



NZ TRANSPORT AGENCY
WAKA KOTAHI

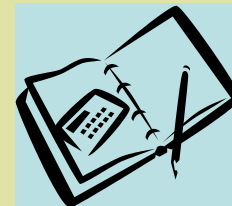
TRENDS IN TRANSPORT-RELATED AIR POLLUTION IN NZ

CASANZ Transport Special Interest Group Workshop
Sydney, Australia
8 September 2013

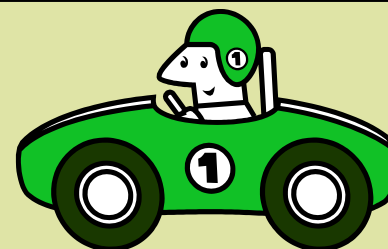
Rob Hannaby – Environment and Urban Design Manager
Highways and Network Operations
Professional Services

OVERVIEW

Context



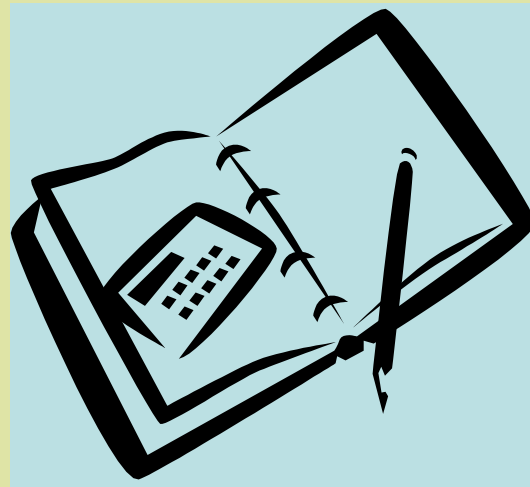
Fleet Trends



Air Quality Trends



CONTEXT



WHY MONITOR TRENDS?

“YOU CANNOT MANAGE WHAT YOU DO NOT MEASURE”

**Pavan Sukhdev – Deutsche Bank
UN Convention on Biological Diversity
20th October 2010**

Capital market expert leading the UN Environment Programme project “The Economics of Ecosystems and Biodiversity (TEEB)”



GOOD QUALITY DATA IS FUNDAMENTAL

- o establishing baseline levels
- o measuring performance against desired targets or indicators
- o highlighting trends – positive and negative – that may require action
- o testing effectiveness of improvements, such as ITS



Need good fleet and good air quality data to manage transport-related air pollution effectively

WHAT DATA EXIST FOR NZ?

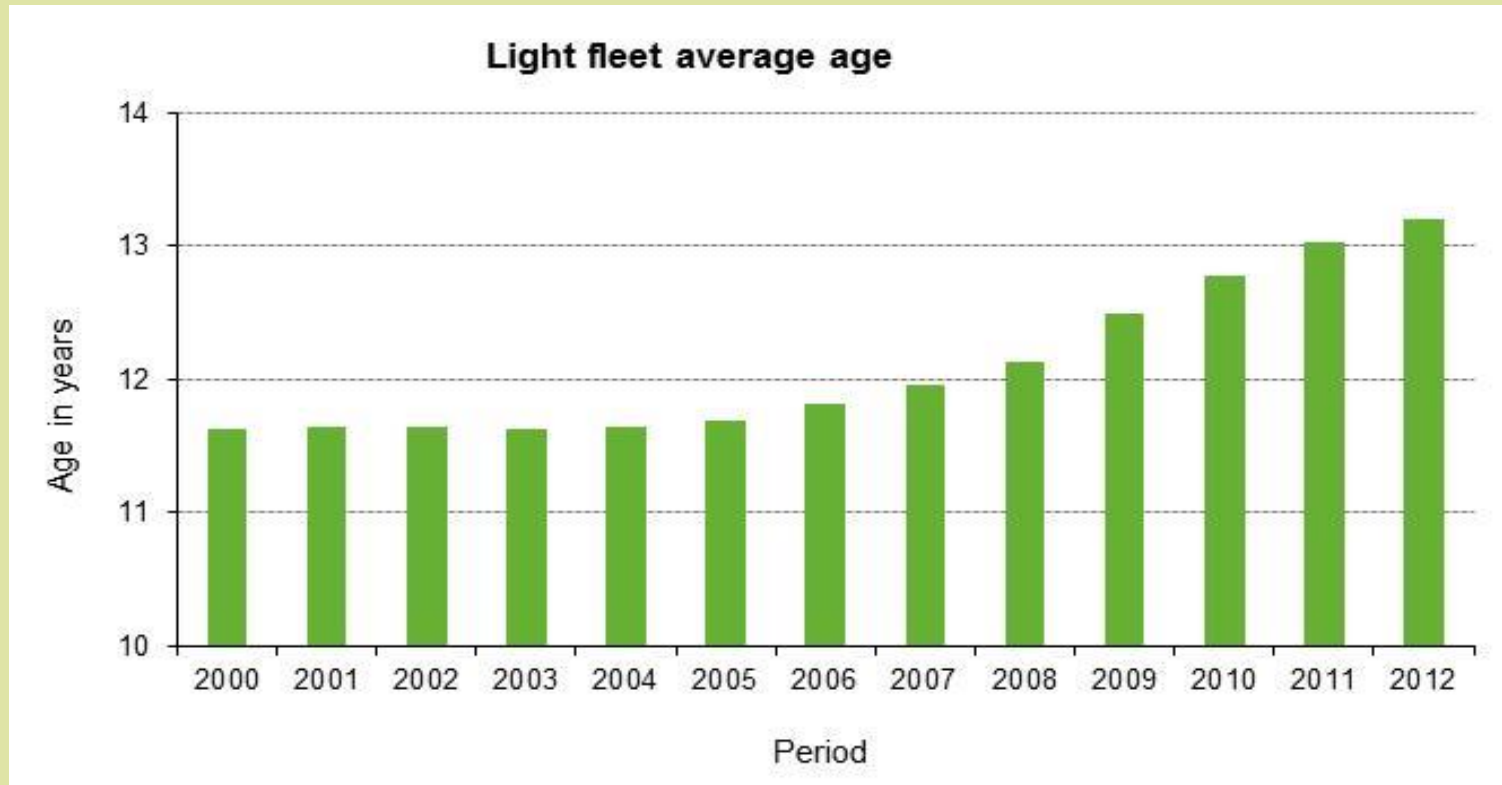
- o Vehicle fleet statistics
- o VKT and AADT info
- o Remote sensing data
- o National NO₂ network measurements
- o TRAMS database
- o Regional council and other data
- o HAPINZ results



