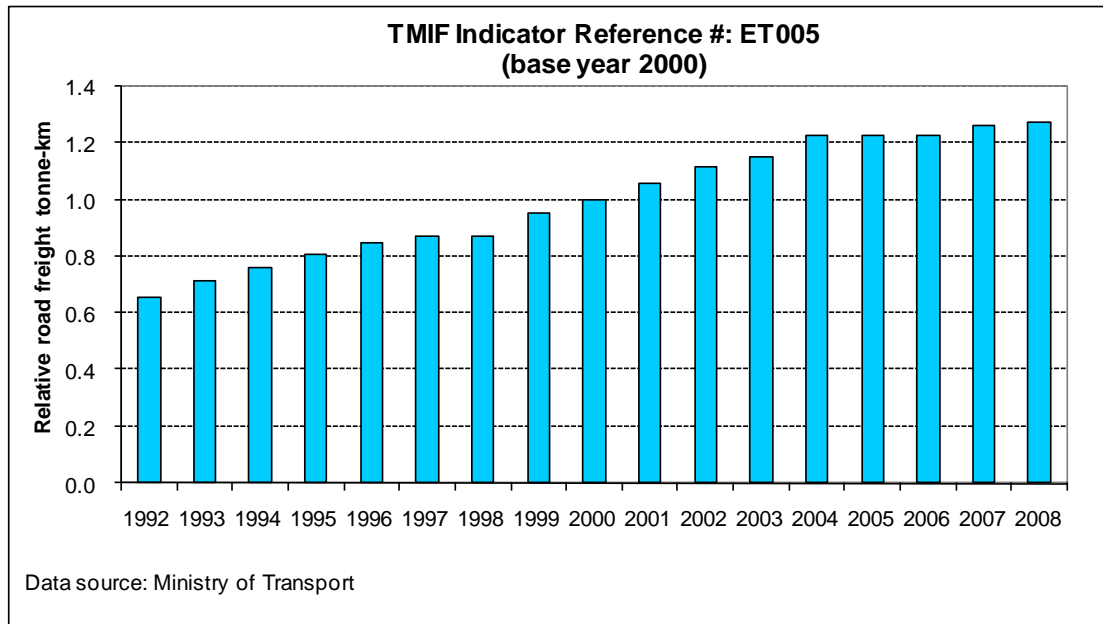
- In the period 1999/00 to 2007/08, the ratio of road freight tonne-km per GDP increased, resulting in more road freight tonne-km being needed to generate each dollar of GDP.
- Road freight accounts for 70% of all domestic freight movements.
- The volume of overseas cargo loaded increased by 22% for the period 1998/99 to 2007/08, while the volume of overseas cargo unloaded increased by 52% for this period.
- Changes in congestion rates vary among the main centres of Auckland, Tauranga, Wellington and Christchurch.
- The amount spent within the National Land Transport Fund increases annually.

## Freight movement

Increased economic activity will generally result in an increase in the demand for transport for business or leisure purposes. The relationship between transport volumes and economic activity can change significantly over time.

Figure 1 shows the trend in road freight movements between 1992 and 2008.

**Figure 1: Road freight tonne-km: base year (2000 = 1.00)**



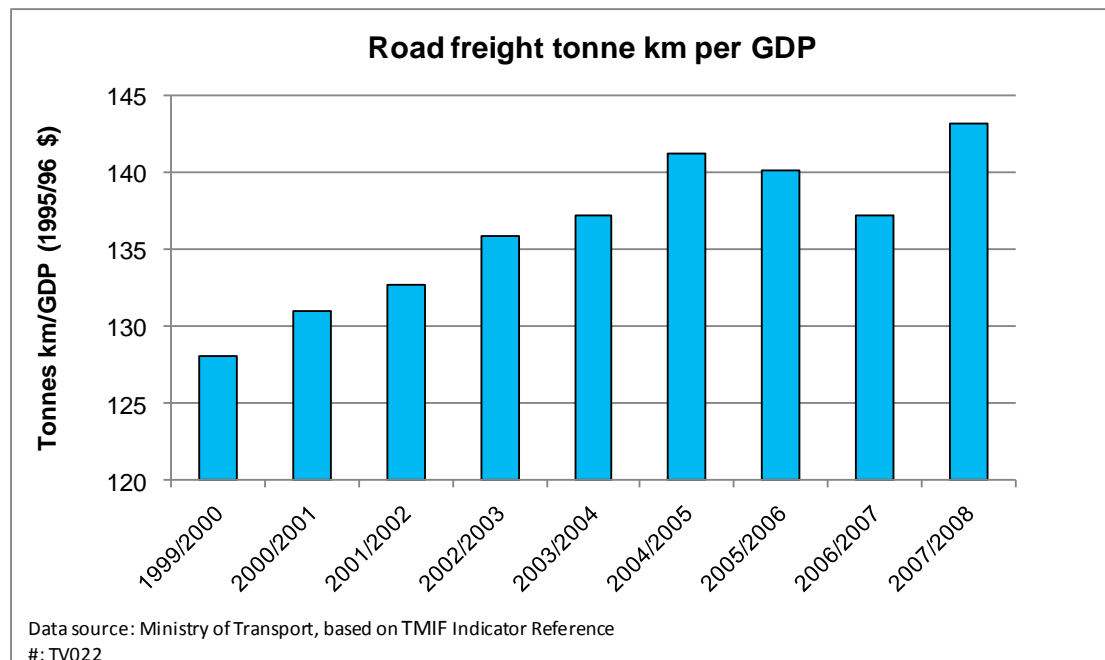
## Road freight and economic activity

Road freight dominates the domestic freight sector. According to the National Freight Demands Study<sup>2</sup>, road freight accounts for 70% of all domestic freight movements.

The following chart shows trends in the freight intensity of economic activity in recent years. This reflects a number of factors, including the industry and the physical mix of output and inputs in those years. The ratio increased from 1999/00 to 2004/05, eased back in 2005/06 to 2006/07, and rebounded in 2007/08.

<sup>2</sup> National Freight Demands Study, Ministry of Transport, September 2008

Figure 2: Ratio of road freight tonne km to GDP



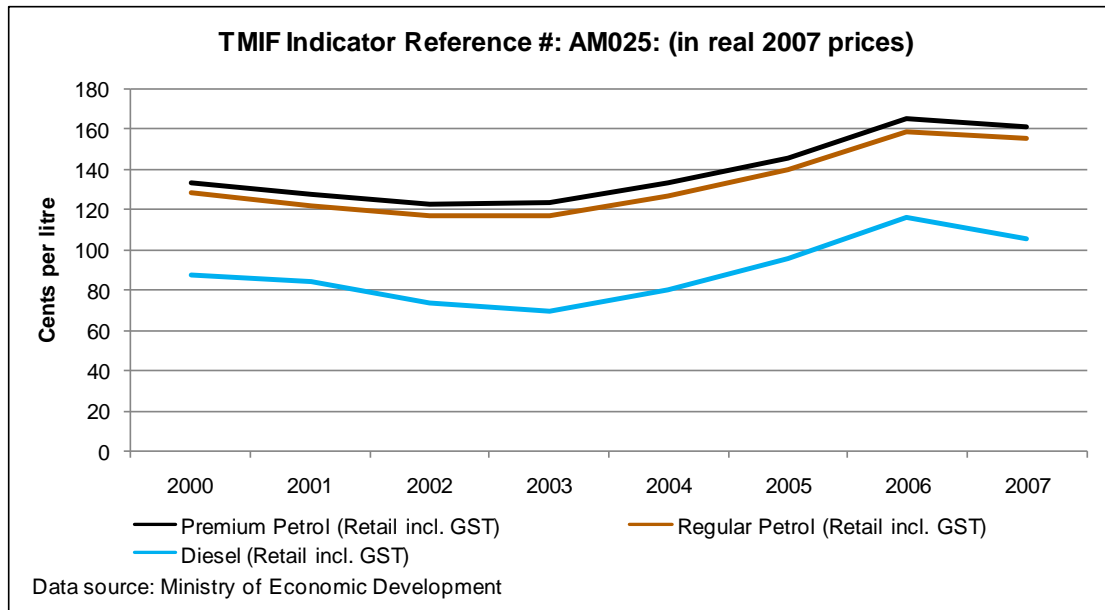
Additional information which would support these data include trends such as diesel sales and road user charges (RUC). Indicators which detail these trends, and others such as petrol pump prices and international oil prices, will be included in Version 2 of the TMIF. Real fuel prices are a TMIF V.1 indicator, and their role in transport and the economy is discussed on the following page.

### Fuel prices

Oil prices are established in international markets and have fluctuated widely in recent years.

Petrol and diesel prices in New Zealand reflect those movements and other factors, such as exchange rates, excise tax and distributor margins.

Figure 3: Real fuel price



Real fuel prices for premium petrol, regular petrol and diesel rose from 2003 to 2006, and dropped in 2007.

### Overseas merchandise trade

Because New Zealand is geographically isolated, maintaining international transport links is vital to New Zealand's continued economic growth.

Primary products make up about two-thirds of the value of New Zealand's exports. Australia, the United States and Japan are the major destinations for New Zealand exports, and have been since the mid-1980s<sup>3</sup>. Domestic and international transport play a vital role in the production and distribution of primary products.

Shipping is the principal mode for New Zealand's imports and exports of merchandise, on the basis of weight and monetary value.

Aviation is the dominant mode for supporting inbound and outbound tourism and business travel. The amount of aviation passenger travel is monitored by the TMIF through the indicator 'TV011: Number of international arrivals and departures by air: NZ residents and overseas visitors'. This indicator is further discussed in Chapter 3: Access and mobility.

<sup>3</sup> Statistics New Zealand "New Zealand in Profile 2009".

Figure 4: Freight tonne-kilometres – domestic mode share

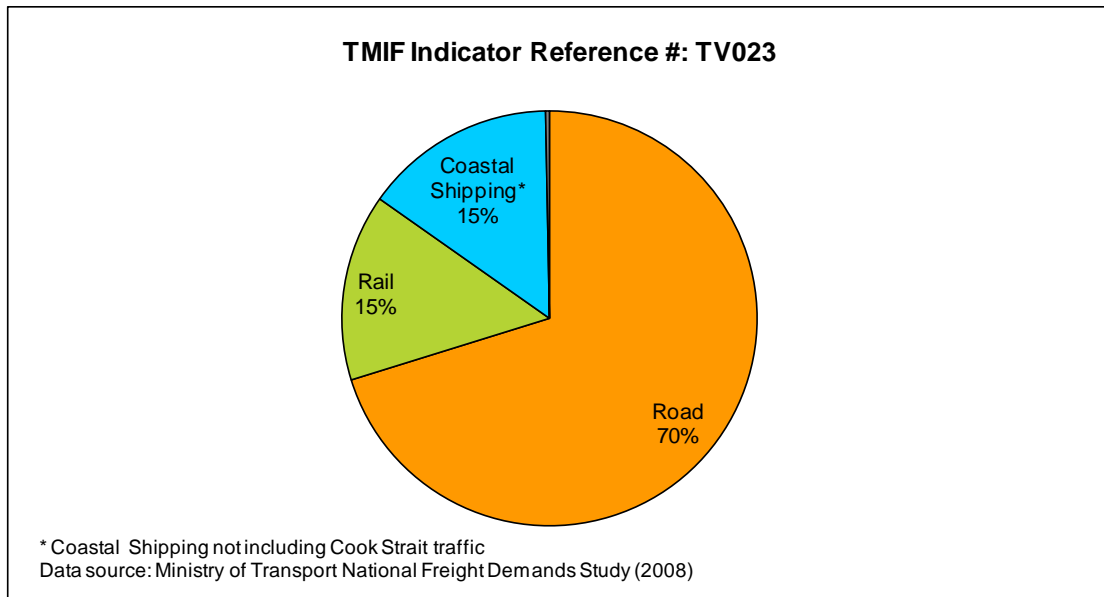
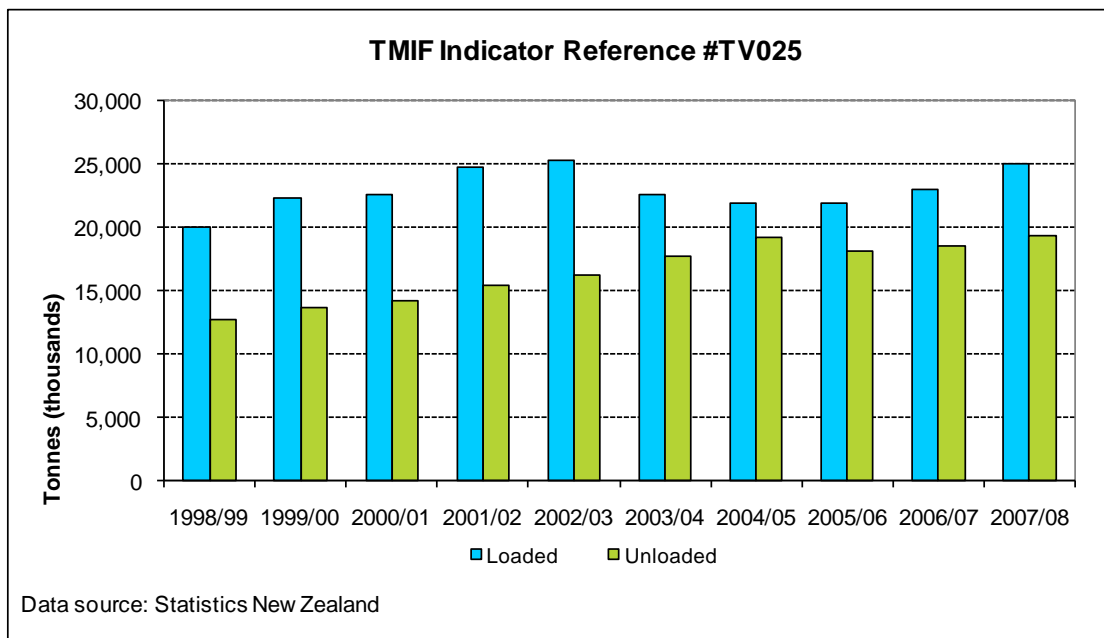


Figure 4 gives the percentage breakdown of the distribution of domestic freight mode share, for the three modes within New Zealand.

Figure 5: Volume of overseas cargo loaded/unloaded (thousand tonnes)



The amount of overseas cargo loaded increased from 20,046 (thousand tonnes) in 1998/99 to 25,022 (thousand tonnes) in 2007/08. The increase between the years 2006/07 and 2007/08 was 4,976 thousand tonnes, or 22%. Unloaded overseas cargo amounts also increased from 12,736 thousand tonnes in 1998/99 to 19,324 thousand tonnes in 2007/08.

**Figure 6: Overseas Merchandise Trade - Actual Values of Imports and Exports as a Percentage of Gross Domestic Product (Actual Current Prices)**

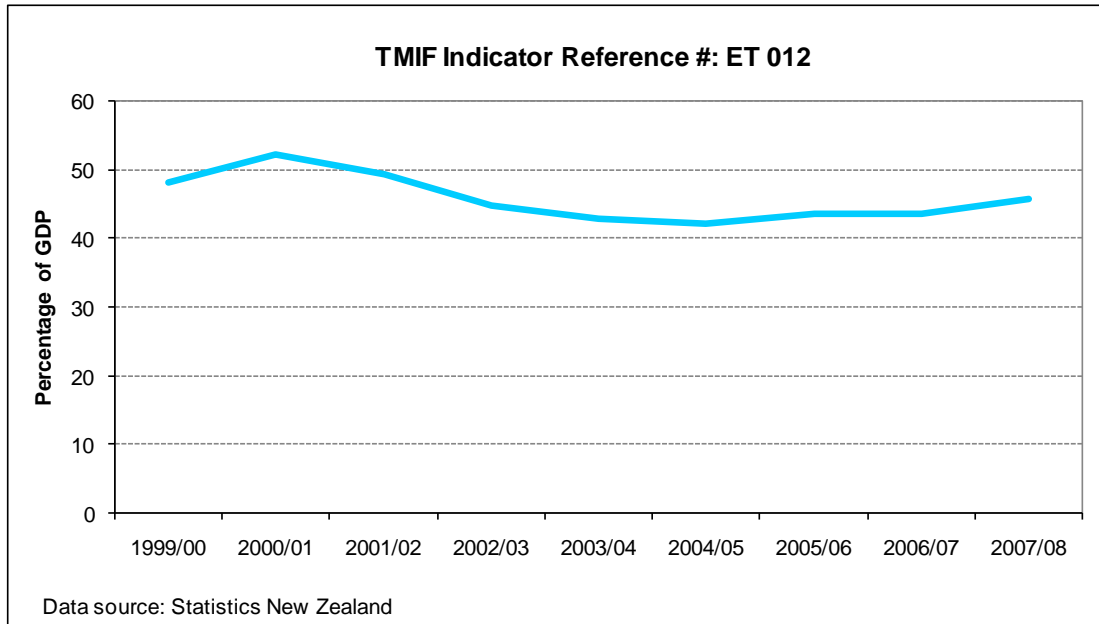


Figure 6 shows the value of merchandise trade loaded and unloaded (ie exported and imported) as a percentage of GDP. This provides an indication of the value of goods transported out of and around the country. Overall, the value of overseas merchandise trade (imports plus exports) as a percentage of GDP has been between 40% and 50% between 1999/00 and 2007/08, with the exception of 2000/01 when the figure was 52%.

**Figure 7: Overseas Merchandise Trade - Actual Values of Exports (including re-exports) FOB \$m – June year**

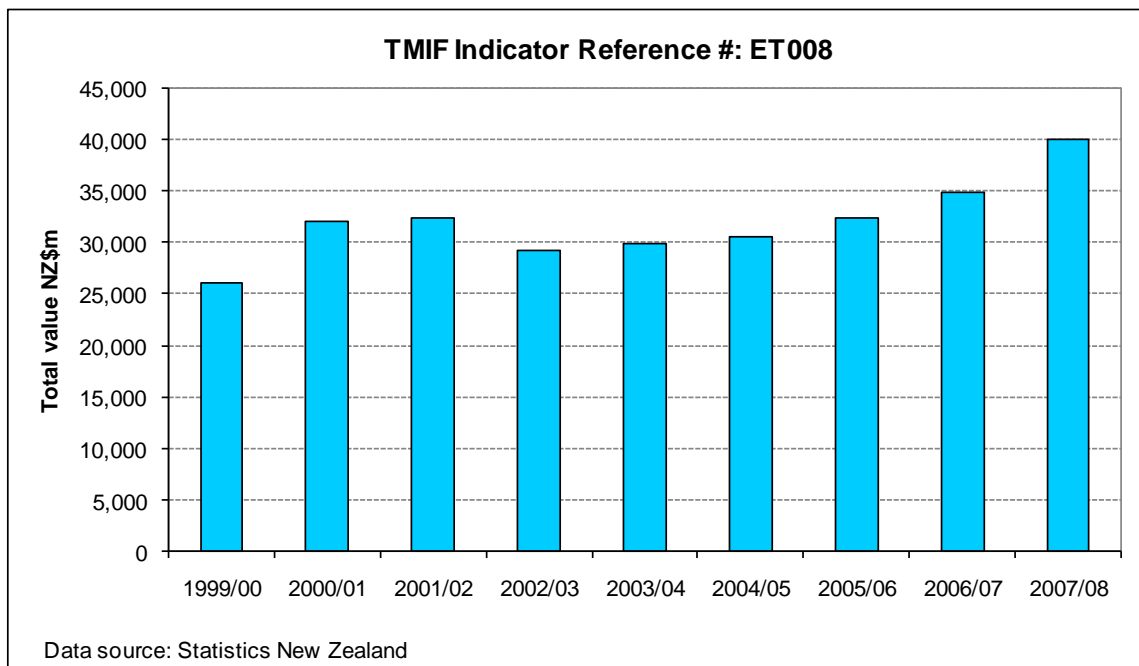


Figure 7 illustrates that in recent years the value of total exports loaded (ie exports including re-exports) has increased substantially. In 2005/06, the total value of overseas merchandise loaded was NZ\$32,430 million. This figure increased to NZ\$34,939 million for 2006/07 and rose again in 2007/08 to NZ\$40,026 million.

**Figure 8: Overseas Merchandise Trade - Actual Values of Exports (including re-exports) as a Percentage of Gross Domestic Product (Actual Current Prices June Year)**

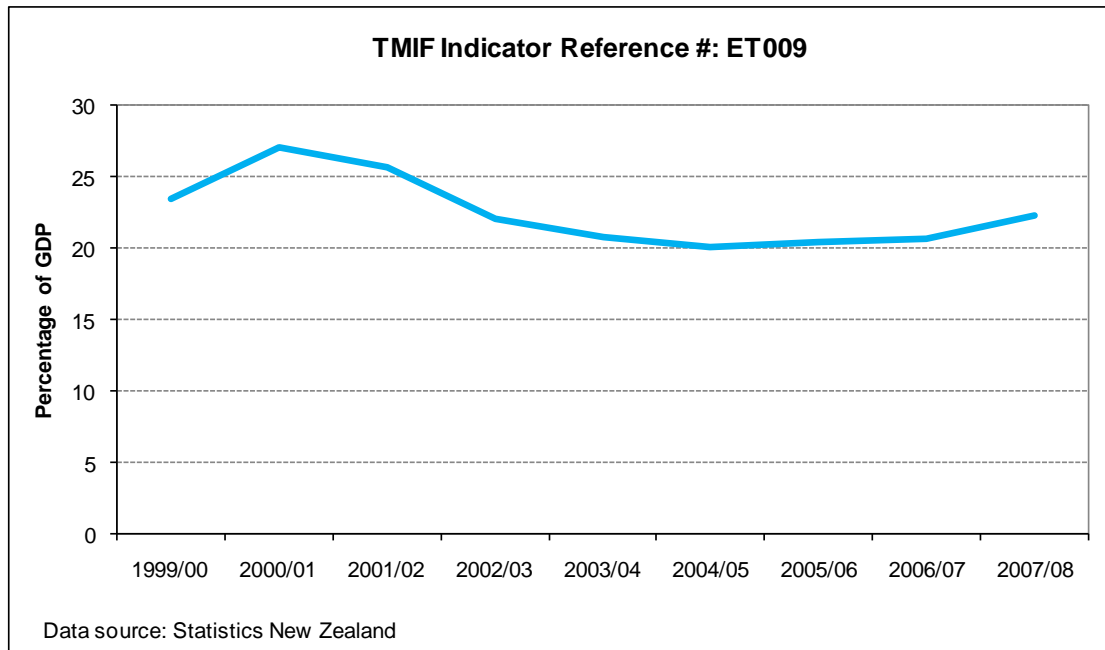
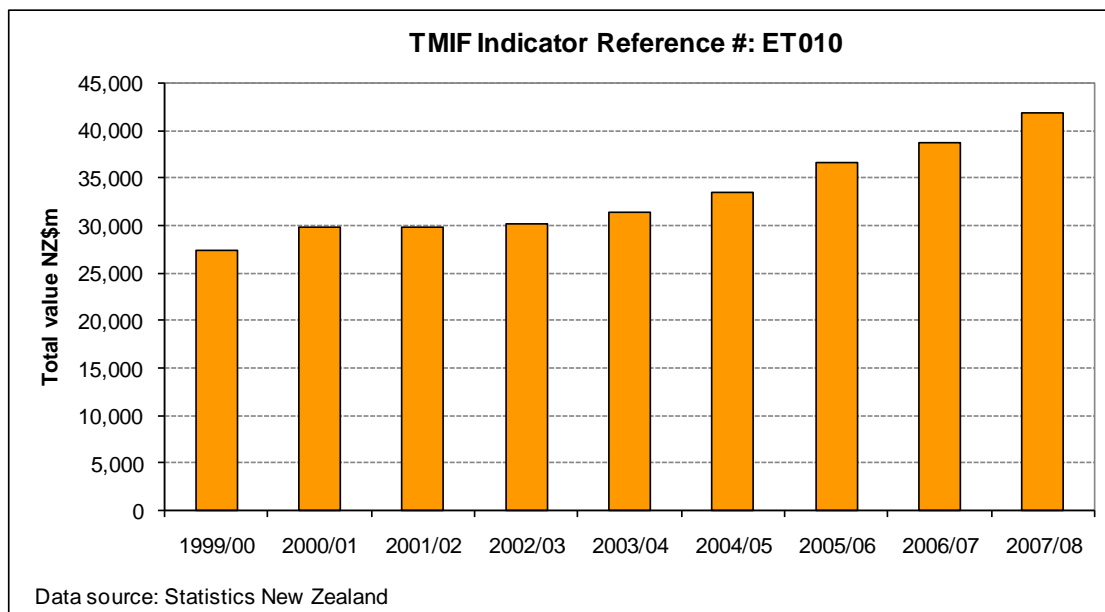


Figure 8 shows that the total value of overseas merchandise loaded (ie exported) as a percentage of GDP has been between 20% and 22% over the last five years.

**Figure 9: Overseas Merchandise Trade - Actual Values of Imports (VFD \$m)**



The total value of total imports unloaded (ie imports, Figure 9) has been rising steadily in the past few years. In 2005/06, the total value of overseas merchandise unloaded (imports) was NZ\$36,586 million. In 2006/07, this figure had increased to NZ\$38,671 million. For 2007/2008 the figure was NZ\$41,927 million, an increase of 8.4% on the previous year.

**Figure 10: Overseas Merchandise Trade - Actual Values of Imports as a Percentage of Gross Domestic Product (Actual Current Prices)**

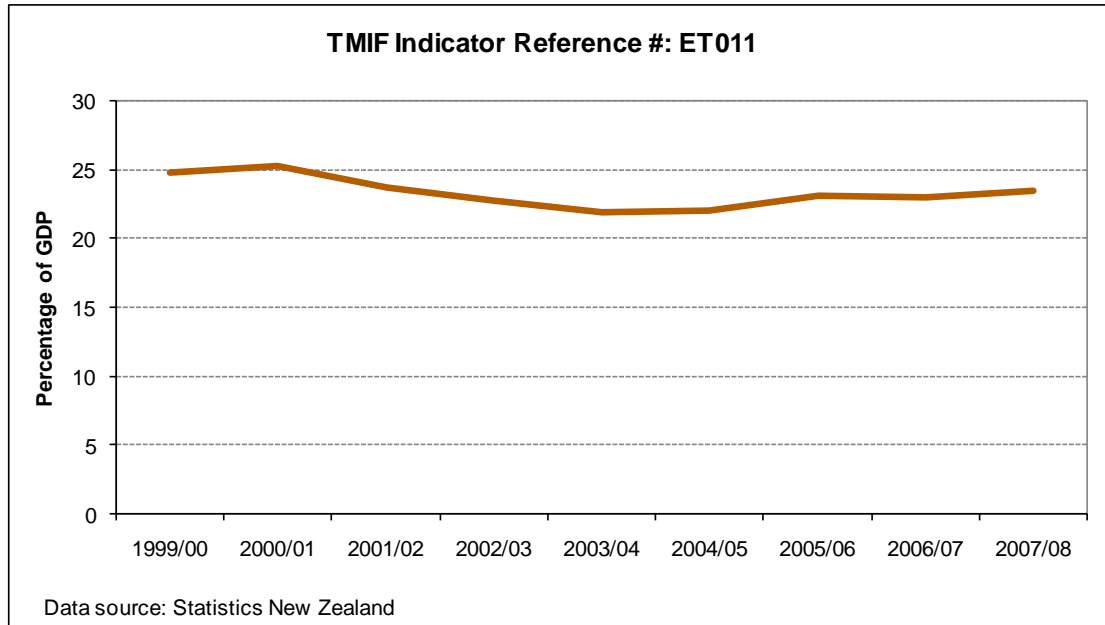
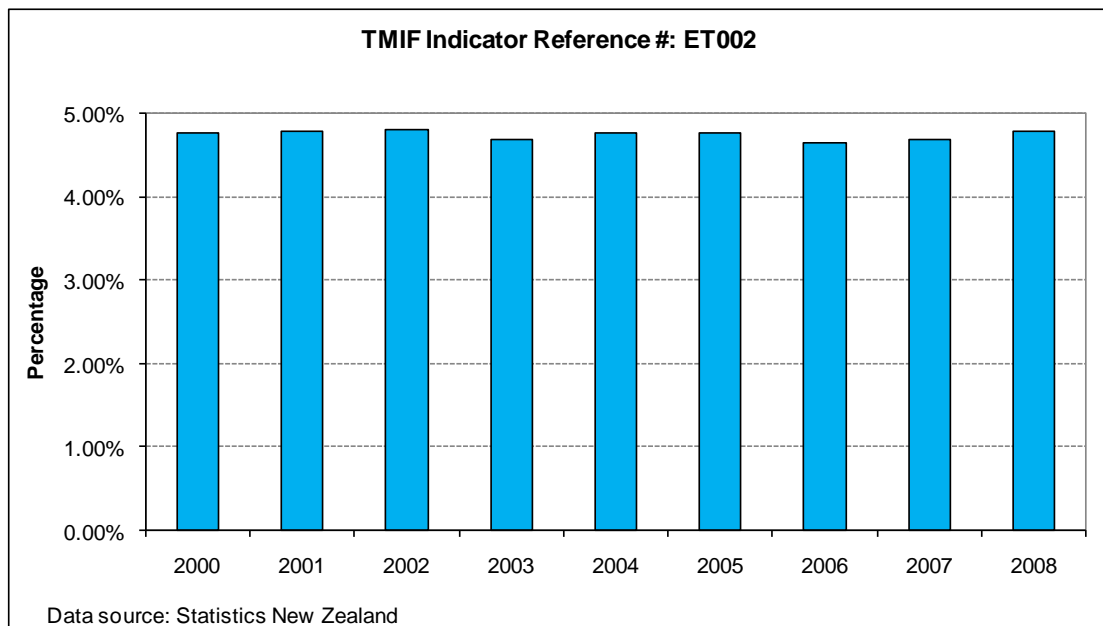


Figure 10 shows the total value of overseas merchandise unloaded (ie imported) as a percentage of GDP has been between 22% and 23% for the last five years.

**Contribution of the transport and storage industry to Gross Domestic Product (GDP)**

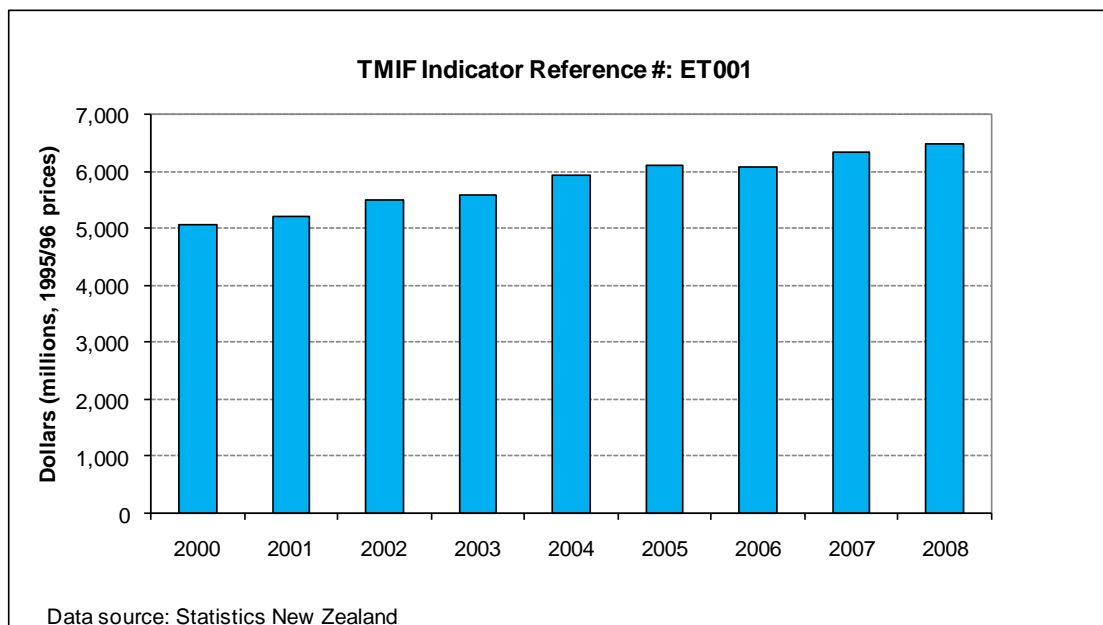
The transport and storage industry has contributed, on average, just under 5% of Gross Domestic Product (GDP) during the last three decades.

**Figure 11: Percentage Contribution of the Transport and Storage Industry to National Gross Domestic Product (December Year)**



In 2008, the transport and storage industry contributed \$6.5 billion to the national GDP (in 1995/96 dollars).

**Figure 12: Contribution of the transport and storage industry to GDP (\$ million, 1995/96 prices, December Year)**



## Congestion

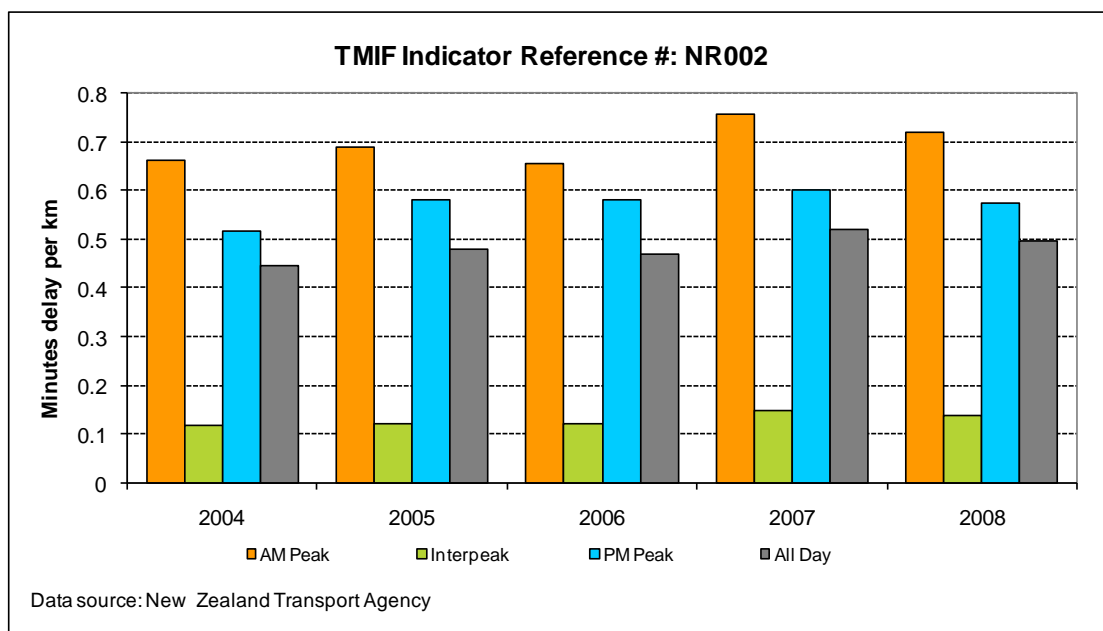
Congestion increases the cost of business, particularly for transport-intensive industries. Sustained congestion at peak hours adds to commuting times and stress in both public and private transport.

The congestion index (or congestion rate) – minutes delay per kilometre – is a measure of the level of congestion estimated by the New Zealand Transport Agency.

‘Road traffic congestion in the Auckland region is considered to be a national problem; in terms of lost income, time and pollution. Congestion is estimated to cost the New Zealand economy nearly NZ\$1 billion per year - about 1% of NZ’s Gross Domestic Product’.<sup>4</sup>

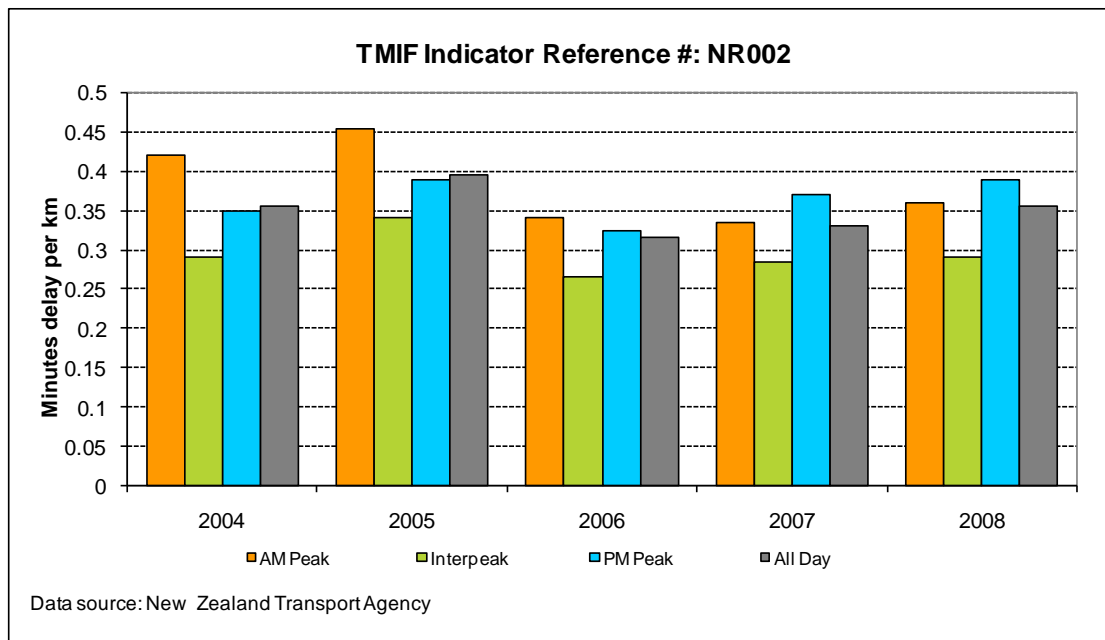
Congestion rates in Auckland have remained stable in recent years. In the period between 2004 and 2008, morning congestion rates increased from 0.66 minutes delay per kilometre in 2004 to 0.72 minutes delay per kilometre in 2008. Evening congestion increased from 0.52 minutes in 2004 to 0.58 in 2008. All-day congestion increased from 0.45 minutes delay per kilometre in 2004 to 0.50 minutes in 2008.

Figure 13: Auckland congestion rate



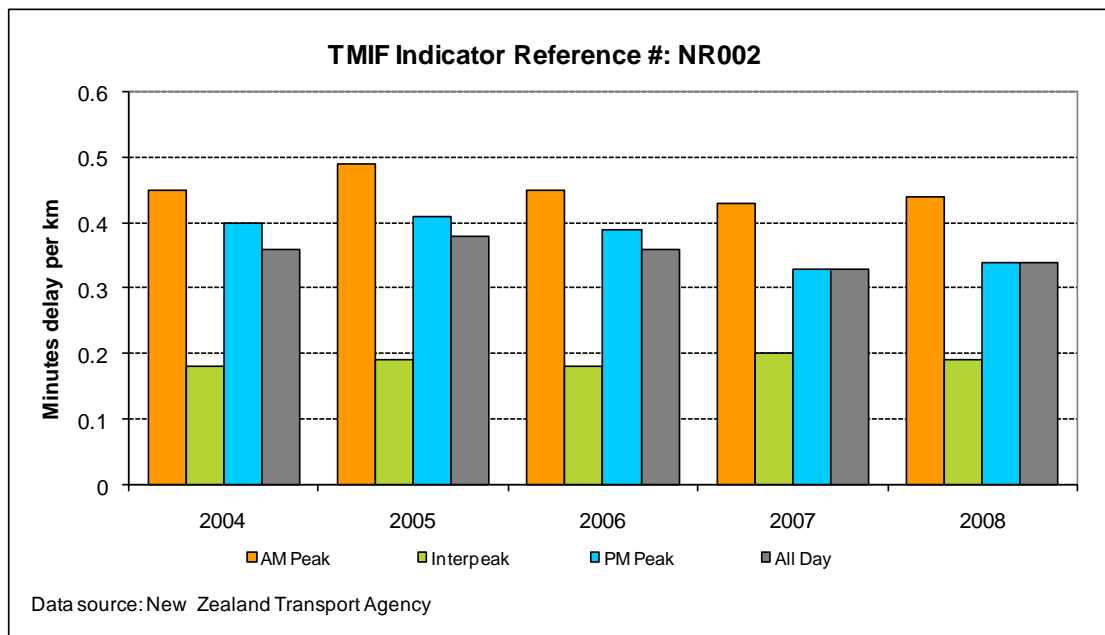
<sup>4</sup> Sankaran, J, Gore, A and Coldwell, B (2005). “The impact of road congestion on supply chains: insight from Auckland, New Zealand.” *International Journal of Logistics Research and Applications*, Vol. 8, No. 2, June 2005, 159-180.

Figure 14: Tauranga congestion rate



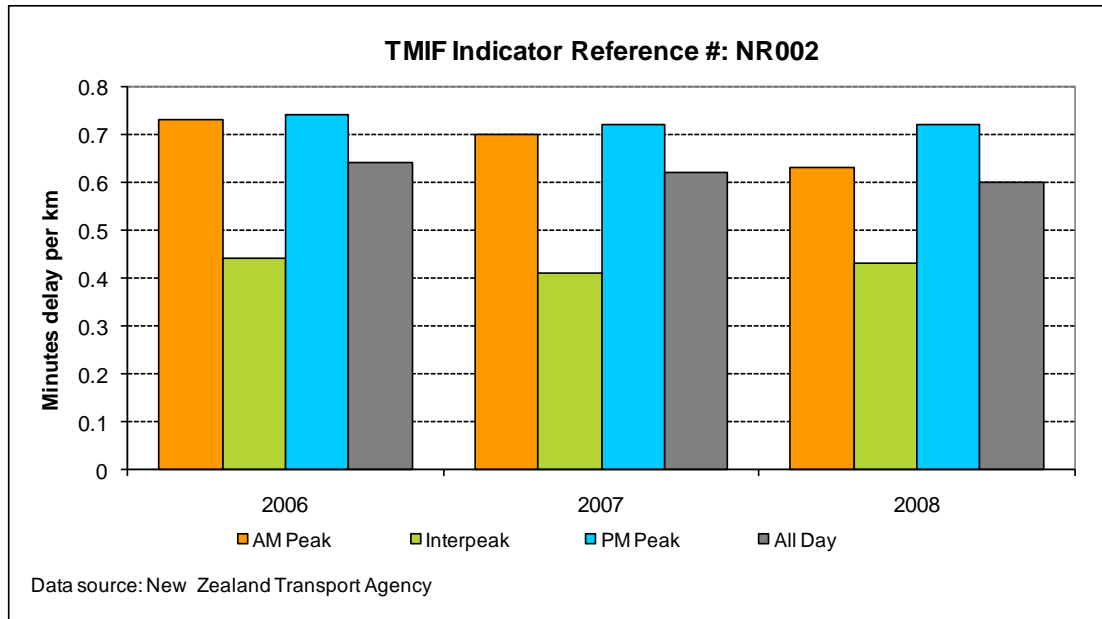
In Tauranga, morning congestion decreased slightly from 0.42 minutes per kilometre delay in 2004 to 0.36 minutes per kilometre in 2008. Evening congestion increased from 0.35 minutes per kilometre in 2004 to 0.39 minutes per kilometre in 2008. All-day average congestion remained constant at 0.36 minutes per kilometre delay.

Figure 15: Wellington congestion rate



Morning congestion in Wellington was relatively stable in the period 2004 to 2008, at about 0.44/0.45 minutes per kilometre delay. Evening congestion decreased from 0.4 minutes per kilometre delay in 2004 to 0.34 minutes per kilometre delay in 2008. All-day congestion had a small decrease from 0.36 minutes per kilometre delay to 0.34 minutes per kilometre.

Figure 16: Christchurch congestion rate



In 2008, the all-day average congestion time was 0.60 minutes delay per kilometre. This figure is a reduction from 0.64 minutes per kilometre delay in 2006. Both morning and evening average congestion rates decreased between 2004 and 2008. Morning congestion decreased from 0.73 (2006) to 0.63, while evening congestion dropped very slightly from 0.74 to 0.72 minutes per kilometre delay.

### Consumers price index

Figure 17: Consumers Price Index: Transport group

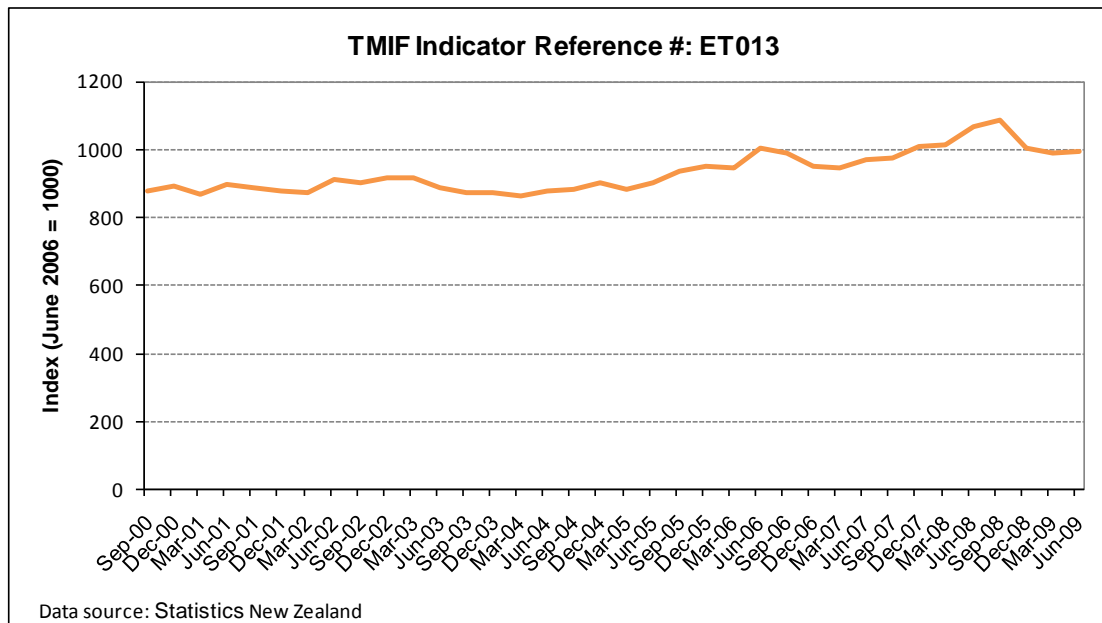


Figure 17 shows quarterly movements in the index of price of goods and services in the Consumers Price Index (CPI) sub-category for transport. This sub-category includes the prices of transport-related goods and services such as new and used vehicles, fuel, parts, repairs, services and passenger tickets. The price of fuel has the highest weighting within the category. The fuel weighting is only 5%, which means that changes in the other components of the index may mask the effects of fuel price. Before 2005, transport prices remained relatively stable while prices of other commodities and services increased. Between March 2005 and March 2009, the transport CPI has increased by 12% from 884 to 998.

