Australian Government
Department of Transport and Regional Services
Bureau of Transport and Regional Economics

btre

Filling a gap in rail data: an investigation of the Gheringhap Loop train sightings

Information Paper 57

Bureau of Transport and Regional Economics

Filling a gap in rail data: an investigation of the Gheringhap Loop train sightings

Information Paper 57

Bureau of Transport and Regional Economics
Department of Transport and Regional Services
Canberra, Australia

ISSN 1440–9585

ISBN 1 921260 09 2

This publication is available free of charge from the Bureau of Transport and Regional Economics, GPO Box 501, Canberra, ACT 2601, or phone (02) 6274 7210, fax (02) 6274 6816 or email: btre@dotars.gov.au, or by downloading it from our website: http://www.btre.gov.au

Disclaimers

The BTRE seeks to publish its work to the highest professional standards. However, it cannot accept responsibility for any consequences arising from the use of information herein. Readers should rely on their own skill and judgement in applying any information or analysis to particular issues or circumstances.

Cover design and desktop publishing by Melinda Keane.

Cover images courtesy of Graham Elliott.

Printed by McLaren Press.

Foreword

Following the growth in private train operations since the mid-1990s and the privatisation of National Rail in 2002, rail freight activity data became increasingly scarce. The lack of data can be a challenge for the BTRE in providing the government with timely and accurate information about trends in Australian freight transport. The rail industry has recognised this deficiency: the Australasian Railway Association and its members are working with the BTRE to produce the first public report on the performance of the Defined Interstate Rail Network and to supply data for AusLink planning.

In the meantime, the BTRE has investigated other potential data sources, including information from railway enthusiasts. This paper presents an analysis of one such source of rail data that is reported online, from video-taped observations made and collated by Graham Elliott at Gheringhap Loop, Victoria, on the mainline between Adelaide and Melbourne. The paper provides a short review of the reliability of the data, makes observations about trends in freight activity from the data set, and draws some conclusions about the value of the data collection method.

The BTRE acknowledges the efforts of Graham Elliott who collects the Gheringhap Loop train sightings. The paper was prepared by Jack McAuley, under the direction of David Gargett and Peter Kain.

Phil Potterton
Executive Director
Bureau of Transport and Regional Economics

February 2007

Contents

Summary

This paper analyses train sightings data collected at Gheringhap, Victoria, located on the Melbourne–Adelaide main line. These sightings provide an independent source of information on train movements, train lengths, and reliability, and, given knowledge of freight volumes, can be used to estimate average wagon loads. In cases where trains are not scheduled, sightings such as these are presently the only publicly available source of data for freight volumes on specific routes.

In particular, the sightings show that:

- Operators tend to use all their allocated slots.
- Grain traffic on the standard gauge line through Gheringhap has generally increased since 1998, peaking in 2002.
- Average train lengths increased from 48 wagons in 1998–99 to 56 wagons in 2005–06.
- Average wagon loads increased from 51 tonnes in 1998–99 to 62 tonnes in 2004–05.

While sightings like these can provide useful insights into a range of train operations, due to uncertainty about the extent of back-loading they cannot reliably be used to infer freight volumes.

Introduction

Following the growth in the number and scale of private train operators in the mid-1990s and the privatisation of National Rail in 2002, there has been a significant decrease in the availability of rail freight movement data, particularly for the interstate rail network.

Regular, publicly available data on interstate rail is limited to information from the Australian Rail Track Corporation (ARTC), the Australian Bureau of Statistics (ABS) and the Australasian Railway Association (ARA).

Information publicly available from the ARTC includes annual rail freight gross tonne-kilometres on each corridor, aggregate reliability indicators, and customer commitment schedules for each corridor. (It is possible to infer train numbers for most operators from these schedules).

The ABS Rail Freight Movements collection (ABS 2004) provides estimates of total rail freight tonnages and tonne-kilometres across Australia. The latest available data is for 2002–03. Confidentiality restrictions prevent the ABS from publishing more detailed rail freight task information.

The ARA's annual industry reports (ARA 2004, 2005) provide estimates of total freight tonnages for interstate and intra-state rail services. The latest available report, ARA (2005), provides estimates for 2003–04.

The lack of detailed and timely rail freight data is a significant issue for the BTRE in its role in providing information and advice to government. In particular, accurate and timely intercapital rail freight data is a key input to the AusLink long-term planning needs.

Potentially valuable information that, for confidentiality reasons, is not made available by the ARTC, the ABS or the ARA, includes:

- Traffic volumes by operation (from which origin-destination rail freight movements could be derived).
- Train lengths by operation.
- Punctuality by operation and direction.
- More frequent (i.e. shorter than annual) data of any sort.