FLEET TRENDS



FLEET COMPOSITION - AGE



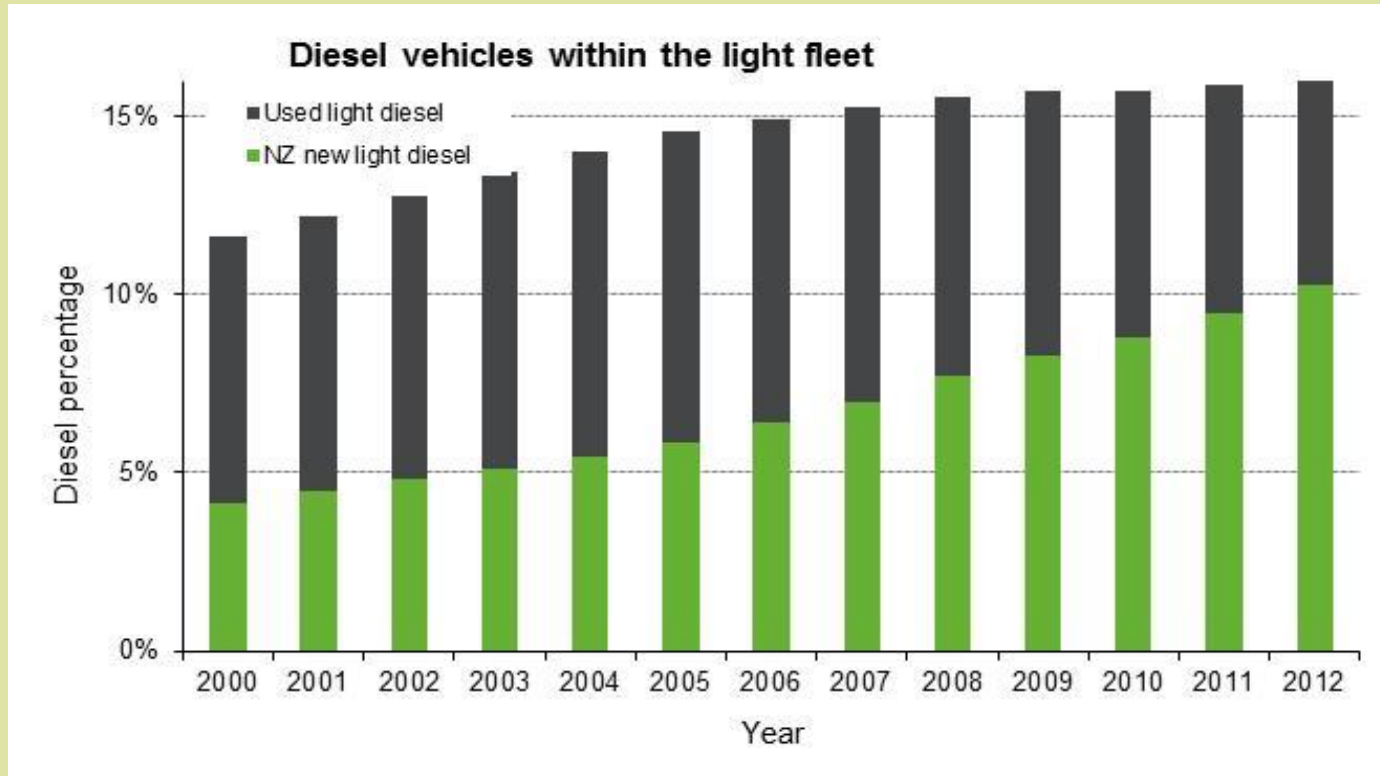
<http://www.transport.govt.nz/research/newzealandvehiclefleetstatistics/>