**Figure 18: Producers Price Index (Outputs)- Road Freight Transport**

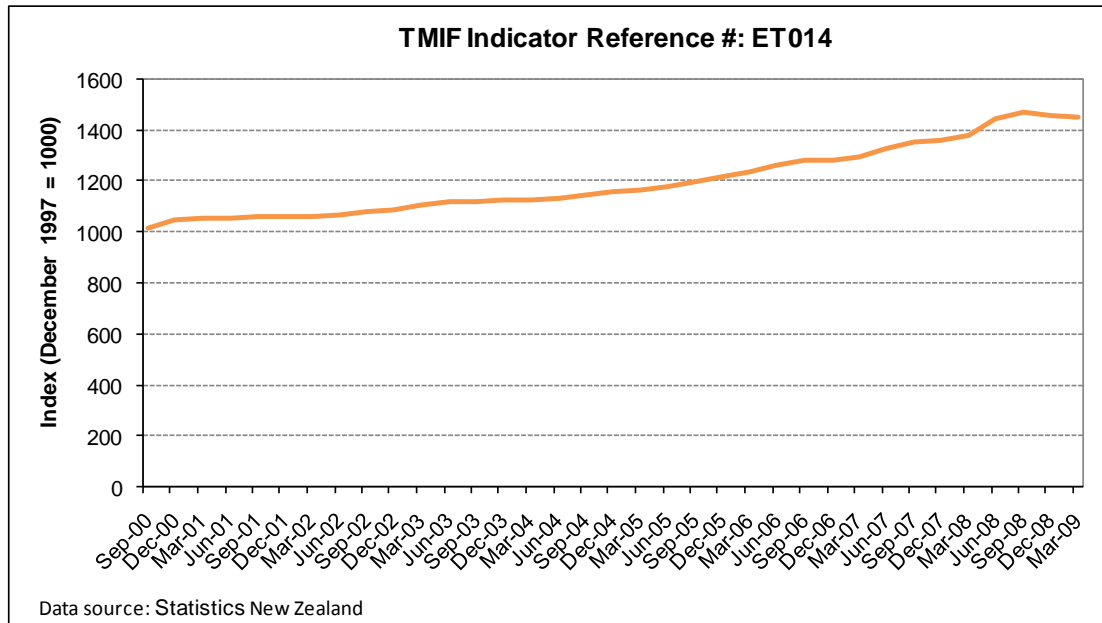
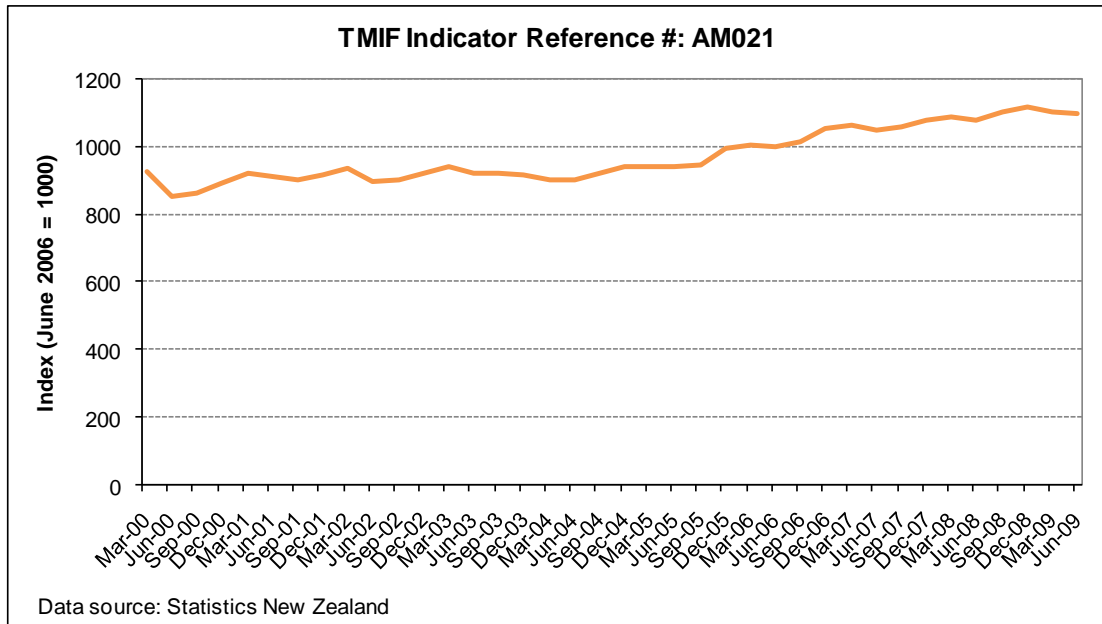


Figure 18 shows the Producers Price Index (Output) for road freight transport, which measures the average changes in prices received by domestic producers for their outputs.<sup>5</sup>

<sup>5</sup> Statistics New Zealand

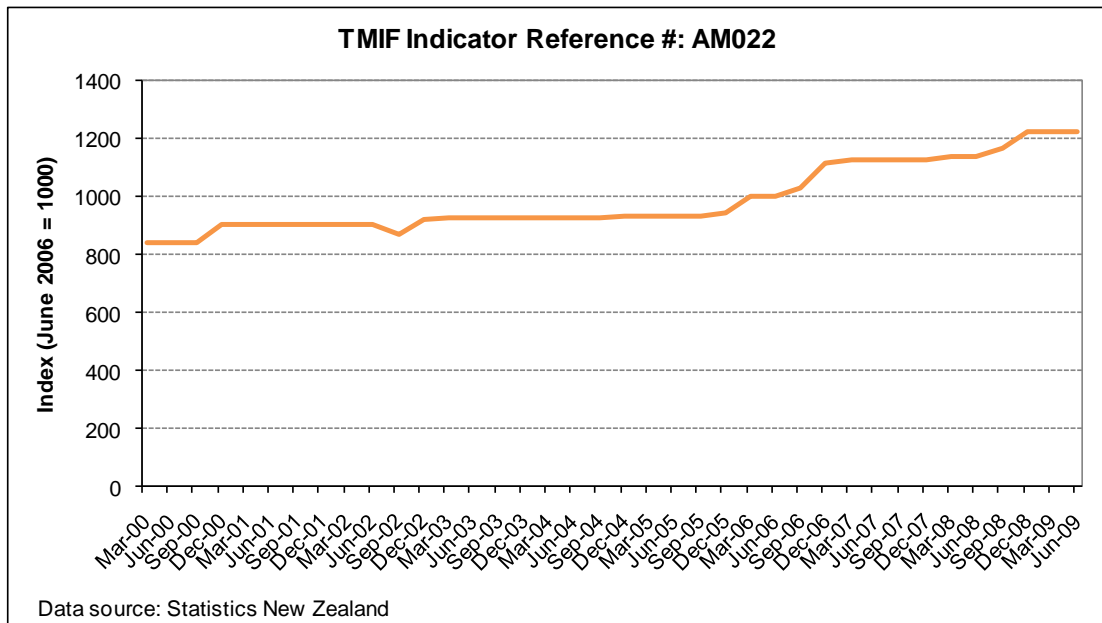
### CPI Road and Rail passenger transport

Figure 19: Consumers Price Index – road passenger transport



The road passenger transport CPI comprises taxi fares, car rentals, urban bus and long-distance bus services. Between March 2006 and March 2009, there was an increase in the CPI for road passenger transport.

Figure 20: Consumers Price Index – rail passenger transport



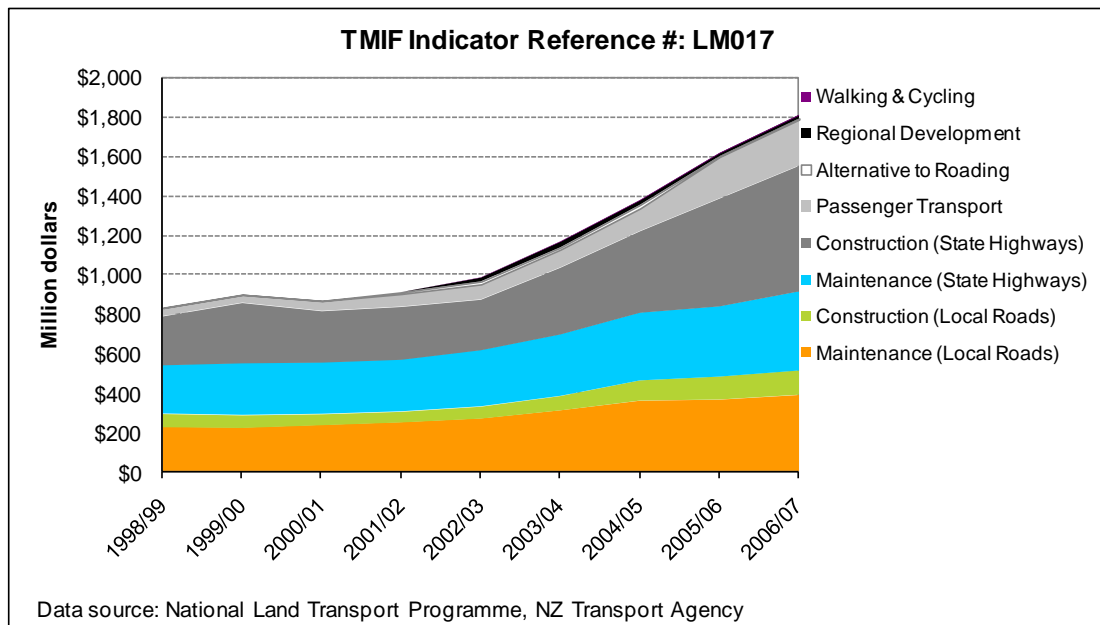
The rail passenger transport CPI includes urban and long-distance train journeys. It is also steadily rising in the long term.

## Infrastructure spending

New Zealand has a small population that is geographically dispersed and becoming increasingly urbanised. Investment in infrastructure is aimed, in part, at reducing journey times and improving the reliability of transport and travel.

National land transport funding has dramatically increased in recent years. For the 2002/03 financial year, the total spent on the national land transport programme was \$1.04 billion. For the 2006/07 year, this figure was \$1.81 billion<sup>6</sup>, representing an increase of 84% over the four-year period from 2003/04 to 2006/07. Local government also contributes to transport, through rates. Local government spending on transport parallels that of central government to a certain extent, depending on financial assistance rates.

Figure 21: National roading expenditure – central government contribution



The greatest increase in spending on national roading was in the construction of State highways, with \$90.3 million more being spent in this area in the 2006/07 year than in the 2005/06 year.

<sup>6</sup> Subtotal, excluding administrative and community activities-related expenses

## Length of roads

Figure 22: Length of State highways

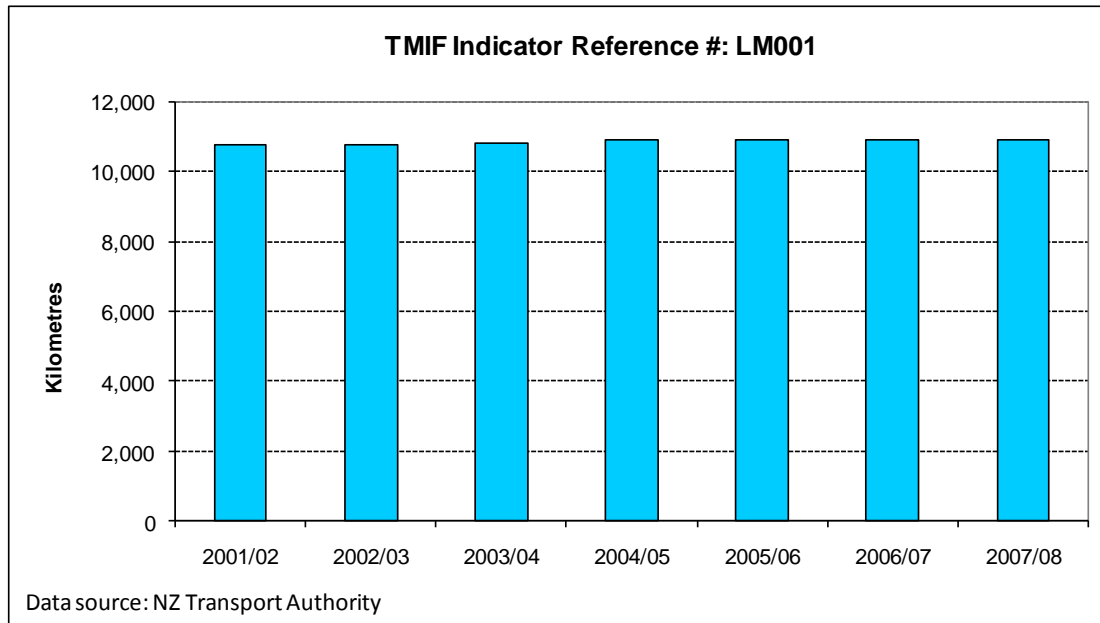
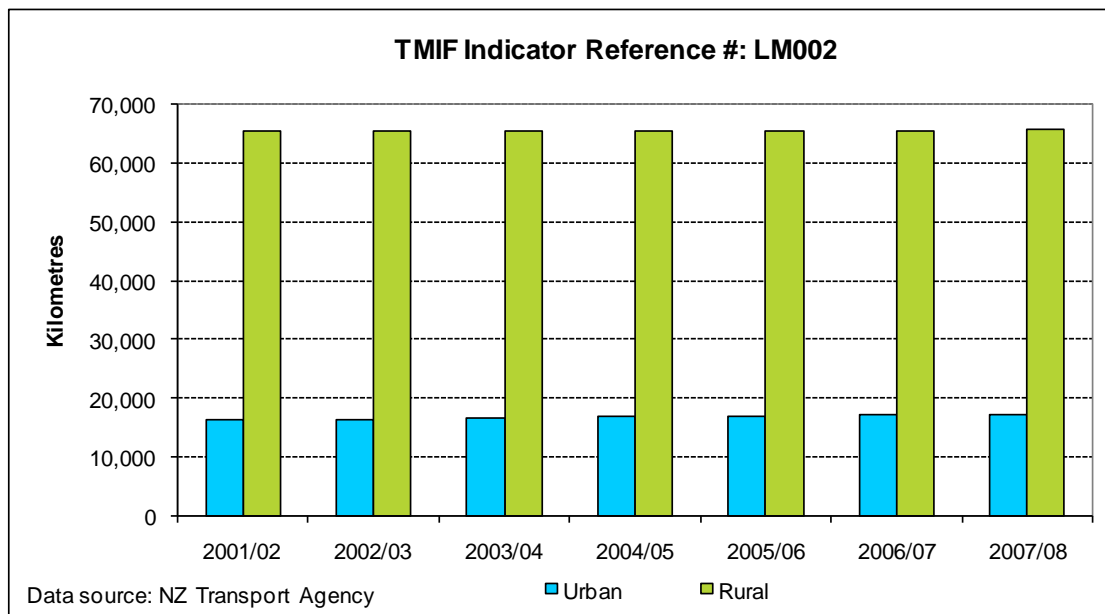


Figure 23: Length of non-State highway roads



In 2007/08, there were a total of 10,906 km of State highways, 17,298 km of urban roading, and 65,432 kms of rural roading. Since 2001/02, there has been a net increase<sup>7</sup> of 123 km of State highway roads, a net increase of 1071 km of urban roads, and a net increase of 230 km of rural roads. The length of the rail track is about 4,000km (TMIF Indicator Reference #: LM003).

<sup>7</sup> Net increase represents additions minus removals, minus net change resulting from realignment and straightening.



## Chapter two: Safety and security



## Chapter 2: Safety and security

Improving the safety and security of the transport system and its users is essential to New Zealand. A transport system that is safe and secure will result in lower social costs and fewer injuries and lives lost as a result of transport-related incidents, as well as minimal fear of death, injury, harassment or loss of possessions. Factors that can affect the safety and security of the transport system include education, engineering, enforcement and management systems.

### Key findings:

- The number of road fatalities for 2008 was 366, the lowest in 49 years.
- New Zealand's transport system has become increasingly safe. There has been a large decrease in the number of Police-reported fatal and injury road accidents since 1990. In recent years, this trend has plateaued for deaths and injuries, and an increase has been noted for accidents. The percentage of drivers travelling over the speed limit on open roads and in urban areas has declined, although deaths in accidents in which 'too fast for conditions' was a contributing factor have been variable since 2001<sup>8</sup>. Road deaths with alcohol as a contributing factor have been variable since 2000.
- The number of rail incidents that resulted in death or injury has varied since 2000.
- Maritime and aviation deaths remain relatively constant and at low levels.
- Overall, New Zealanders perceive all modes of transport (except cycling) to be safe and secure.

### Safety

#### Accidents

New Zealand has observed a steady decrease in the number of Police-reported fatal and injury accidents between 1990 and 2000 as a result of effective National Road Safety Plans. This reported decrease has levelled out since then and, since 2000, an increase has been observed. In 2007, there were 12,043 reported accidents, an increase of over 50% in reported fatal and injury accidents relative to 2000. The largest increase was between 2000 and 2002. A comparison of hospital admissions from Police-reported injury accidents suggests that Police reporting of injury accidents improved between 2000 and 2002, possibly accounting for at least part of this reported increase.

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<sup>8</sup> The Police accident report form changed in 2000; therefore, post-2000 and pre-2000 data on speed are not strictly comparable.

Figure 24: Number of accidents by mode – road

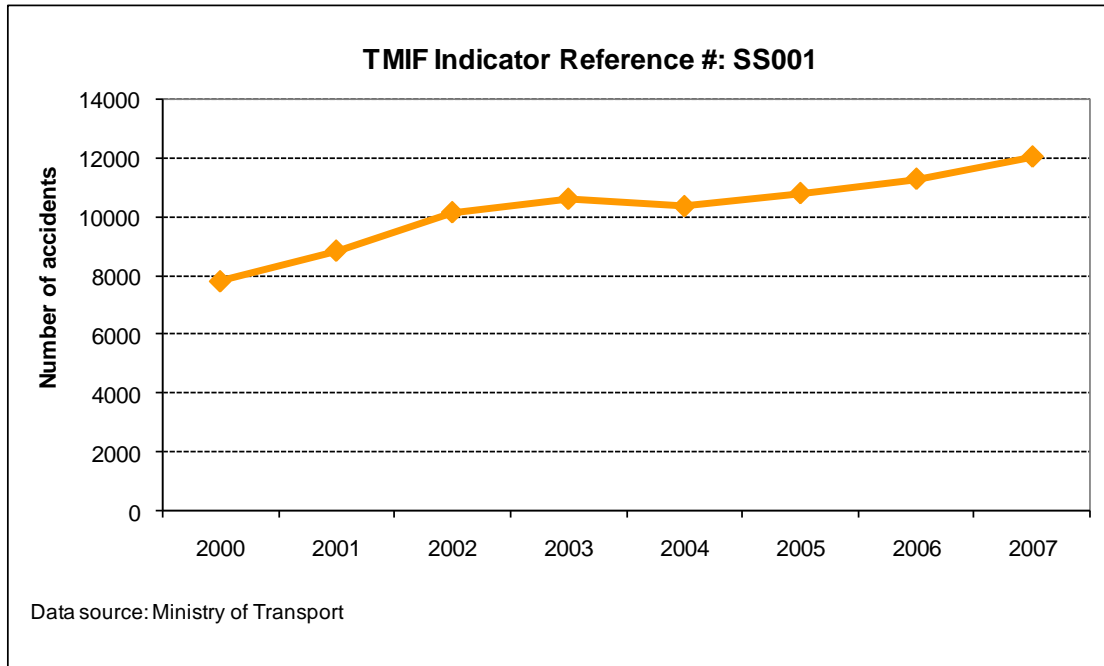
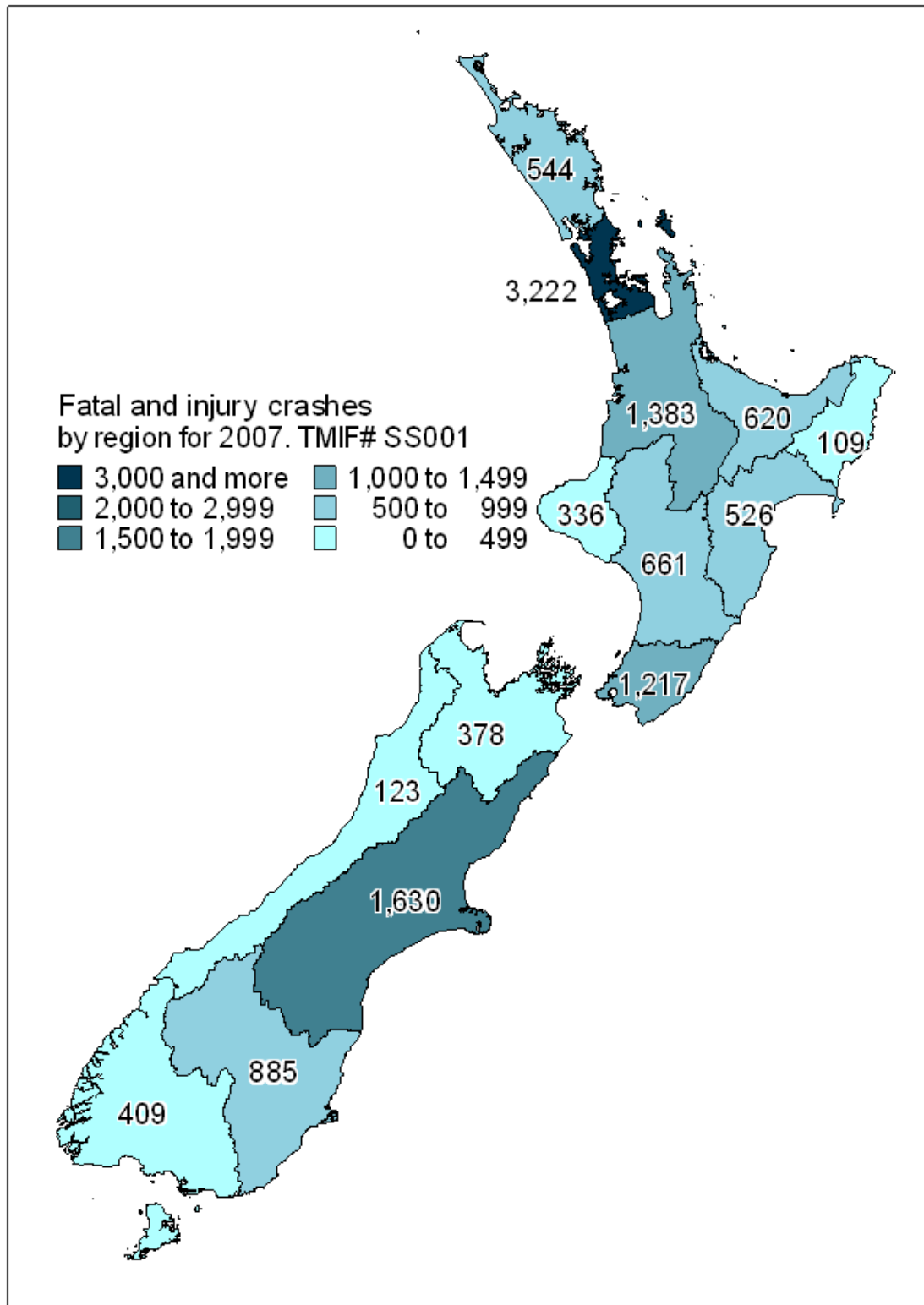
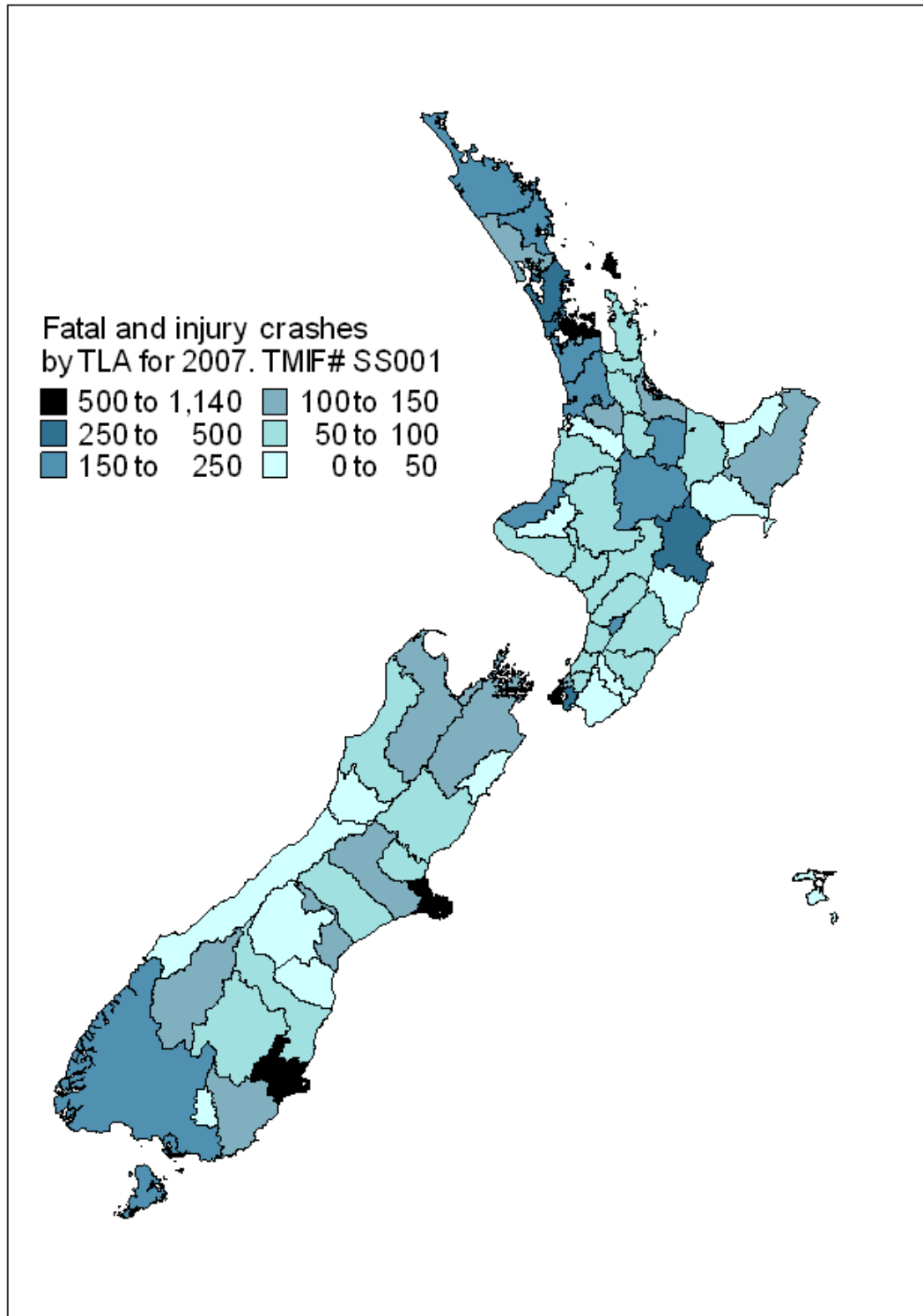


Figure 25: Fatal and injury accidents by region for 2007



Data source: Ministry of Transport

Figure 26: Fatal and injury accidents by TLA for 2007



Data source: Ministry of Transport

Between 1990 and 2000, there was a decrease in the number of road crashes per capita. Since 2000, the number of road accidents has steadily increased.

In 2007, there were 285 reported accidents per capita, a rise of over 40% relative to 2000.

Figure 27: Number of accidents per capita by mode – road

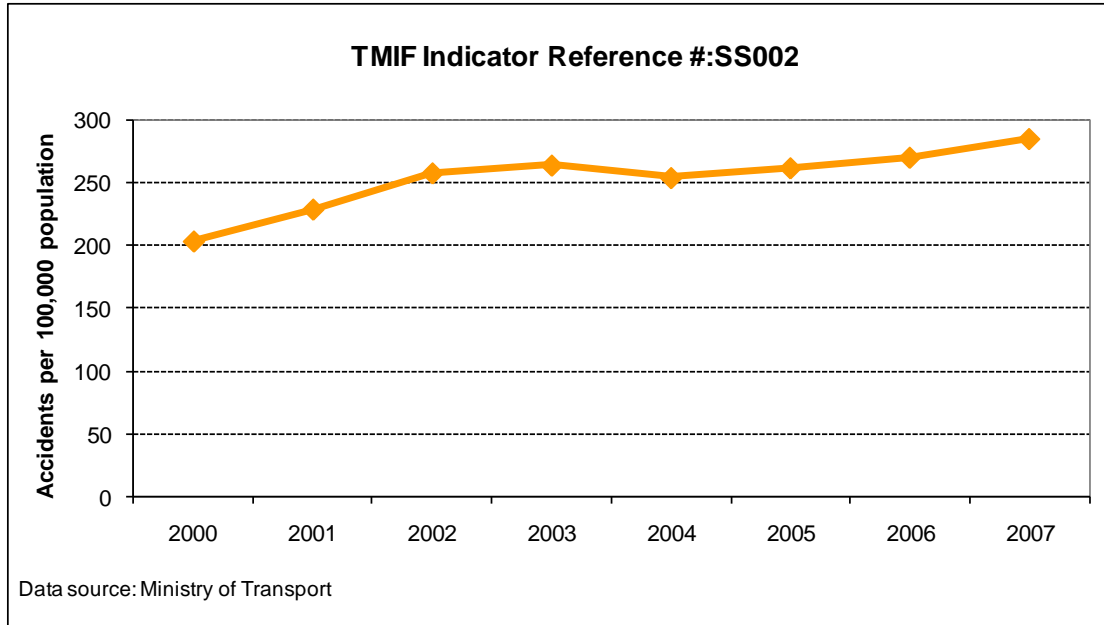
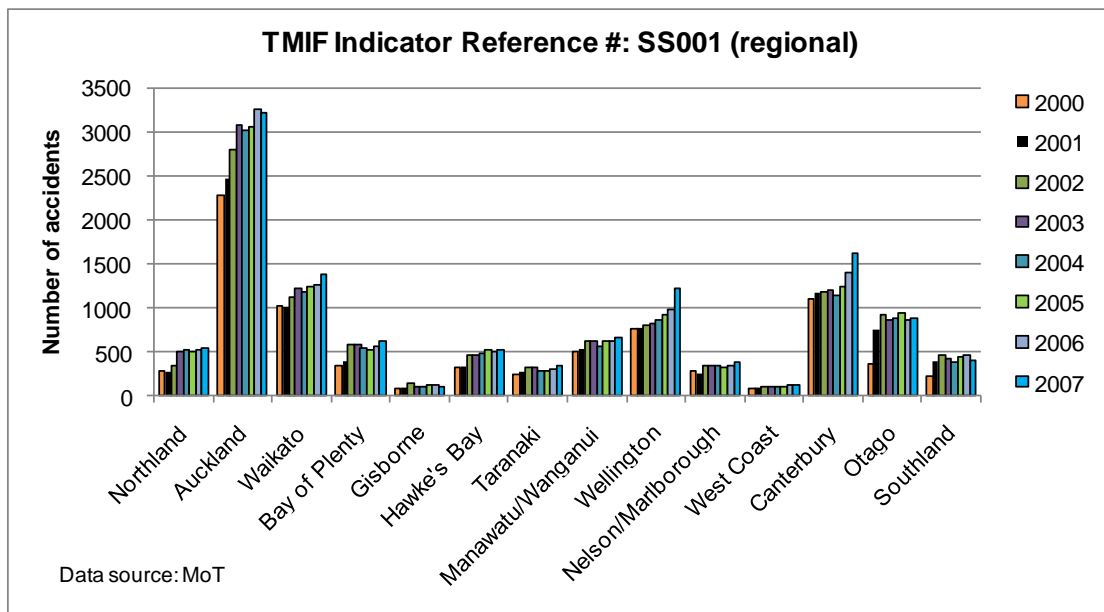
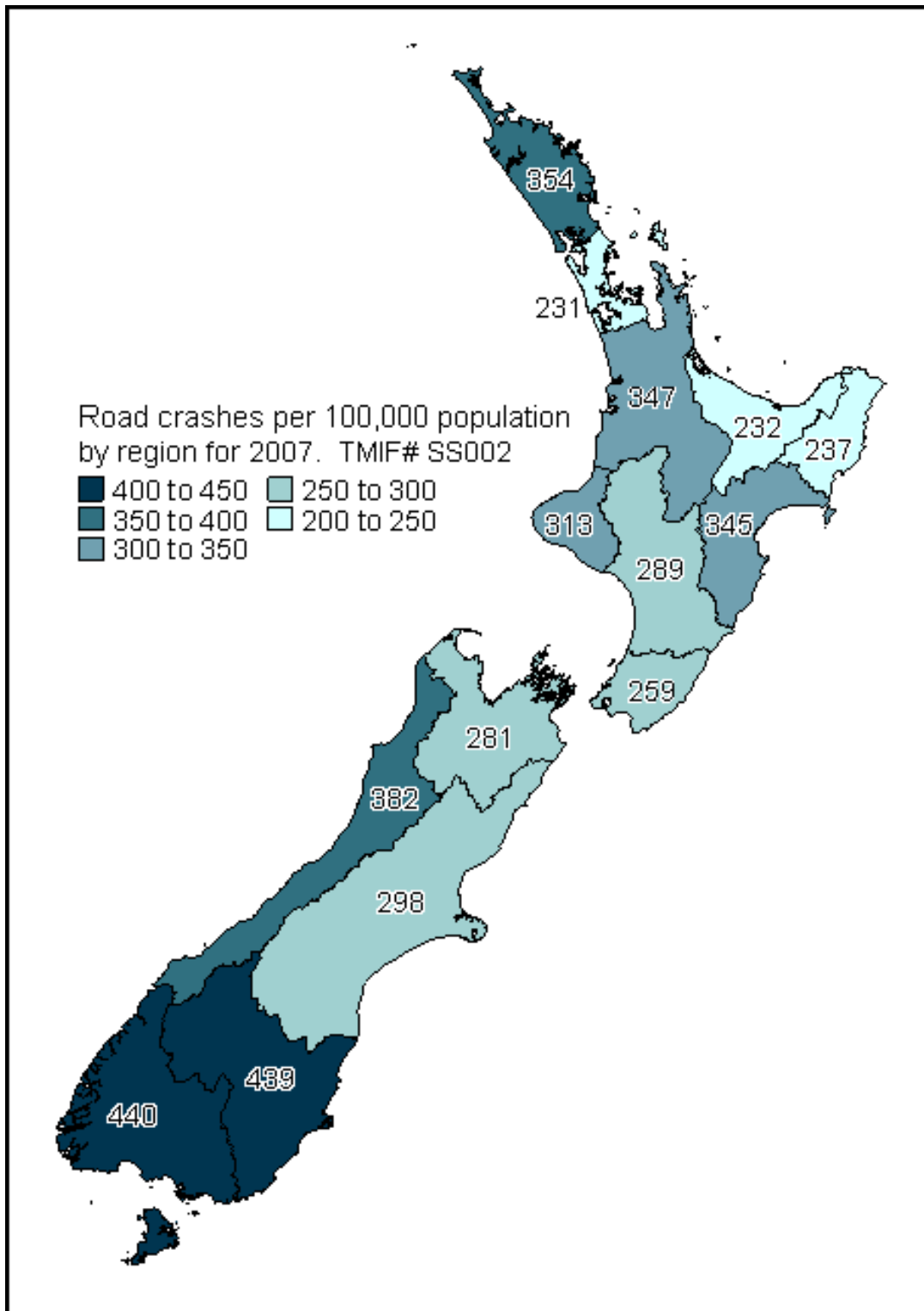


Figure 28: Number of accidents by mode (road) – regional



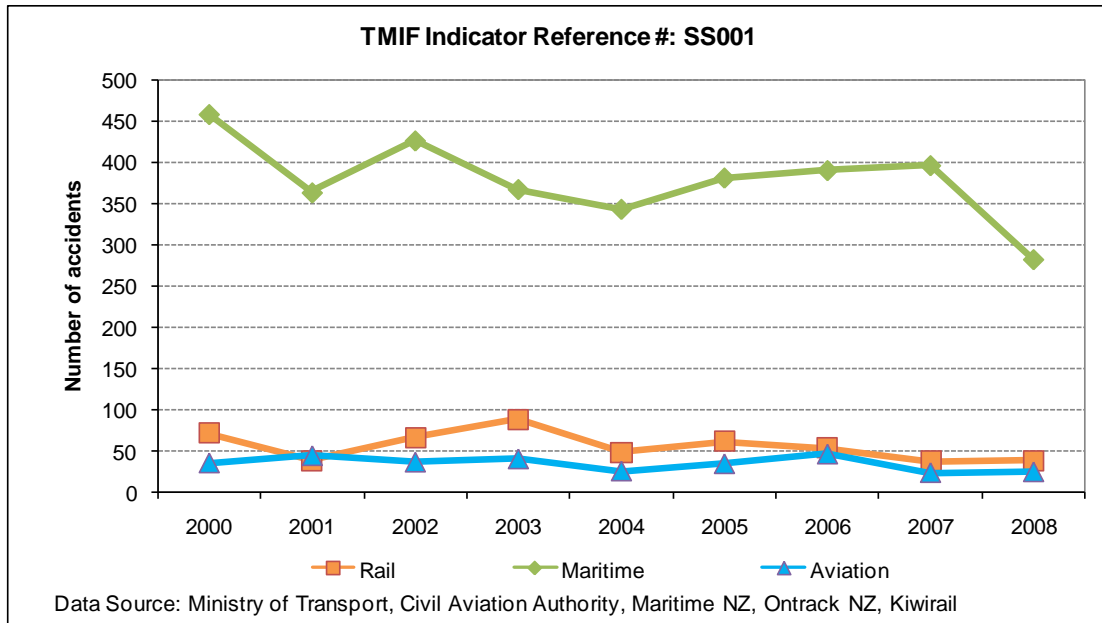
Between 2000 and 2007, the number of recorded road accidents increased in all regions.

Figure 29: Road accidents per 100,000 population by region for 2007



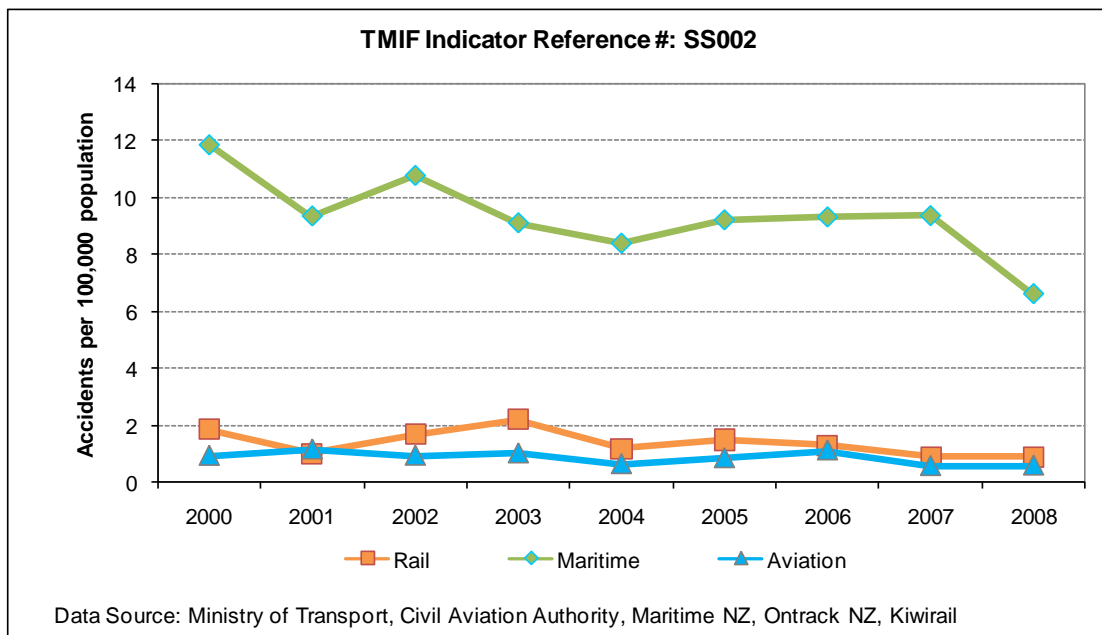
Data source: Ministry of Transport

Figure 30: Number of accidents by mode – rail, maritime, aviation



The number of accidents reported in rail, maritime and aviation has fluctuated during the period 2000 to 2008<sup>9</sup>.

Figure 31: Number of accidents per capita by mode – rail, maritime and aviation



Maritime and rail accidents per capita decreased by about 20% and 50% respectively, between 2000 and 2008. The number of aviation accidents per capita decreased by about 30% between 2000 to 2008.

<sup>9</sup> Rail incidents include all incidents resulting in death or injury occurring on the rail corridor and involving a rail vehicle. Maritime accidents include both commercial and recreational accidents.

Figure 32: Number of fatal accidents – road

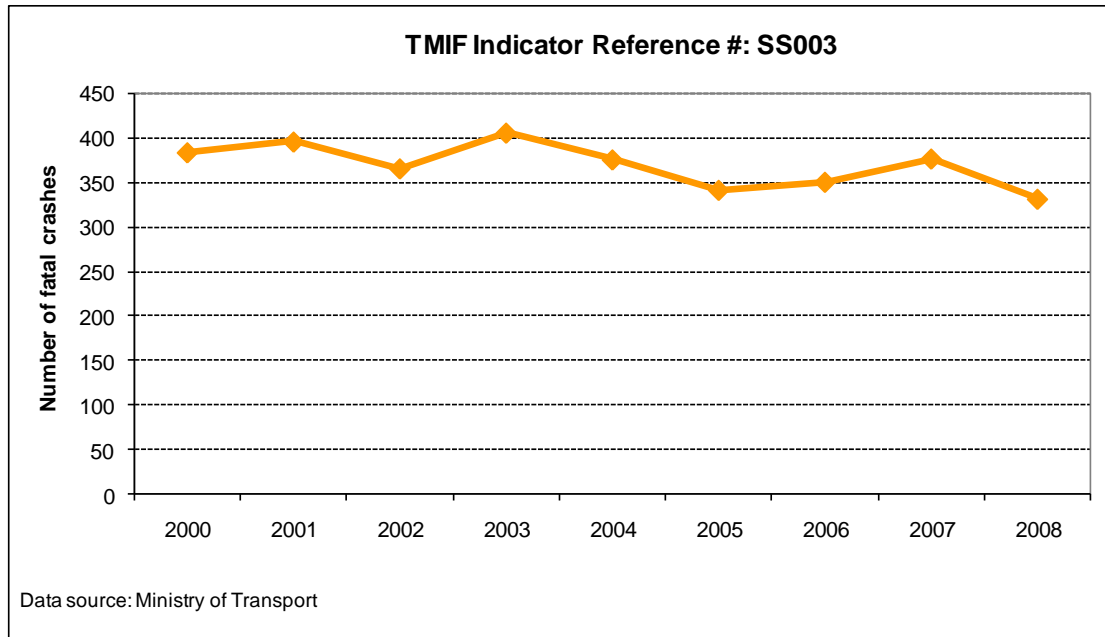
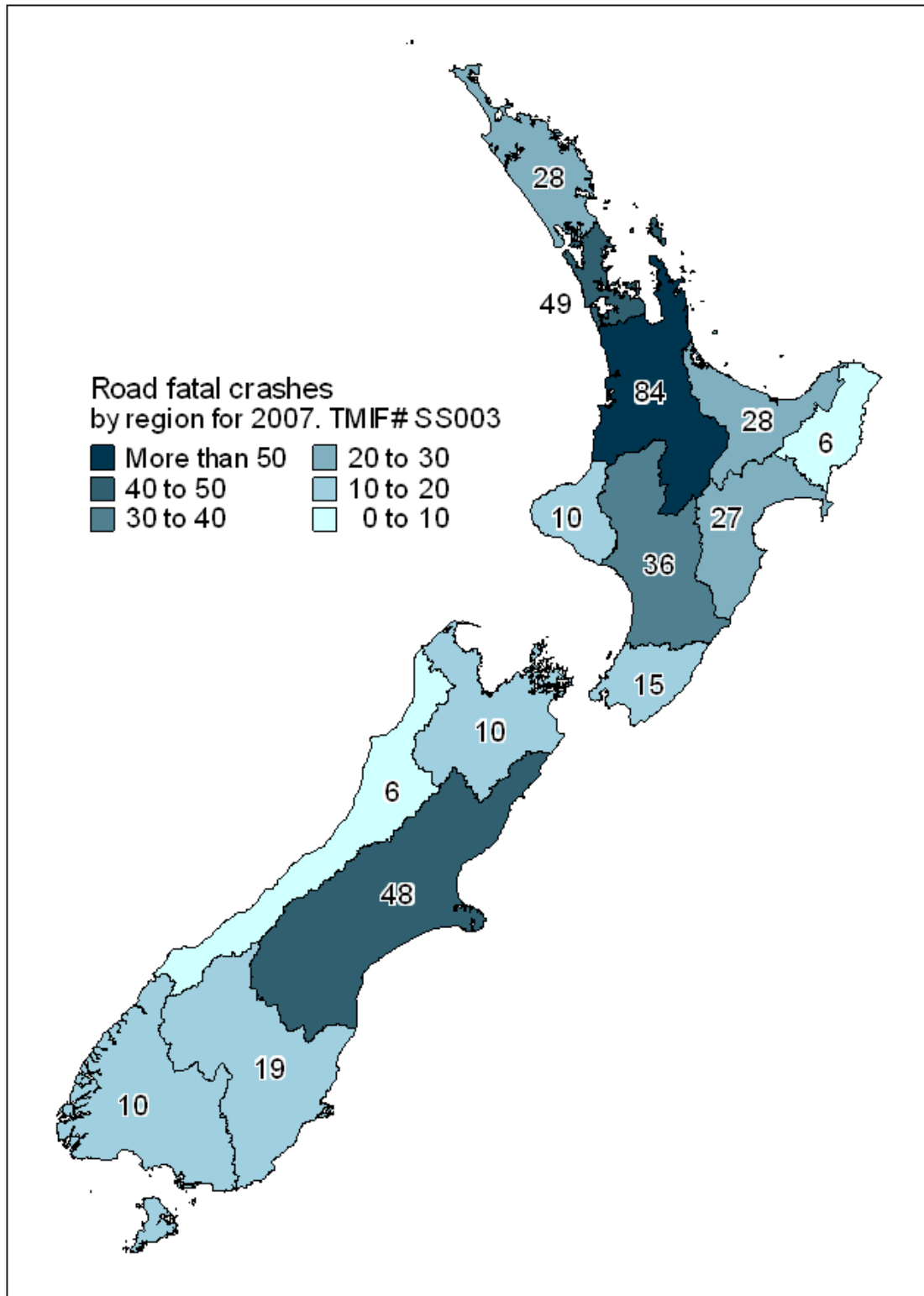


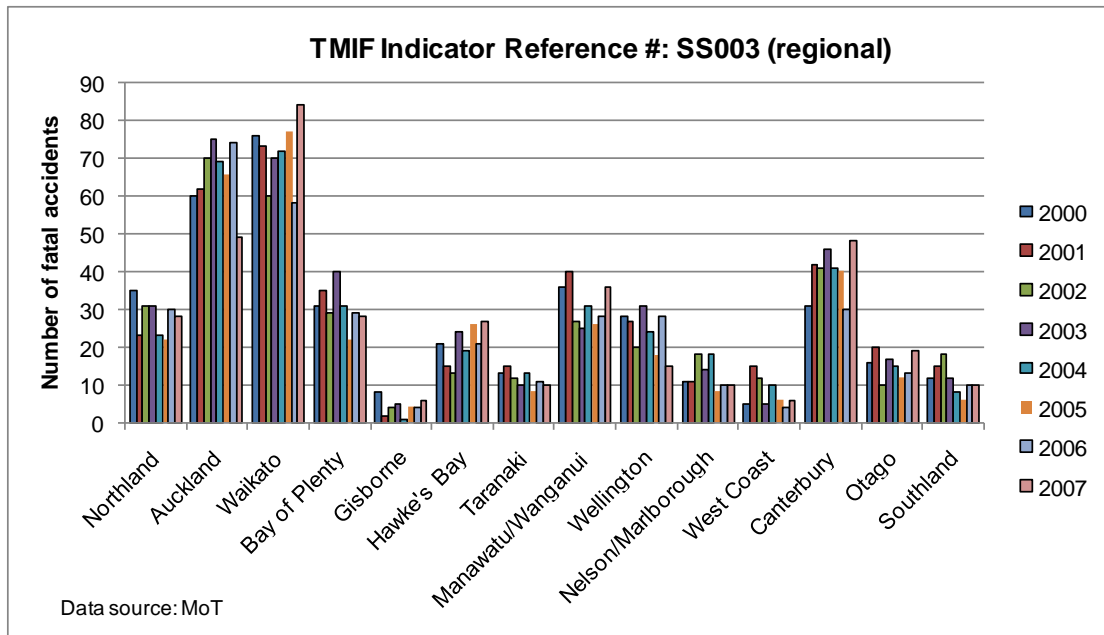
Figure 32 shows that the number of fatal road accidents has decreased between 2000 and 2008. There were 331 reported fatal accidents on New Zealand roads in 2008; a 13% reduction compared to the 2000 figure of 383 deaths.

