

Background Discussion of Regional Vehicle-Kilometres Travelled (VKT) Data in New Zealand - July 2019

There are two major sources for vehicle-kilometres travelled (VKT) data in New Zealand, each of which have their limitations, and which are not always consistent with each other. This document briefly discusses the two sources of data and the difficulties of reconciling their results at the regional level.

The first data source is what is often called 'odo-data' from the Motor Vehicle Register. Each time a vehicle is inspected for a Warrant of Fitness, the odometer reading of the vehicle is noted and recorded in the Motor Vehicle Register. This odometer reading data from the Motor Vehicle Register may then be aggregated to obtain estimates of total VKT by vehicle type and region.

The second data source is what is often called 'RAMM data'. RAMM is an acronym for Road Assessment and Maintenance Management, a database maintained by the New Zealand Transport Agency (NZTA). RAMM is designed to track the usage of every public road in New Zealand for purposes of planning road maintenance and road improvements. The data in RAMM is based on road traffic counts collected regularly by the NZTA on state highways or local road controlling authorities on local roads. These road counts may be used to model VKTs by road type (such as state highway or local road) by region. On state highways, the NZTA's road counts distinguish between light and heavy vehicles, so RAMM also provides estimates of state highway (but not local road) VKTs by light and heavy vehicles.

At a national level, the total VKTs by vehicle type from the odo-data should be reasonably accurate. However, at a regional level, both sources of VKT data have their limitations.

For the odo-data, a major potential source of error is that the VKT data by region has to be inferred based on the region where the vehicle was inspected. Of course, vehicles can actually be driven in any region, and many vehicles incur a substantial number of kilometres in a region other than the one where they were inspected. If these miss-assigned VKTs were completely random, they would cancel out and there would be no problem. However, some regions have lots of tourists driving in from other regions (such as the West Coast) or travelling across them between other regions (Waikato, Manawatu-Wanganui). Also, some regions may be the base for big fleets of rental cars or trucks that actually get driven a lot in other regions (Auckland). A less significant source of errors are timing issues: it would be nice if all odometers got read on the same date each year, but alas, they aren't, so some adjustment has to be made to assign the VKTs to the right year.

Production of the RAMM data is much less straightforward. Some kind of model must be used to multiply the traffic counts on each road by an assumed distance travelled, then this data on each road must be aggregated. Clearly, this process requires a number of assumptions on the part of the modeller, which may or may not be correct. In the case of at least one region (Auckland), an even higher level modelling technique is used, based on a sample of carriageway counts from around the region. Also, the counts are not done on the same day each year, and may not even be done each year at all, so, as with the odo-data, there are timing issues. In particular, there is a possibility of significant lags between when traffic actually changes and when the changes get reported in RAMM.

To see how the two data sources differ, and how stable the differences are over time, we compared the two sets of figures for two time periods—2017/18, the most recent period currently available, and 2012/13, five years earlier. Table 1 shows the comparison for 2012/13. 'TNM' is for the combined Tasman, Nelson, and Marlborough regions.

Million VKTs			
	RAMM Data	Odo Data	Percent Excess RAMM over Odo
Northland	1671.647	1534.703	8.9%
Auckland	12716.727	12636.360	0.6%
Waikato	5330.098	4146.377	28.5%
Bay of Plenty	2713.310	3092.084	-12.2%
Gisborne	389.394	362.975	7.3%
Hawke's Bay	1473.708	1394.768	5.7%
Taranaki	1036.331	1048.513	-1.2%
Manawatu	2404.274	2101.115	14.4%
Wellington	3506.928	3670.768	-4.5%
TNM	1315.503	1331.894	-1.2%
West Coast	506.199	343.013	47.6%
Canterbury	5470.683	5908.249	-7.4%
Otago	2195.423	1762.868	24.5%
Southland	1133.115	1035.056	9.5%
Total - All Regions	41863.342	40368.743	3.7%

Table 1 – Comparison of RAMM vs. Odo-Data for 2012/13¹

Focusing on the regions with a difference greater than 8%, the largest excess RAMM over odo-data were as follows:

West Coast – 47.6%

Waikato – 28.5%

Otago – 24.5%

Manawatu-Wanganui ('Manawatu') – 14.4%

Southland – 9.5%

Northland – 8.9%

The largest deficit of RAMM vs. odo-data was as follows:

Bay of Plenty – -12.2%.

Table 2 shows the comparison for 2017/18.

¹ All data in this table is drawn from the RAMM and odo-data incorporated into the Transport Outlook VKT and Vehicle Numbers Model workbooks available at <https://www.transport.govt.nz/mot-resources/transport-outlook/transport-outlook-future-state-model-results/transport-outlook-updated-future-state-model-results/>. The 2012/13 data may be found in the 'Original 2012-13 Data' tab.