NZ TRANSPORT AGENCY
WAKA KOTAHI

New Zealand Government

FLEET COMPOSITION – FUEL TYPE

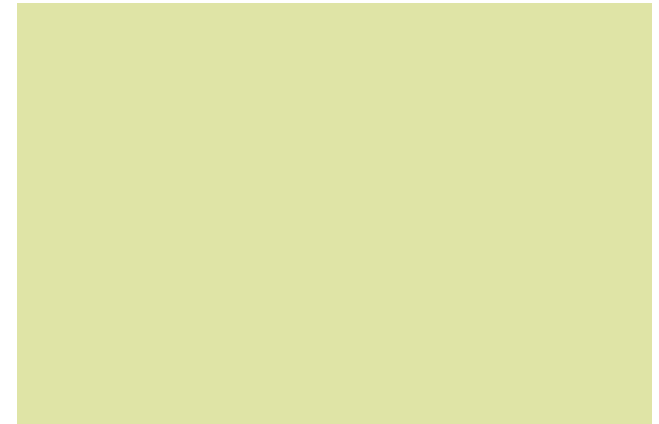
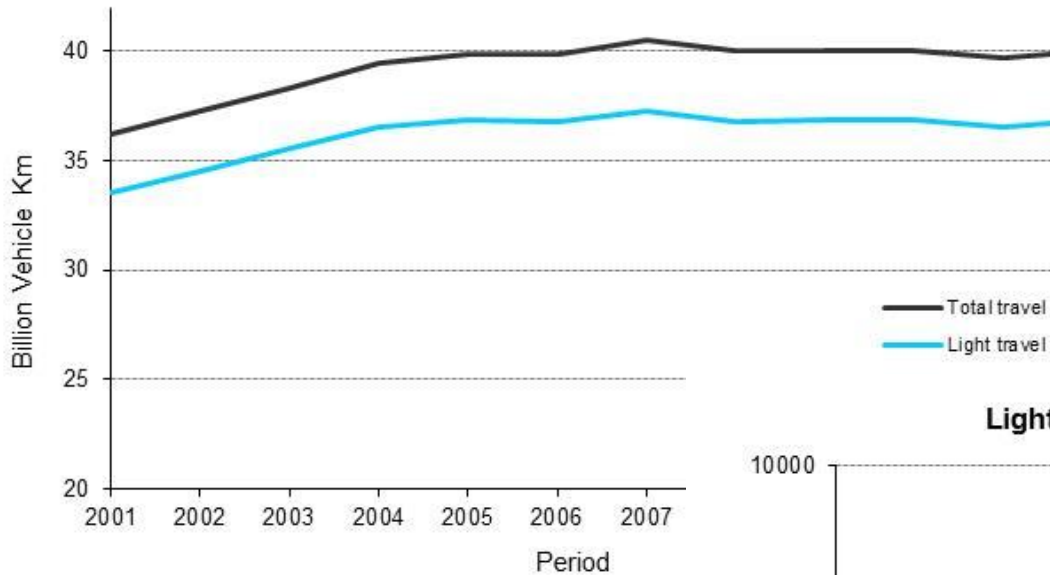