Figure 33: Road fatal accidents by region for 2007



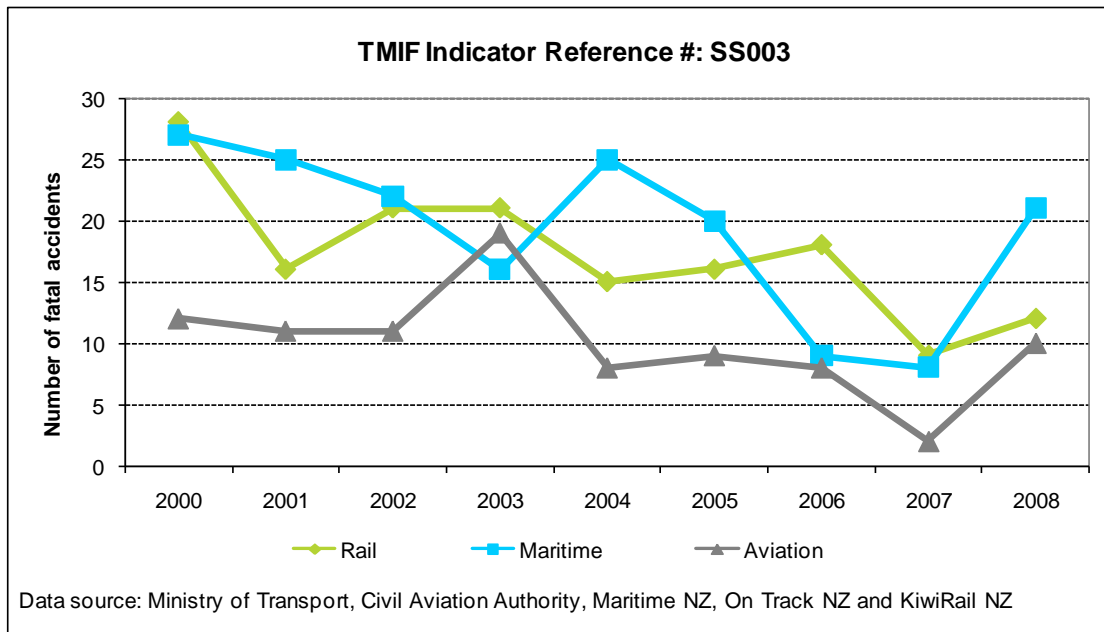
Data source: Ministry of Transport

Figure 34: Number of fatal accidents – road (regional)



The following regions had a lower number of fatal accidents in 2007 than in 2000: Northland, Auckland, Bay of Plenty, Gisborne, Taranaki, Wellington, Nelson/ Marlborough/Tasman and Southland.

Figure 35: Number of fatal accidents – rail, aviation and maritime



Between 2000 and 2008, all non-road modes recorded a decrease in the number of fatal accidents.

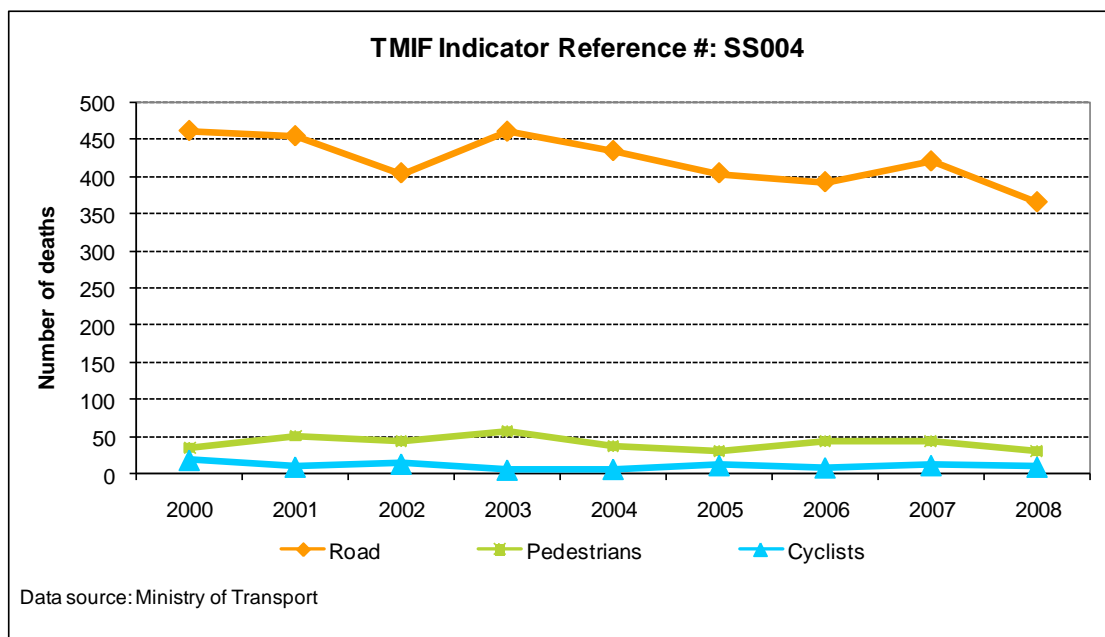
### Transport deaths and injuries

Figure 36 shows the total number of road deaths, as well those of pedal cyclists and pedestrians injured in collisions with motor vehicles. Although there has been a significant decrease in the total number of reported road deaths<sup>10</sup> since 1990, this decrease has levelled out since 2000.

In 2008, there were 366 road deaths. This is a reduction from the total of 421 road deaths in 2007.

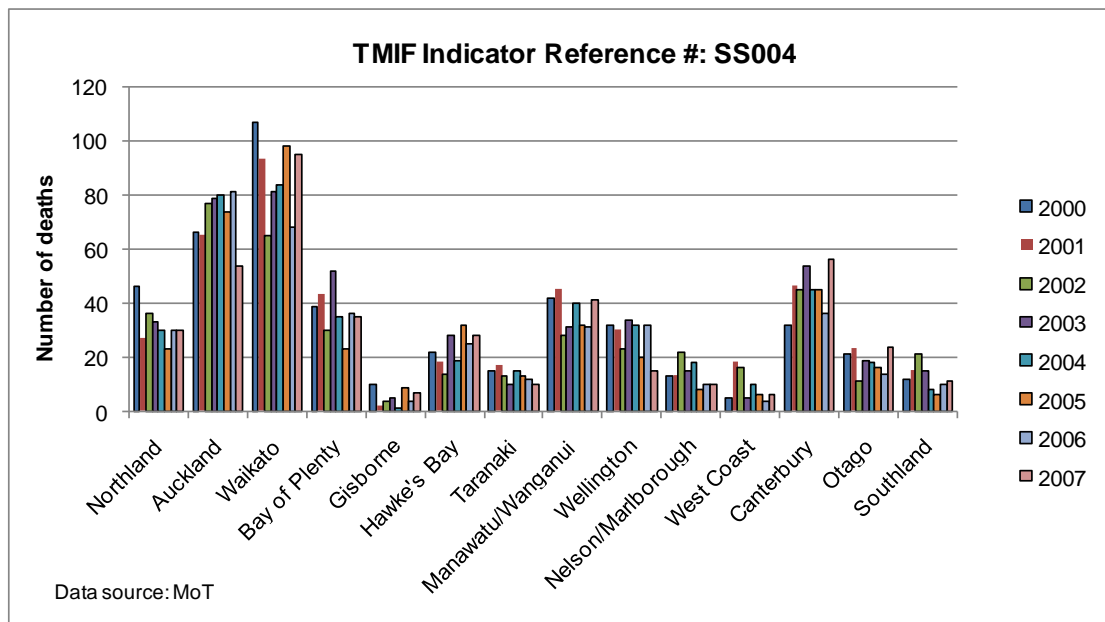
The number of deaths of pedestrians and pedal cyclists remained stable between 2000 and 2008, at 40 and 10 respectively.

Figure 36: Number of deaths by mode – road<sup>11</sup>



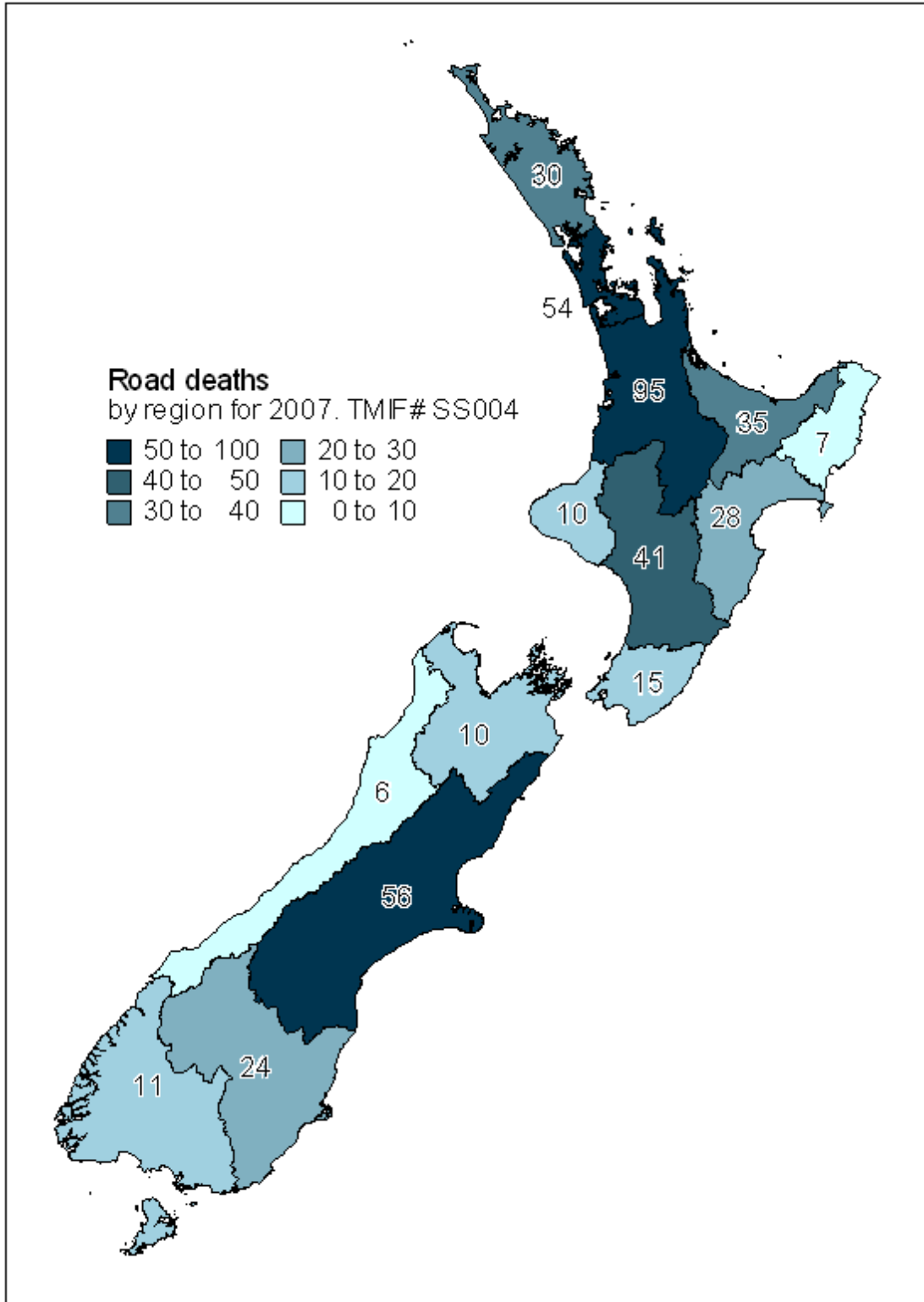
<sup>10</sup> Total road deaths include pedal cyclists and pedestrians injured in collisions with motor vehicles.

Figure 37: Number of deaths – road



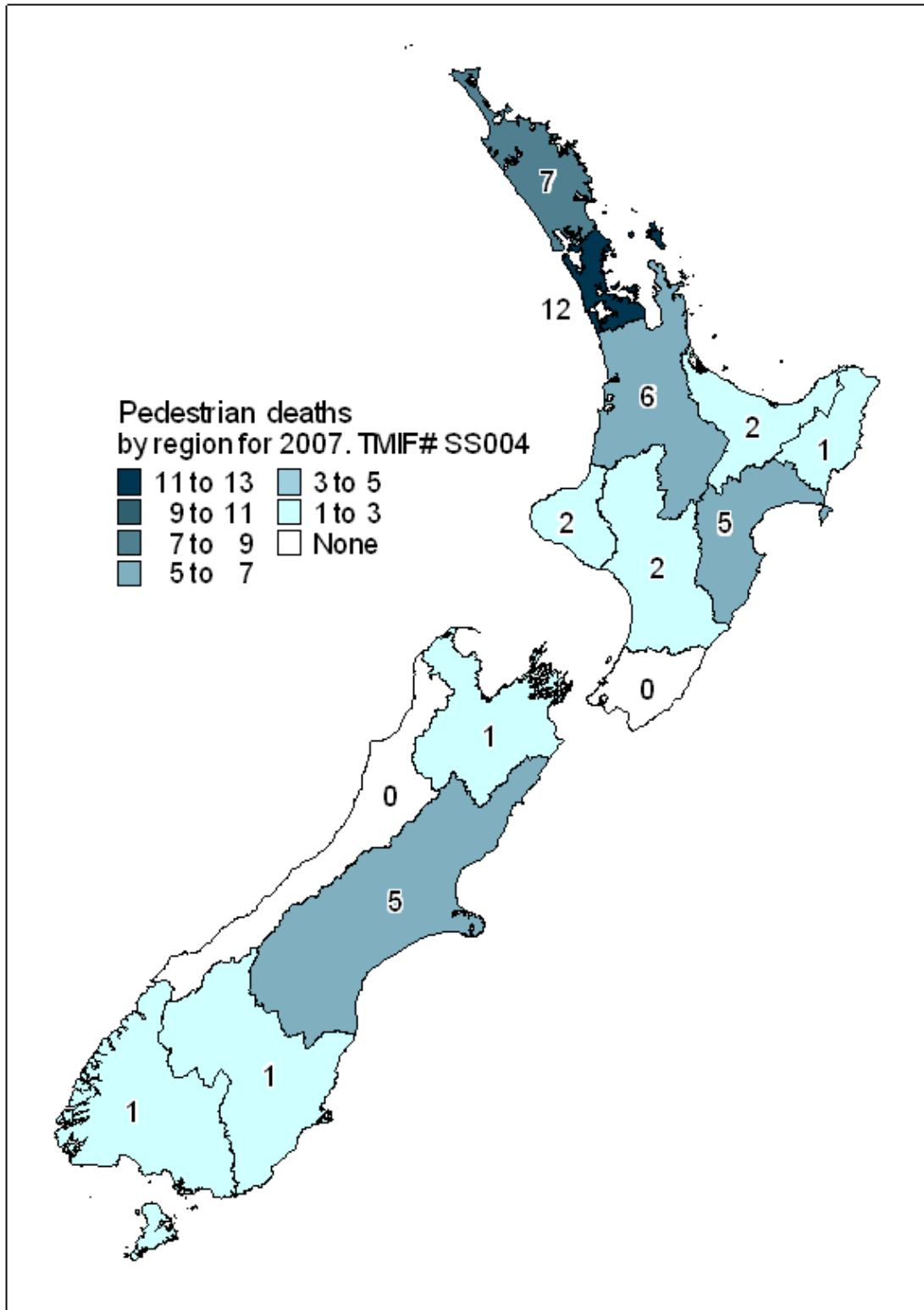
All regions except for Hawke's Bay, the West Coast and Otago had a reduction in the number of deaths between 2000 and 2007.

Figure 38: Road deaths by region for 2007



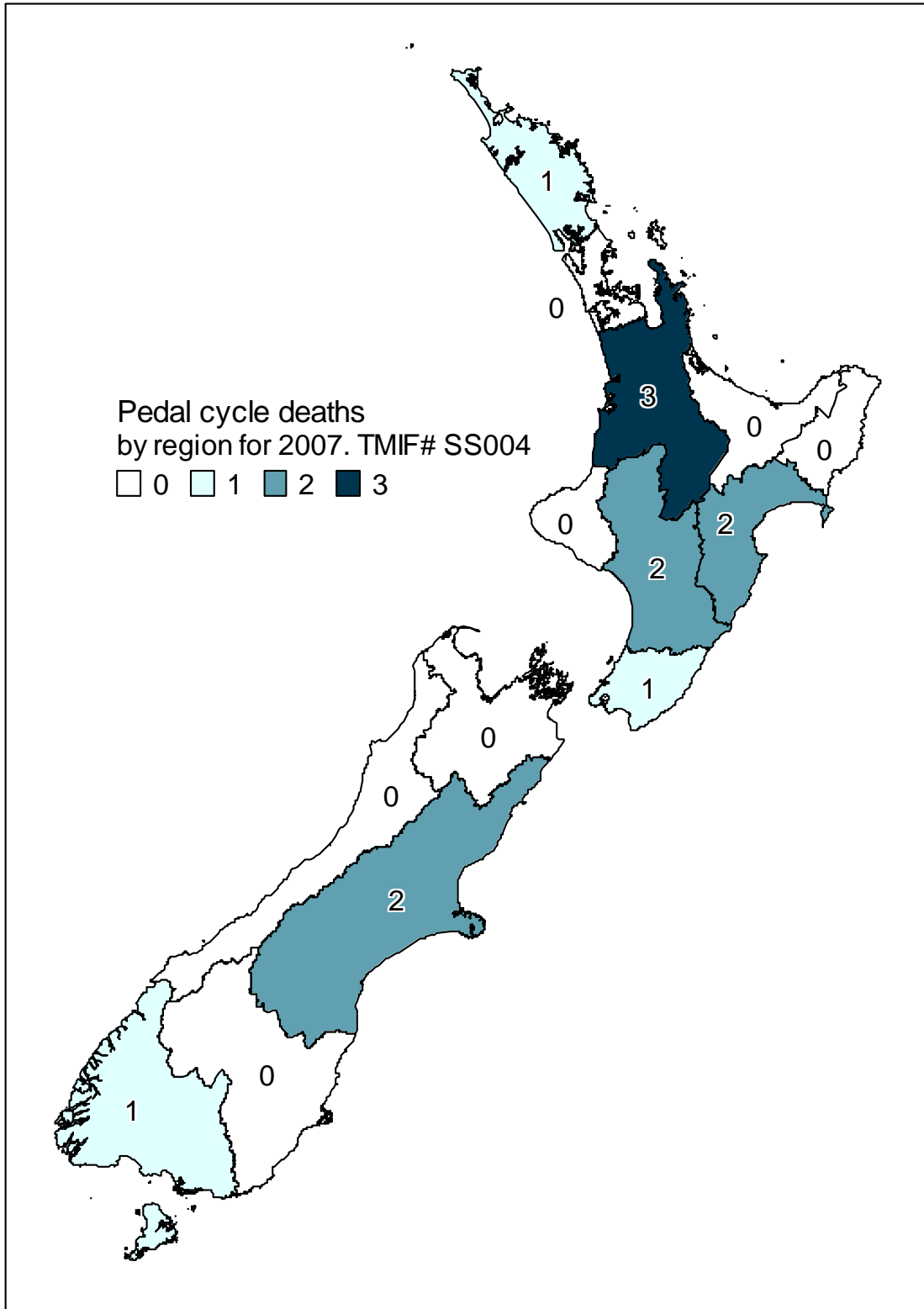
Data source: Ministry of Transport

Figure 39: Pedestrian deaths by region for 2007



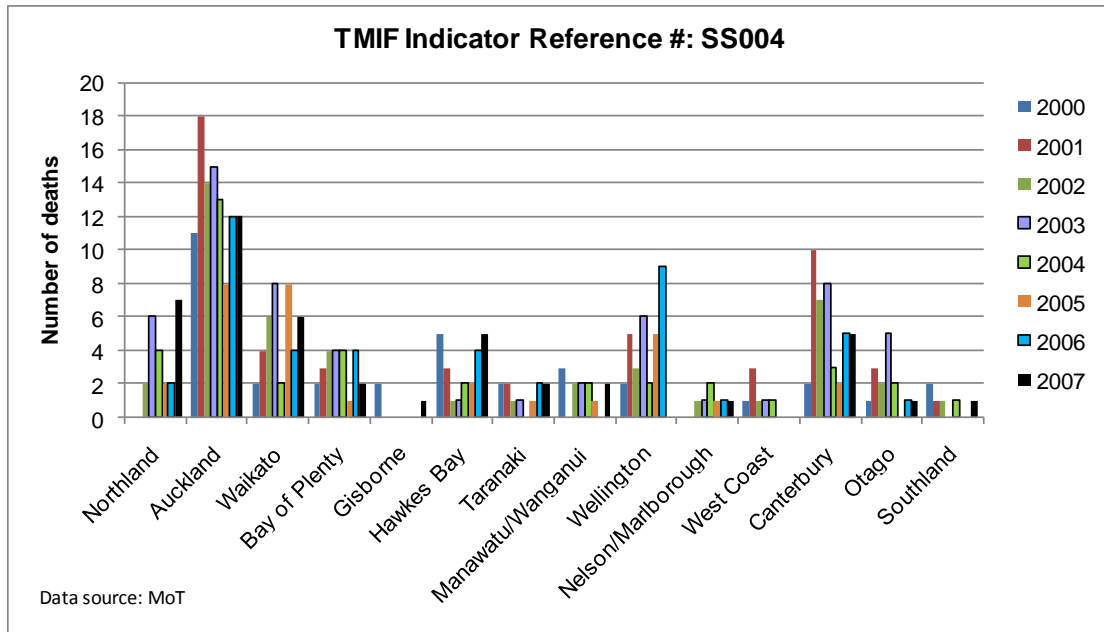
Data source: Ministry of Transport

Figure 40: Pedal cycle deaths in motor vehicle accidents by region for 2007



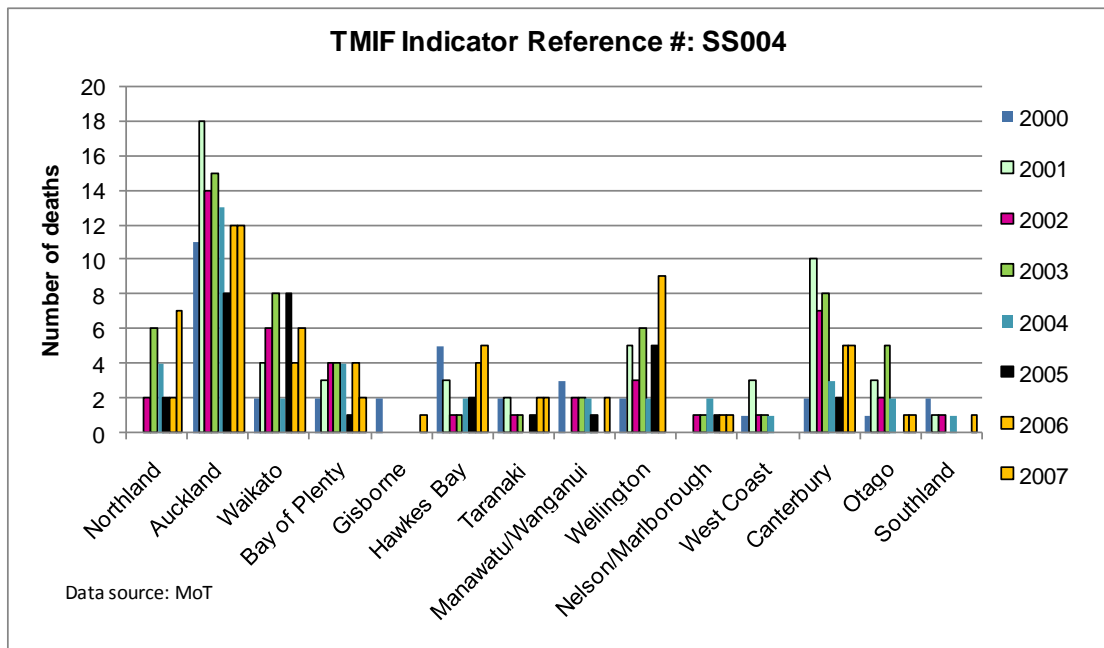
Data source: Ministry of Transport

Figure 41: Number of deaths in motor vehicle accidents – pedal cyclists



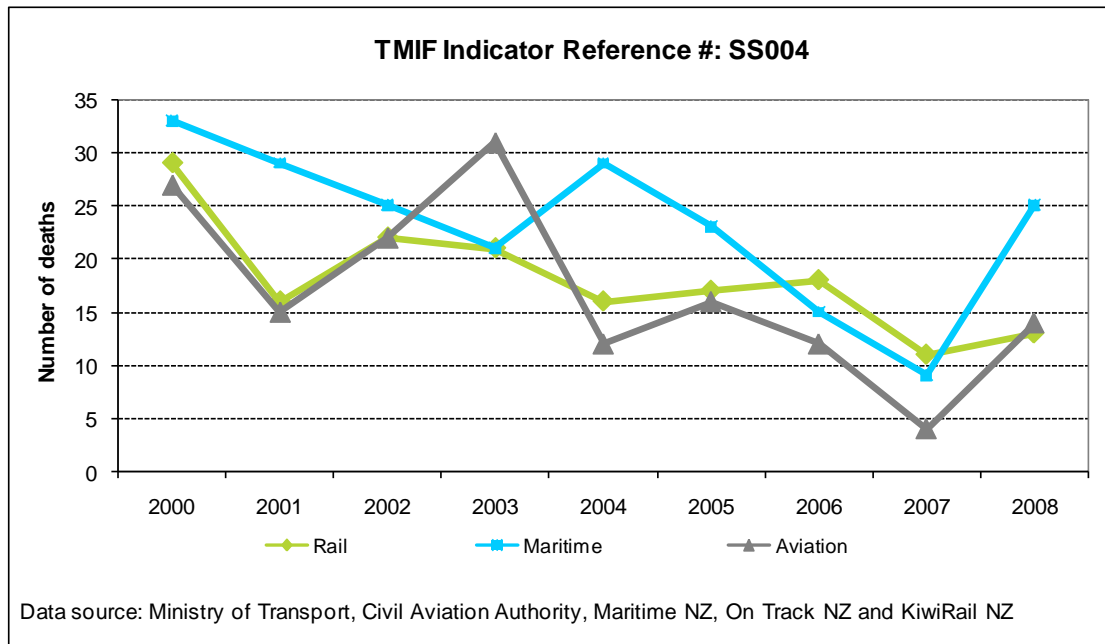
The number of annual pedal cycle deaths by region is too low to comment on trends.

Figure 42: Number of deaths – pedestrian



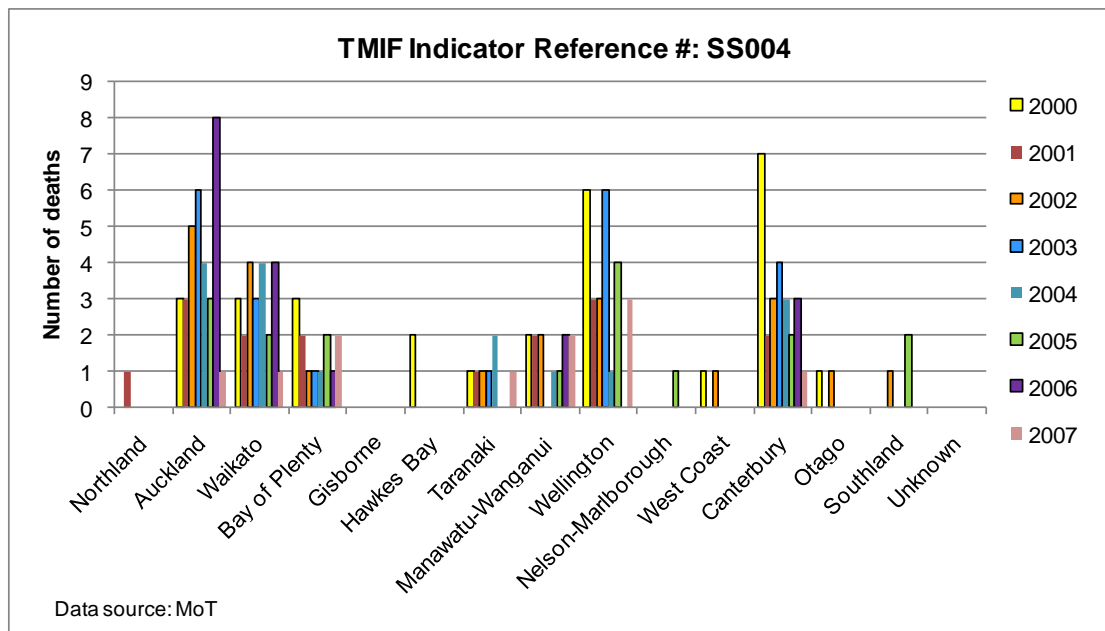
The number of annual pedestrian deaths by region is too low to comment on trends.

Figure 43: Number of deaths by mode – rail, aviation and maritime



In spite of the variable pattern of reported non-road deaths, the total number of deaths for all modes is generally lower than it was in 2000.

Figure 44: Number of deaths – rail (regional)



The number of reported road accident injuries remained relatively constant during the period from 2000 to 2007, increasing by only 7% over that time. Road accident injuries refer to those which required more than one night of hospitalisation. The number of pedal cyclist injuries also remained relatively stable over the stated period, with an increase of 6% between 2000 and 2007. Pedestrian injuries had an 8% decrease in the period 2000 to 2007.

While kilometres travelled by vehicles increased by 12% between 2001 and 2007, the rate of hospitalisations increased by only 7% over this period<sup>12</sup>. A lower accident increase when compared to the VKT increase suggests that the actual risk to an individual travelling on a road at a given time is probably no worse than it was in previous years.

Figure 45: Number of injuries by mode – road

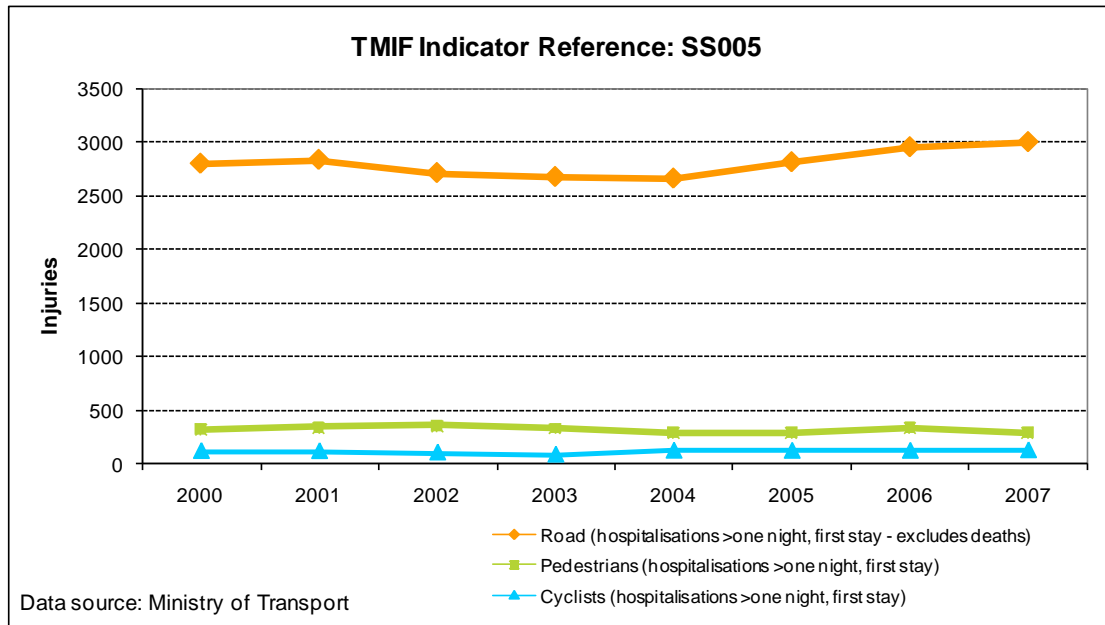
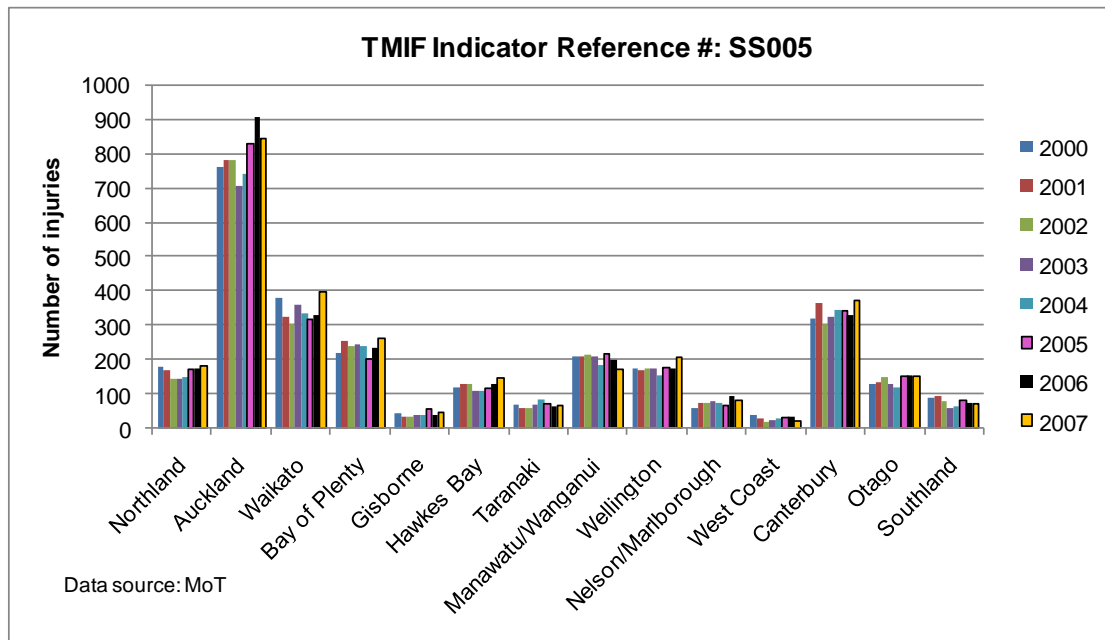
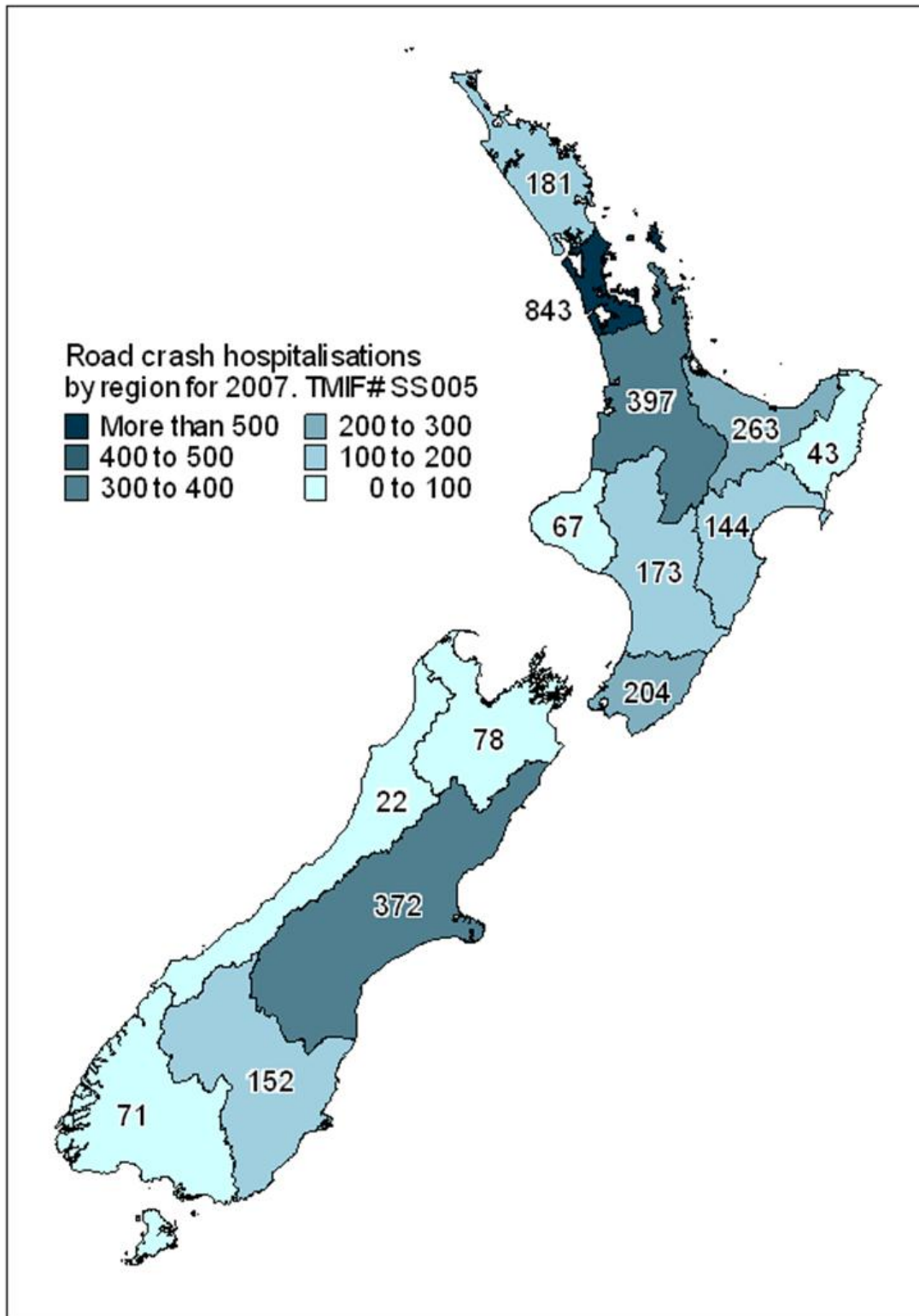


Figure 46: Number of injuries – road (regional)



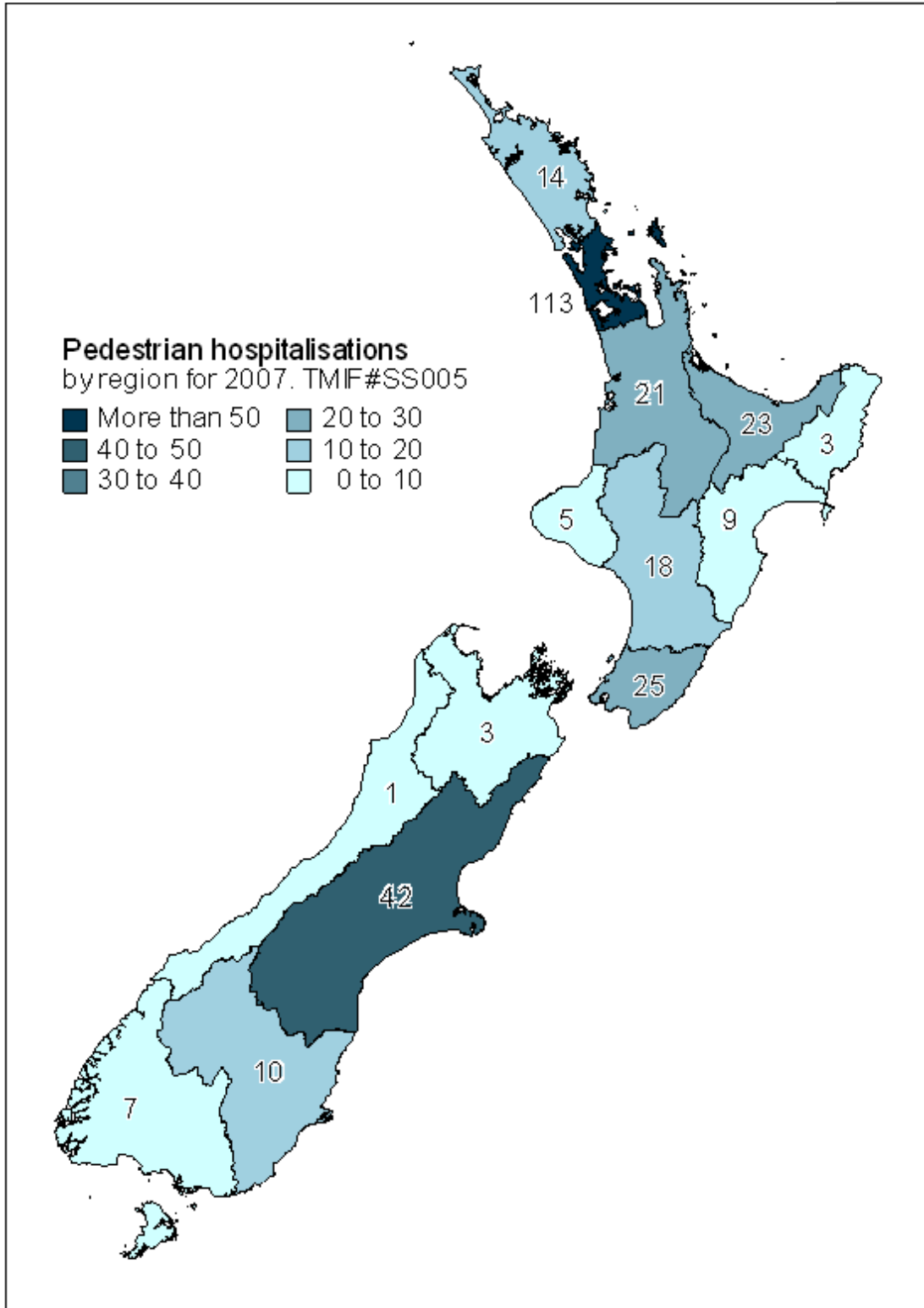
<sup>12</sup> Ministry of Transport

Figure 47: Road accident hospitalisations by region for 2007



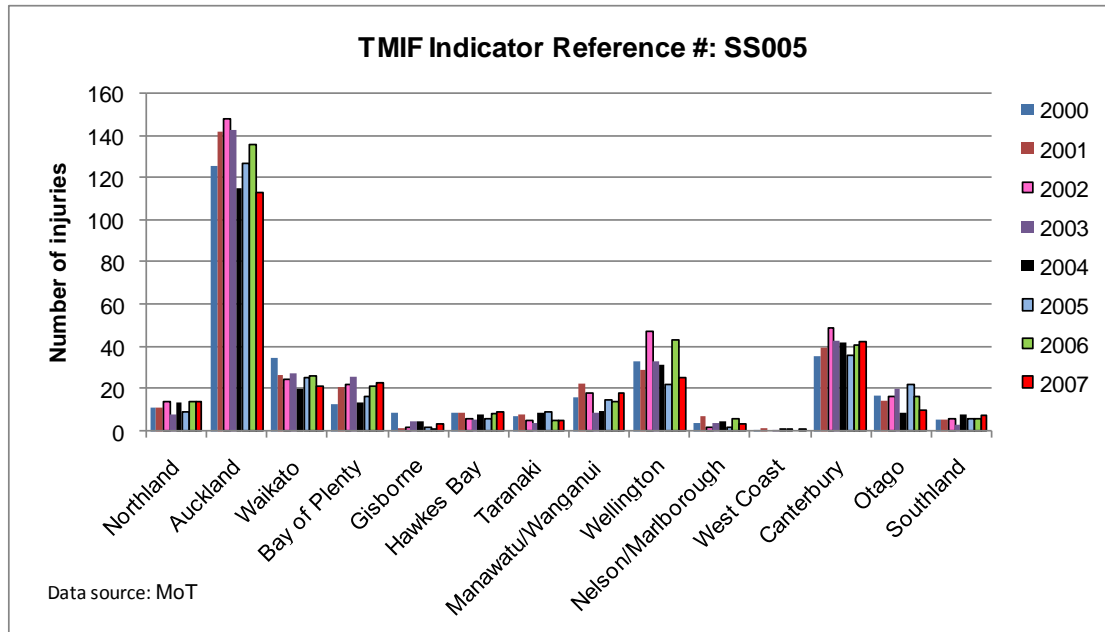
Data source: Ministry of Transport

Figure 48: Pedestrian hospitalisations by region for 2007



Data source: Ministry of Transport

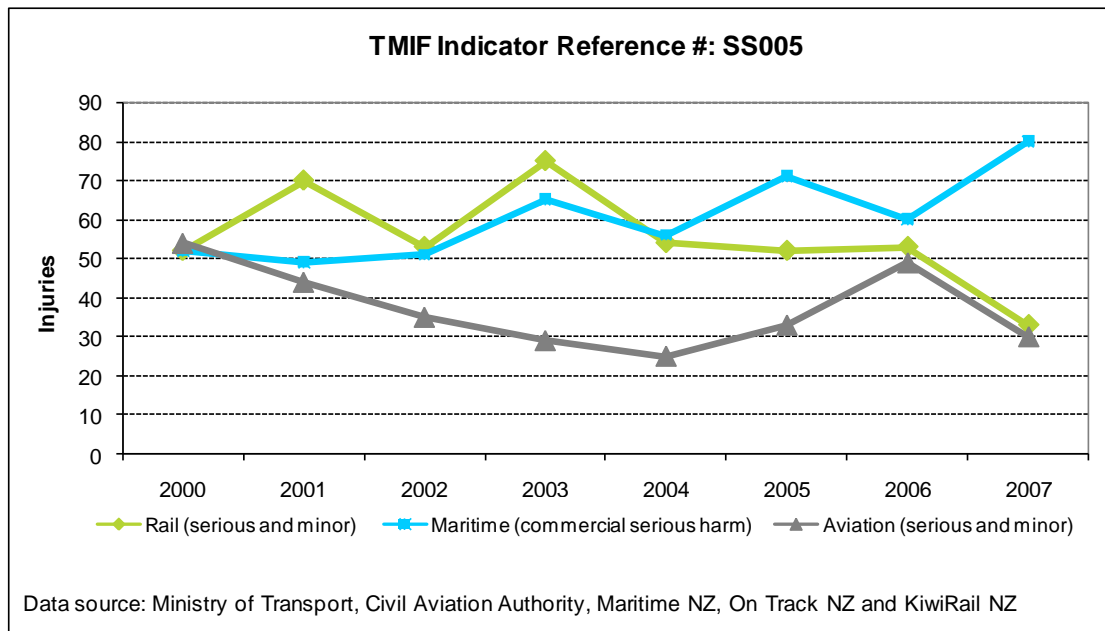
Figure 49: Number of injuries – pedestrian (regional)



Trends for the annual number of pedestrian injuries vary among the regions.