Million VKTs			
	RAMM Data	Odo Data	Percent Excess RAMM over Odo
Northland	2006.320	1768.974	13.4%
Auckland	13166.390	15164.302	-13.2%
Waikato	6249.050	4802.448	30.1%
Bay of Plenty	3203.730	3649.921	-12.2%
Gisborne	404.500	377.687	7.1%
Hawke's Bay	1619.990	1552.594	4.3%
Taranaki	1149.630	1147.295	0.2%
Manawatu	2565.430	2336.551	9.8%
Wellington	3706.520	4119.242	-10.0%
TNM	1552.400	1674.156	-7.3%
West Coast	601.960	334.181	80.1%
Canterbury	6427.820	6795.733	-5.4%
Otago	2634.500	3181.528	-17.2%
Southland	1266.160	1143.048	10.8%
Total - All Regions	46554.400	48047.661	-3.1%

Table 2 – Comparison of RAMM vs. Odo-Data for 2017/18²

The largest excess RAMM over odo-data in 2017/18 were as follows:

West Coast - 80.1%

Waikato – 30.1%

Northland – 13.4%

Southland – 10.8%

Manawatu – 9.8%

The largest deficits of RAMM vs. odo-data in 2017/18 were as follows:

Otago – -17.2%

Auckland – -13.2%

Bay of Plenty – -12.2%

Wellington – -10.9%

Interestingly, between 2012/13 and 2017/18, Otago has flipped from a 24.5% excess of RAMM over odo to a 17.2% deficit. Auckland, and Wellington have been added to the significant deficit category.

What might explain these differences? Clearly, in the case of the West Coast, Waikato, Southland, and Northland, all of which are popular tourist destinations, tourist travel in

² All data in this table is drawn from the RAMM and odo-data incorporated into the Transport Outlook VKT and Vehicle Numbers Model workbooks available at <https://www.transport.govt.nz/mot-resources/transport-outlook/transport-outlook-future-state-model-results/transport-outlook-updated-future-state-model-results/>. The 2017/18 data may be found in the 'Original 2017-18 Data' tab.

vehicles inspected elsewhere could be one explanation. To test this hypothesis, we obtained data from the MBIE accommodation survey on numbers of regional guest nights— see <https://www.stats.govt.nz/information-releases/accommodation-survey-march-2019>. This data indicates the West Coast had 1,411,000 guest-nights in 2017/18, or an average of 3866 guests per night. Our understanding is that this would be a conservative figure, which does not include some 'unconventional' accommodations, such as AirBNB and freedom campers (holiday parks are included). This compares to a West Coast resident population of only 32,500 in 2017/18. Assuming that tourists tend to drive, say, four times as many VKTs per day as a resident, this would suggest that there may be 48% more traffic on West Coast roads than statistics on driving by local residents (the odo-data) would indicate. Here we may have an explanation for the discrepancy in the West Coast data.

However, the West Coast appears to be in a category by itself in this respect. The other regions all have much larger resident populations, with much smaller ratios of tourists to residents. In particular, Northland had 1,960,000 million guest nights, or an average of 5370 guests per night, but a resident population of 176,100. This might suggest around 12% more traffic than driving by local residents would indicate. Southland had 1,185,000 guest nights, or an average of 3247 guests per night, but a resident population of 99,200. This might suggest around 13% more traffic on Southland roads than statistics on driving by local residents would indicate. So far, so good.

Waikato had 3,508,000 guest nights, or an average of 9611 guests per night, but a resident population of 467,200, suggesting only around 8% more traffic than statistics on driving by local residents would indicate. However, Waikato could have additional Auckland-Wellington through traffic. The Accommodation Survey combines Managwatu-Wanganui with Taranaki, so no statistics on guest-nights for Manwatu-Wanganui alone are available. However, as with Waikato, Manawatu-Wanganui may have additional Auckland-Wellington through traffic, as well as overnight visitors.

Turning to the deficit regions, the only real-world explanation we can think of for RAMM data being less than the odo-data is that these are regions where vehicles are inspected and then driven frequently elsewhere. This might be the case of Auckland and Wellington, which are the base for large rental car and truck fleets. But the fact that both regions had much smaller differences in 2012/13 (their excesses of RAMM over odo in 2012/13 were Auckland 0.6% and Wellington -4.5%), that Otago flipped, and that Bay of Plenty is not a likely fleet base (although there are some truck fleets based near the Port of Tauranga), leads us to suspect that the causes of these deficits are mainly data reporting delays and modelling anomalies in RAMM, rather than anything going on in the real-world.

Our overall conclusion would be that we can be confident that the odo-data is significantly understating VKTs on the West Coast, and modestly understating VKTs in Waikato, Northland and Southland, and Manawatu-Wanganui, but that is about all we can say with reasonable certainty. The degree of understatement is quite uncertain; the RAMM data is only indicative. To the extent that there is understatement of VKTs in the odo-data for these four regions, it may be due to driving in these four regions by rental vehicles or fleet trucks that are inspected in Auckland or Wellington, suggesting that the odo-data could be slightly overstating VKTs in the latter two regions. Discrepancies in the other regions are not well-explained, but may be due to lags or other deficiencies in their RAMM modelling.

Your comments on this document, or any further evidence on the topics discussed here, are welcome and may be sent to MoTAnalytics@transport.govt.nz.