<http://www.transport.govt.nz/research/newzealandvehiclefleetstatistics/>

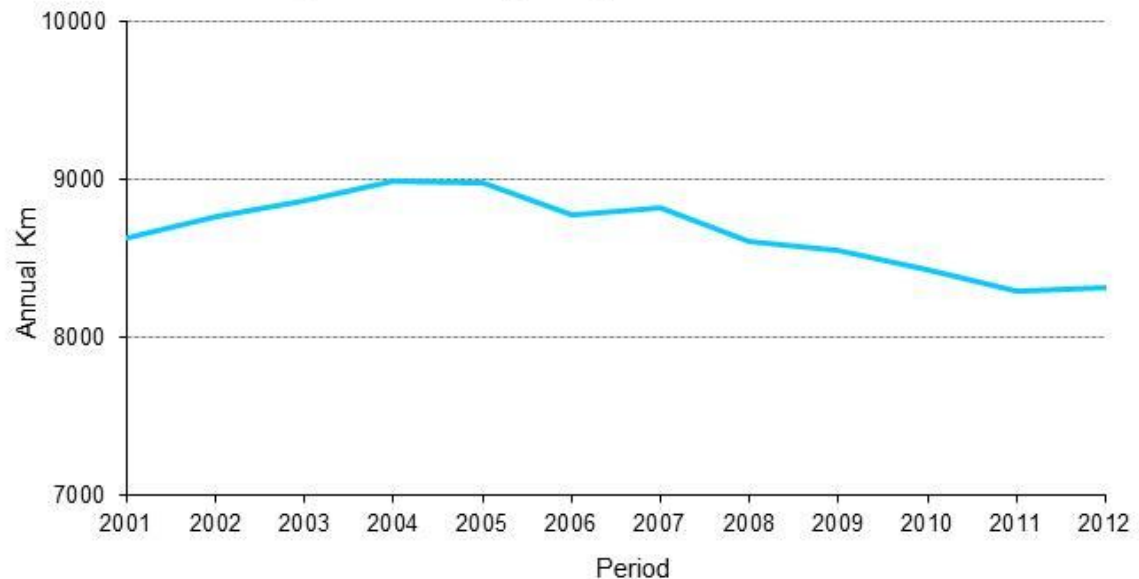


FLEET TRAVEL - NATIONAL

Light fleet total travel

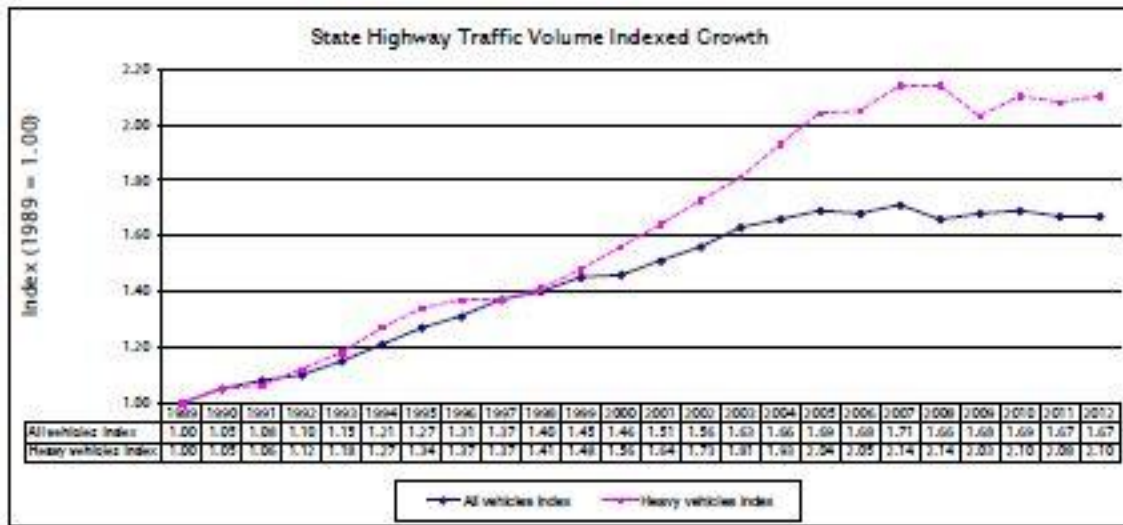


Light fleet travel per capita



<http://www.transport.govt.nz/research/newzealandvehiclefleetstatistics/>

FLEET TRAVEL – STATE HIGHWAY

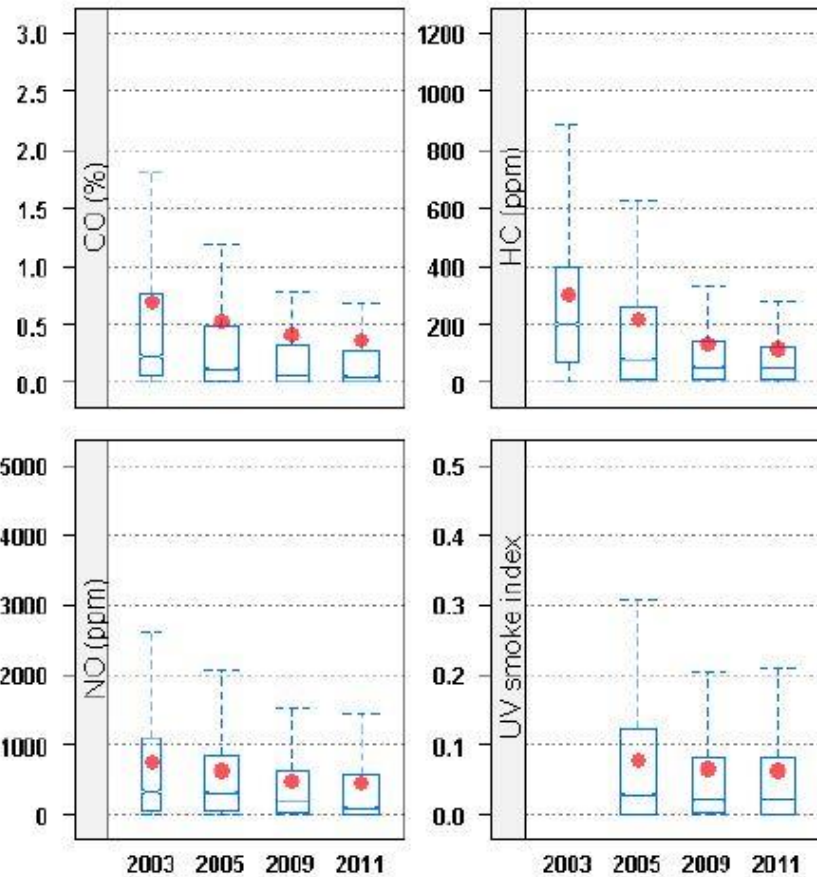


<http://www.nzta.govt.nz/resources/state-highway-traffic-volumes/>



State Highway Traffic Data Booklet
2008- 2012

FLEET EMISSIONS – REMOTE SENSING



Trends in Light Duty Vehicle Emissions
2003 to 2011
September 2012 TR 2012/032

Auckland Council
Technical Report TR2012/032
ISSN 2230-4525 (Print)
ISSN 2230-4533 (Online)
ISBN 978-1-927216-09-5 (Print)
ISBN 978-1-927216-10-1 (PDF)

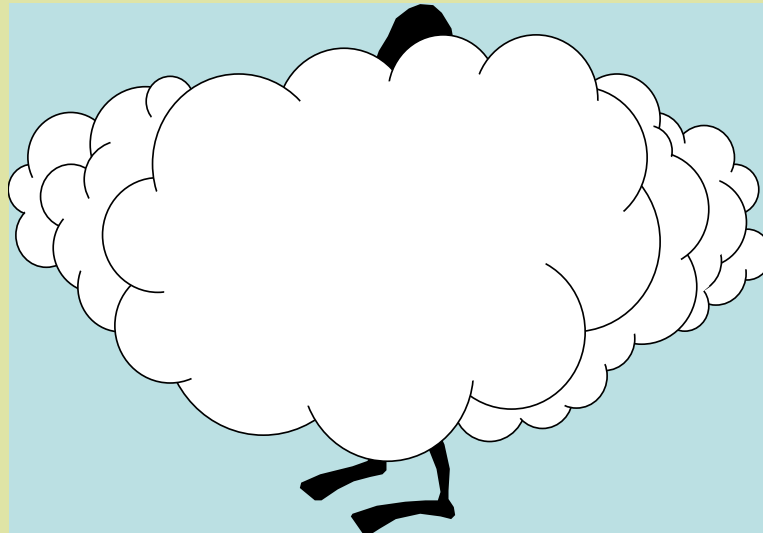