Figure 50 shows the number of non-road injuries reported between 2000 and 2007<sup>13</sup>. Maritime and aviation injuries have been variable while rail injuries have declined.

Figure 50: Number of injuries by mode – rail, aviation and maritime



<sup>13</sup> Note that aviation, maritime and rail differ slightly in their definitions of injury. Aviation contains serious and minor injuries, maritime contains commercial serious harm, and rail contains serious and minor.

Figure 51: Number of injuries – rail (regional)

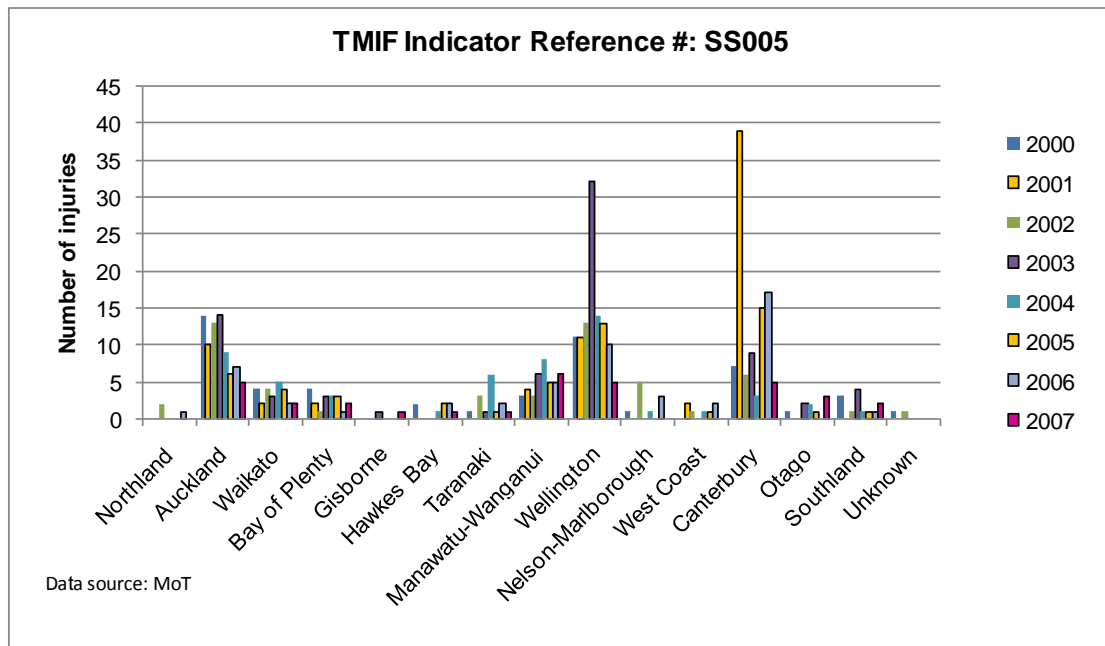


Figure 51 documents regional rail injuries, for which trends vary across the regions. With the exception of Auckland and Wellington, rail injuries by region remain low. Between 2000 and 2007, the number of rail injuries dropped from 14 to 5 in Auckland, and from 11 to 6 in Wellington.

**Social costs**

Road accident injuries include pedal cyclists and pedestrians in collisions with motor vehicles. The total social cost of road injuries (fatal, serious and minor) in 2007 was \$3,730 million<sup>14</sup>; up from the 2000 figure of \$3,652 million. Social costs associated with fatal and serious injuries have decreased since 2000. In contrast, the total social costs of minor injuries have steadily increased. In 2007, the social cost of minor injuries was estimated at \$788 million; up from \$715 million in 2006.

<sup>14</sup> \$ million at June 2007 prices

Figure 52: Social cost of accidents by mode – road<sup>15</sup>

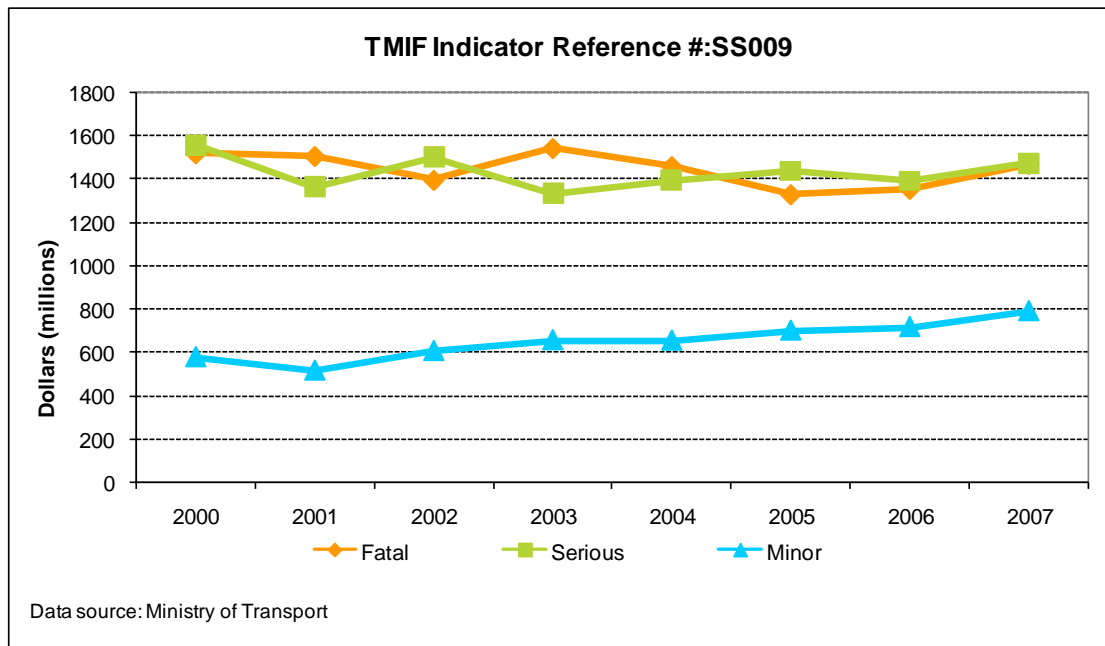
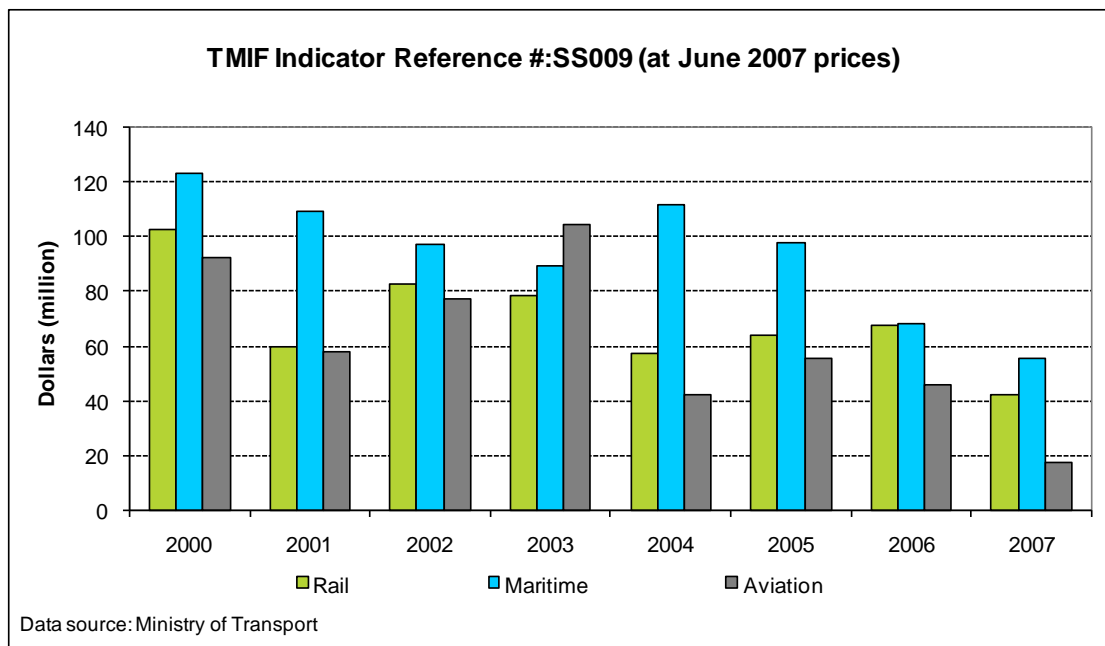


Figure 53: Social cost of accidents by mode – rail, aviation and maritime



The total social cost of maritime injuries was estimated at \$56 million in 2007; down from \$123 million in 2000. The social cost of aviation injuries varied over the same period; it peaked in 2003 at \$104 million and reached a low of \$17 million in 2007. In 2007, the social cost of rail injuries was \$40 million.<sup>16</sup>

<sup>15</sup> Including property damage cost, \$ millions at June 2007 prices

<sup>16</sup> Excluding property damage cost, \$ millions at June 2007 prices

**Table 1: Social cost of accidents by mode – road (regional)****TMIF Indicator Reference #: SS009**

	2005	2006	2007
	(Millions \$)		
Northland	218	245	250
Auckland	693	771	624
Waikato	540	469	578
Bay of Plenty	231	281	299
Gisborne	64	53	67
Hawke's Bay	194	179	197
Taranaki	81	102	105
Manawatu/Wanganui	259	257	286
Wellington	248	291	290
Nelson/Marlborough	92	111	109
West Coast	50	47	54
Canterbury	436	397	532
Otago	241	219	228
Southland	123	142	119
All NZ	3,472	3,564	3,739

Data source: Ministry of Transport

**Contributing factors**

The amount that people travel, the speeds at which they travel, the incidence of drinking while driving, and the wearing of restraints all have an impact on accident rates and accident severity. At present there is reliable data only for vehicle-kilometres travelled (VKT) on roads. VKT by all vehicle types increased by 12% during the period 2001-07<sup>17</sup>. Estimated yearly distances travelled by bus passengers increased progressively over the six years after 1999/00. In 2005/06, passengers travelled an estimated distance of 3.8 billion kilometres; an increase of almost one-third over the total kilometres travelled in 1999/00<sup>18</sup>.

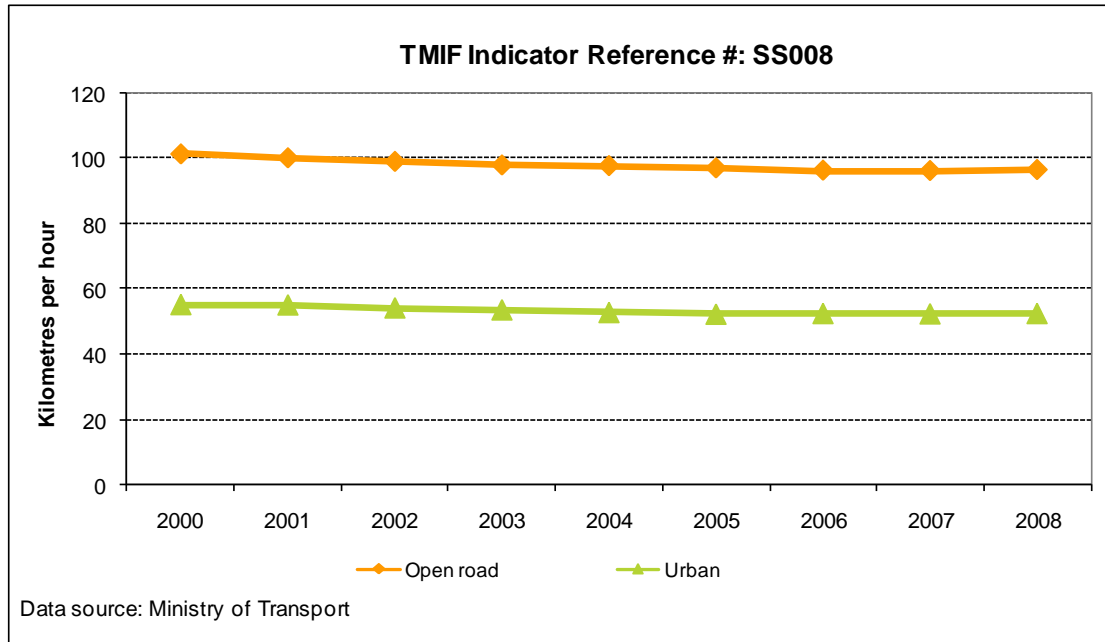
During the seven years since 2000, the mean speed of unimpeded vehicles has slightly decreased<sup>19</sup>. In 2007, the mean speed travelled on the open road was estimated at 96.3 km/h; down from 101.4 km/h in 2000 (and down from 97.2 km/h in 2005). The mean speed travelled in urban areas was reported as 53.5 km/h which is slightly down from 55.3 km/h in 2000.

<sup>17</sup> VKT increased by 2.6% in 2007 relative to the previous year – an in-depth discussion about VKT is provided in the section discussing environmental sustainability.

<sup>18</sup> Ministry of Transport, 2008.

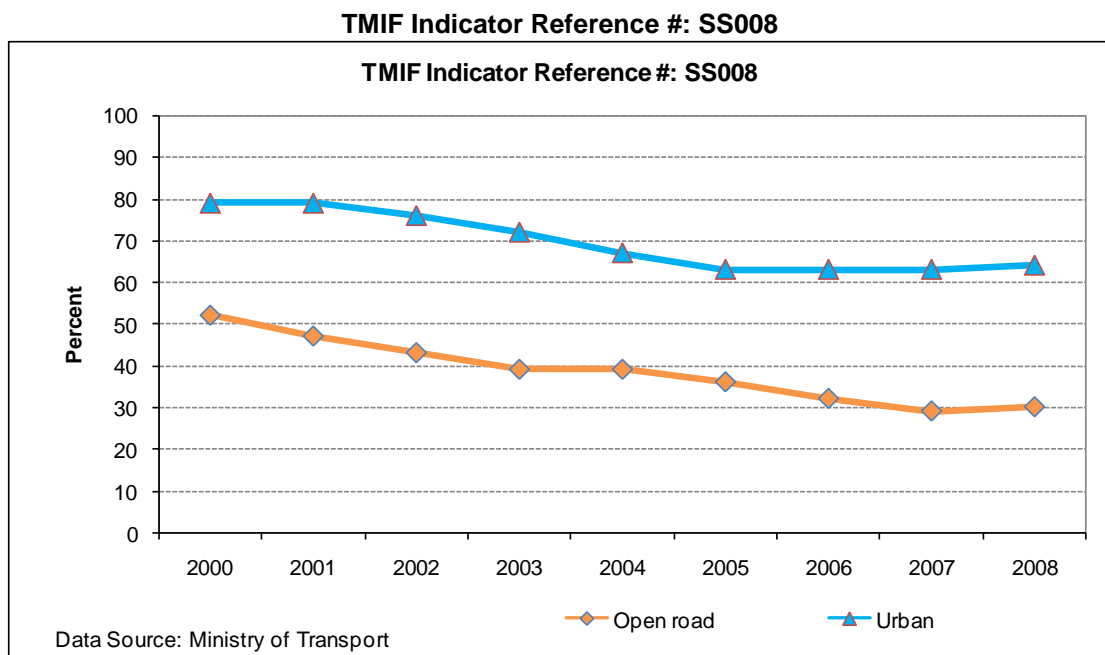
<sup>19</sup> Ministry of Transport, 2008.

Figure 54: Mean unimpeded speed on urban and open roads



The percentage of drivers travelling over the speed limit on open roads and in urban areas continued to decline during the seven years from 2000<sup>20</sup>. Moreover, drivers in urban areas were more likely to exceed the speed limit than those driving on open roads. In 2008, 30% of drivers on open roads exceeded the 100 km/h speed limit; a 22% decrease compared to 2000. In urban areas, 53% of drivers exceeded the speed limit; down from 79% in 2000.

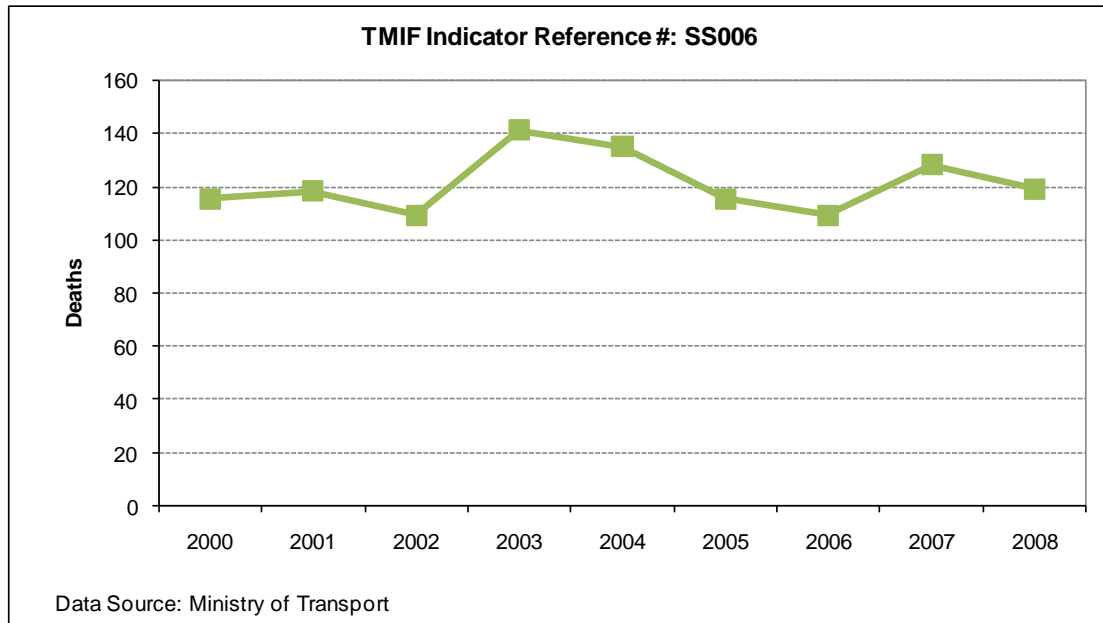
Figure 55: Proportion of drivers travelling over the designated speed limit



<sup>20</sup> Ministry of Transport

In 2008, there was a decrease in the number of alcohol-related road accidents, compared with 2007.

**Figure 56: Number of deaths with alcohol as a contributing factor**



**Table 2: Number of deaths with alcohol as a contributing factor (regional)**

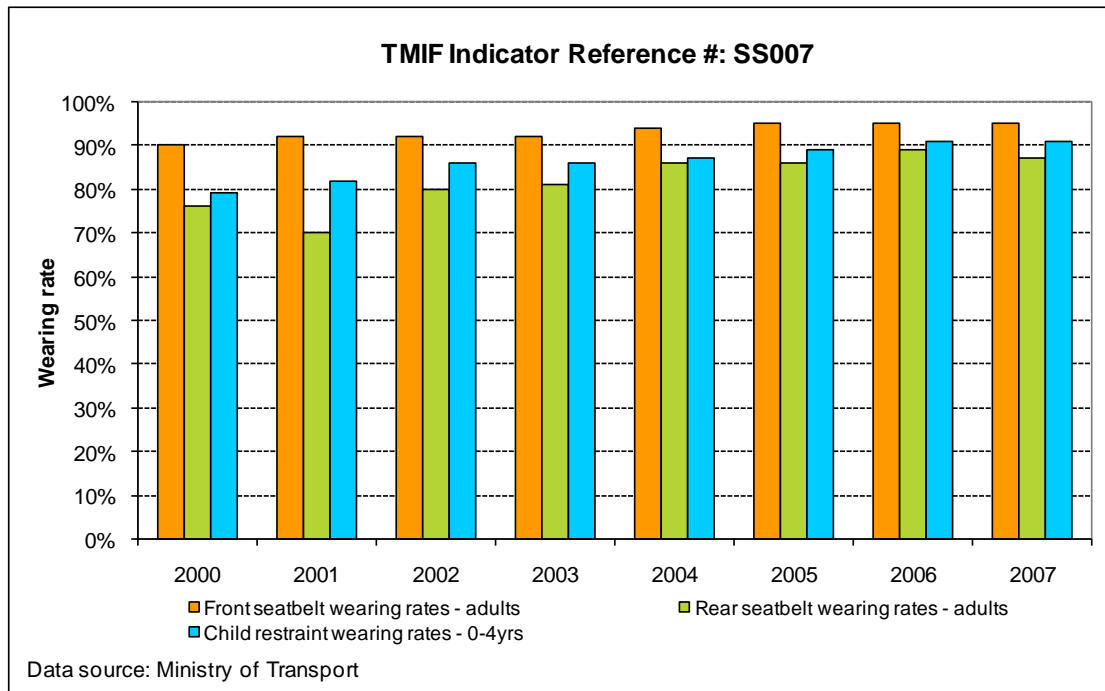
**TMIF Indicator Reference #: SS006**

	2005	2006	2007
Northland	6	8	9
Auckland	24	25	16
Waikato	28	22	29
Bay of Plenty	11	8	11
Gisborne	8	1	3
Hawke's Bay	9	4	11
Taranaki	3	4	4
Manawatu/Wanganui	8	10	7
Wellington	4	8	5
Nelson/Marlborough	3	4	2
West Coast	1	2	2
Canterbury	7	4	19
Otago	3	8	8
Southland	1	1	2
All NZ	<b>116</b>	<b>109</b>	<b>128</b>

Data source: Ministry of Transport

Ninety-five percent of adults wore front seatbelts in 2007, compared to 90% in 2000. Figure 57 also shows that the proportion of adults wearing seatbelts in the front seat averaged 95%; 8% more than those who wore rear seatbelts. Ninety-one percent of children aged up to four wore approved child restraints in 2007; the same proportion as in 2006 and 12% more than in 2000.

Figure 57: Front and rear seatbelt and child restraint wearing rates

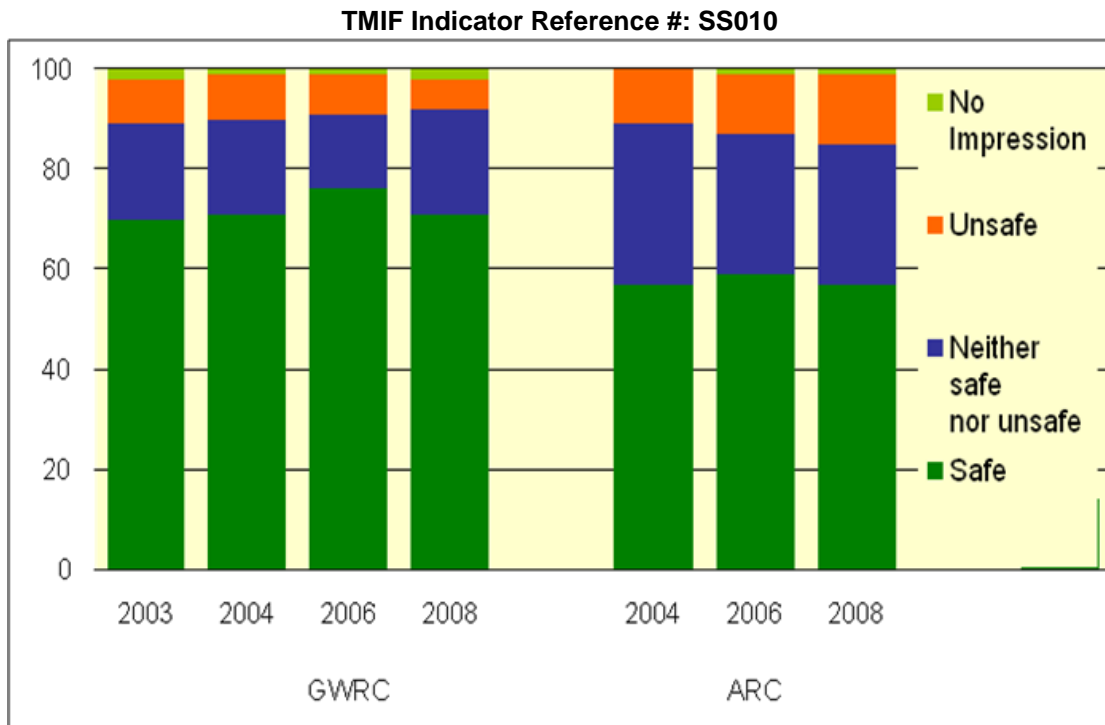


## Security

A reduction in the number of deaths and serious injuries arising from road, rail, maritime and aviation transport will enable users to feel safe and secure. Personal security is a particular issue for users of public transport and walking and cycling networks. The fear of harassment, attack or theft may deter people from using public transport, or from walking or cycling.

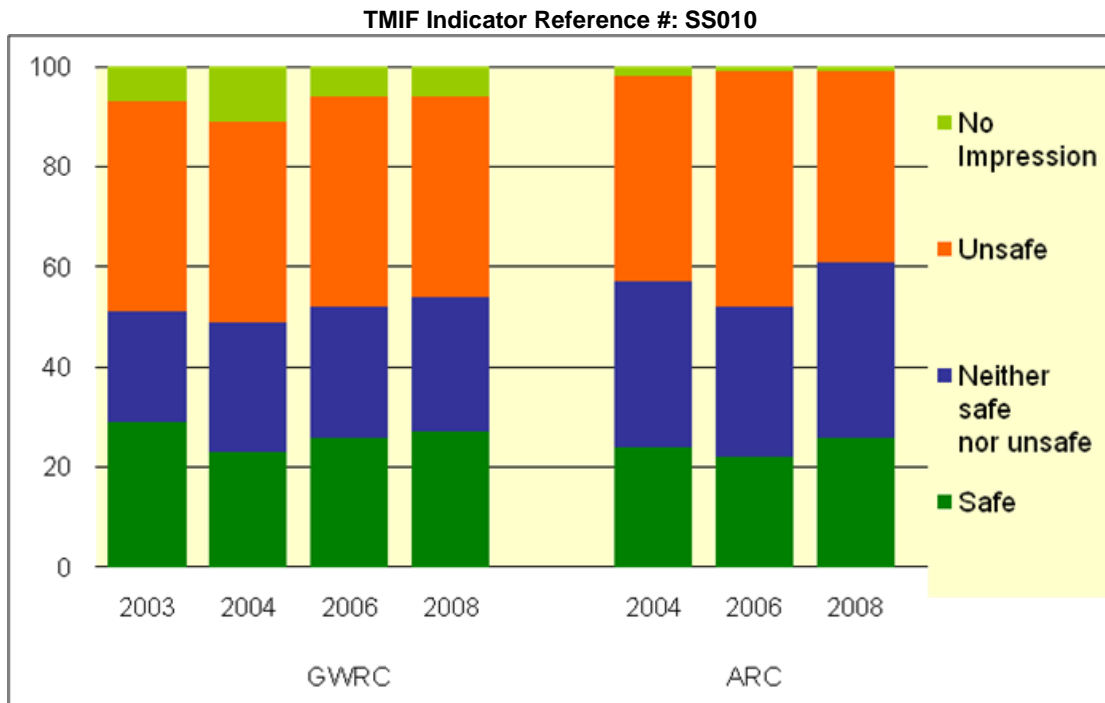
In 2008, 71% of respondents in Wellington said they felt safe while walking, compared to 76% and 71% respectively in 2006 and 2004. This compared favourably to Auckland where 57% and 59% of respondents respectively shared the same perception in 2008 and 2006.

Figure 58: Perception of pedestrian safety



Data source: Greater Wellington Regional Council, Auckland Regional Council

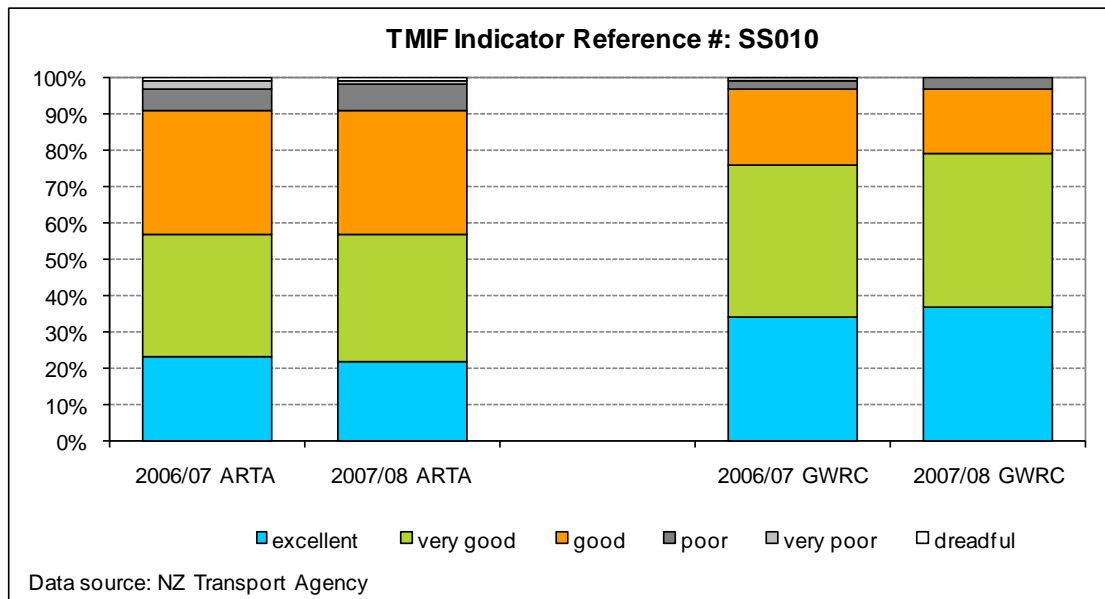
Figure 59: Perception of cyclist safety



Data source: Greater Wellington Regional Council, Auckland Regional Council

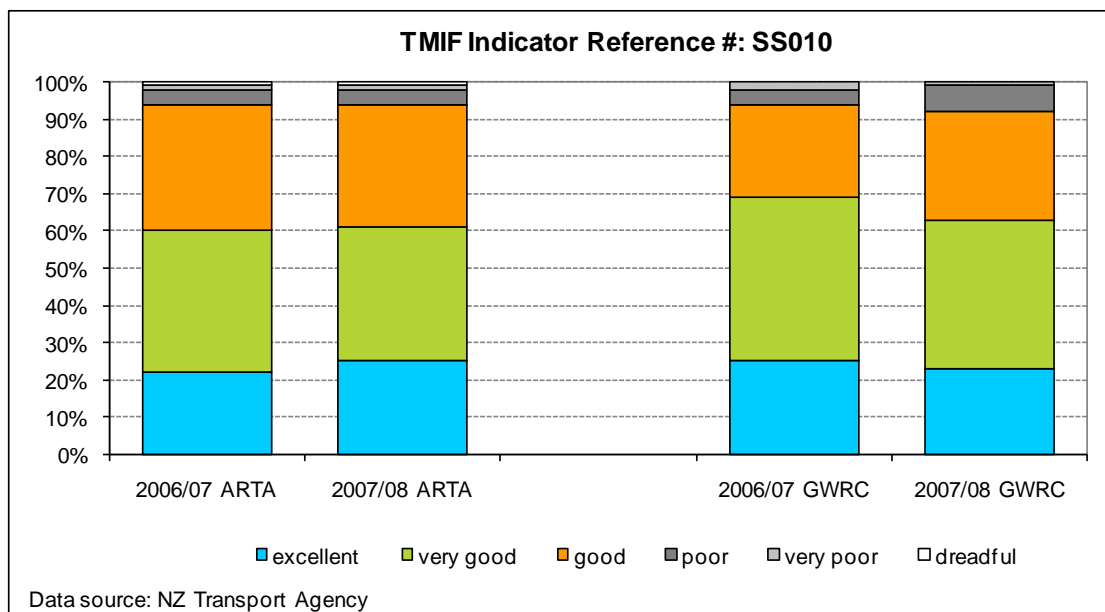
In 2008, 27% of respondents in Wellington said people felt safe while cycling compared to 26% and 23% respectively in 2006 and 2004. In Auckland, 26% of respondents shared the same perception (down from 22% in 2006).

**Figure 60: Passenger rating of bus service safety and security**



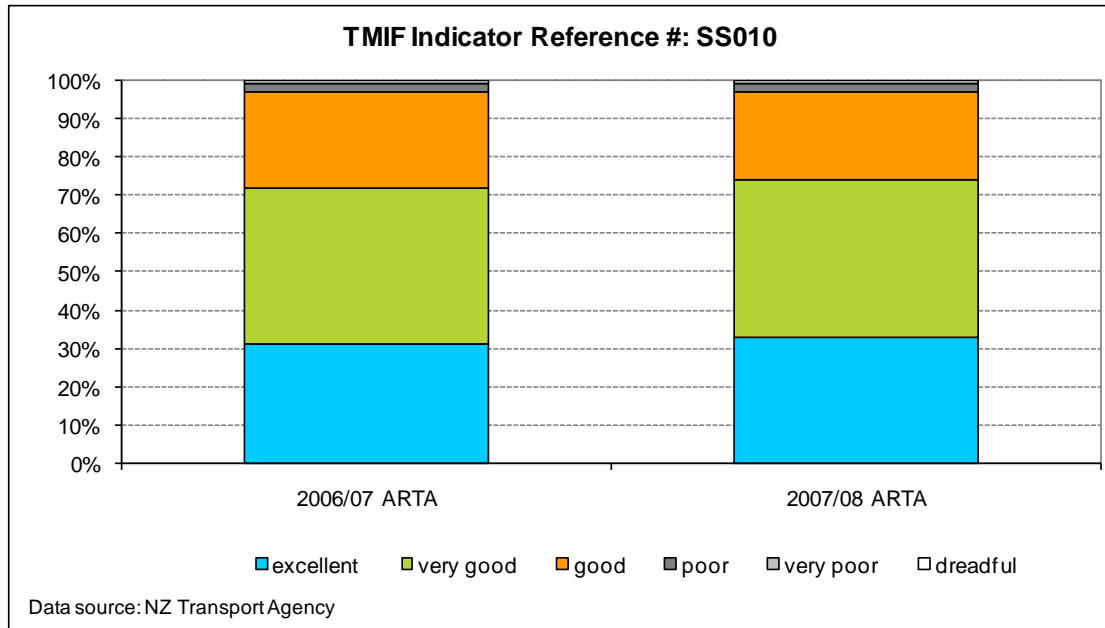
Over 90% of respondents in the Wellington and Auckland regions rated bus service safety and security during their trips in the period 2007/2008 as at least 'good'. A larger proportion of Wellington respondents rated bus safety and security as either 'very good' or 'excellent', than did respondents in Auckland.

**Figure 61: Passenger rating of train safety and security**



Ninety-four percent of respondents in the Auckland region and 92% in the Wellington region rated train service safety and security as either 'good' or better for the period 2007/08.

**Figure 62: Passenger rating of safety and security of ferry services**



Ninety-seven percent of respondents in Auckland rated ferry service safety and security during the trip as at least 'good' for the period 2007/08.

In addition to personal security, security also encompasses the protection of the transport system and the safety of its users from acts of terrorism. The primary focus of transport security has been on aviation and maritime transport, and work is now commencing on land transport security.

The New Zealand transport system is vulnerable to disruptions by major events such as natural disasters (including the effects of climate change, earthquakes and volcanic eruptions), acts of crime or terrorism, and external changes in the environment such as technological developments and variations in the global economy. The ability to recover quickly and effectively from such adverse events requires a resilient transport sector.

A recent example of a natural disaster having a negative effect on the transport system was the collapse of the Mitimiti Bridge on State Highway 1 as a result of intense rain and damaging winds on Waitangi Day, 2007. The road network in Northland is limited because of its low-density population. The Mitimiti Bridge connects several isolated Northland communities to the rest of the North Island. As a result of the collapse, these communities were completely cut off from the rest of the road network. However, within 48 hours a temporary stone crossing connected the bridge and allowed State Highway 1 to re-open.



## Chapter three: Access and mobility



## Chapter 3: Access and mobility

Providing access is vital to the part people play in our economy and society. It is also crucial to their health and well-being. People need access to education and information, employment and recreational opportunities, healthy food and good health care, as well as access to friends and family.

There is a need for measures that recognise that access is influenced or supported not only by transport provision. Transport is a way of assisting access in the context of the physical, economic and political environments. The location of community services (ie, schools, shops, parks, medical facilities) and their operating times also significantly influence accessibility. Services that assist access can also include communication technologies that allow social interaction, distance learning and e-commerce. The development of performance indicators to measure accessibility is currently underway. Most of the indicators within the TMIF indicator sets that relate to this chapter provide a measure of mobility.

### Key findings:

- Vehicle ownership per capita has increased, with a corresponding growth in vehicle kilometres travelled (VKT) per capita. These changes illustrate that mobility is increasing.
- However, in main urban areas<sup>21</sup> total VKT per person aged 15 and over has increased only marginally.
- A slight increase in urban road infrastructure suggests a potential increase in the level of mobility for New Zealanders.
- Although total road-based travel distance has increased, there has been a shift away from active modes, such as walking and cycling, towards greater car use.
- There has been growth in New Zealanders' use of public transport. People generally perceive public transport as value for money, reliable, frequent and available <sup>22</sup>.
- More people are flying in and out of New Zealand. This indicates that access and mobility to international destinations by aeroplane is expanding.

Overall, although there are indications that mobility has increased, there is not enough information available to conclude that accessibility has also increased.

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<sup>21</sup> Main urban areas are population centres of 30,000 or more, Statistics New Zealand.

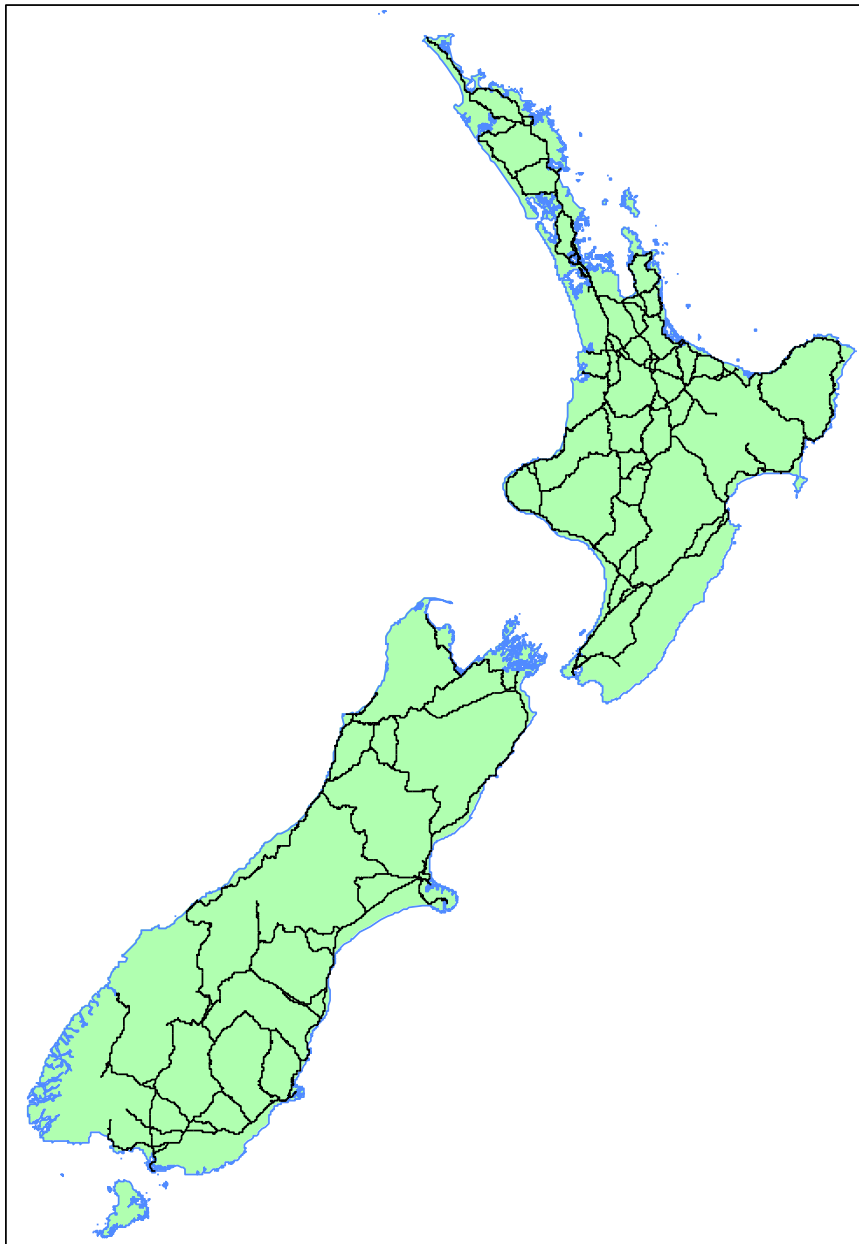
<sup>22</sup> In the regions of Auckland, Wellington and Canterbury 2006/07

### Transport infrastructure – size and state

Infrastructure is a factor in all levels of mobility. The length of the networks for roads, rail, cycle paths and footpaths (and whether it is a complete, fully integrated network) can inform us about the level of mobility that is possible to achieve through infrastructure availability.

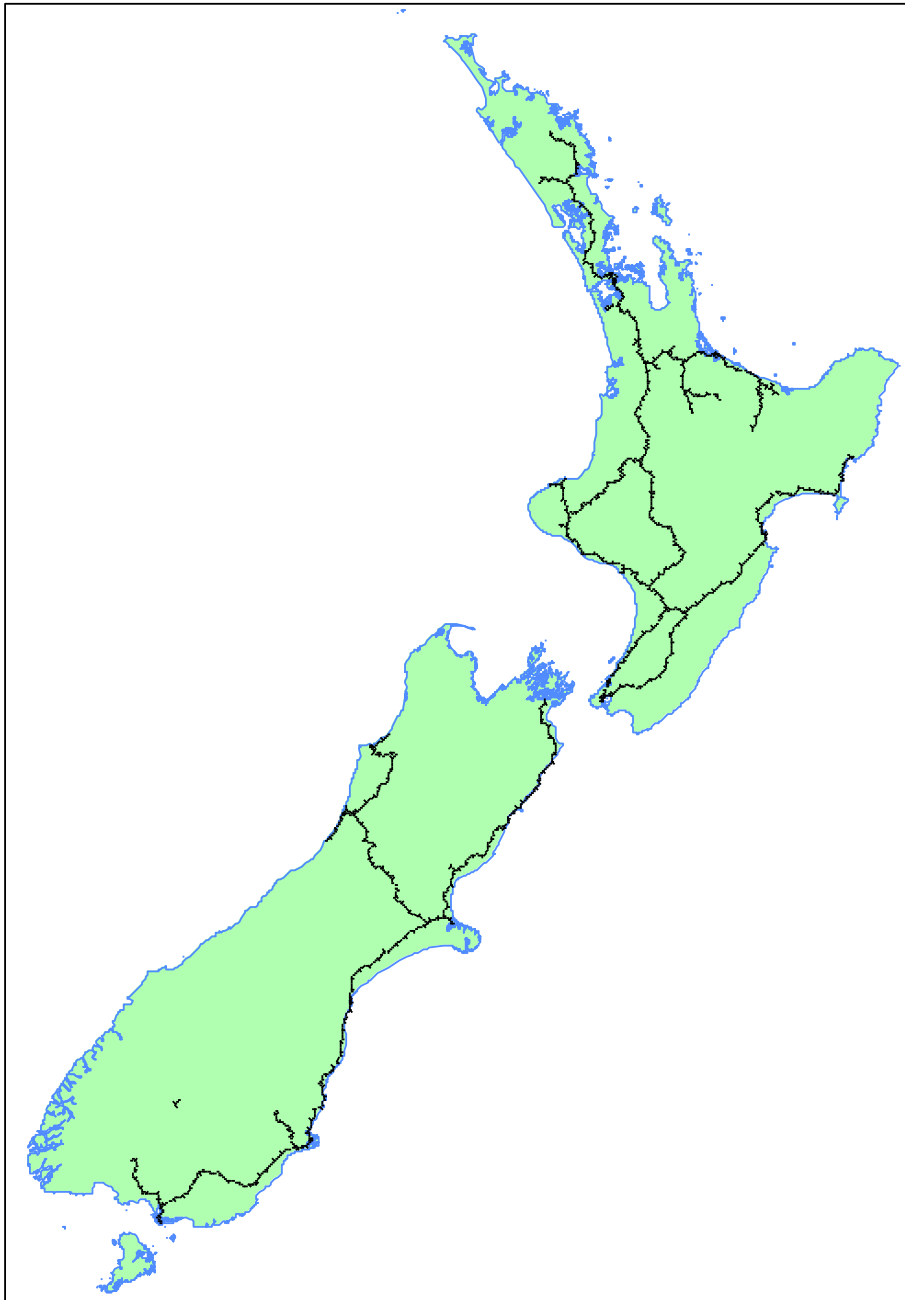
The length of New Zealand roads increased marginally between 2001 and 2008. The length of New Zealand's roads is further discussed in Chapter One: Transport and the Economy.

**Figure 63: State highway coverage**



Data source: Critchlow Ltd

Figure 64: Rail network coverage – both freight and passenger



Data source: Critchlow Ltd

Figure 65: Road VKT (vehicle kilometres travelled)

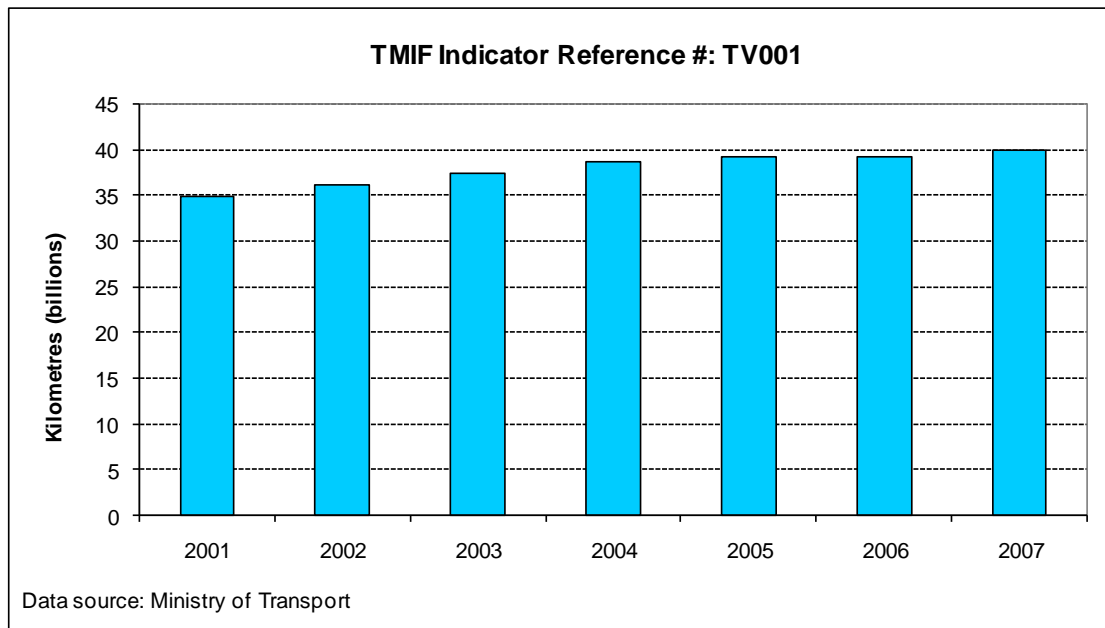
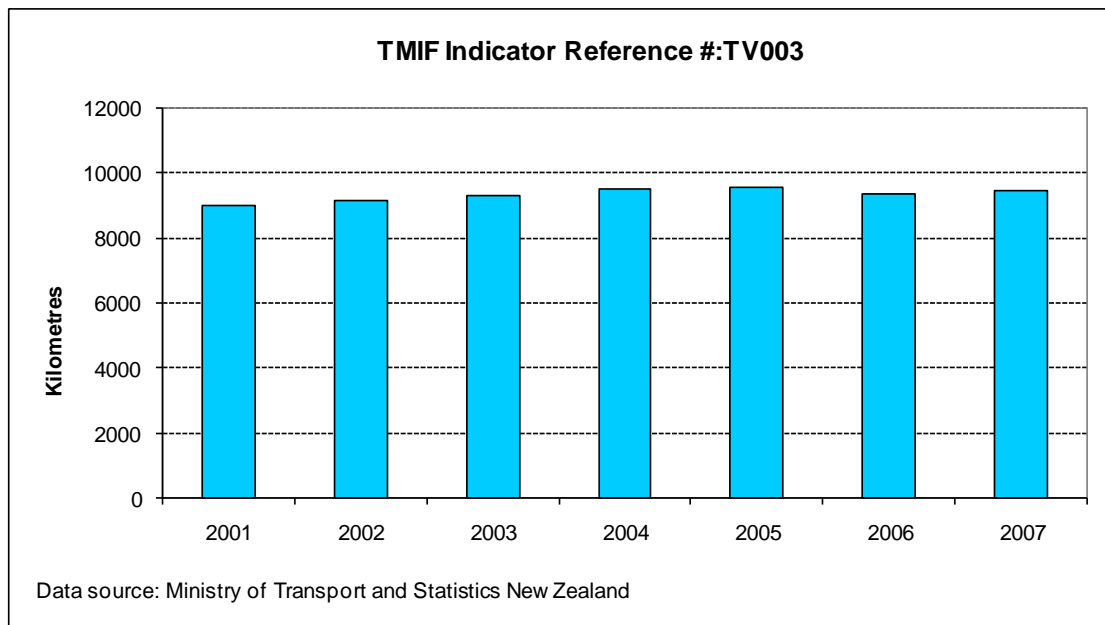
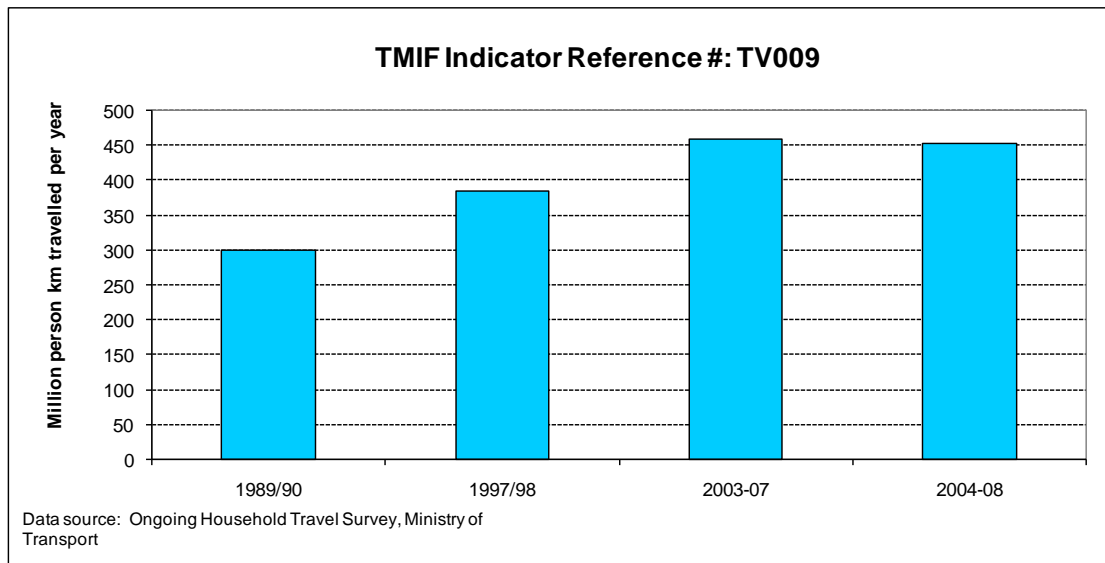


Figure 66: Road VKT per capita



This infrastructure has supported an increase in total road VKT by over 11%, and an increase in VKT per capita of 3% during the same time period.

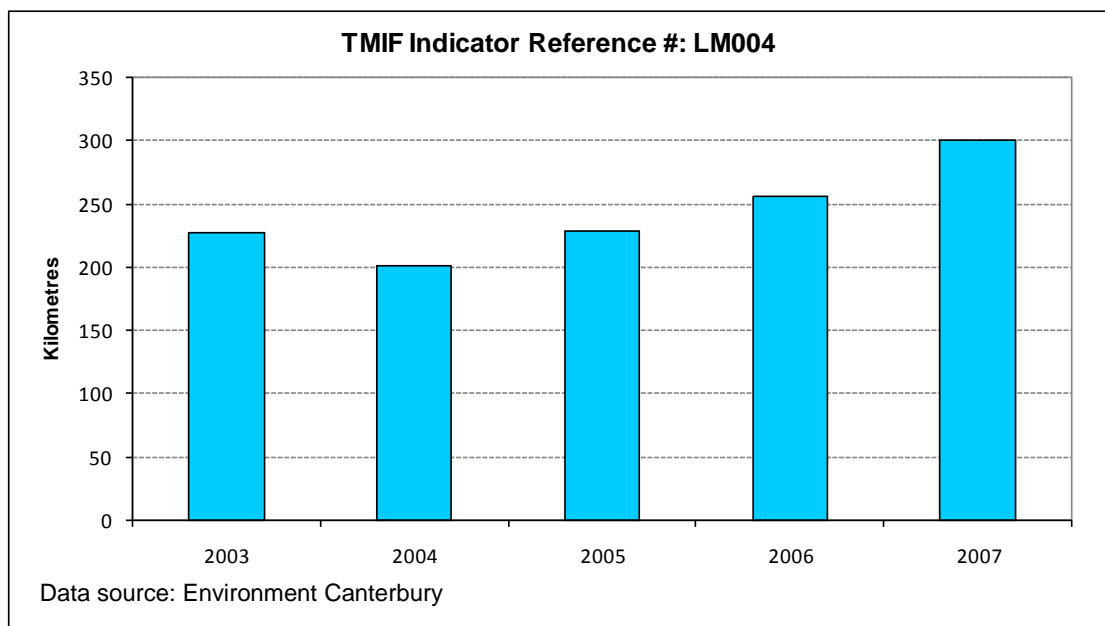
**Figure 67: Total person kilometres travelled (aged over five years)**



In line with increasing VKT, the total kilometres travelled by persons over five years old has also risen. Between 1989/90 and 2004-08, the total person-km travelled increased from 299 to 452 million kilometres per year.

There is a lack of national data on the length of cycle paths in New Zealand. Some data is available for Canterbury, where the total length of cycle paths has increased by approximately 30% since 2003. In 2007, the total length of all cycle paths in Canterbury was approximately 301 kilometres. The measure of the length of the cycle paths does not provide information about the completeness of the network. A quality measure of the cycle path network needs to be developed.

**Figure 68: Length of cycle paths**

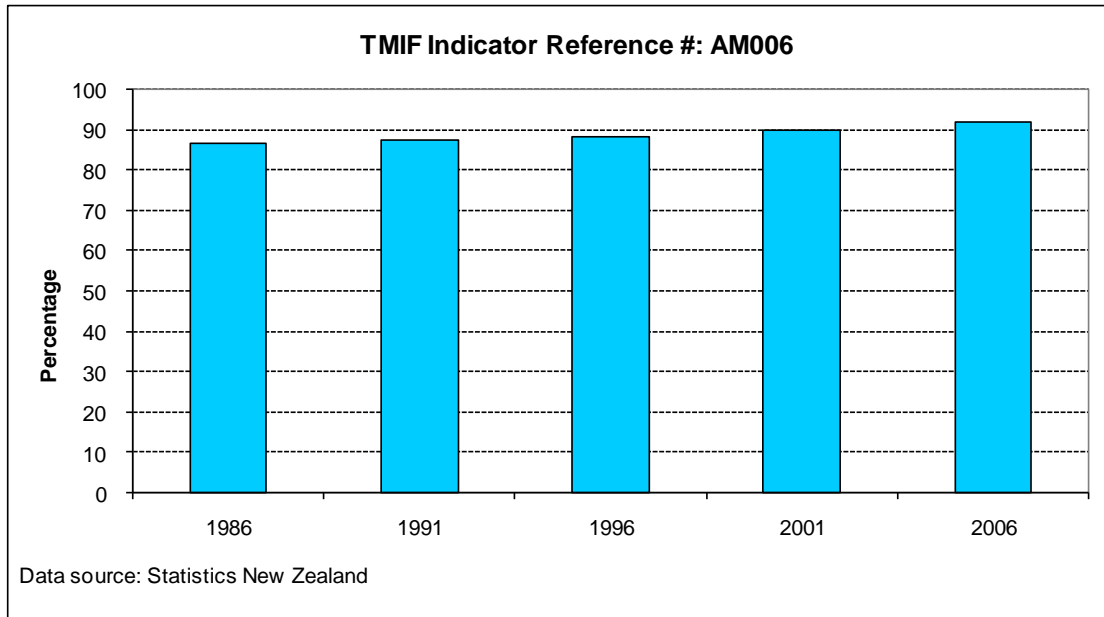


There are no data available about the length and quality of the New Zealand foot-path network.

### Access to a motor vehicle or bicycle

Having access to a motor vehicle or bicycle (in working order) increases mobility in those two modes. The proportion of households with access to at least one motor vehicle has increased marginally since 1986. Not only do more households have access to a vehicle, but more households also have access to several vehicles. Correspondingly, vehicle ownership per person has increased, resulting in greater mobility. This is reflected in the increase in VKT.

**Figure 69: Percentage of households with access to a motor vehicle**



**Figure 70: Number of households with access to a motor vehicle**

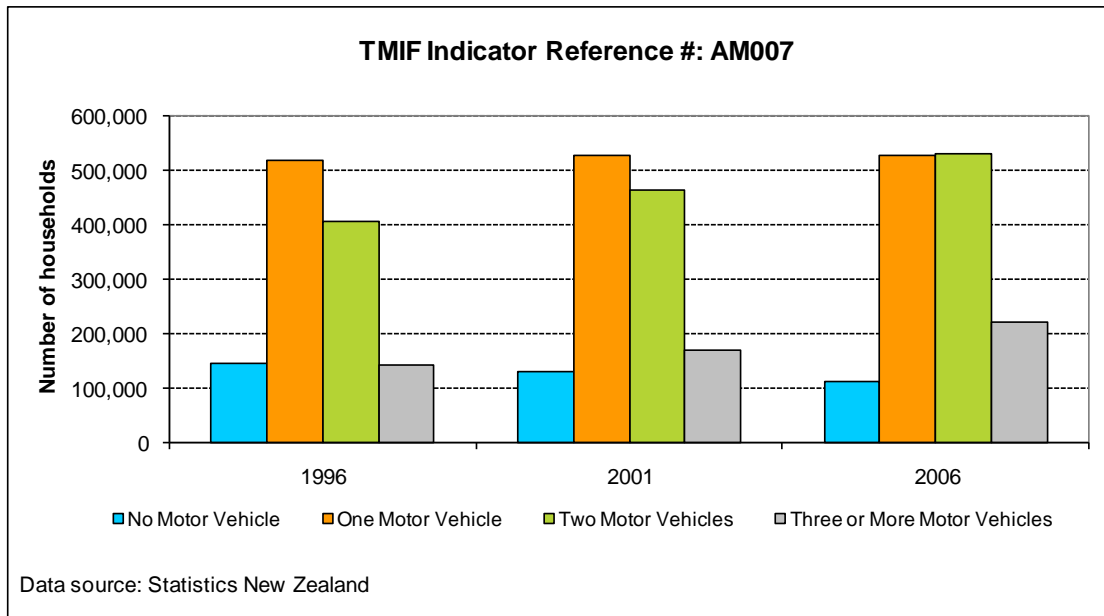
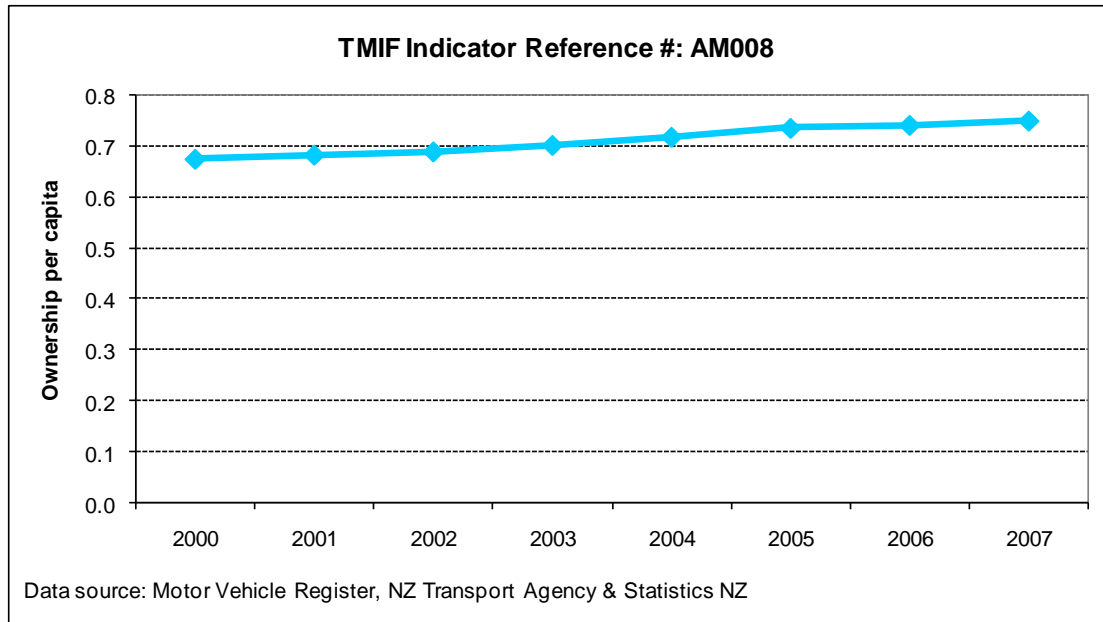


Figure 71: Vehicle ownership per capita



In the New Zealand Ongoing Household Travel Survey (2004-08), 43% of New Zealand households reported owning at least one bicycle in working order.

This is monitored in the **TMIF Indicator Reference #: AM009**. (Data source: Ministry of Transport)

## Travel

The amount that people travel shows the level of mobility experienced in New Zealand. The way people travel can indicate the degree of transport choice they have and therefore the level of access and mobility they experience.

Public transport passenger boardings have increased by over 30% since 2000/01. In 2004-2008, public transport mode share is reported to be 1.8% of all trip legs.

- This data is monitored in the TMIF Indicator Reference #: TB003. (Data source: Ministry of Transport)

**Table 3: The ratio of public transport legs to driver trip legs**

1998/90	1997/98	2004-2008
1:18	1:21	1:20

TMIF Indicator Reference #: TB004/ Data source: Ministry of Transport

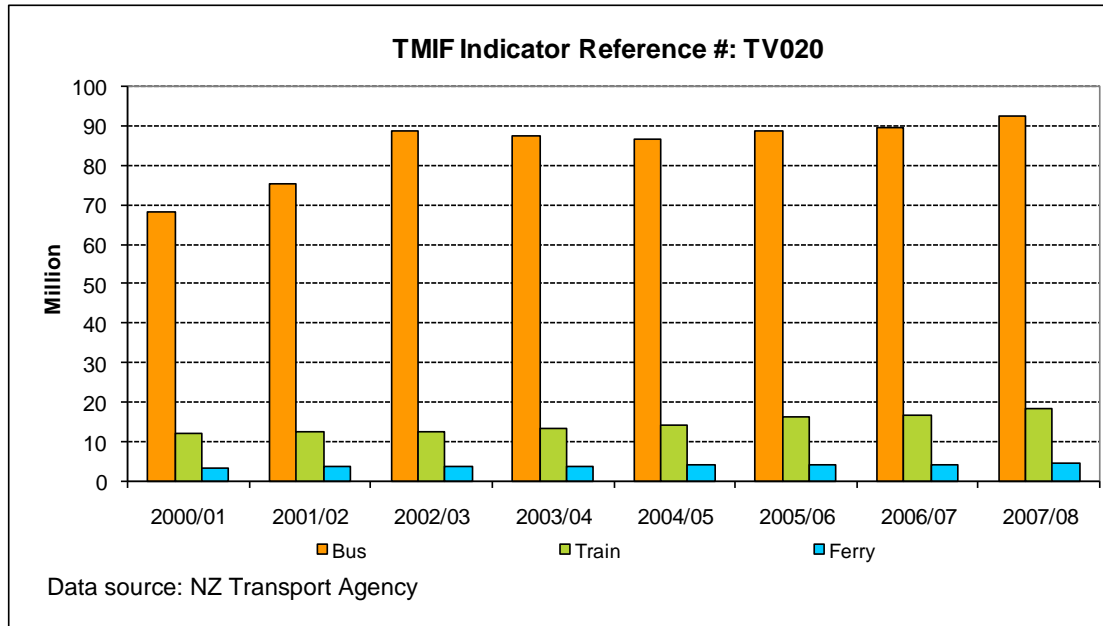
**Table 4: Percentage of population living within 500 metres of a bus route**

### TMIF Indicator Reference #: AM015

Authority	Target community	2005/06	2006/07	2007/08
Auckland Regional Transport Authority	Auckland	77.7	97	80
Environment Bay of Plenty	Rotorua	91	91	91
	Tauranga	83.6	84	85
Environment Canterbury	Canterbury	95	78.5	95
Environment Waikato	Waikato	49	49	49
Gisborne District Council	Gisborne		92	85
Greater Wellington	Greater Wellington	89.6	90	91.5
Hawke's Bay Regional Council	Napier-Hastings	90	90	75
Invercargill City Council	Invercargill	95	95	100
Marlborough District Council	Blenheim	90	90	15
Nelson City Council	Nelson	30	30	30
Northland Regional Council	Whangarei	30	40	25
Otago Regional Council	Dunedin	95	95	97
Taranaki Regional Council	New Plymouth	95	95	95
Horizons	Manawatu-Wanganui	85	-	
New Plymouth, Bell Block, Waitara and Oakura (08),				84
Inglewood, New Plymouth				93
Waverly, Patea, Hawera				90
Opunake, Eltham, Hawera				93
Opunake- New Plymouth				93

Data source: NZ Transport Agency

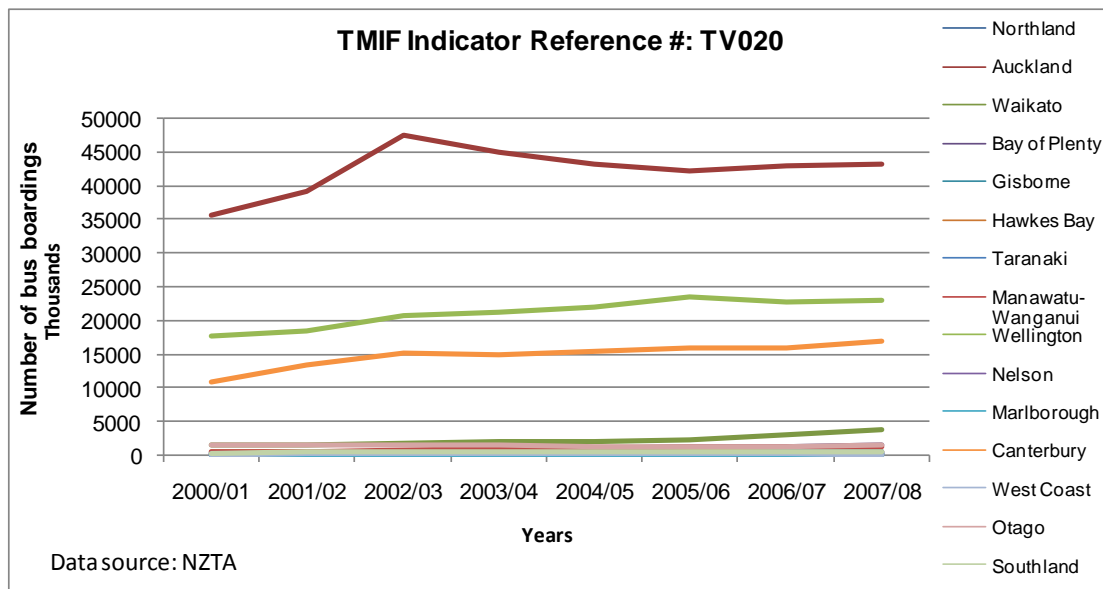
Figure 72: Total public transport boardings



Between 2000/01 and 2007/08, the total number of public transport boardings increased by 37%, from 84.08 million to 115.32 million.

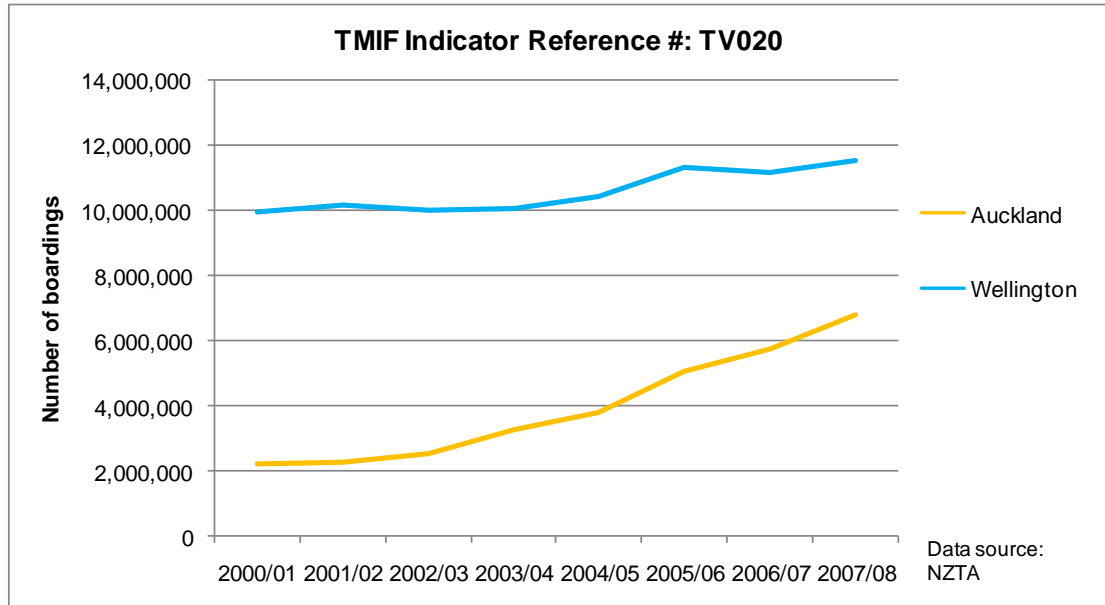
The following are regional graphs for public transport boardings:

Figure 73: Bus passenger boardings



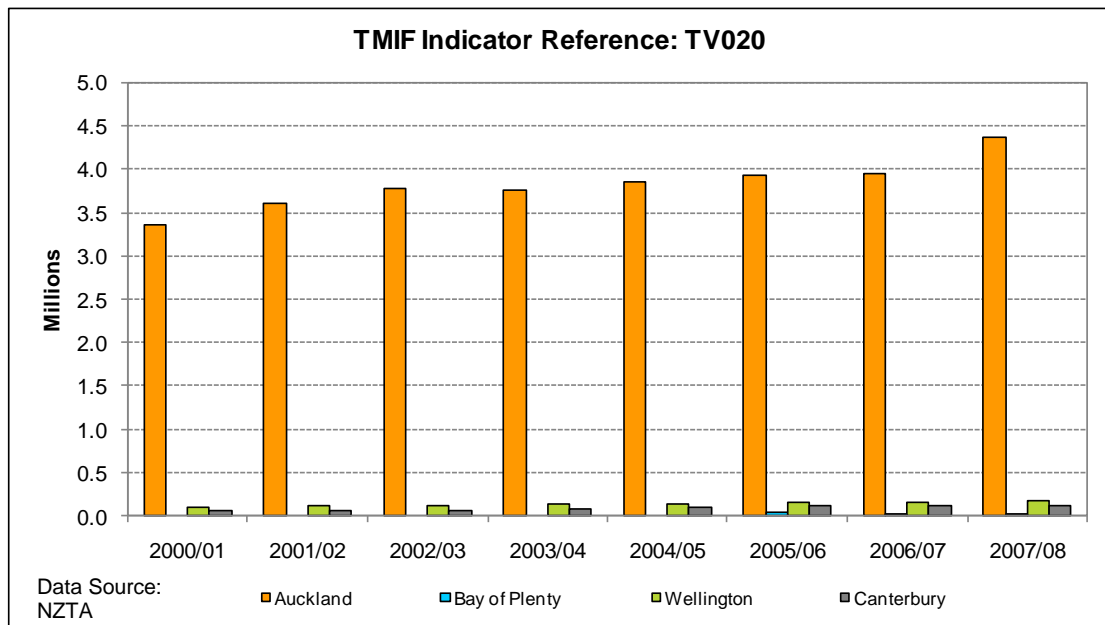
As a general trend, bus passenger boardings increased at a high rate between 2000/01 to 2002/03, but increased less rapidly in the years 2003/04 to 2007/08.

Figure 74: Train passenger boardings



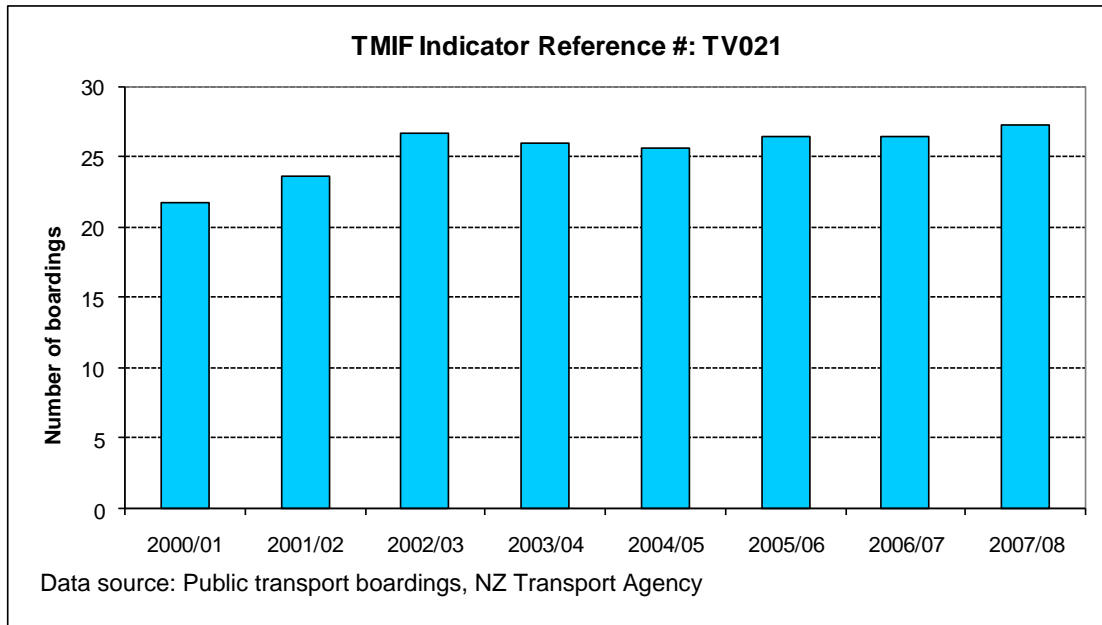
Auckland train passenger boardings have grown steadily, rising from 2.2 million in 2000/01 to 6.8 million in 2007/08. Wellington train boardings have also increased, particularly between the period 2004/05 and 2007/08. During this period the number of Wellington train boardings rose by 16%.

Figure 75: Ferry passenger boardings



Ferry passenger boardings increased in all areas, except the Bay of Plenty. In the period 2000/01 to 2007/08, Auckland ferry passenger boardings increased from 3.4 million to 4.4 million, Wellington ferry passenger boardings increased from 97 thousand to 177 thousand, and Canterbury ferry passenger boardings increased from 53 thousand to 121 thousand.

Figure 76: Total public transport boardings per capita



Figures 77, 78 and 79 all show a similar trend. The number of arrivals, departures and international flights increased between 2005 and 2007, and in the last year it reduced.

Figure 77: Number of short-term international arrivals and departures by air: New Zealand residents

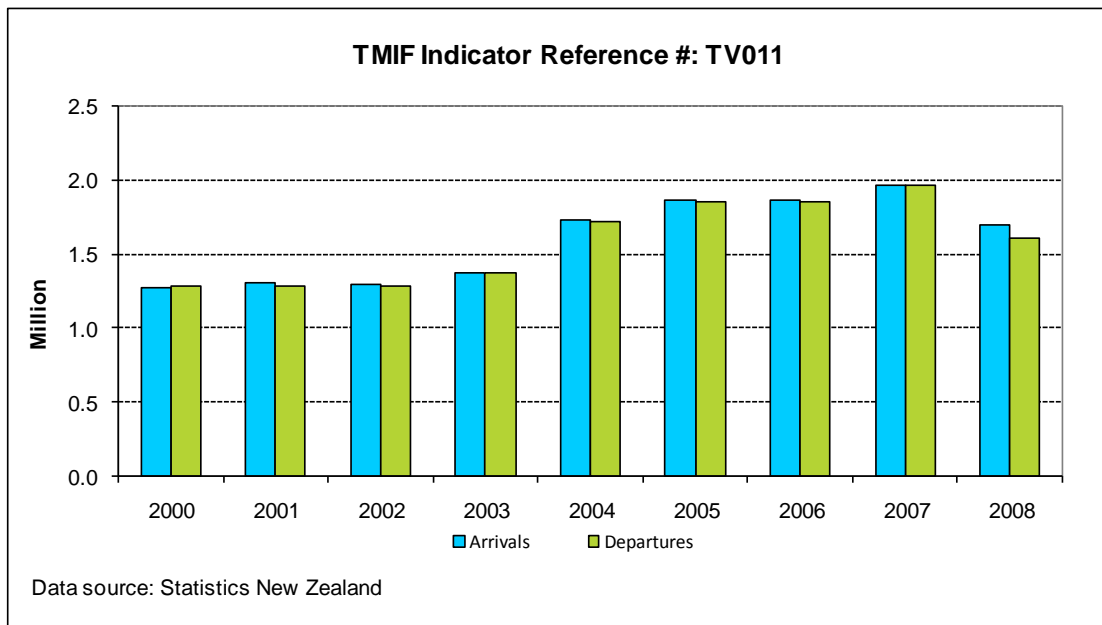


Figure 78: Number of short-term international arrivals and departures by air: overseas visitors

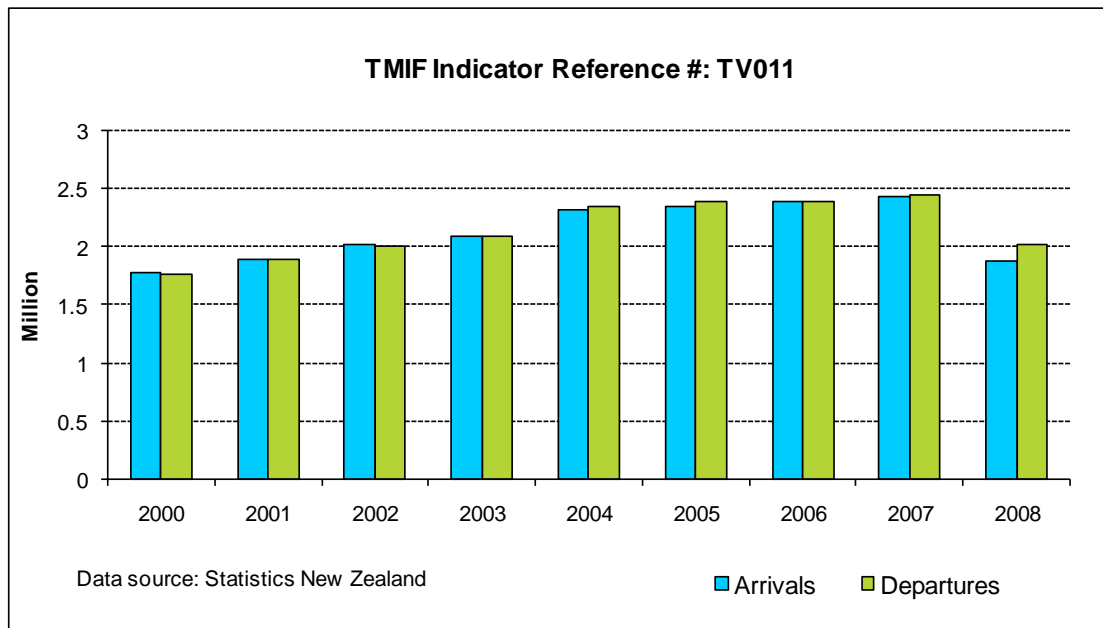
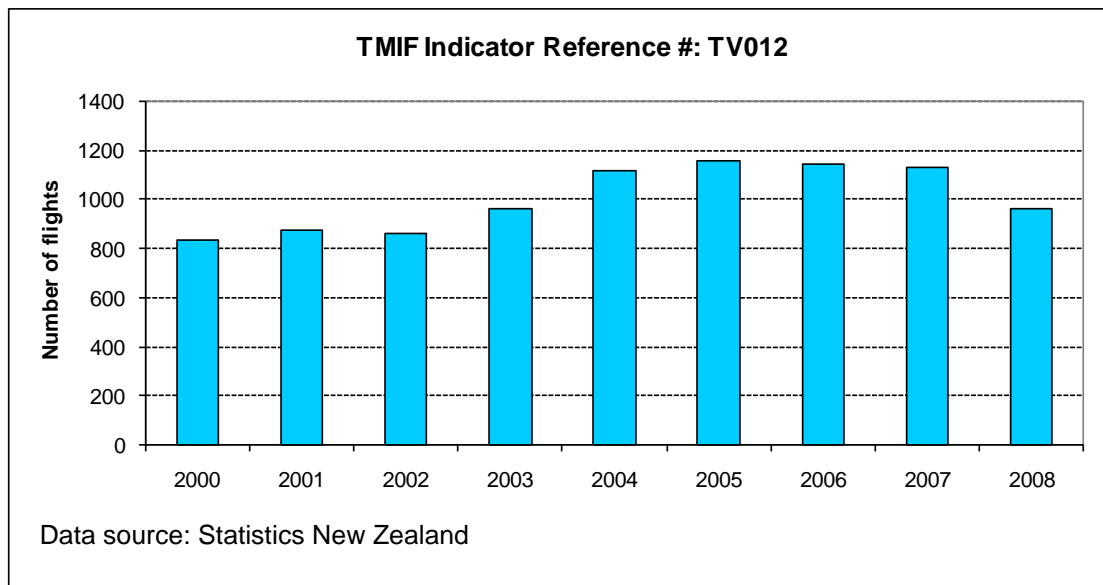


Figure 79: Number of international flights per week



In 2000/01, there were 840 international flights, on average, each week. This figure increased to 962 in 2008. The international airports are Auckland, Palmerston North, Wellington, Christchurch, Dunedin, Queenstown and Hamilton<sup>23</sup>. The number of available international flights has also increased.

<sup>23</sup> At the time of data collection

Figure 80: Total mobility boardings per year

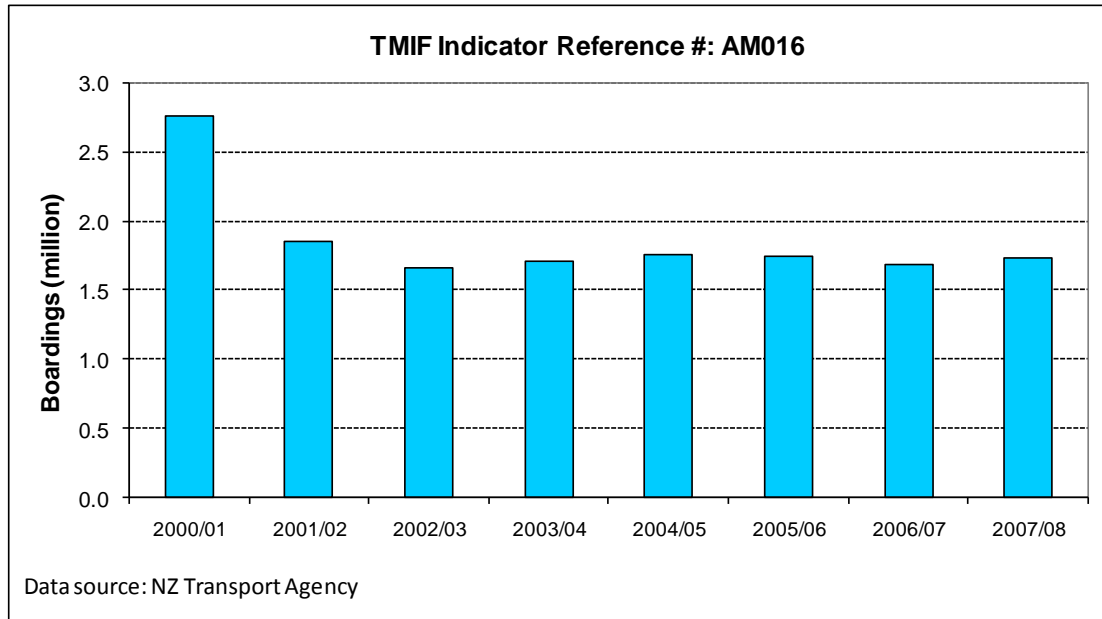
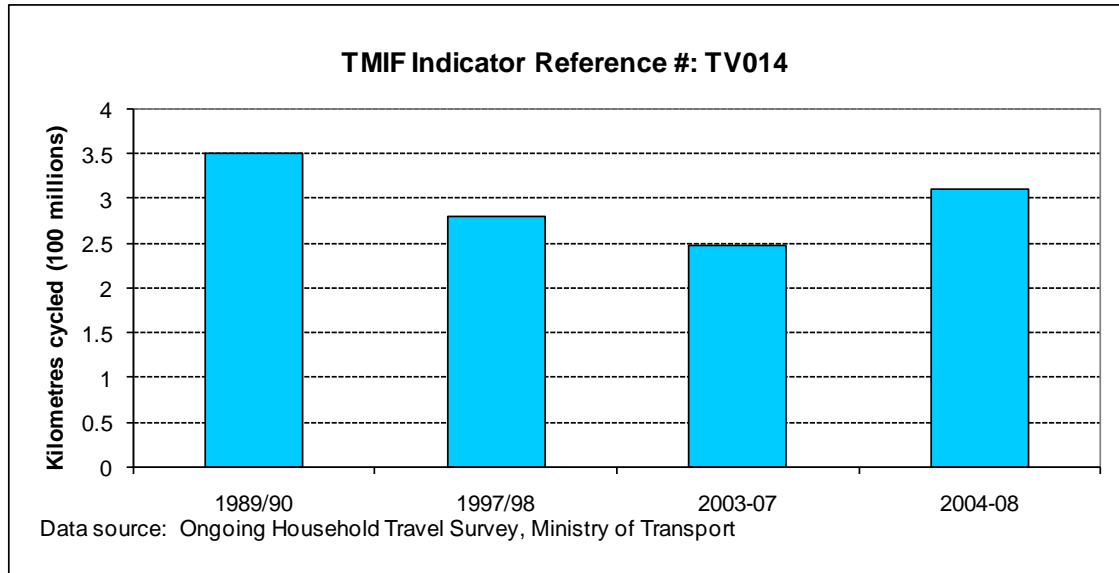


Figure 80 shows the number of ‘total mobility’ boardings for the period 2000/01 to 2007/08. ‘Total mobility’ is a scheme that provides financial assistance for disabled people to use taxis and shuttles. In 2007/08, ‘total mobility’ boardings totalled 1.73 million; a 37% decrease compared to 2000/01, but up 3% relative to 2006/07. More information is needed about the number of people who required this service during the period to determine whether or not the decline was due to a lack of access to the service. It may be that fewer people need this service, which is in itself a positive outcome. It may be that the cost of the service has become unaffordable to more people and, if this is the case, access could be severely affected for some of New Zealand’s most socially excluded people.

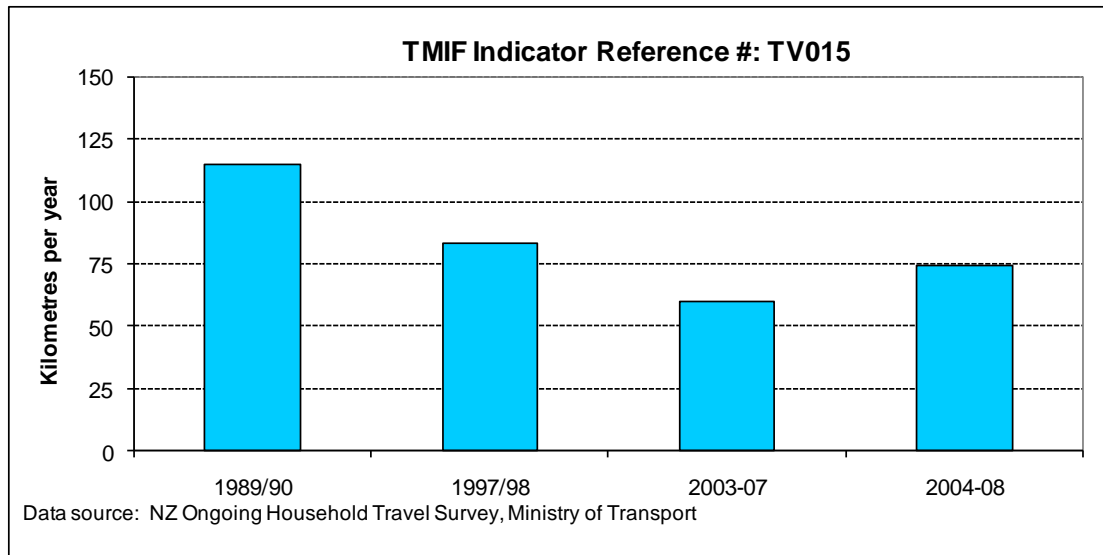
In 2004-08, people cycled shorter distances (per person, per year) than in 1989/90 and 1997/98<sup>24</sup>. Overall, New Zealanders aged five and over cycle approximately 310 million km per year.

**Figure 81: Distance cycled per year (people aged five and over)**



In the period 2004-08, each individual cycled, on average, a total distance of 74 km per year. This figure is an increase from the 2003-07 survey of 60 km per year. It is less than the distance cycled in the periods 1997/98 and 1989/90.

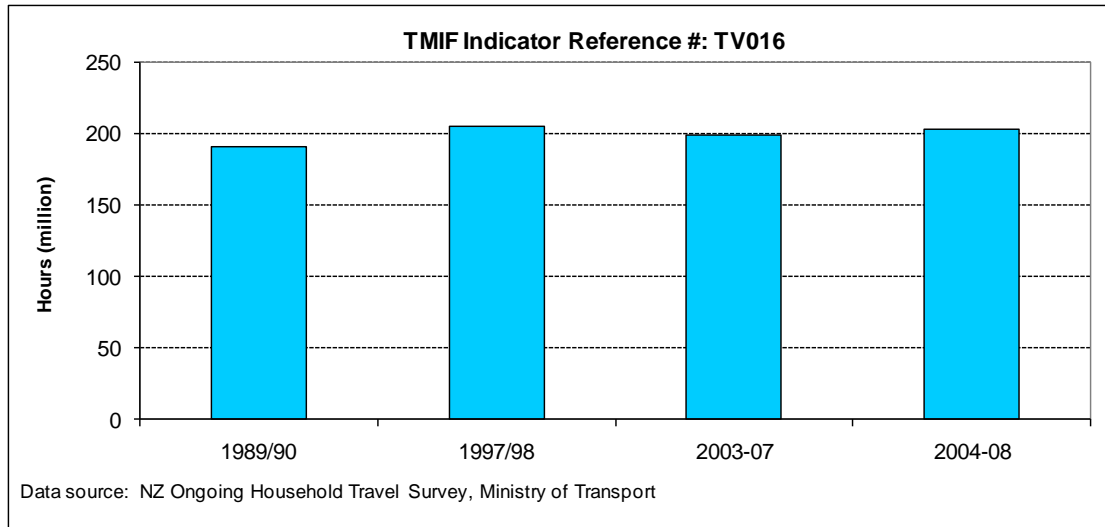
**Figure 82: Distance cycled per person aged five and over**



Overall, in 2004-08, New Zealanders aged five years and over spent 203 million hours per year walking (distances are not estimated for walking trips).