<http://www.aucklandcouncil.govt.nz/EN/planspoliciesprojects/reports/technicalpublications/Pages/technicalreports2012.aspx/>

SUMMARY OF KEY FLEET TRENDS

- o NZ fleet aging – average age now 13.2 years
- o Dieselisation increasing – now at 16.2% of light fleet with big increase in new light diesels
- o Fleet travel plateauing – total VKT and AADT stable since 2007 with per capita/vehicle travel decreasing
- o Fleet emissions better but ... – per vehicle emissions have improved significantly since 2003 but have plateaued especially for NO emissions from light diesels
- o Also introduction of emissions standards has not delivered expected reductions in emissions

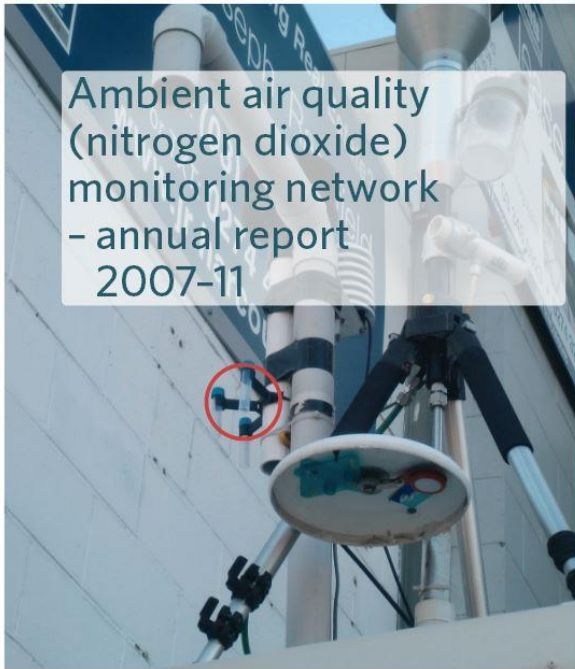


AIR QUALITY TRENDS



NZTA NATIONAL NO₂ NETWORK - 1

Ambient air quality
(nitrogen dioxide)
monitoring network
- annual report
2007-11

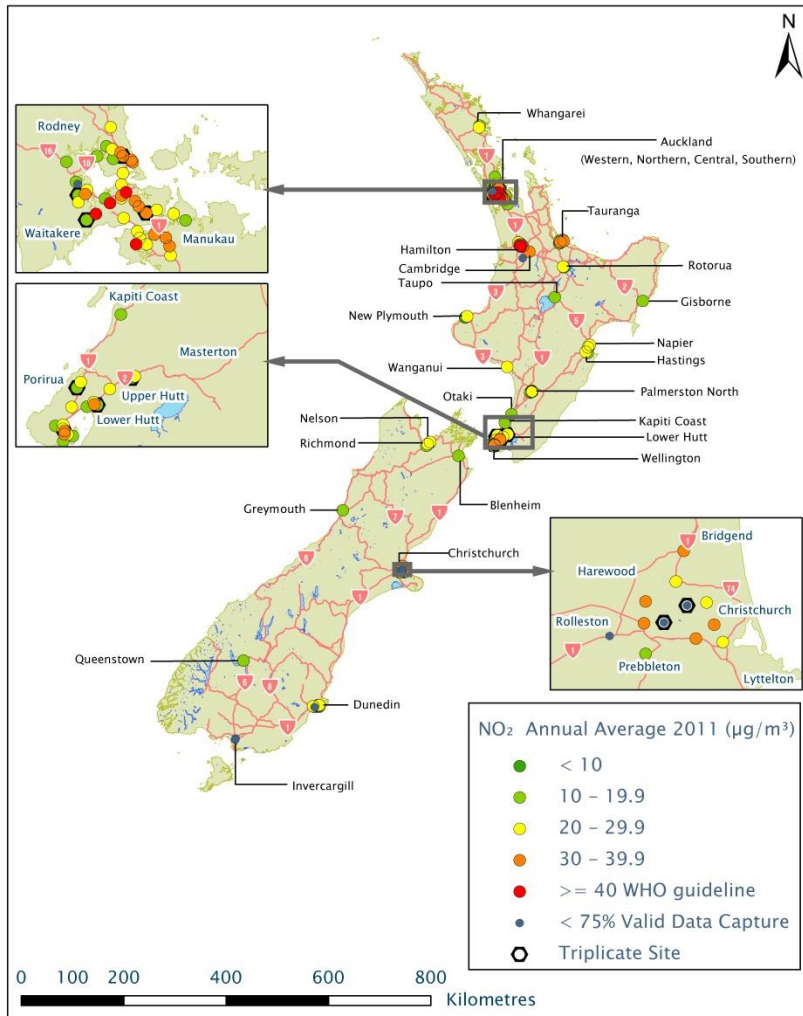


Ambient air quality
(nitrogen dioxide)
monitoring network -
site metadata report
2007-2011