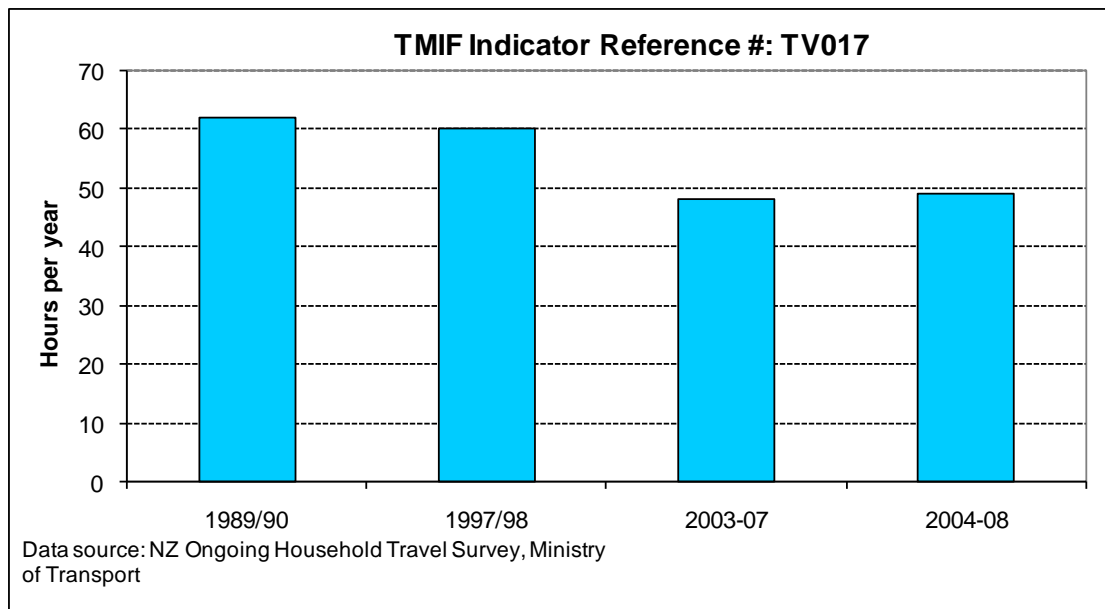
<sup>24</sup> New Zealand Ongoing Household Travel Survey, Ministry of Transport 2008. Further information on cycling for transport is provided in the Cycling for Transport fact sheet on the Ministry of Transport website: [www.transport.govt.nz](http://www.transport.govt.nz)

**Figure 83: Time spent walking per year (people aged five and over)**



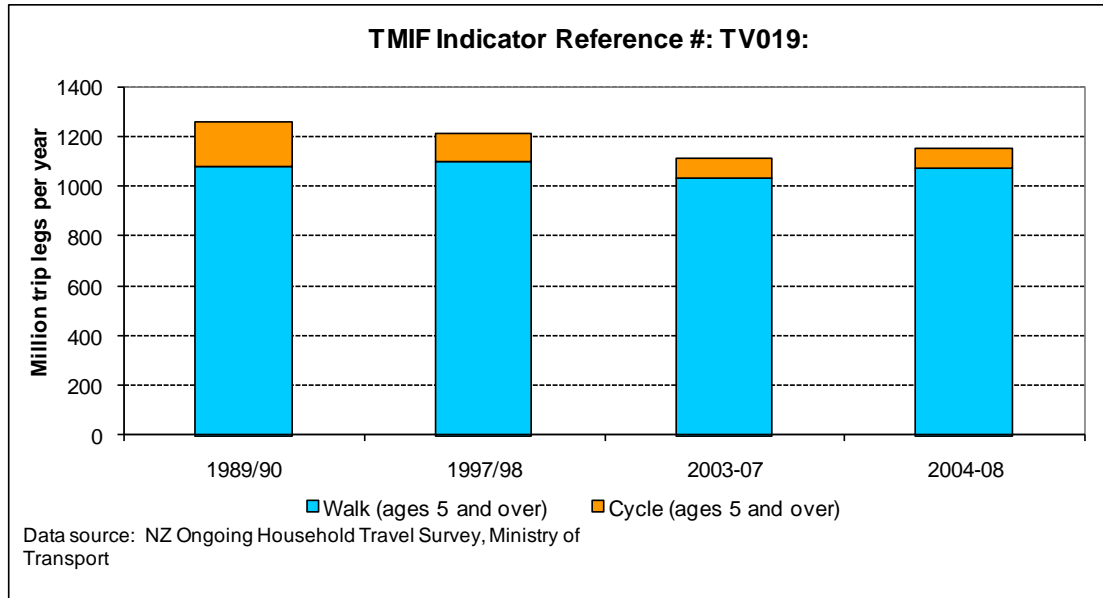
In the period 2004-08, individuals spent slightly more time walking, compared to the 2003-07 survey. In the period 2004-08, each individual was estimated to allocate 49 hours of his or her time per year to walking, compared to the 48 hours recorded in the 2003-07 period. The 2004-08 figure, though, compared unfavourably to the periods 1997/98 and 1989/90, when 62 and 60 hours respectively were spent walking per year. 'Walking' is considered to be walking on a roadside for at least 100 metres, and includes crossing the road. It does not include recreational walking (eg tramping) or indoor activities.

**Figure 84: Time spent walking per person aged five and over**



Cycling, by people aged five and over, is less common than walking, with about 85 million trip legs<sup>25</sup> cycled per year, as compared to 1,070 million trip legs per year walked.

**Figure 85: Number of walking and cycling trip legs**



**Travel to work and school**

Considering the mode share of the total number of trips, being a driver in a vehicle (of any type) continues to be the predominant mode. Driving as a mode increased by 3% between the 1989 Ongoing Household Travel Survey and the 2004-2008 survey. Walking or cycling as mode share of total trips decreased during this time period, while bus or train passenger rates remained almost the same (decreasing slightly from 2.9% to 2.7%).

**Table 5: Mode share of total trips**

**TMIF Indicator Reference TB002 #: Mode share of total trips**

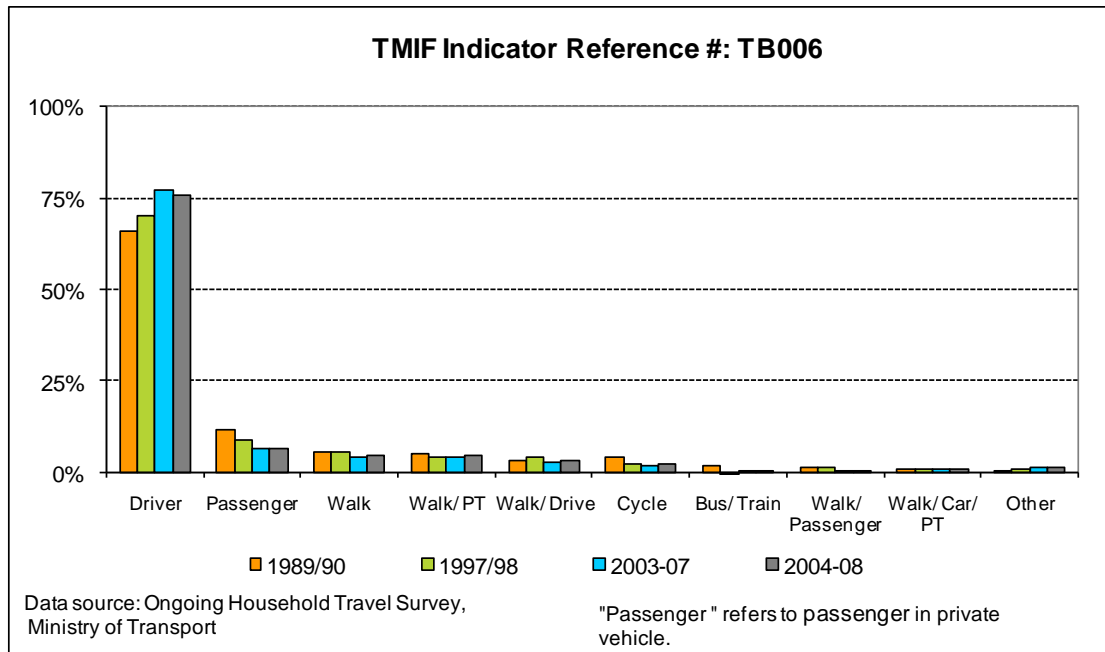
TB002. Mode share of total trip legs (people aged 5 years and over)	1989/90	1997/98	2003-2007	2004-08
Car or van driver*	48%	49%	51%	51%
Car or van passenger	22%	26%	26%	26%
Pedestrian	22%	19%	17%	17%
Cyclist	3.7%	1.9%	1.3%	1.3%
PT passenger (bus,train or ferry)	2.9%	2.5%	2.7%	2.7%
Motorcyclist	0.9%	0.5%	0.5%	0.6%
Other household travel	0.9%	1.1%	1.7%	1.2%
Total household travel	100.0%	100.0%	100.0%	100.0%

Data source: Ongoing Household Travel Survey, MoT  
 NB: The categories used for this table have changed. Previously published figures categorised motorcyclists and drivers of trucks and taxis, with Driver.

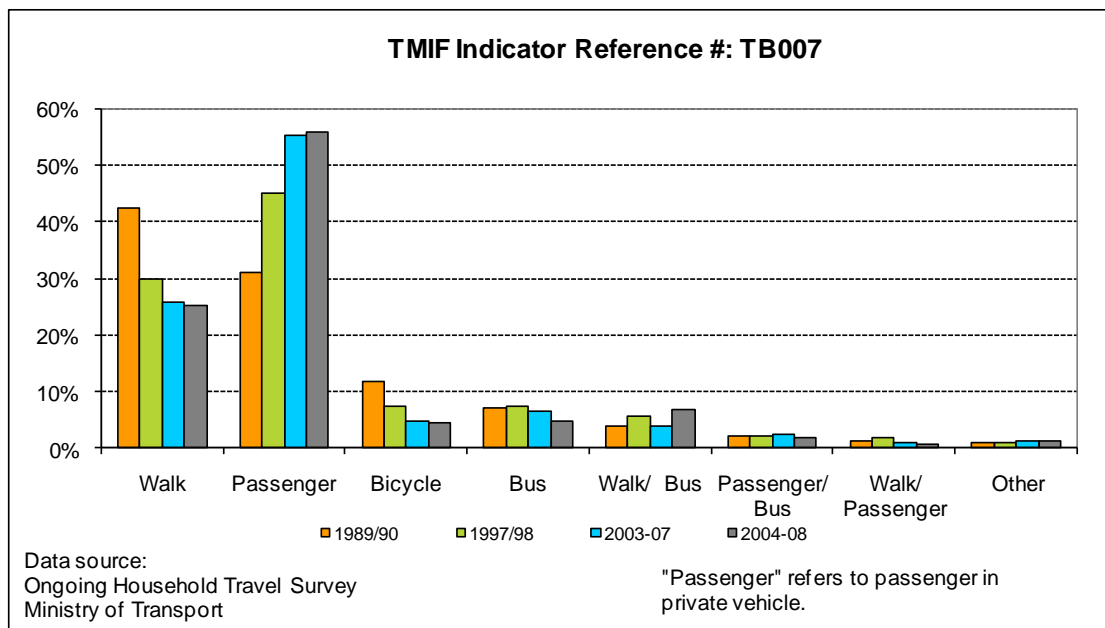
<sup>25</sup> A 'trip leg' is a surveying unit of non-stop travel by a single mode for a single purpose. For example, walking to work with a stop at the shop is two trip legs; catching a bus to work may be three trip legs (walk to bus stop, bus trip, walk from bus stop to work). The New Zealand Ongoing Travel Survey does not record trip legs under 100 metres, off-road travel or travel on private property (eg, farms, malls).

During 2004-08 a greater proportion of working adults reported driving to work compared to 1997/98. In the period 2004-08, 76% of working adults surveyed drove to work (up from 70% in 1997/98). The New Zealand Ongoing Household Travel Survey also shows that the proportion of full-time workers who walk the whole journey to work has decreased slightly over this period, to about 4%, while the proportion of full-time workers who cycle the whole journey to work has remained the same at about 2%.

**Figure 86: Mode share of journeys to work (full-time workers 6-9.30am; includes combined modes)**



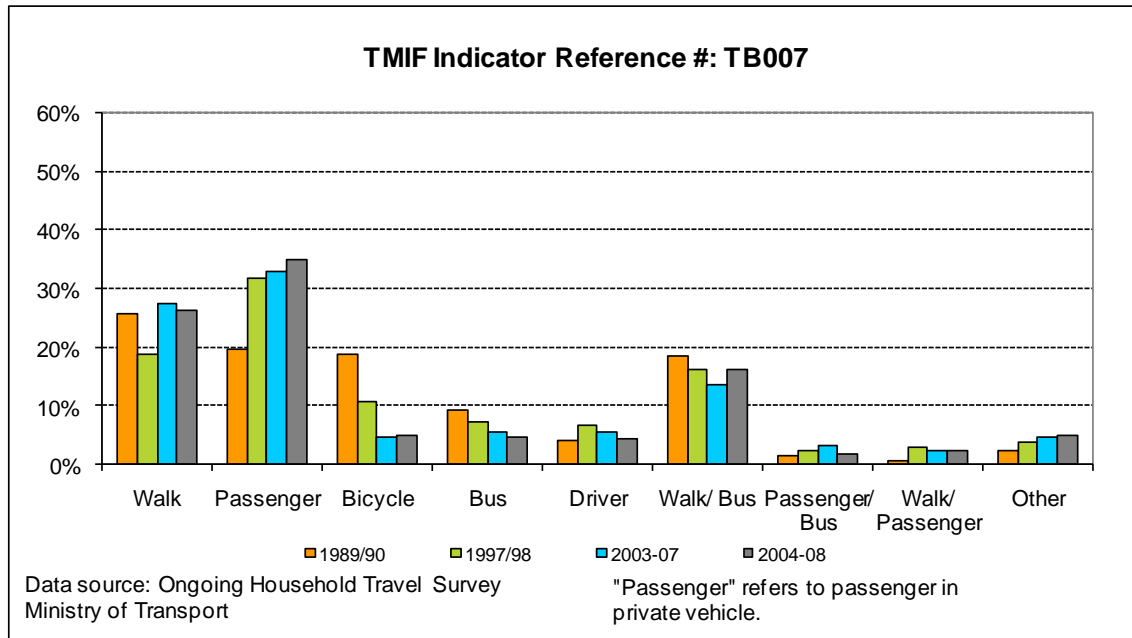
**Figure 87: Mode share of journeys to school (ages 5-12)**



The mode used for children to get to school has changed since 1989/90; a trend which reflects increasing vehicle use by families, and heightened societal concern for children being unaccompanied by guardians.

In 1989/90, 25% of children aged 5-12 years walked to school whereas, in 2004-08, only 4% of young children walked to school.

**Figure 88: Mode share of journeys to school (ages 13-17)**



In contrast to younger children, the percentage of teenagers who walk to school has increased. The results of the 2004-08 survey showed that 26% of teenagers walked to school. This figure is a decrease of 1% from the 2003-07 survey, but an increase from the 19% who reported walking to school in the 1997/1998 survey. The percentage of teenagers who cycle to school continues to decrease. The 2004-08 data found that 5% of teenagers cycle to school.

Modal shift in schools with travel plans is monitored under **TMIF Indicator Reference #: TB001**. Currently, data for this indicator is collected only for Auckland. The following table lists data for 2006.

**Table 6: Modal shift in schools with travel plans (Auckland)**

Walk	WSB	Cycle	PT	Family car	Friend car	Scooter	Drive self
1.50	1.60	-0.10	0.50	-3.60	0.20	-0.10	0.10

Data source: ARTA

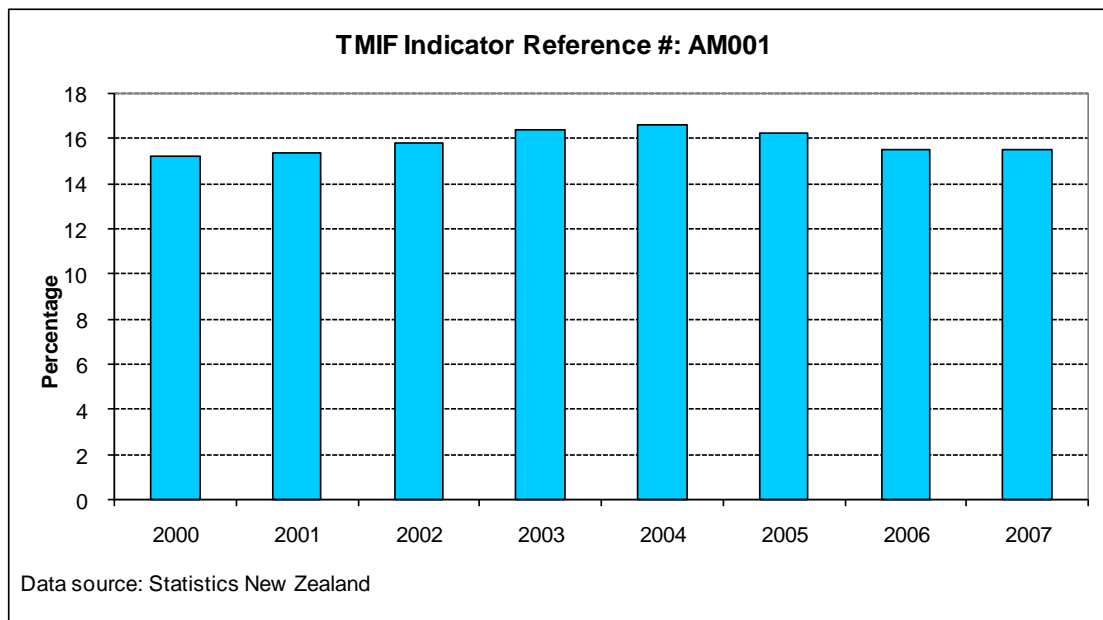
The mean vehicle occupancy is 1.65 (people/km). This data is monitored in the **TMIF Indicator Reference #: TV010**. (Data source: NZOHTS/Ministry of Transport)

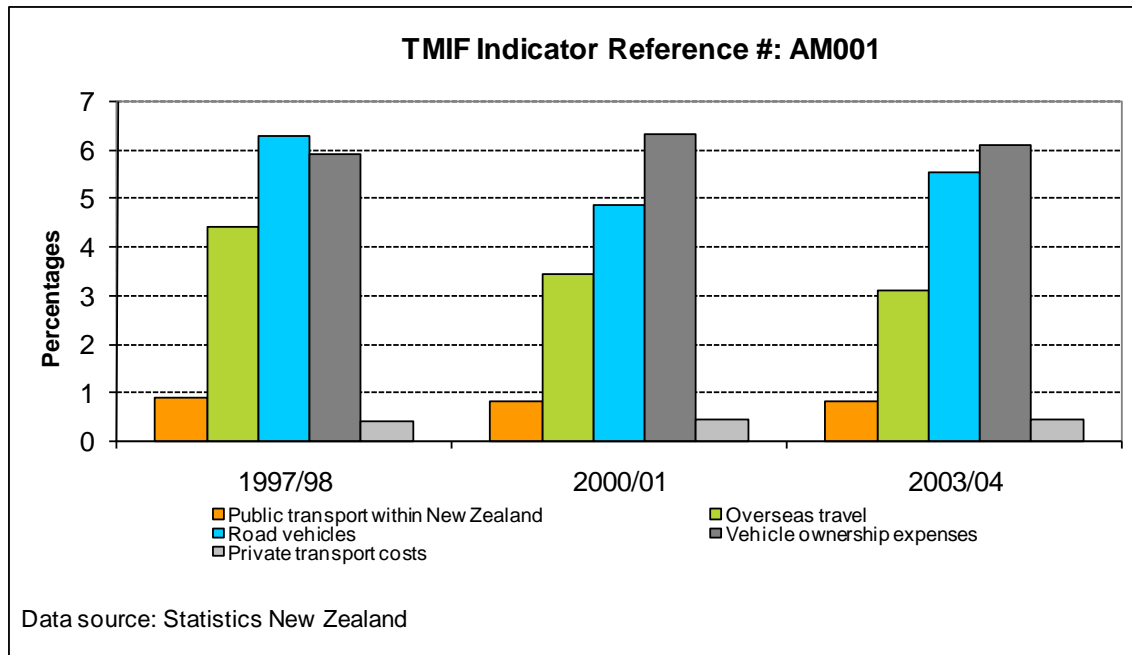
## Affordability

Transport affordability plays an important part in how accessible transport is to an individual or community. People who have to commute to work or school have greater transportation requirements than people who do not work, or who work at home. People with physical disabilities or other special needs tend to require more specialised services and have fewer transport and destination options.

The relative amount of money that people spend on transport per household has not varied greatly by year. There are some small changes over time in the category of transport on which people spent their money (eg overseas travel, public transport within New Zealand, purchase of road vehicles, vehicle ownership and running costs).

**Figure 89 and Figure 90: Percentage of household expenditure on transport – calendar year (overseas travel, public transport within New Zealand, purchase of road vehicles, vehicle ownership and running costs)**



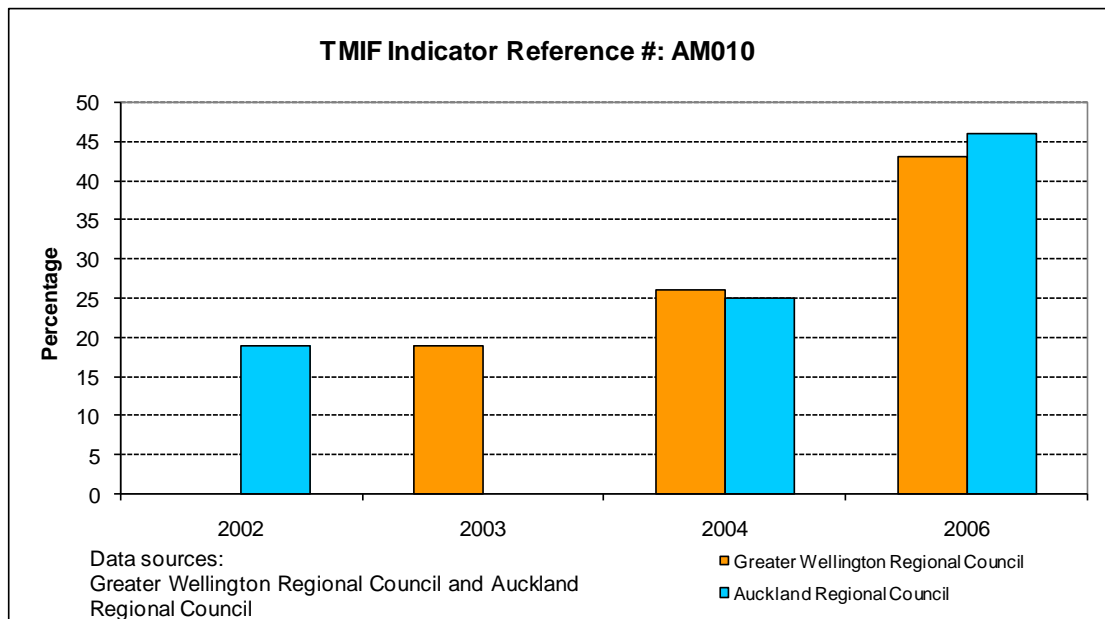


The perception of transport affordability is very useful in gaining a measure about attitudes to transport-related issues. The perception data made available in this report are drawn from regional surveys where a consistent data collection methodology is used as often as possible. This means that not all regions are represented, and no nationally aggregated figure is available. As only Auckland and Wellington have rail networks used for daily commuting, the representation of the perception data is limited by the availability of a specific mode within the region, and whether or not the region reports on it.

The cost of owning, operating and maintaining a car is usually considered when choosing a mode of transport. The perceived cost of using a private vehicle is increasingly becoming a barrier to its use. In 2006, 43% of those in the Wellington region felt that the cost of using a private vehicle hindered their use of it, compared to only 26% in 2004. The results are almost identical in Auckland, with an increase from 25% sharing this view in 2004, to 46% in 2006.<sup>26</sup>

<sup>26</sup> 2006/2007 Annual Monitoring Report on the Regional Land Transport Strategy, Greater Wellington Regional Council.

**Figure 91: Perception of private transport user costs – whether cost of running a vehicle hinders use of it**



During 2007/08, public perceptions of the affordability of public transport in the three regions of Auckland, Wellington and Canterbury, showed that people who used public transport services found them value for money. Ninety percent of Canterbury respondents who used the services considered bus service value for money as 'good' or better. This compared favourably to results in Auckland and Wellington where 61% and 88% respectively of user respondents shared the same view. Seventy-three percent of Auckland respondents rated train service value for money as 'good' or better for the period. Eighty-five percent of Wellington respondents shared the same perception. Sixty-three percent of respondents in Auckland rated ferry service value for money as at least 'good'. Canterbury data for this perception was not available for the 2007/08 period, but in 2006/07 41% rated ferry service value for money, 27% rated the service 'very good', and 32% rated the service 'good'.

Figure 92: Passenger rating of bus service value for money

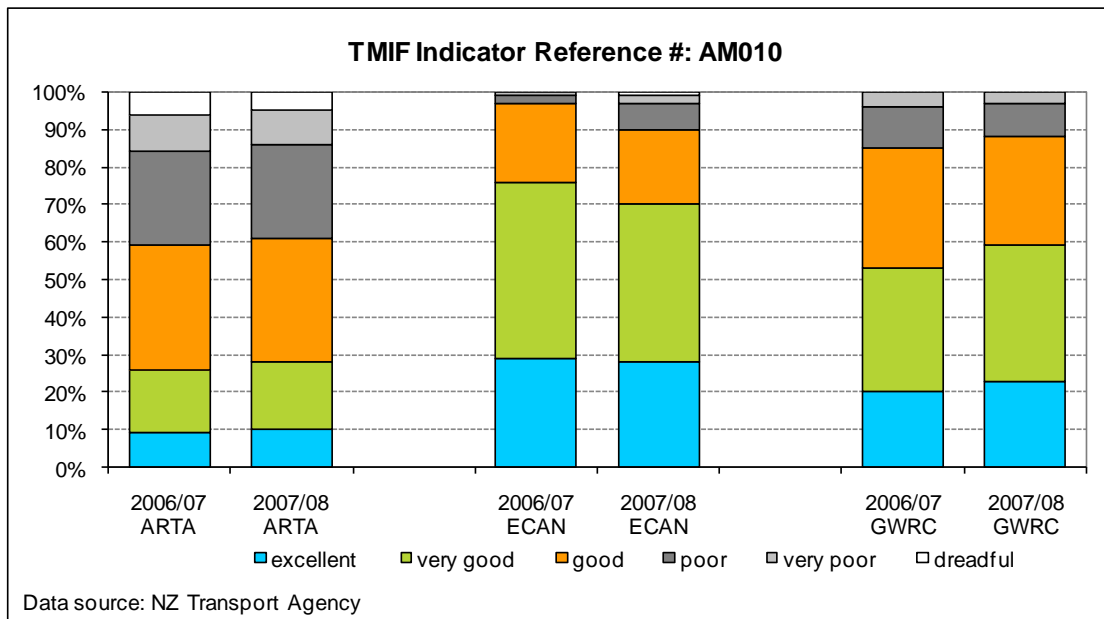
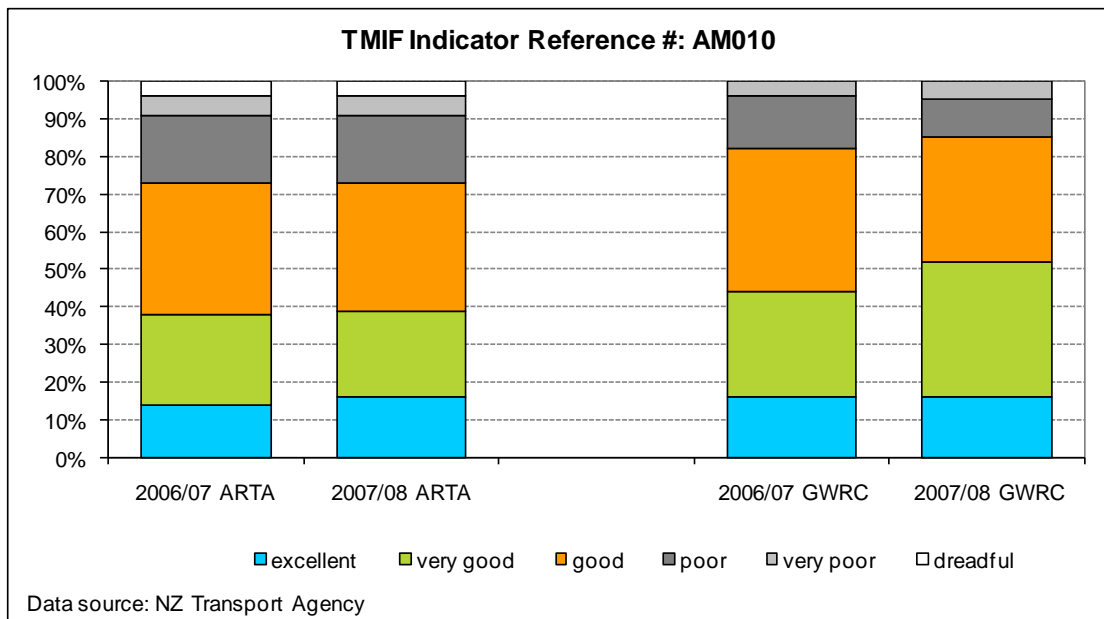
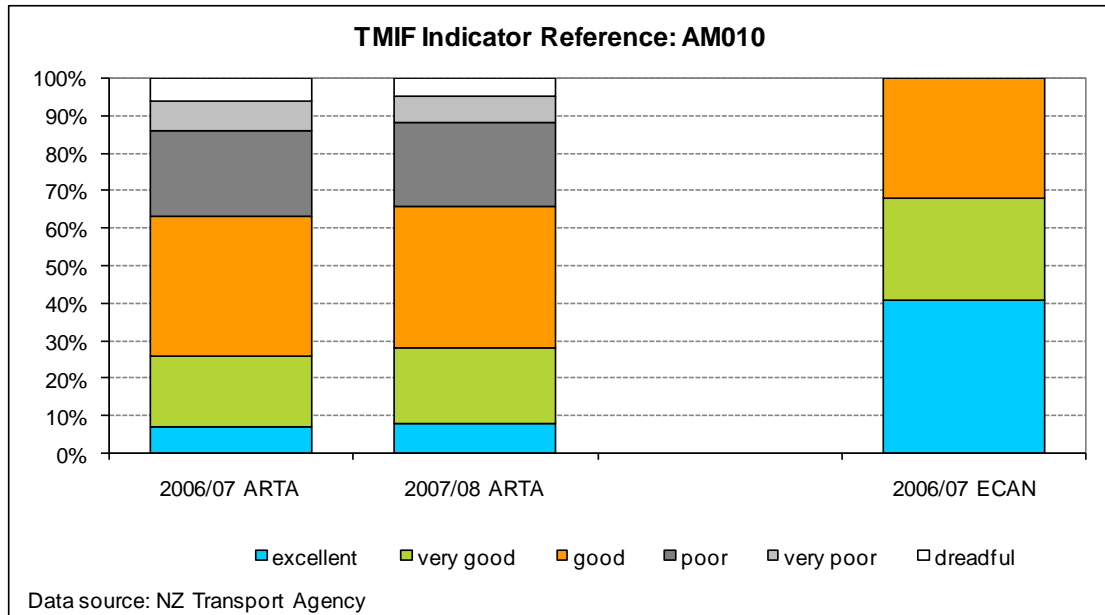


Figure 93: Passenger rating of train service value for money



**Figure 94: Passenger rating of ferry service value for money**

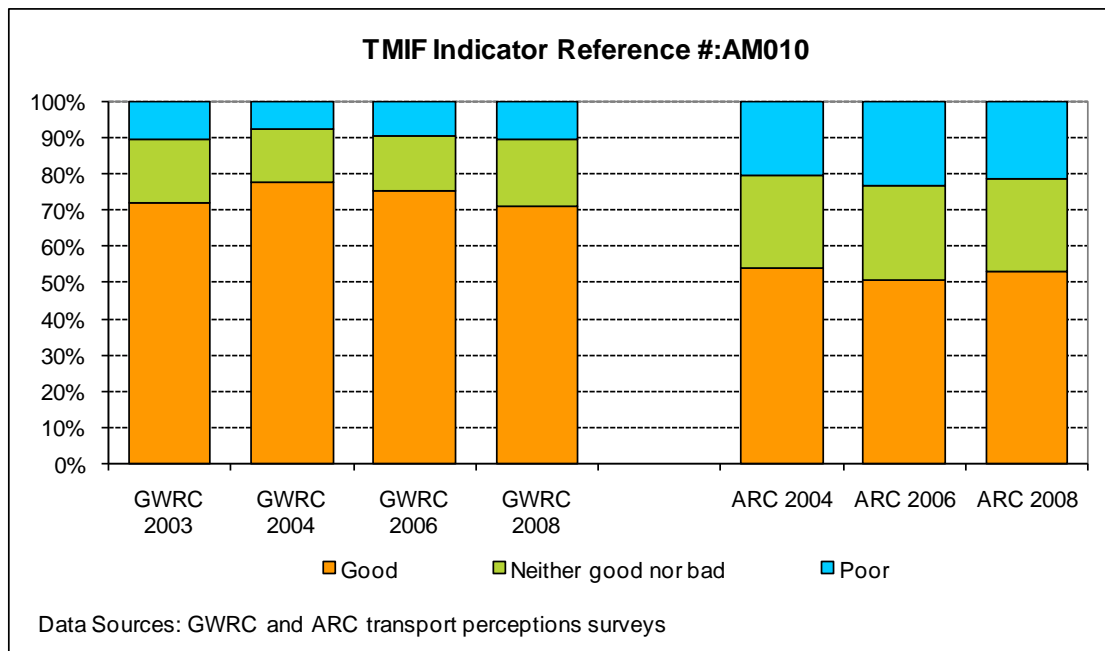


**Other travel perceptions<sup>27</sup>**

Sixty-nine percent of respondents<sup>28</sup> in Wellington, in the 2008 survey, said moving around the region by walking was ‘good’, compared to 74% and 70% respectively in 2004 and 2003. Therefore, access on foot in Wellington is generally believed to be ‘good’. In Auckland, 52% of respondents said getting around by walking was ‘good’.

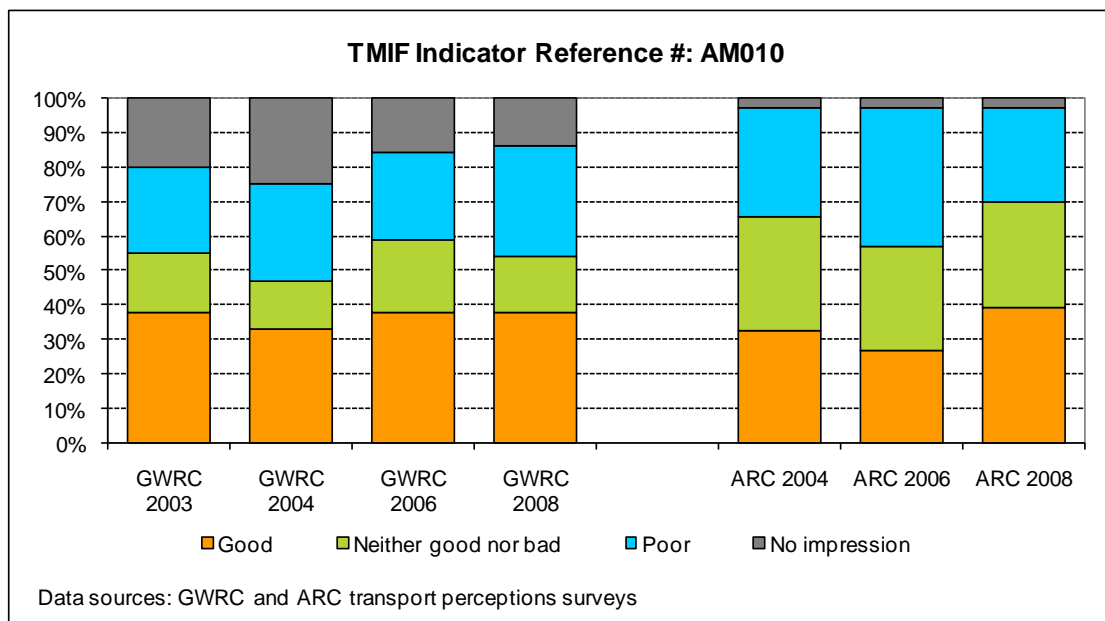
<sup>27</sup> Perceptions of safety and security of the transport system are covered under the objective ‘Safety and Security’  
<sup>28</sup> Both users and non-users were interviewed.

Figure 95: Perception of ease of walking



Thirty-eight percent of respondents<sup>29</sup> in Wellington, in the 2008 and 2006 surveys said getting around the region by cycling was 'good' compared to 33% in 2004. This compared favourably to Auckland where, in 2008, 39% of respondents said getting around the region by cycling was 'good' (up from 27% in 2006)<sup>30</sup>.

Figure 96: Perception of ease of cycling

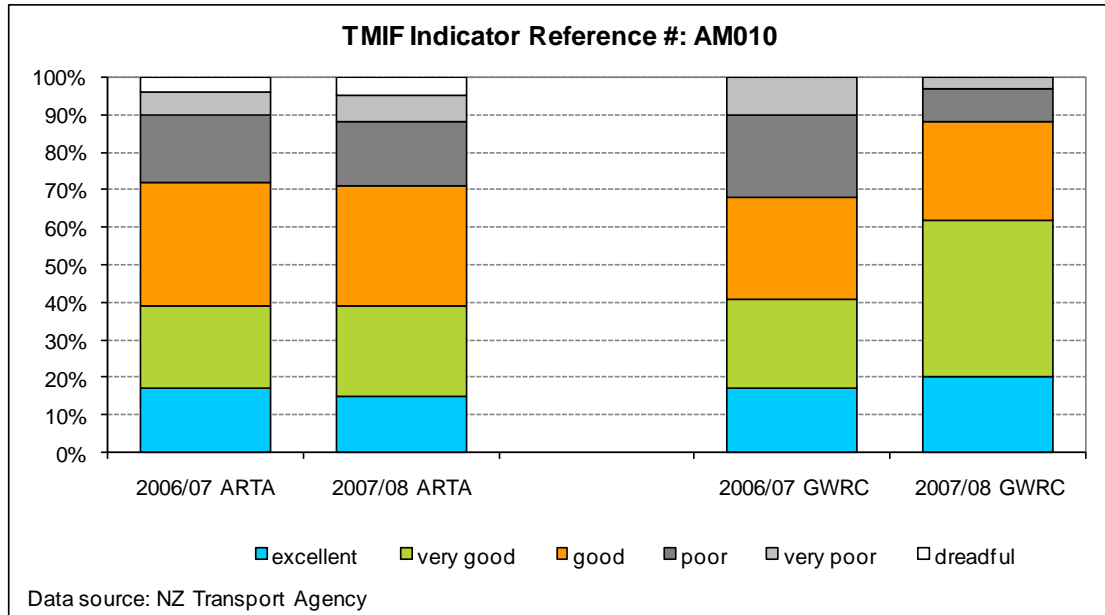


<sup>29</sup> Both users and non-users were interviewed.

<sup>30</sup> 2006/2007 Annual Monitoring Report on the Regional Land Transport Strategy, Greater Wellington Regional Council.

Seventy-one percent of respondents<sup>31</sup> in Auckland rated bus service availability as 'good' or better, compared to 88% in the Wellington region. Five percent of Aucklanders thought bus availability was 'dreadful', while no Wellington respondents perceived availability this way.

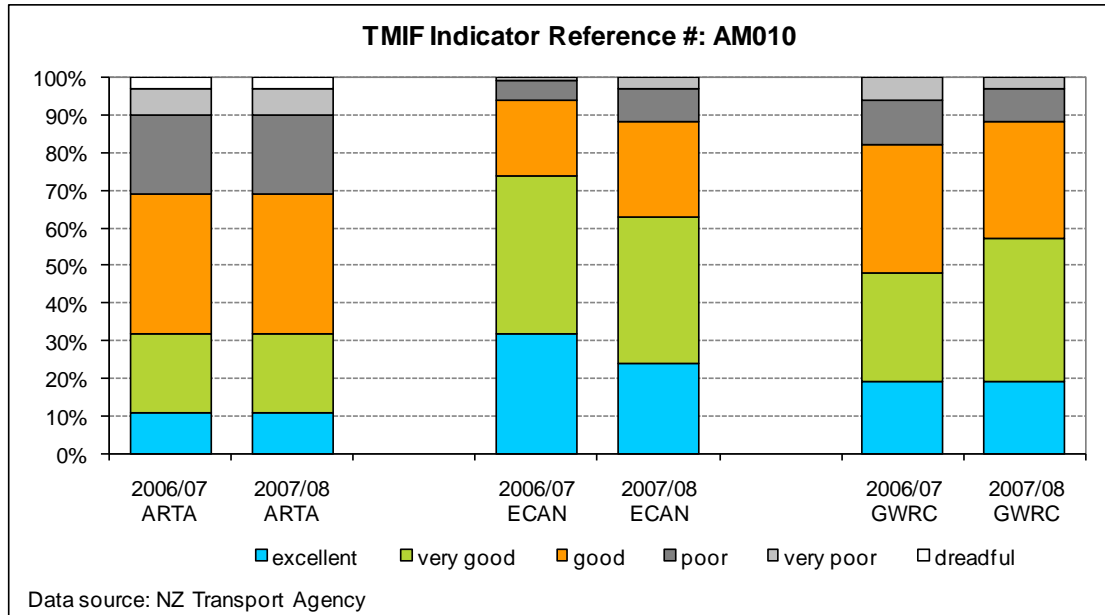
**Figure 97: Perception of bus availability**



<sup>31</sup> Both users and non-users were interviewed.

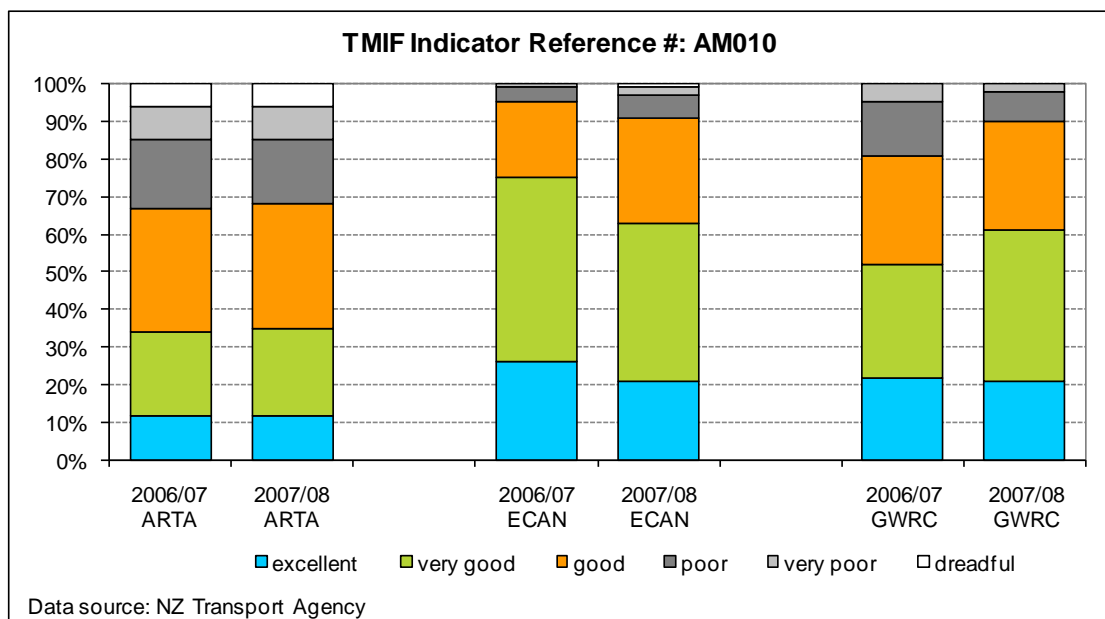
In Auckland, 69% of respondents rated bus service frequency as 'good' or better compared to 88% in both Canterbury and Wellington. Thirty-one percent of Auckland respondents considered service frequency as 'poor' or worse in the region compared to 12% for both Wellington and Canterbury.

**Figure 98: Perception of bus service frequency**



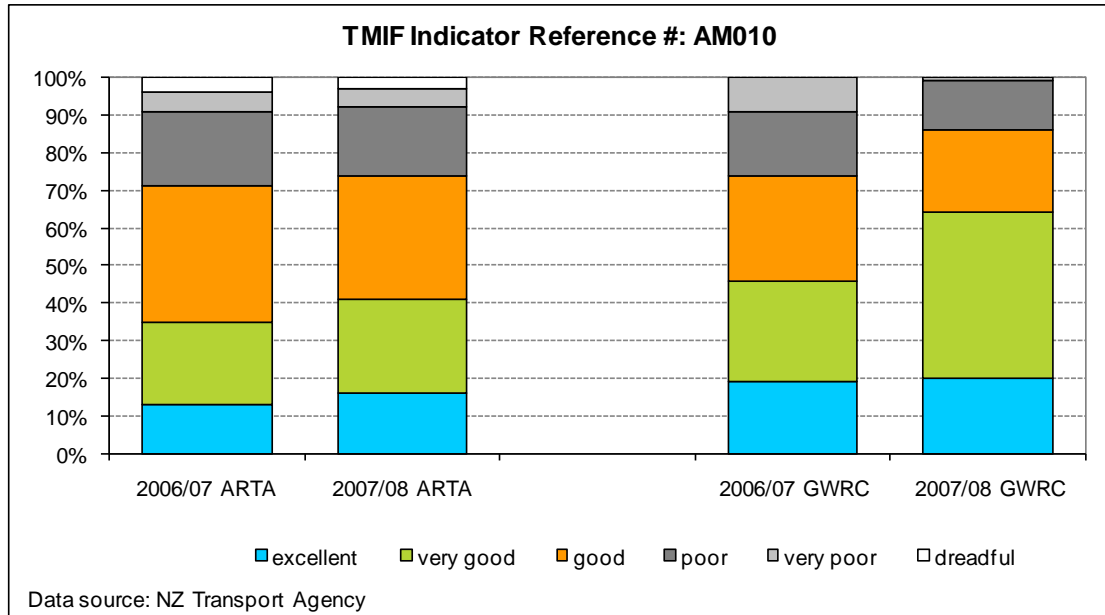
Ninety-one percent of bus service users in Canterbury rated bus service reliability as at least 'good', compared to 68% and 90% respectively in the Auckland and Wellington regions, for the period 2007/08. Thirty two percent in Auckland rated bus service reliability as 'poor' or worse. Only 9% and 10% respectively of Canterbury and Wellington respondents shared this view.