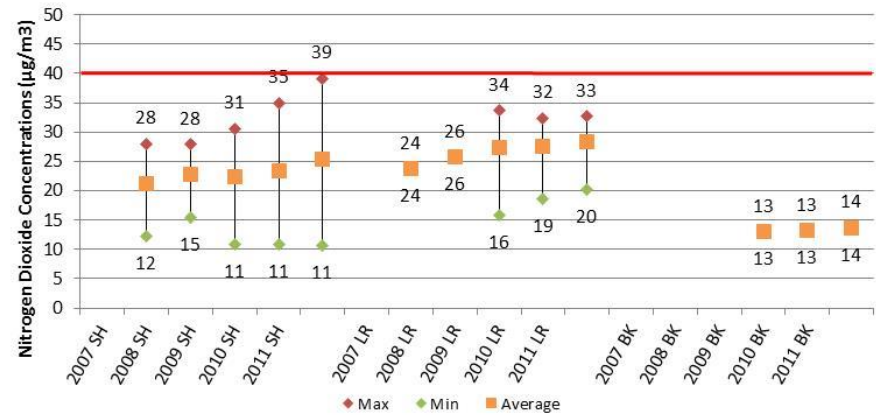


<http://www.nzta.govt.nz/resources/air-quality-monitoring/>

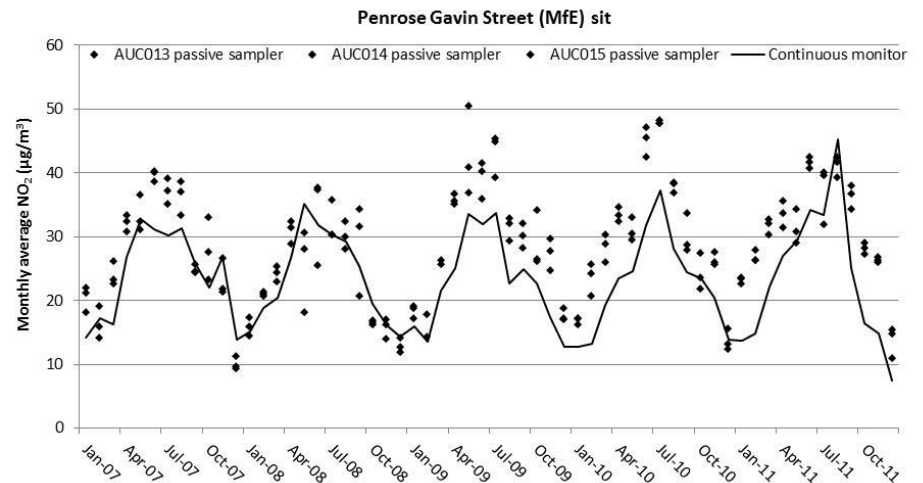
NZTA NATIONAL NO₂ NETWORK - 2



Annual Trends by Site Type - Auckland Northern




Co-located diffusion tube and continuous NO₂ monitoring results



NZTA TRAMS DATABASE - 1

Select a region



Auckland

Choose contaminants

	Select all
Benzene Annual	<input type="checkbox"/>
Carbon monoxide Max 1hr	<input type="checkbox"/>
Carbon monoxide Max 8hr	<input type="checkbox"/>
Nitrogen dioxide Annual	<input type="checkbox"/>
Nitrogen dioxide Max 1hr	<input type="checkbox"/>
Nitrogen dioxide Max 24hr	<input checked="" type="checkbox"/>
Nitrogen dioxide Summer	<input type="checkbox"/>
Nitrogen dioxide Winter	<input type="checkbox"/>
Particulate matter less than 10µm Annual	<input type="checkbox"/>
Particulate matter less than 10µm Max 24hr	<input checked="" type="checkbox"/>
Particulate matter less than 2.5µm Annual	<input type="checkbox"/>
Particulate matter less than 2.5µm Max 24hr	<input checked="" type="checkbox"/>

Show site summary

Export detailed contaminant data

<http://air.nzta.govt.nz/transport-related-air-quality-monitoring-data>

NZTA TRAMS DATABASE - 2

Auckland

Site ID	Site name	NO2 Max 24hr	PM10 Max 24hr	PM2.5 Max 24hr
AUC082	Christ the King School 2	Yes	Yes	No
AUC083	Christ the King School 1	Yes	Yes	No
AUC086	Alan Wood Reserve 1	Yes	Yes	Yes
AUC101	Cowley St	Yes	Yes	Yes
AUC172	Johnstone's Hill Tunnel	Yes	Yes	No
AUC174	Beaumont Centre Carpark	Yes	Yes	No
AUC175	Te Puea Marae	Yes	Yes	No
AUC184	Deas PI Reserve	Yes	Yes	No
AUC185	Deas PI	Yes	Yes	No
AUC186	Luke St	Yes	Yes	No

Auckland

AUC086 Alan Wood Reserve 1

Contaminant	2012	2011	2010	2009	2008	2007	2006
NO2 Max 24hr					37.7	34.2	86.0
PM10 Max 24hr			117.4		36.5	34.6	
PM2.5 Max 24hr			36.5				

[Choose a new region or contaminants](#)

[Export site summary](#)

Other Organisations

In addition to this data, please contact the following organisations as they may have additional monitoring data available:

Auckland Council tbc

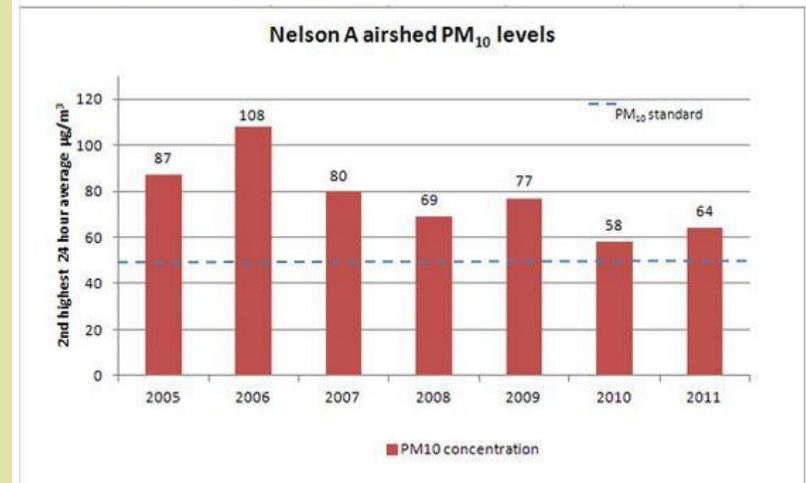
Watercare (on behalf of NZTA) Kath McLeod

REGIONAL COUNCIL & OTHER DATA

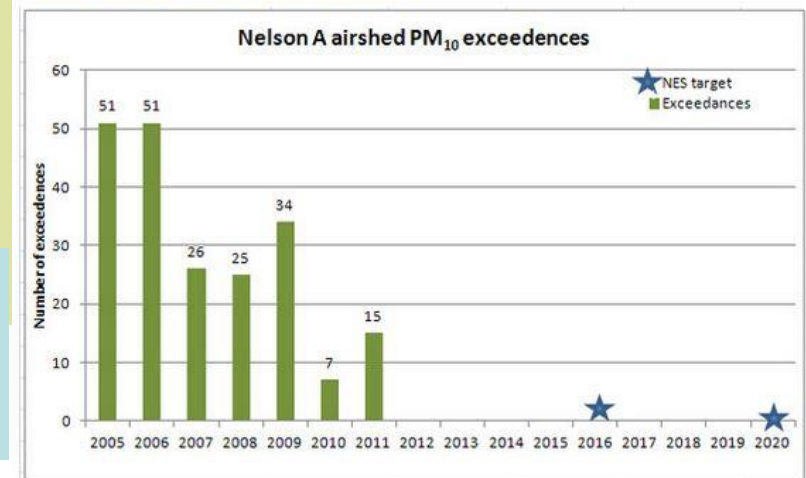


Air quality in the Nelson region: Airshed A (Nelson South)

Nelson Airshed A PM₁₀ concentrations



Nelson Airshed A PM₁₀ Exceedences



<http://www.mfe.govt.nz/environmental-reporting/air/air-quality-indicator/pm10/nes/air-quality-airsheds.html>

HAPINZ UPDATE - 1

The total social costs associated with anthropogenic air pollution in NZ are ~\$4.28 billion per year or \$1,061 per person, with:

- o 56% due to domestic fires
- o 22% due to motor vehicles
- o 10% due to industry
- o 12% due to open burning.

<http://www.hapinz.org.nz>

Updated Health and Air Pollution in New Zealand Study

Volume 1: Summary Report



Prepared for Health Research Council of New Zealand,
Ministry of Transport, Ministry for the Environment
and New Zealand Transport Agency
March 2012



Dr. Jagdish Guria
Economic Evaluation & Analysis
Specialist

Kevin Rolfe & Associates Ltd
Chemical Engineer & Environmental
Management Specialist



HAPINZ UPDATE - 2

Table A1-6: Total social costs from PM₁₀ air pollution in 2006 by source and by region

Region	Pop'n	Social Costs by Source (\$million)						Anthropogenic Fraction
		Dom Fires	Motor Vehicles	Industry	Open Burning	Natural	Total	
Auckland	1,303,029	411.8	465.7	79.0	115.0	1,181.6	2,253.1	48%
Bay of Plenty	257,382	128.8	52.4	35.9	37.6	303.0	557.7	46%
Canterbury	521,847	680.9	164.2	145.5	23.4	568.0	1,582.1	64%
Gisborne	44,508	13.2	1.5	0.0	6.5	55.8	77.0	28%
Hawke's Bay	147,777	148.1	24.3	32.7	44.4	161.4	410.9	61%
Manawatu-Wanganui	222,411	110.2	25.8	0.16	39.8	272.5	448.4	39%
Marlborough	42,564	51.2	6.5	5.3	19.6	30.7	113.2	73%
Nelson	42,897	38.9	11.9	6.4	0.0	36.6	93.8	61%
Northland	148,482	62.5	19.5	28.1	29.4	181.0	320.5	44%
Otago	193,782	212.0	40.9	67.1	11.6	216.5	548.1	61%
Southland	90,873	83.3	2.5	5.9	4.9	104.7	201.2	48%
Taranaki	104,118	65.8	22.3	0.0	36.6	131.9	256.7	49%
Tasman	44,634	32.1	3.2	9.0	1.3	44.7	90.3	50%
Waikato	382,701	161.2	43.9	33.0	62.6	381.6	682.3	44%
Wellington	448,947	156.9	48.1	0.2	70.5	445.8	721.5	38%
West Coast	31,332	27.3	2.1	0.8	4.3	38.7	73.2	47%
Outside	618	0.1	0.0	0.0	0.0	0.2	0.2	26%
National	4,027,902	2,384.2	934.8	448.8	507.7	4,154.7	8,430.3	51%

SUMMARY OF KEY AIR QUALITY TRENDS

- o Since 2007, nine NZTA national network sites have exceeded the WHO NO₂ annual guideline of 40µg/m³
- o Annual average NO₂ levels in 2012 were 15% higher on average than in 2007 but reduced slightly versus 2010
- o PM₁₀ levels nationally have generally improved in response to improvements in domestic fire emissions in order to meet the National Environmental Standard
- o Across NZ, most of the air pollution health effects are from domestic fire-related PM₁₀ but more work needs to be done to quantify NO₂ effects especially in traffic-impacted areas

THANKS

Rob Hannaby
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