**Figure 99: Perception of bus service reliability**



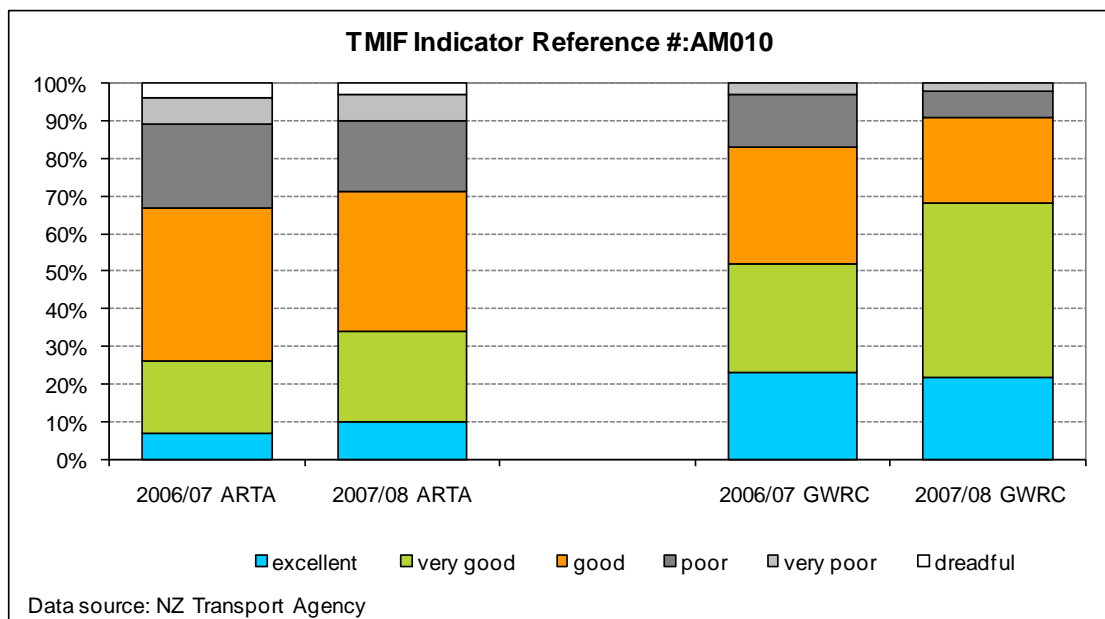
Seventy-one percent of train service users in Auckland rated train service availability as at least 'good', compared to 86% in the Wellington region. There were 3% more respondents in Auckland and 12% more respondents in Wellington who felt that availability was at least 'good', compared to the 2006/07 survey.

**Figure 100: Perception of train service availability**



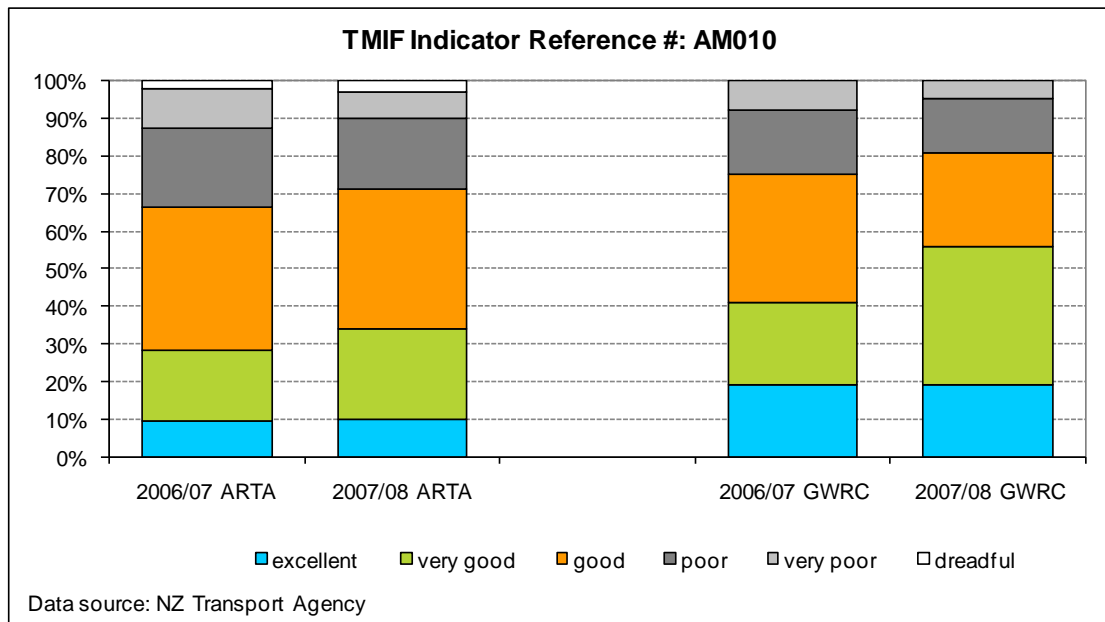
In Auckland, 71% of train users rated train service frequency as 'good' or better compared to 91% of respondents in Wellington. Twenty-nine percent of Auckland respondents rated service frequency as 'poor' or worse, compared to 9% in Wellington.

**Figure 101: Perception of train service frequency**



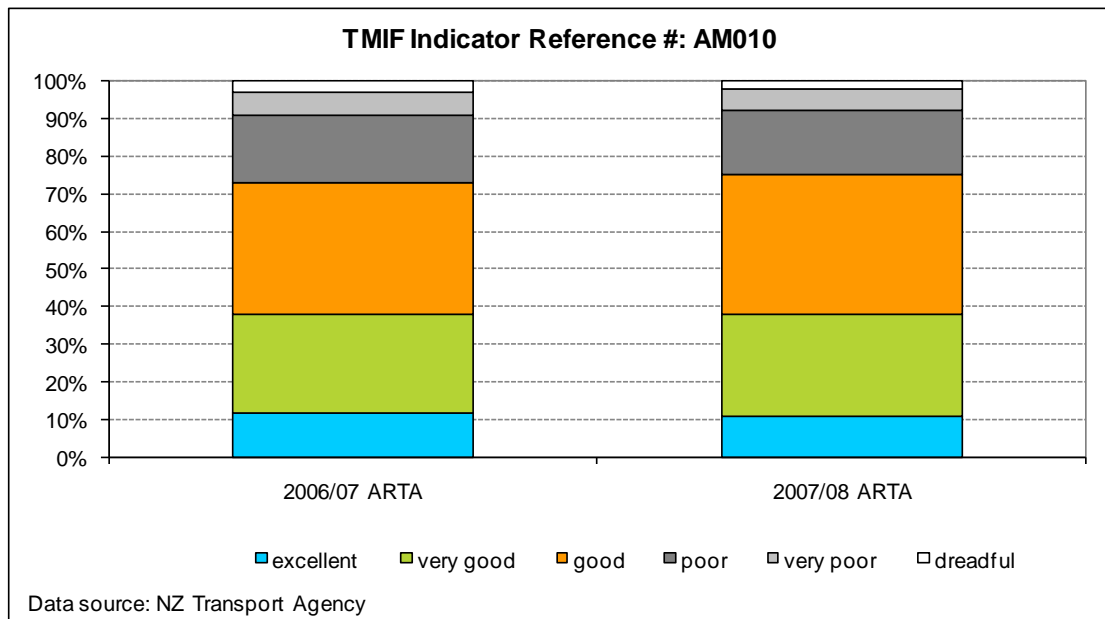
Seventy-one percent of train users in Auckland rated train service reliability as at least 'good', compared to 81% in Wellington for the period 2007/08.

Figure 102: Perception of train service reliability



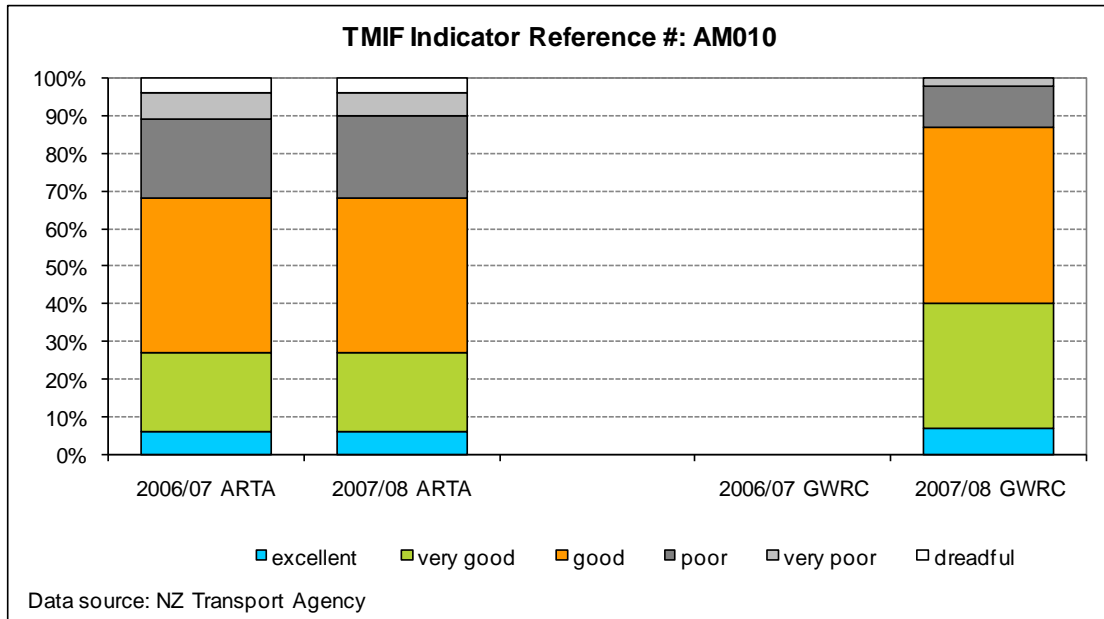
Seventy-three percent of Auckland ferry users rated ferry service availability in the Auckland region for the period 2006/07 as at least 'good'.

Figure 103: Perception of ferry service availability



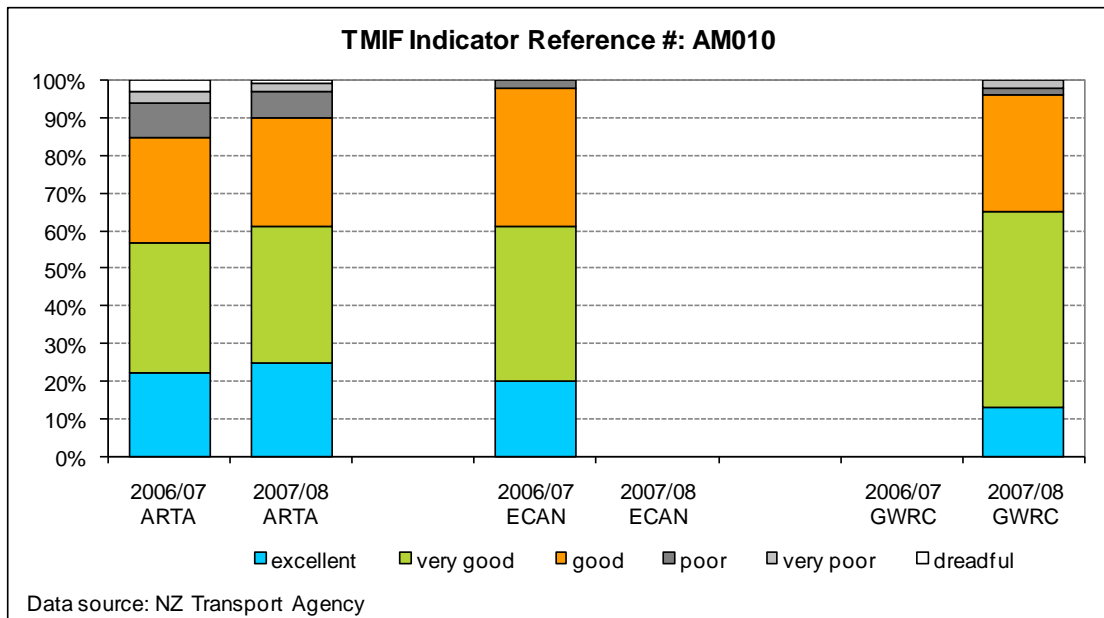
Seventy-five percent of Auckland respondents rated ferry service frequency as 'good' or better for the period 2007/08. This figure is an increase of 2% from the 2006/07 survey.

Figure 104: Perception of ferry service frequency



Ninety percent of Auckland ferry users surveyed rated ferry service reliability as at least 'good', with 25% thinking that reliability was 'excellent'. For Wellington, 96% of respondents thought ferry service reliability was at least 'good'. There was no data collected for Christchurch for 2007/08, or Wellington for 2006/07

Figure 105: Perception of ferry service reliability



The indicators reported in this section provide a good indication of the level of access to the transport system (ie access to vehicles or public transport services). However, access to a transport mode, in itself, does not necessarily mean that individuals have access to the people or services they need to feel part of a vibrant community.



## Chapter four: Public health and the environment



## Chapter 4: Public health and the environment

Over the past few decades New Zealanders have made good progress in many of the aggregate and per-capita health impacts of their vehicle ownership and use.

Vehicles today produce fewer harmful emissions than in the recent past. Lead emissions have all but completely disappeared because of this element's removal from petrol. As at January 2009, sulphur levels in diesel were reduced to 10 parts per million, meaning that diesel is almost 'sulphur-free'.

Though these measures have been put in place, they could potentially be offset by greater transport use. New Zealanders are driving further than before. They own more vehicles than previously and are using them for a larger percentage of all trips, and car trips of single occupancy are increasingly common.

### Key findings:

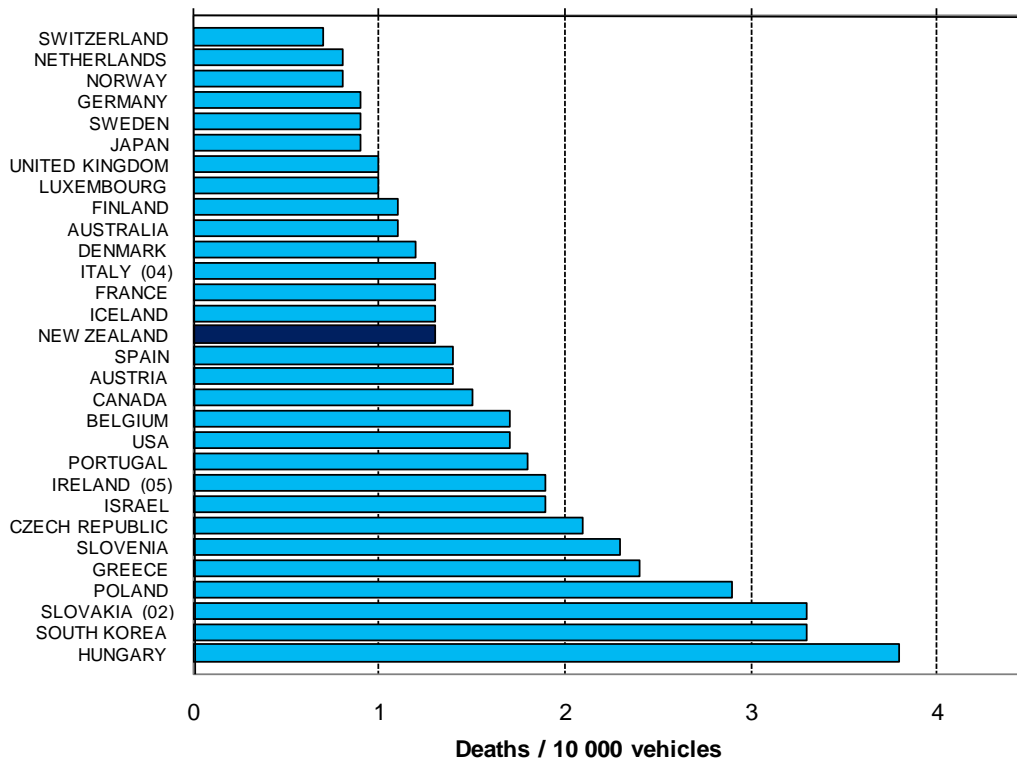
- The number of deaths for modes other than road (eg aviation, maritime, rail) continues to decrease.
- The 2008 road-death number was 366; the lowest number recorded in 49 years.
- The percentage of trips made by active modes continues to decrease, as does the time which people spend walking and the average distance walked.
- A strong reliance on vehicles as a mode of transport can be seen in the increased percentage of people who use vehicles to get to work and school.
- New Zealand's vehicle fleet continues to be an ageing fleet.
- New Zealand's vehicle fleet has an increasing average engine size.
- The move to diesel continues, with an increasing percentage of the light-commercial vehicle fleet being diesel-powered.
- The yearly total of maritime oil spills is decreasing, though the estimated spill volume is variable.
- There are no comprehensive national noise or air-quality indicator monitoring programmes in place. Only ad-hoc data are currently available.
- Greater Wellington Regional Council has undertaken periodic monitoring of road traffic noise at a limited number of sites across the region. The data suggest that noise levels in residential areas near major roads may present a risk to public health.
- The NZ Transport Agency has an ongoing national monitoring programme measuring the concentration of nitrogen dioxide in sensitive locations, such as residential areas close to major State highways. This programme suggests that elevated levels of this air pollutant are experienced in certain areas of Auckland, Hamilton and Wellington.

## Deaths and injuries through accidents

New Zealand has a high rate of road-user mortality and injury, in comparison to other OECD countries. Although New Zealand's performance in the prevention of road deaths has improved over time, it is still about 50% worse than the best-performing countries.

One of the reasons for New Zealand's high road-accident mortality rate is the high number of vehicles per capita; however, New Zealand's mortality rate per vehicle is also one of the highest in developed countries.<sup>32</sup>

**Figure 106: Number of deaths per 10,000 vehicles (OECD countries, 2007)**



Data source: OECD

## Road travel

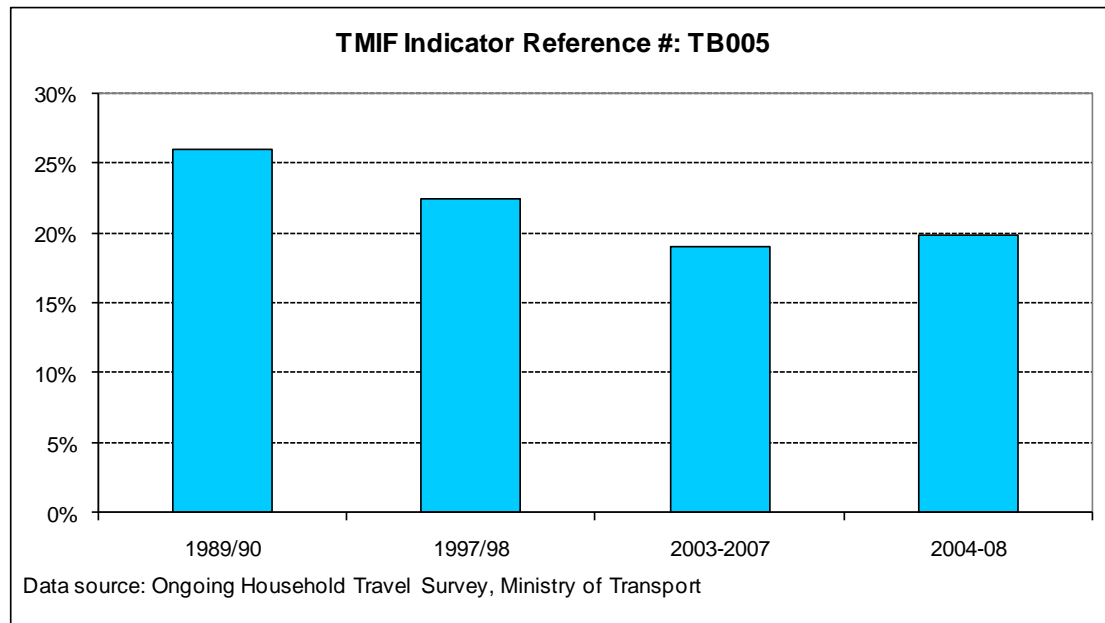
Indicators which document accidents, injuries and fatalities for all modes (road, maritime, aviation and rail) are important to public health. These safety indicators are discussed in detail in Chapter 2: Safety and security.

<sup>32</sup> Synergia Auckland Regional Land Transport Strategy Health Impact Assessment Literature Review, February 2009

## Walking and cycling

Walking and cycling can help to reduce the health risks associated with obesity<sup>33</sup>. Within New Zealand, the percentage share of all trip legs carried out by walking or cycling has declined continuously since 1989/90. In the period 2004-08, 20% of all trip legs were undertaken either by walking or cycling. This figure is a slight increase from 19% in the 2003-07 survey period.

**Figure 107: Percentage of all trips which are carried out by walking or cycling (ages 5 and over)**



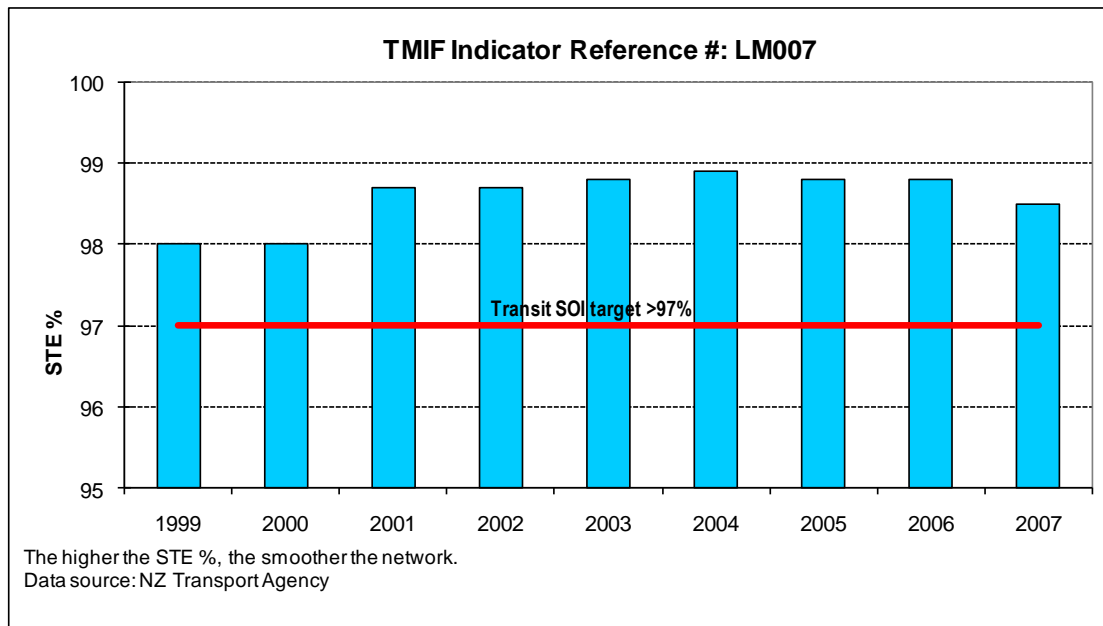
Taking active modes of transport to work and school can provide important health and fitness benefits. Time spent as a passenger (eg as part of a car pool) can be 'down time' from the stress of commuting, and valuable for mental health. The benefit gained from walking and cycling, rather than driving, depends on the intensity and time of the exercise undertaken. In the 2004-08 survey, 4% of people walked to work, which is the same percentage as recorded in the 2003-07 survey. This percentage is one-third less than the 6% of people in the 1997/1998 survey who walked to work.

The percentage of people who drive to work continues to rise; a trend which has been observed since the first Household Travel Survey (1989/90). The number of people who travel to work as car passengers is declining; this is a trend which parallels the increasing vehicle-ownership-per-capita rate, which is shown in the graph on the next page. Walking and cycling indicators are discussed further in Chapter 3: Access and Mobility

<sup>33</sup> Raising the profile of walking and cycling in New Zealand: Ministry of Transport, October 2008, p 6.

## Road condition

Figure 108: Smooth Travel Exposure



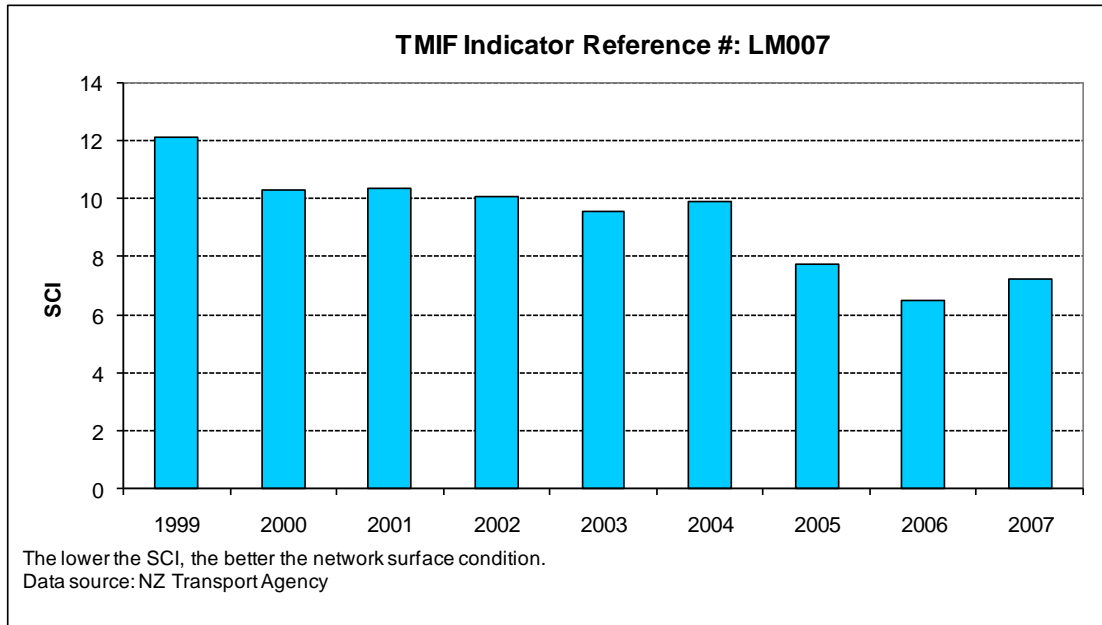
The Smooth Travel Exposure Indicator is a measure which monitors the level of comfort for those on the roads. It can also be used to indicate the effectiveness of investments made in sealed road maintenance and pavement smoothing.<sup>34</sup> Smooth Travel Exposure measures the proportion (%) of vehicle kilometres travelled in a year (VKT) on 'smooth' sealed roads, and indicates the ride quality experienced by motorists. A 'smooth' road is one smoother than a predetermined NAASRA (National Association of Australian State Road Authorities) roughness threshold. The thresholds used vary with traffic density and road location. Heavily trafficked roads have a lower (smoother) threshold.<sup>35</sup> The higher the smooth travel exposure, the smoother the network.

In 2007, there was a slight decrease in the smoothness of the network, with an average of 98.5% smoothness recorded, down from 98.8% recorded in both 2006 and 2005.

<sup>34</sup> Local Road Maintenance Cost Comparisons, Transfund New Zealand 2002/2003

<sup>35</sup> Land Transport Road Assets, Taupo/Waikato Region: June 2007

Figure 109: Surface Condition Index

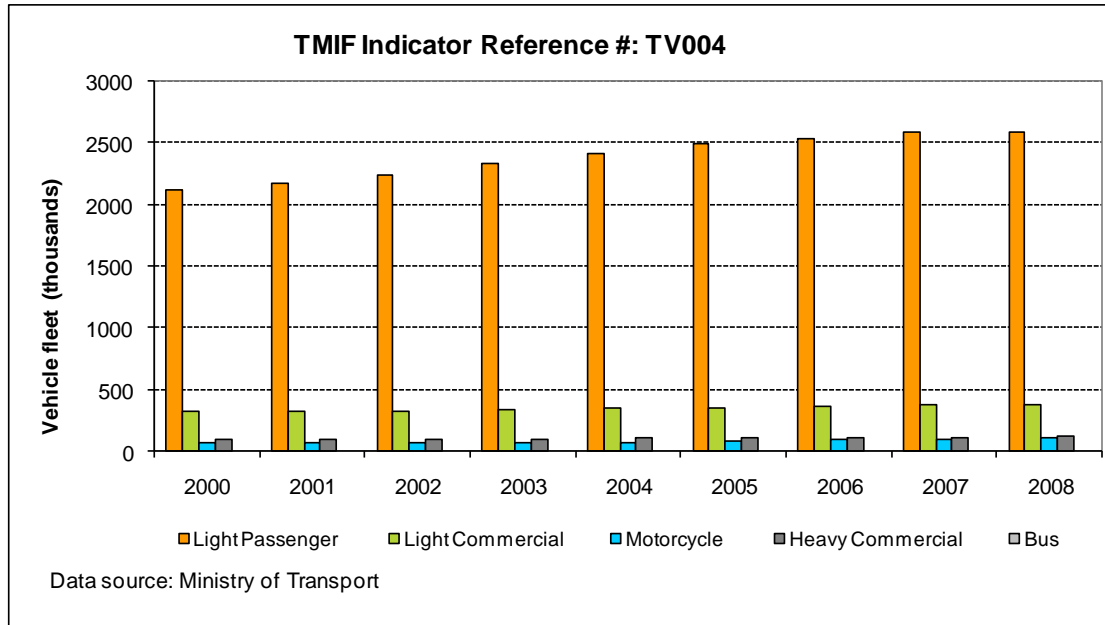


The lower the Surface Condition Index, the better the network surface condition is recorded to be. The surface condition is the sum of two indices; the age index (AI) and condition index (CI). CI is calculated from the number of defects (potholes, cracks, flushed areas)<sup>36</sup>. In 2007, the surface condition index was 7.23. The increase in 2007, up from the 2006 smoothness condition index recording of 6.49, was the first increase in three years.

<sup>36</sup> Local Road Maintenance Cost Comparisons - Transfund New Zealand 2002/2003

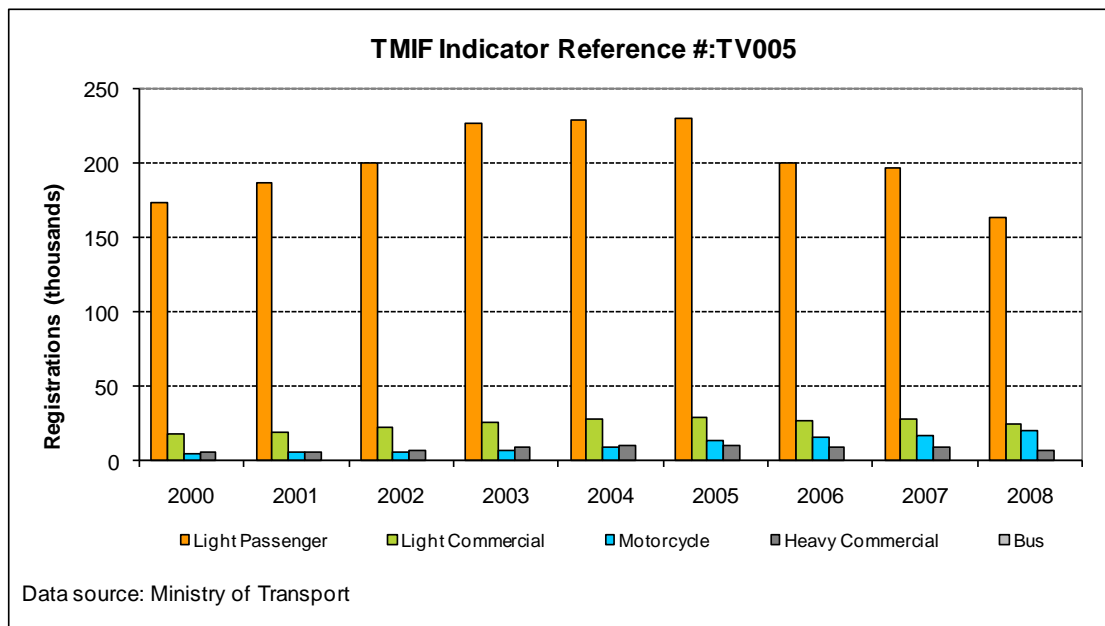
## Fleet information

Figure 110: Road fleet numbers



The number of vehicles in all classes increased substantially between 2000 and 2008. There was a 22% increase in the number of light passenger vehicles and an 18% increase in the number of light commercial vehicles. Motorcycles and buses showed increases of 53% and 48% respectively. Heavy vehicle fleet numbers increased by 32%.

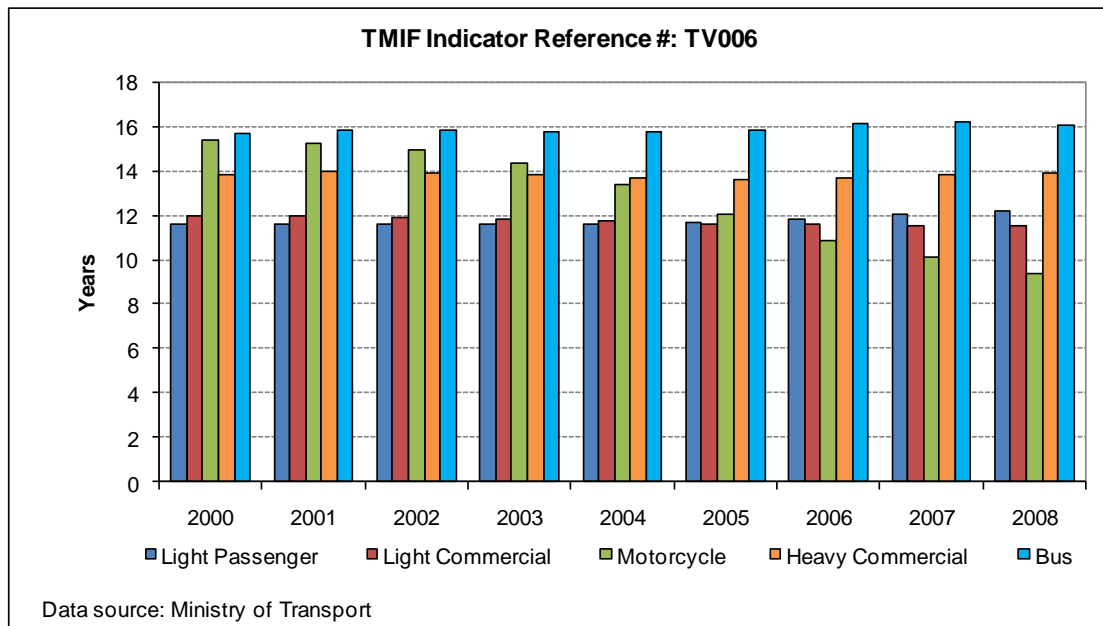
Figure 111: Total number of first registrations of road vehicles



From 2006 onwards, there has been a decrease in the number of first registrations of road vehicles, particularly light passenger vehicles. A first registration is carried out when the vehicle is brought into New Zealand for the first time.

In 2000, the number of first registrations for light passenger vehicles was 173,214. By 2003, the number of vehicles first registered had risen to 226,938 and stayed at roughly this level for the next two years. From 2006 to 2008, the numbers dropped, so that in 2008 the number of first-registered vehicles was 163,222, which is lower than the 2000 figure of 173,214.

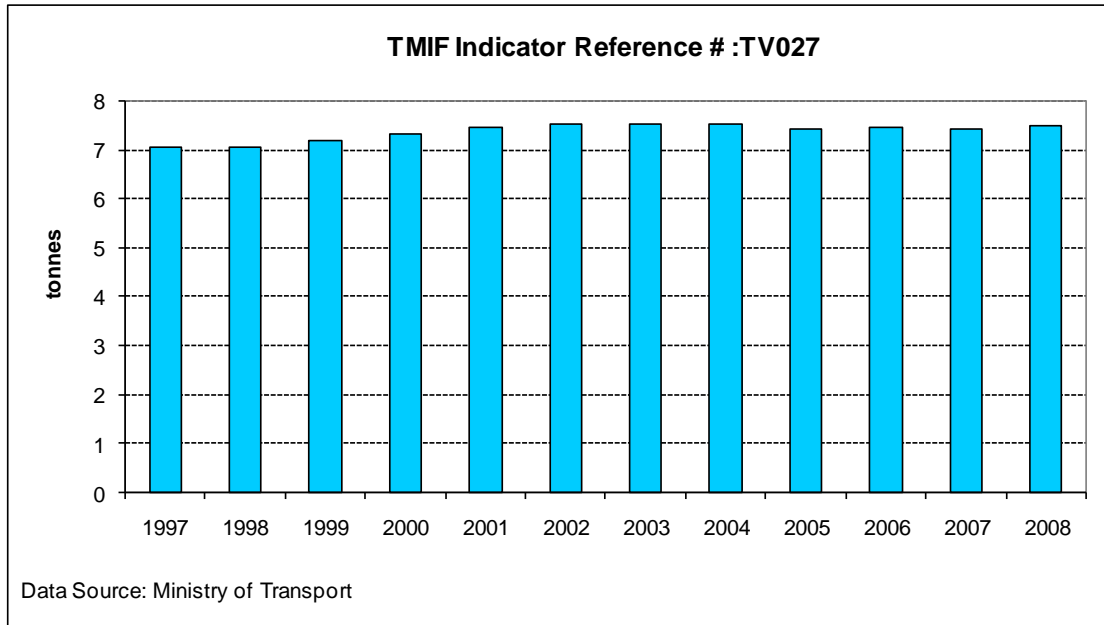
**Figure 112: Average age of fleet**



New Zealand has an older vehicle fleet than most developed countries. Because vehicle technologies continue to improve, the vehicles on our roads are likely to have higher levels of harmful emissions and lower levels of safety features than those in other countries and may not be as fuel efficient as is technically possible.

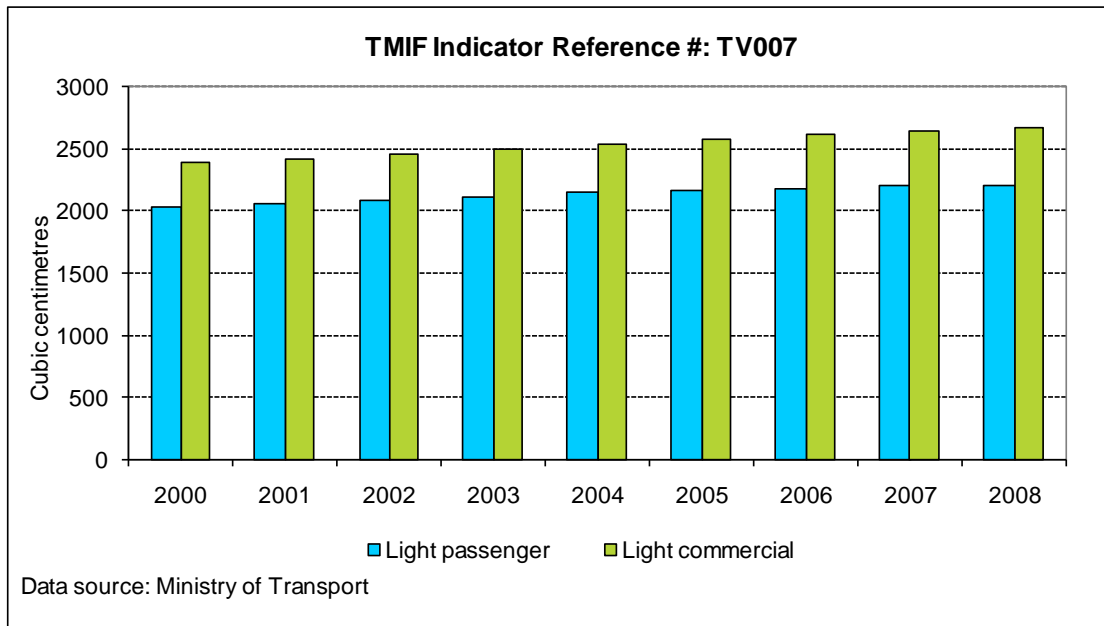
The average age of light passenger vehicles has been increasing steadily since 2000 when the average vehicle age was 11.58 years. In 2008 the average age for light passenger vehicles was 12.22 years. Between the years 2007 and 2008, all classes of vehicle showed an increase in the average age, with the exception of motorcycles which decreased from 10.09 years to 9.35 years, and buses which decreased from 16.22 years to 16.04 years.

Figure 113: Average load (tonnes) of heavy vehicles



Between the years 1997 and 2008, the average load of heavy vehicles increased from 7.06 tonnes to 7.48 tonnes, an increase of 6%.

Figure 114: Engine size of road light vehicle fleet



Although engineering improvements over the past ten years mean that vehicle engines of a given size have become more efficient and consequently use less fuel, people are purchasing cars with larger engines, as shown in Figure 114.

Since 2000, there has been an 8.4% increase in the average engine size for the whole light vehicle fleet. For the same period, the average engine size of the light commercial fleet has increased by 11%. Larger engines require more fuel and more energy is required to overcome the vehicle's own weight. This trend towards increased vehicle engine size appears to be a global one.

### Vehicle kilometres travelled (VKT)

The annual vehicle kilometres travelled, or VKT, is on the rise. All fleet classes, except heavy buses, increased in VKT, with a 3.3% increase in truck VKT for the period between 2006 and 2007, and a 3.7% increase in light commercial vehicles for the same period. Monitoring VKT provides valuable background information, but the value of VKT as an indicator, particularly in relation to the environment and health, comes from its consideration with other factors. For example, the rate of fuel consumed *per VKT* provides information on the negative impact that transport may be having on the environment and public health as a result of the emissions generated by fuel consumption.

Figure 115: Road VKT by vehicle type

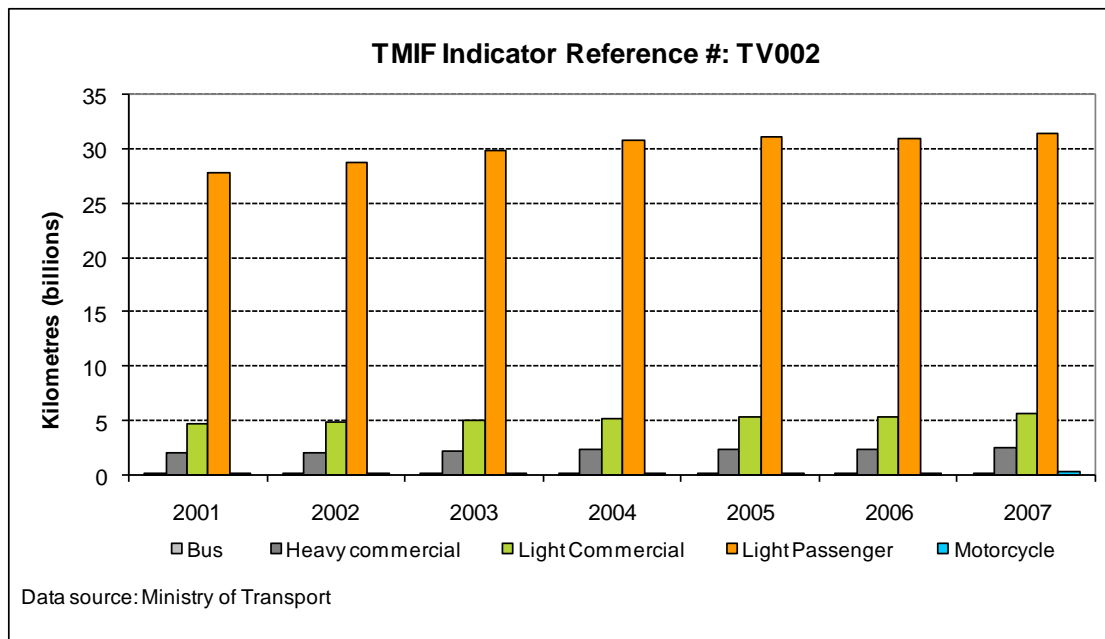
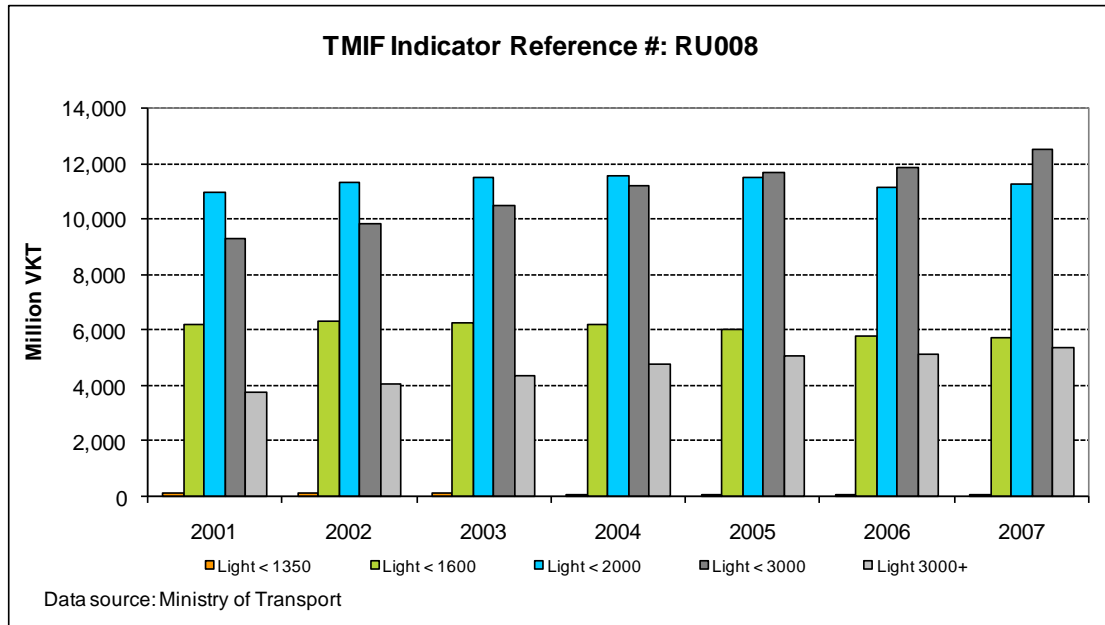


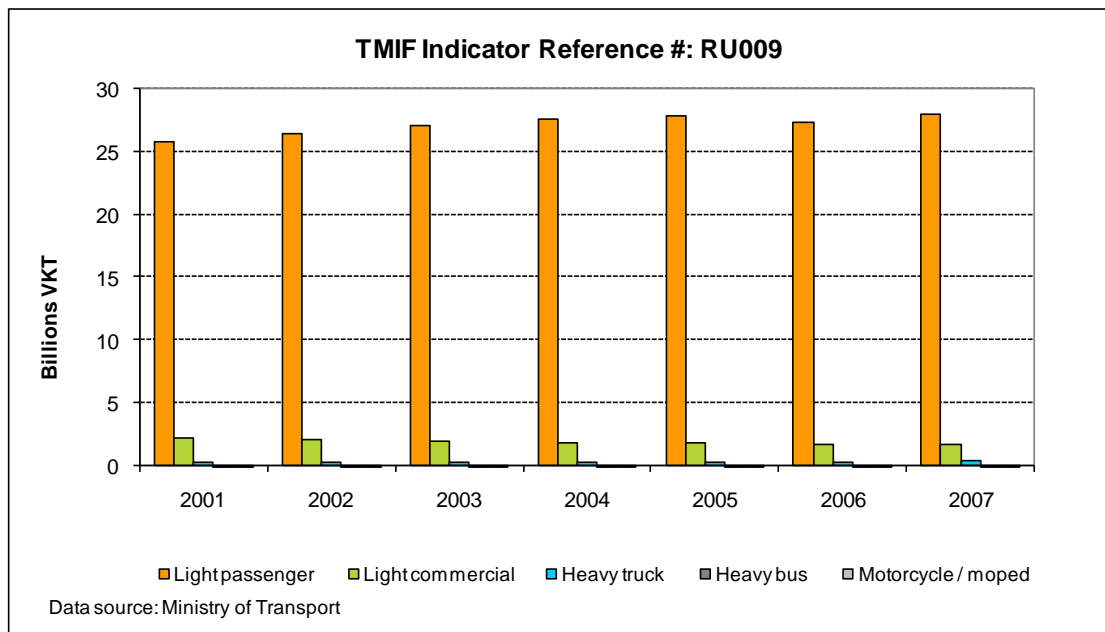
Figure 116: Road fleet VKT by vehicle class (cubic centimetres)



The move to larger engine vehicles is well illustrated in Figure 117.

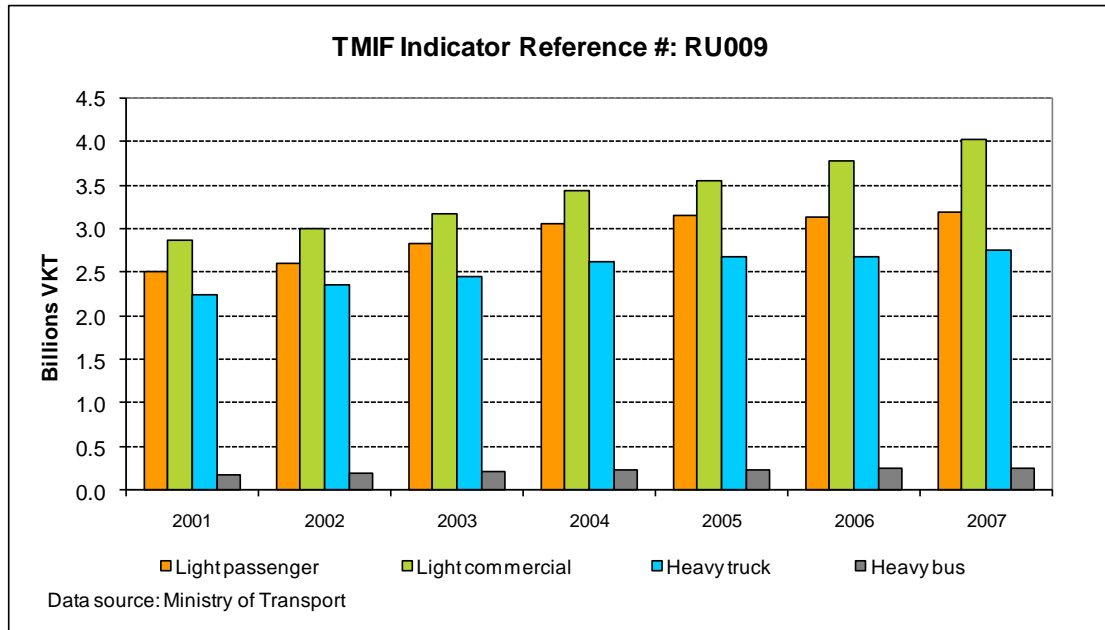
- From 2001 to 2005, VKT of light vehicles with engines of <3000 cubic centimetres (cc) increased.
- In 2005, light vehicles with engines of <3000 cc had a greater VKT than light vehicles with an engine size of <2000 cc.

Figure 117: VKT by fuel type, petrol



For petrol-fuelled vehicles, the trend in recent years has been an increasing VKT for light passenger vehicles, and decreasing VKT for light commercial vehicles. This decrease in light commercial vehicles could be linked to the trend of increasing diesel VKT for light commercial vehicles. In 2007, the VKT for light passenger petrol-fuelled vehicles was 28.0 billion, a slight increase from 27.3 billion in 2006. The VKT for light commercial vehicles in 2007 was 1.6 billion, a slight decrease from the 1.7 billion in 2006.

Figure 118: VKT by fuel type, diesel



Vehicle kilometres travelled by diesel-fuelled vehicles has increased for all vehicle classes during the period 2001 to 2007. Light commercial vehicles experienced the greatest rate of growth in VKT travelled, increasing by 38% over the given period. The VKT travelled by light passenger diesel-fuelled vehicles also showed a significant increase of 28% over this time period, from 2.5 billion VKT to 3.2 billion VKT.

**The move to diesel**

The New Zealand vehicle fleet has experienced a shift to diesel-powered vehicles. This is due in part to the increase in freight transport which is almost entirely diesel-powered, as well as the rising popularity of diesel-powered SUVs and light trucks. There has been a relatively small shift to diesel-powered light passenger vehicles.

All classes of diesel-fuelled vehicles have experienced increases in number since 2000. Light passenger and light commercial vehicle numbers increased by more than 50% over the eight years after 2000. The number of heavy truck and heavy bus vehicles also increased significantly, rising by 38% and 62% respectively, relative to 2000.

Figure 119: Diesel-fuelled fleet

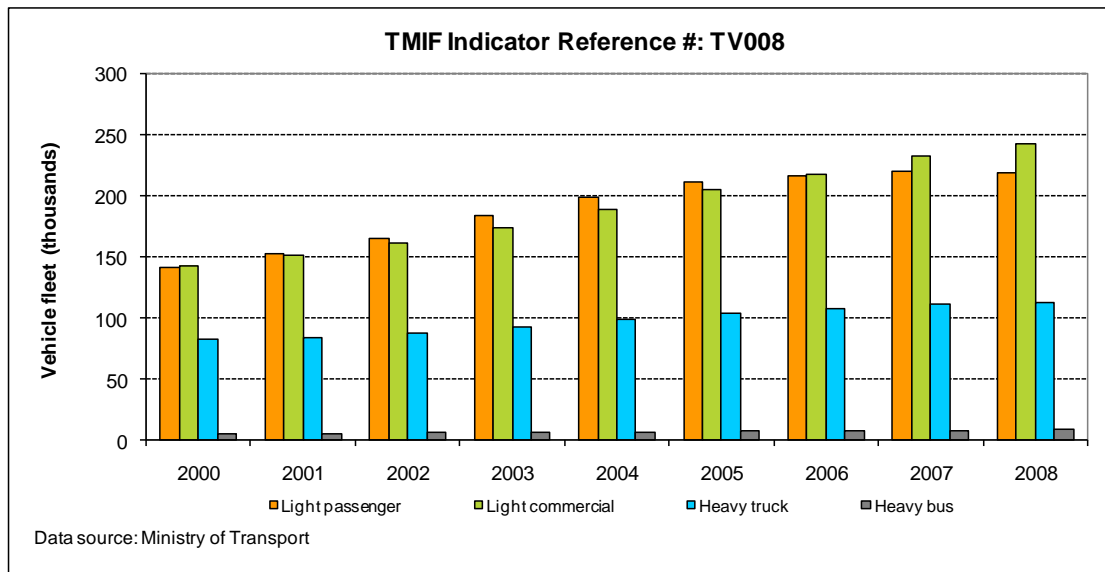
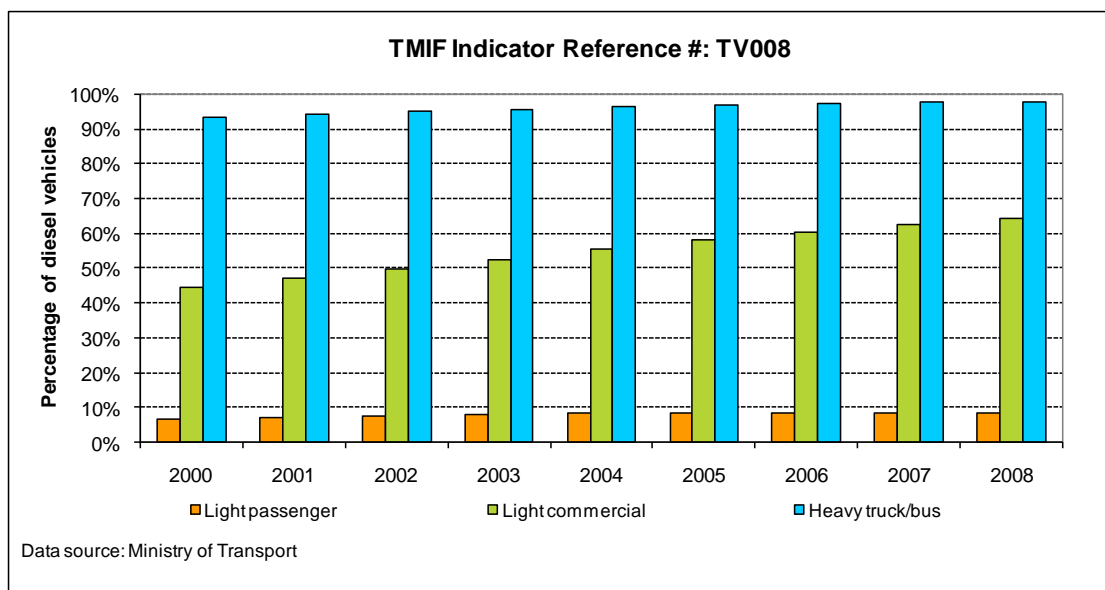


Figure 120: The move to diesel (percentage of fleet which is diesel vehicles)



Heavy truck and bus vehicles remain the vehicle type with the highest percentage of its fleet run on diesel. For the year 2008, 97.8% of the heavy truck and bus vehicle fleet were recorded in the Motor Vehicle Register as being diesel vehicles. The proportion of diesel vehicles in the light commercial fleet is increasing, with 64.3% recorded in 2008, an increase of 62.6% on the 2007 figure. The percentage of the light passenger fleet which is diesel powered has remained at 8.5% for the years 2006 to 2008.

## Noise

The following TMIF indicators have been created for monitoring the public-health effects of noise:

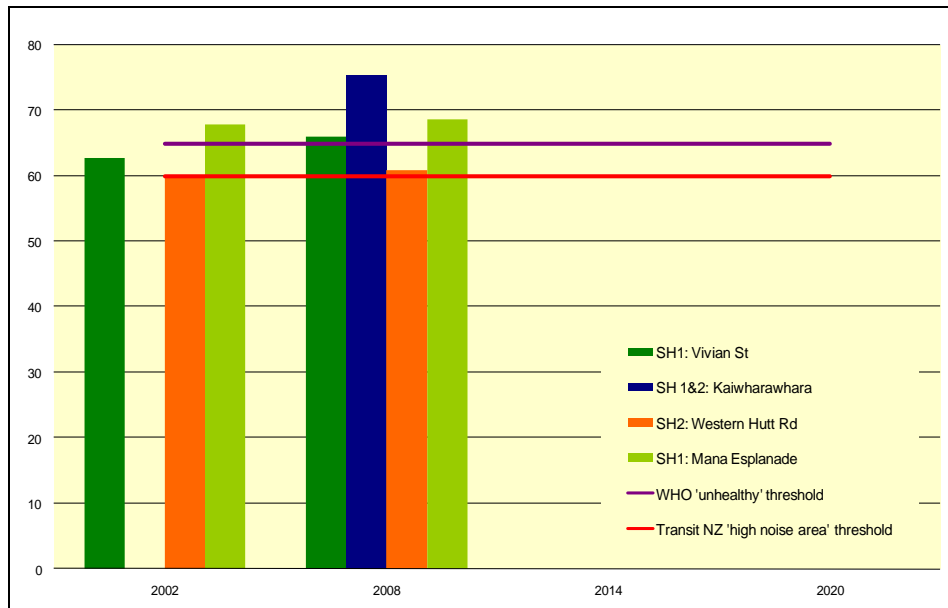
- PH001: Percentage of residential population who are exposed to road- user traffic noise in excess of the following noise levels: 55, 60, 65, 70 dB(A)Leq, 24hours
- PH002: Number of residential buildings that are exposed to airport noise in excess of the following noise levels: 55, 60, 65, 70 dB(A)Leq, 24hours
- PH003: Number of residential buildings that are exposed to seaport noise in excess of the following noise levels: 55 and 65 dB (A) LdN
- PH004: Social costs of transport-related noise
- PH010: Traffic noise measurements that are in excess of 55, 60, 65, 70 dB(A)Leq, 24hours.

There are no comprehensive national noise-quality indicator monitoring programmes currently in place. At present there are only ad-hoc data available. The data, graphs and indicators referred to below are being used as a proxy in this report; they are not data collected under the TMIF.

Below are data collected by the Greater Wellington Regional Council (GWRC) which has undertaken periodic monitoring of road-traffic noise at specific sites around Wellington. The sites were intentionally chosen to be near high traffic-volume roads where high traffic-noise levels might be expected.

It is important to bear in mind that not all sites which have excessive noise levels will be causing negative health effects, as they may not be near residential areas. For example, in the graph below, the Kaiwharawhara site has the highest level of noise measured, but there are no residential areas which would be affected near this site. In contrast, the Vivian Street site monitoring is located near residential buildings, and high noise levels on this street will affect people in these areas.

**Figure 121: Noise near to arterial routes (L<sub>Aeq</sub>, dB(A))**



Data source: GWRC survey, 2002.

The graph marks the NZ Transport Agency (NZTA) guidelines for what is a 'high noise' area (> 59dB (A) Leq (24hour)). The NZTA guidelines are a main source of guidelines for noise levels in New Zealand. GWRC has noted that, for the 2008 data, three of the four sites measured were classed as 'high noise' areas.

These data are an example of how to gather and display data on noise exposure. This is the kind of data that could contribute to national data which is sought for the TMIF indicators PH001 and PH010; ie, indicators which consider road-traffic noise levels in residential areas.

The above data show that all four sites have recorded noise levels of about 55 dBH(A) and 60 dB LAeq(24hr), and that three of the sites have levels higher than 65 dB LAeq(24hr). However, as previously indicated, some of the monitoring sites included in the Wellington survey are not in residential areas.

## Air quality

The following TMIF indicators relate to air quality:

- PH005 Emissions of particulates (PM<sub>10</sub> and PM<sub>2.5</sub>), nitrogen oxides (NO<sub>x</sub>, NO and NO<sub>2</sub>), carbon monoxide (CO), sulphur dioxide (SO<sub>2</sub>) benzene (C<sub>6</sub>H<sub>6</sub>) and 1,3 butadiene (C<sub>4</sub>H<sub>6</sub>) by mode (road, rail, maritime, aviation)
- PH006 Social cost to human health of transport-related air pollution
- PH007 The number of occasions on which ambient concentrations of particulates (PM<sub>10</sub> and PM<sub>2.5</sub>), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO) and sulphur dioxide (SO<sub>2</sub>), measured in areas where the impact of transport emission is significant, are in excess of the relevant standards and guidelines specified in the National Environmental Standard for Air Quality, in the Ministry for the Environment Ambient Air Quality Guidelines and by the World Health Organization
- PH008 Percentage of the total population residing in areas where the impact of transport emissions is significant, and the exposure to ambient concentrations of particulates (PM<sub>10</sub> and PM<sub>2.5</sub>), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO) and sulphur dioxide (SO<sub>2</sub>), is in excess of the relevant standards and guidelines specified in the National Environmental Standard for Air Quality, in the Ministry of the Environment Ambient Air Quality Guidelines and by the World Health Organization.

There are no comprehensive national air-quality indicator monitoring programmes currently in place. At present there are only ad-hoc data available. The data, graphs and indicators referred to below are being used as a proxy in this report; they are not data collected under the TMIF.

The impact on health of vehicle-produced emissions is a matter of continuing concern. The first national study of the health impacts of vehicle emissions in New Zealand estimated that emissions contributed to the premature mortality of between 241 and 566 people in New Zealand annually.<sup>37</sup>

Acidifying substances (sulphur dioxide, nitrogen oxides and ammonia) bring about changes in soil and water quality, and damage to forests, crops and other vegetation, as well as damage to buildings and cultural monuments.

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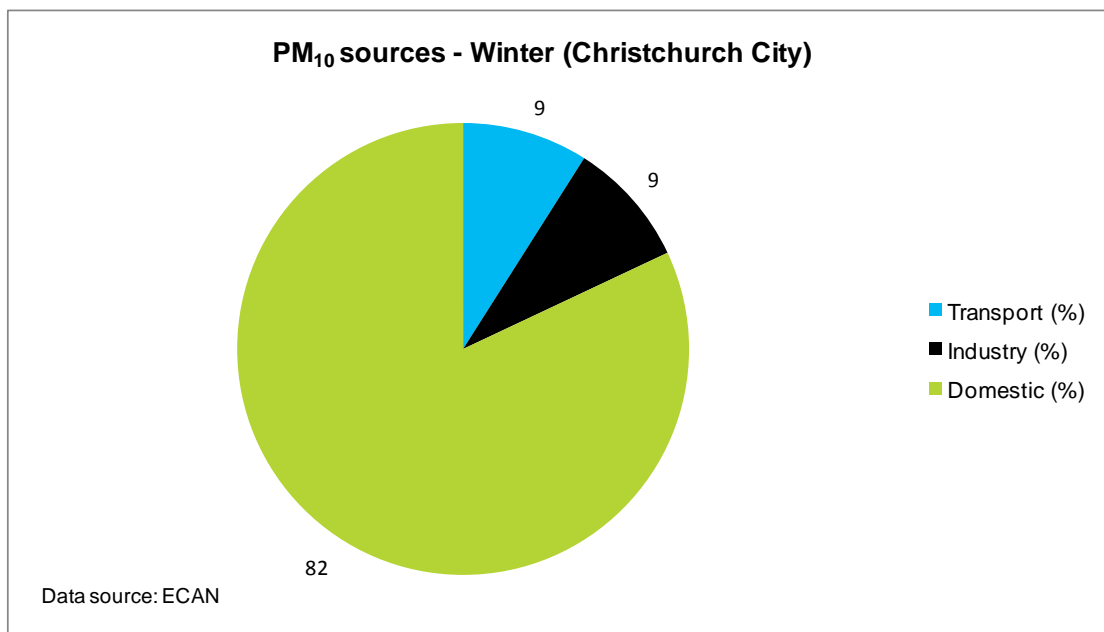
<sup>37</sup> Fisher et al. (2002) Health effects of motor vehicle air pollution in New Zealand.

**PM<sub>10</sub>**

PM<sub>10</sub> is an air pollutant which regularly occurs at high concentrations in urban areas, and is linked to harmful health effects. While transport is a contributor to PM<sub>10</sub> levels, there are other sources, such as domestic wood-burning fires which also make a large contribution.

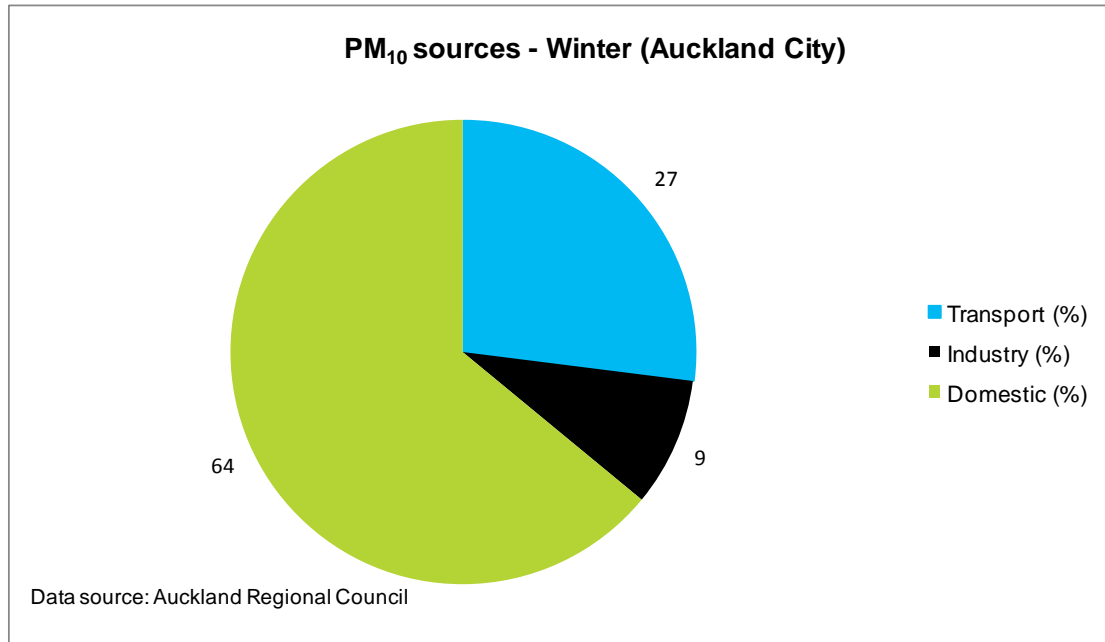
The three graphs below provide a 'snap-shot' of the contributors to PM<sub>10</sub> in Auckland, Wellington and Christchurch. Each graph shows the percentage contributed by the main sources of PM<sub>10</sub> in winter. The graphs do not detail data collected at the same time, and serve as a rough guide to how the contribution that transport makes to PM<sub>10</sub> levels may differ among regions.

**Figure 122: PM<sub>10</sub> sources: Christchurch**



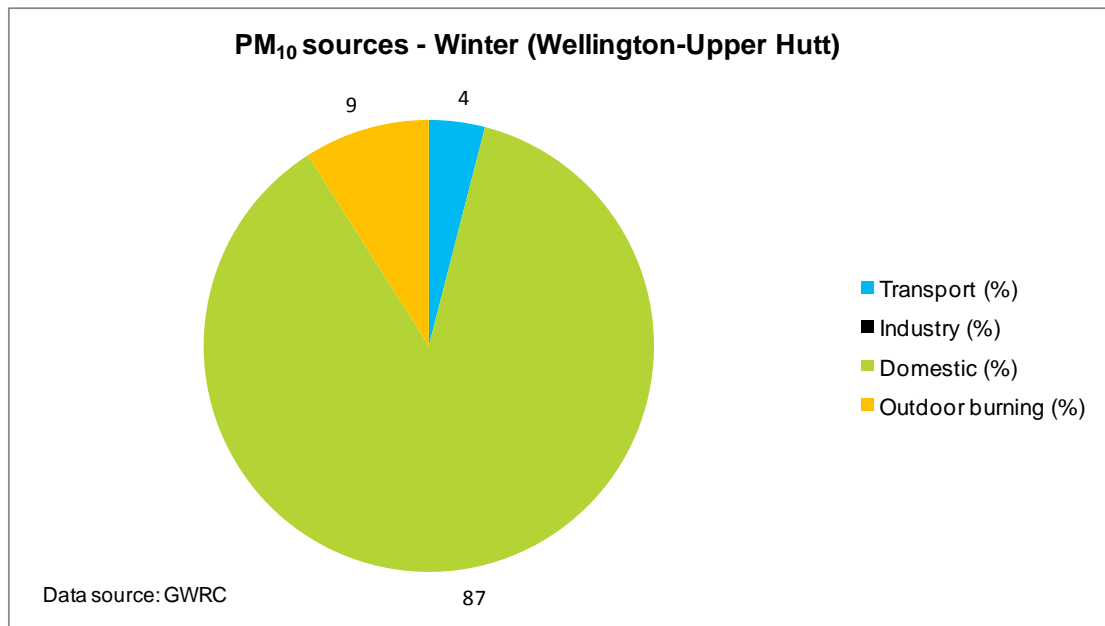
Data published in 'Inventory of emissions to air in Waimate, Ashburton, Kaiapoi and Rangiora', Environment Canterbury, 2004

Figure 123: PM<sub>10</sub> sources: Auckland



Data collected by Auckland Regional Council, 2004

Figure 124: PM<sub>10</sub> sources: Wellington



Data published in 'Annual air quality report for the Wellington region, 2006' - Greater Wellington Regional Council

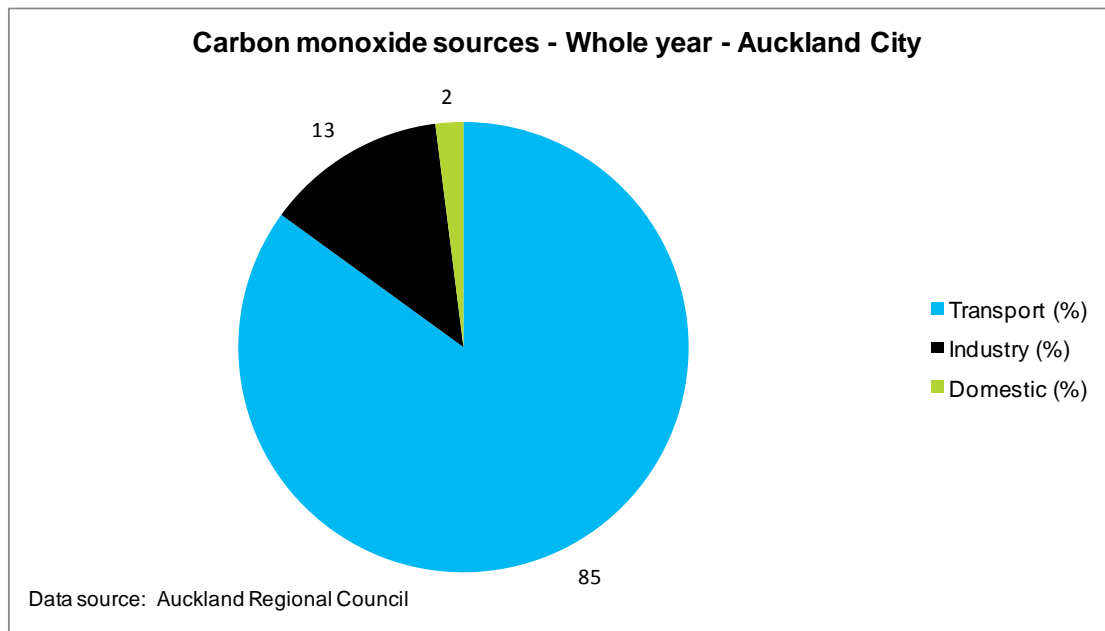
The graphs illustrate that the percentage contribution which transport makes to PM<sub>10</sub> levels varies greatly. These graphs show that, in areas such as Christchurch, atmospheric conditions and a heavy reliance on wood-burning heating mean that transport makes a lower percentage contribution than in other areas. Areas such as Auckland City have heavy transport traffic flow and a lower ratio of wood-burning heating. The Upper Hutt graph has a very low transport percentage (4%) and a high domestic percentage, illustrating lower amounts of traffic and transport emissions in Upper Hutt, when compared to Auckland City and Christchurch City.

**Carbon monoxide**

Carbon monoxide (CO) is formed from burning fuel, particularly incomplete combustion. Transport modes (especially motor vehicles) produce carbon monoxide by the incomplete combustion of carbon-containing fuels.<sup>38</sup>

The graphs below provide a ‘snap-shot’ of the contributors to carbon monoxide in Auckland and Hamilton. Each graph shows the percentage contributed by the main sources of carbon monoxide for a whole year, on average. The graphs do not detail data collected at the same time, and serve as a rough guide for how the contribution which transport makes to carbon monoxide may differ between regions.

**Figure 125: Carbon monoxide sources: whole year, Auckland 2004**

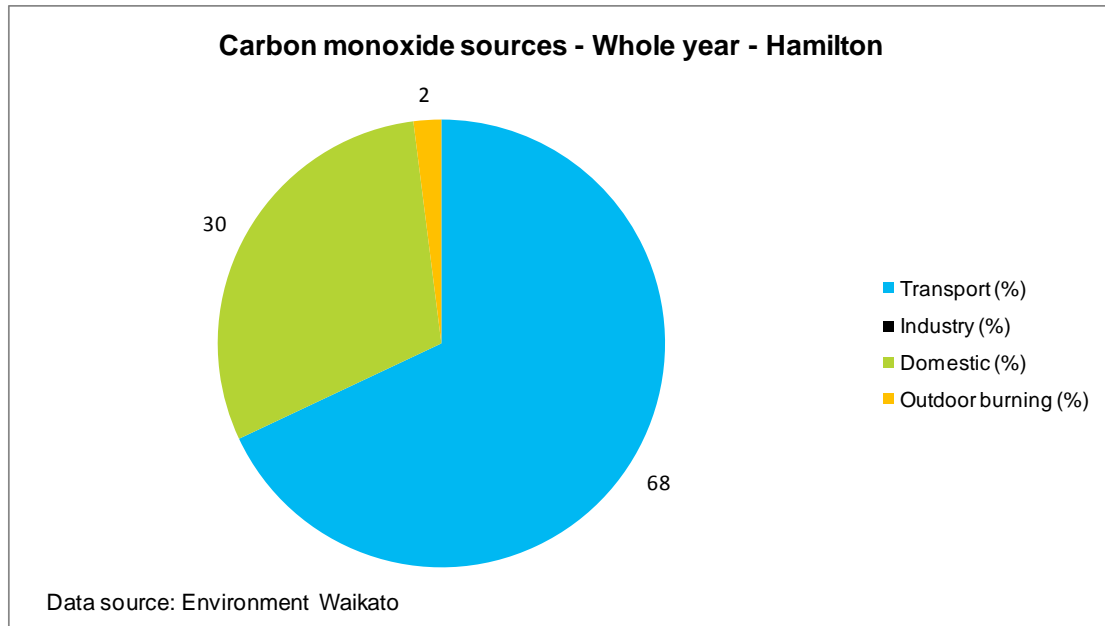


Data published in 'Auckland Air Emissions Inventory, 2004', February 2006, ARC

In the above graph, 85% of carbon monoxide emissions for the recorded year were produced by transport.

<sup>38</sup> MfE Ambient Air Quality Guidelines, 2002

Figure 126: Carbon monoxide sources: Hamilton 2005



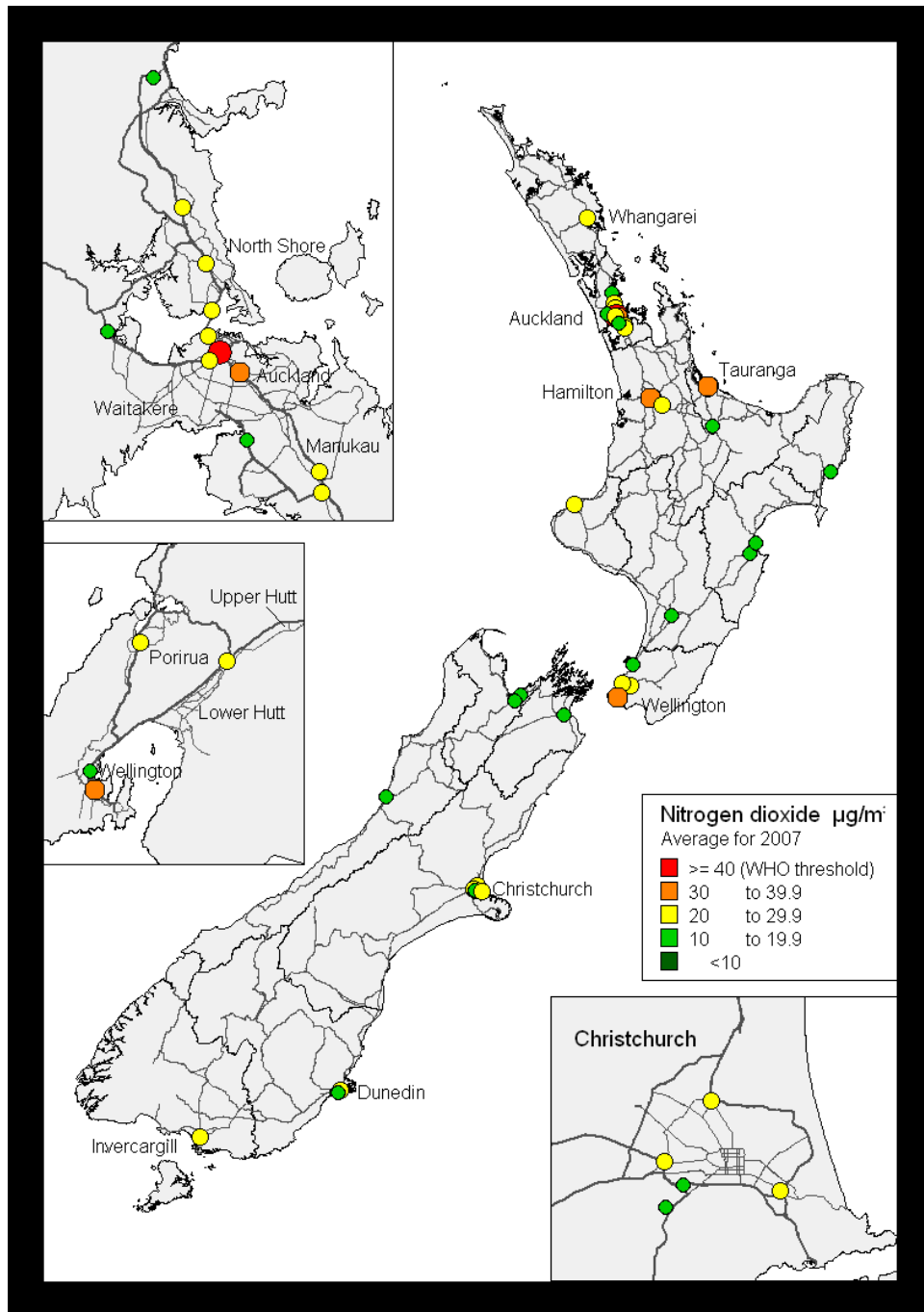
Data published in 'Carbon Monoxide Levels in Air', Environment Waikato

In 2005, transport contributed to 68% of carbon monoxide recorded in Hamilton. Carbon monoxide emissions from transport can be reduced by keeping vehicles well tuned, using emission-control equipment in vehicles and limiting vehicle use.

### Nitrogen oxides (NO<sub>x</sub>)

Nitrogen oxides (NO<sub>x</sub> = NO + NO<sub>2</sub>) are derived mainly from the combustion of fossil fuels by oxidation of the nitrogen present in the atmosphere. The health effects of NO<sub>x</sub> include an increase in susceptibility to, and severity of, asthma and a lowered resistance to infections.<sup>39</sup>

Figure 127: Nitrogen dioxide levels at air-quality monitoring sites



Data source: Transit NZ (2007)

<sup>39</sup> MfE Ambient Air Quality Guidelines, 2002.

To monitor air quality, and levels of pollutants like NO<sub>2</sub>, ‘airsheds’ have been set up around the country. Currently there are 68 airsheds in areas where it is considered that air quality is likely to breach the national environmental standards. Approximately 1.5% of New Zealand’s total land area has been gazetted as included in an airshed. This equates to an area in which an estimated two-thirds of New Zealand’s population live.<sup>40</sup>

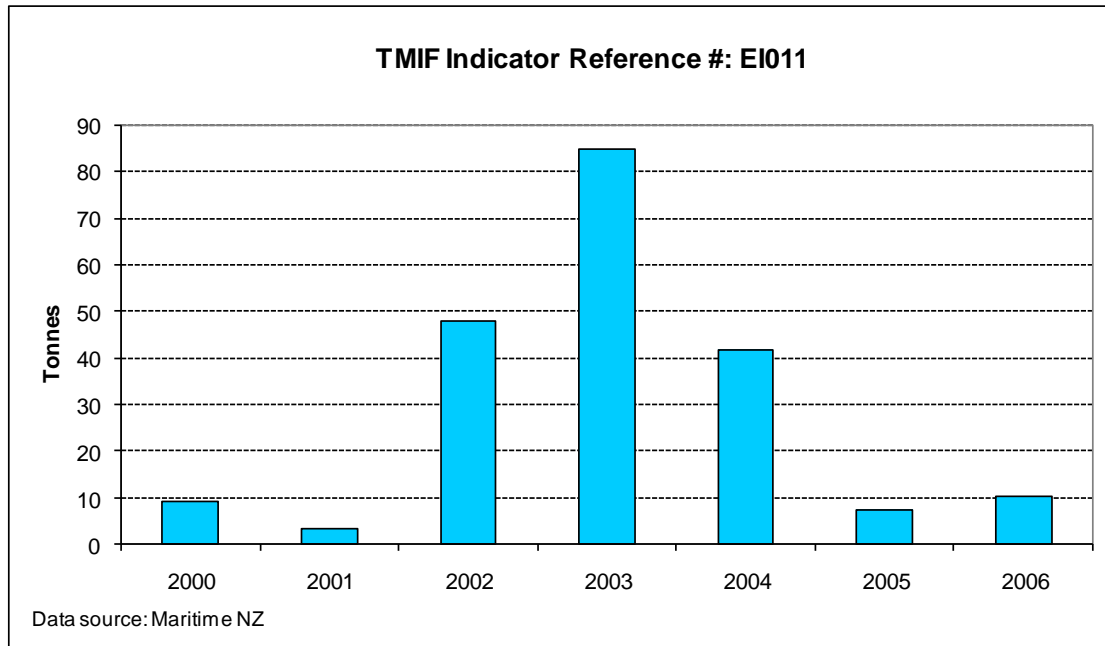
### Sulphur

As at January 2009, diesel fuel for road transport became ‘zero sulphur’. Diesel will be less than 10ppm, with the result that road transport will be a negligible source of sulphur. Marine diesel still has high sulphur content.

### Maritime oil spills

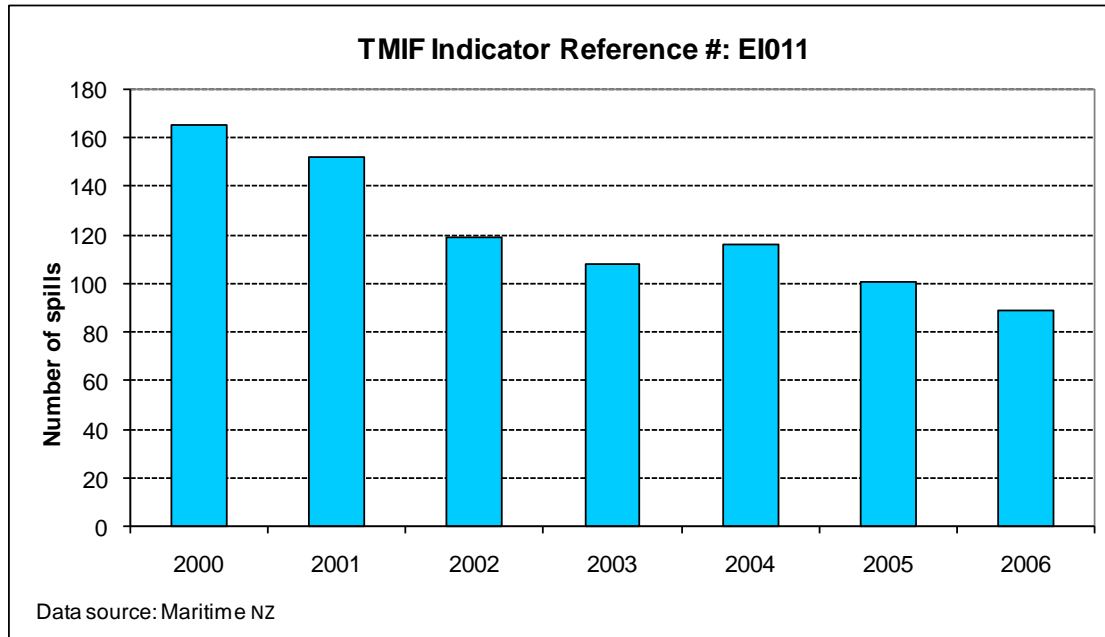
The graphs below record the number and amount of maritime oil spills which have occurred in New Zealand.

**Figure 128: The amount (tonnes) spilt in maritime oil spills, per year**



<sup>40</sup> MfE Air Quality (Particulate Matter-PM<sub>10</sub>) Report Card - Feb 2009

Figure 129: The number of spills which occurred, per year



## Appendix 1

The following TMIF indicators are not yet supported by data. It is the aim for the TMIF to contain data on all indicators eventually.

- TV013: Distance travelled by walking and cycling by residents of main and secondary urban areas.
- TV018: Average load of heavy vehicles
- TV024: Freight tonne-kilometres inter-regional mode share
- TV026: Overseas cargo value loaded/unloaded by port/airport
- TV028: Road VKT in major urban areas
- TV029: Percentage of empty-running heavy vehicles
- TV031: Average load of heavy vehicles
- NR001: Road network congestion
- NR003: Percentage variability of travel time (road, rail, maritime, aviation)
- NR004: Average journey times for identified critical routes
- NR005: Average reliability of journey times for identified critical routes
- ET006: Freight tonne-km growth compared to GDP growth by mode (road, rail, maritime, aviation)
- ET007: Value of road freight per tonne-km
- AM002: Price of domestic air travel between major urban centres compared to the median wage
- AM003: Price of international air travel from NZ compared to median wage
- AM004: Access to essential services
- AM005: Percentage of the population who can get to key locations door-to-door by public transport
- AM017: Percentage of fully accessible buses and trains on specified routes
- AM018: Percentage of fully accessible bus stops and train stations
- AM019: Number of wheelchair-accessible taxis (city/town)
- AM020: Availability of accessible information about public transport
- TB008: Percentage of road-based short trips of less than 5 km by bicycle
- TB009: Percentage of road-based short trips less than 2 km on foot
- TB010: Change in mode share of workplace travel (modal shift)
- TB011: Kilometres travelled for workplace travel (all modes)
- TB012: Trip duration for workplace travel

- SS011: Personal security incidents while using the transport network (road, rail, ferry, aviation)
- SS012: Resilience of the transport system
- SS013: Security of the transport system
- PH001: Percentage of the residential population that is exposed to road traffic noise in excess of the following noise levels: 55, 60, 65, 70, 75 dB(A) Leq, 24hours
- PH002: Number of residential buildings that are exposed to airport noise in excess of the following noise levels: 55, 60, 65, 70, 75 dB(A) Leq, 24hours
- PH003: Number of residential buildings that are exposed to seaport noise in excess of the following noise levels: 55, 60, 65, 70, 75 dB(A) Leq, 24hours
- PH004: Social cost of transport-related noise
- PH005: Emissions of particulates (PM<sub>10</sub> and PM<sub>2.5</sub>), nitrogen oxides (NO<sub>x</sub>, NO and NO<sub>2</sub>), carbon monoxide (CO), sulphur dioxides (SO<sub>2</sub>), benzene (C<sub>6</sub>H<sub>6</sub>) and 1,3 butadiene (C<sub>4</sub>H<sub>6</sub>) by mode (road, rail, maritime and aviation)
- PH006: Social cost to human health of transport-related air pollution
- PH007: The number of occasions on which ambient concentrations of particulates (PM<sub>10</sub> and PM<sub>2.5</sub>), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO) and sulphur dioxide (SO<sub>2</sub>), measured in areas where the impact of transport emissions is significant, are in excess of the relevant standards and guidelines specified in the National Environment Standard for Air Quality, in the Ministry for the Environment Ambient Air Quality Guidelines, and by the World Health Organization
- PH008: Percentage of the total population residing in areas where the impact of transport emissions is significant, and the exposure to ambient concentrations of particulates (PM<sub>10</sub> and PM<sub>2.5</sub>), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO) and sulphur dioxide (SO<sub>2</sub>) is in excess of the relevant standards and guidelines specified.
- PH009: Total number of transport-related occupational health incidents (long-term and short-term) by mode (road, rail, maritime and aviation)
- PH010: Road traffic noise measurements that are in excess of 55, 60, 65, 70 and 75 dB(A), Leq, 24hours
- LM005: Length of footpath
- LM006: International airports with > 10 plane departures per week
- LM008: Rail track quality
- LM009: Cycle path quality
- LM010: Footpath quality
- LM011: Airport quality
- LM012: Port quality
- LM013: Percentage of deregistered or wrecked vehicles, aeroplanes, ships, trains, recycled
- LM014: Lane km of pavement using recycled material (State Highway)
- LM015: Volume of pavement waste to landfill
- LM016: Tonnes of waste product used for bio fuels or biodiesel production
- LM018: Bus stop quality

- LM019: Rail station quality
- EI001: Tonnes of CO<sub>2</sub> equivalent emissions from domestic transport by mode (road, rail, maritime, aviation)
- EI002: Grams of CO<sub>2</sub> per km driven by vehicles entering the light vehicle fleet
- EI003: Tonnes of CO<sub>2</sub> and tonnes of CO<sub>2</sub> equivalent emitted from domestic transport per vehicle-km travelled by mode (road, rail, maritime, aviation)
- EI005: Tonnes of CO<sub>2</sub> emitted and tonnes of CO<sub>2</sub> equivalent emitted from domestic transport per tonne-km by mode (road, rail, maritime, aviation)
- EI006: Tonnes of CO<sub>2</sub> and tonnes of CO<sub>2</sub> equivalent emitted from domestic transport per person-km travelled by mode (road, rail, maritime, aviation)
- EI007: Total emissions of methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) by mode (road, rail, maritime, aviation)
- EI009: Area of Crown transport land covered with indigenous vegetation
- EI010: Number of stormwater quality improvement devices installed per km of road
- EI012: Harbour water quality
- RU001: Energy use in petajoules (PJ) by domestic transport compared to other sectors
- RU002: Energy use per vehicle-km travelled by domestic transport mode (road, rail, maritime, aviation)
- RU003: Energy use (PJ) per capita by domestic transport mode (road, rail, maritime, aviation)
- RU004: Energy use (PJ) per tonne-km by domestic transport mode (road, rail, maritime, aviation)
- RU005: Energy use (PJ) per person-km travelled by domestic transport mode (road, rail, maritime, aviation)
- RU012: Land devoted to transportation facilities per capita