A relatively unexplored source of rail data is information collected by railway enthusiasts. One such source of information is a site containing daily records of train movements past Gheringhap Loop, west of Geelong on the Melbourne–Adelaide rail line, from video-taped observations made and collated by Graham Elliott. This paper explores this data. The paper provides a short review of the reliability of the data, makes observations about trends in freight activity from the data set (and from comparisons of the data to publicly available aggregate figures), and draws some conclusions about the value of the data collection method.

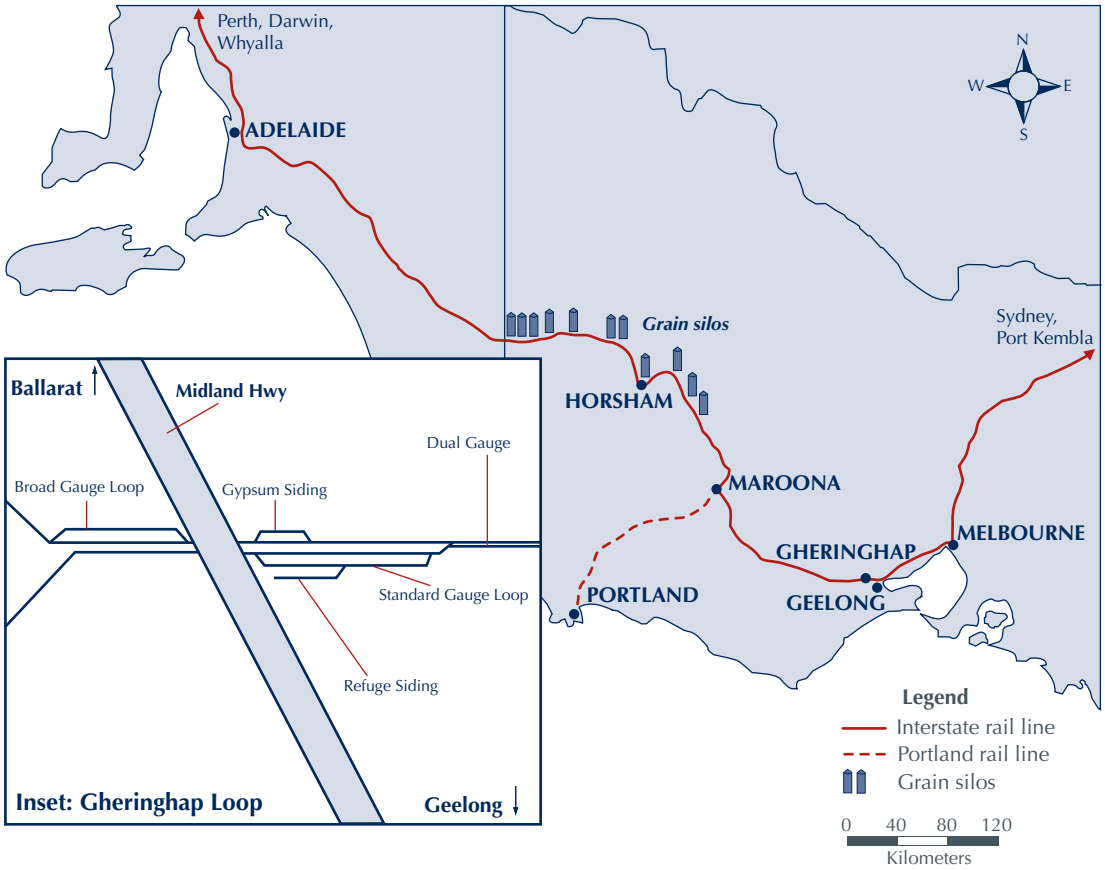
The sightings also include information on sceduled and actual arrival times at Gheringhap, which has not been analysed for this paper. It is not clear that punctuality at Gheringhap affects arrival time at the final destination, and futhermore the importance of arrival time in overall service quality is uncertain.[1] Further research into these issues would enable better interpretation of these data.

1 *BTCE (1996, p.42) suggests that cargo availability time is a better measure of customer satisfaction than train arrival time.*

About the sightings

Since January 1998, Graham Elliott has recorded most trains passing through the Gheringhap Loop, located on the standard-gauge rail line linking Melbourne and Adelaide, 82 km from Melbourne and 15km west of Geelong (see figure 1). The Loop is also a junction for the broad-gauge Geelong–Ballarat (freight-only) line. This paper includes information for trains on the standard gauge line only.

Figure 1 Location of Gheringhap Loop



Each record in the Gheringhap Loop train sightings data set includes:

- The four-digit train number, as designated in the ARTC's working timetable for Victoria.
- A description of the train (in most cases the name of the operator or a description of the load).
- The time the train passes through and, for scheduled services, the time the train is scheduled to pass through.
- The number and types of locomotives hauling the train.
- The type and, for most trains, the number of wagons.
- The line on which the train is running (standard gauge or broad gauge).

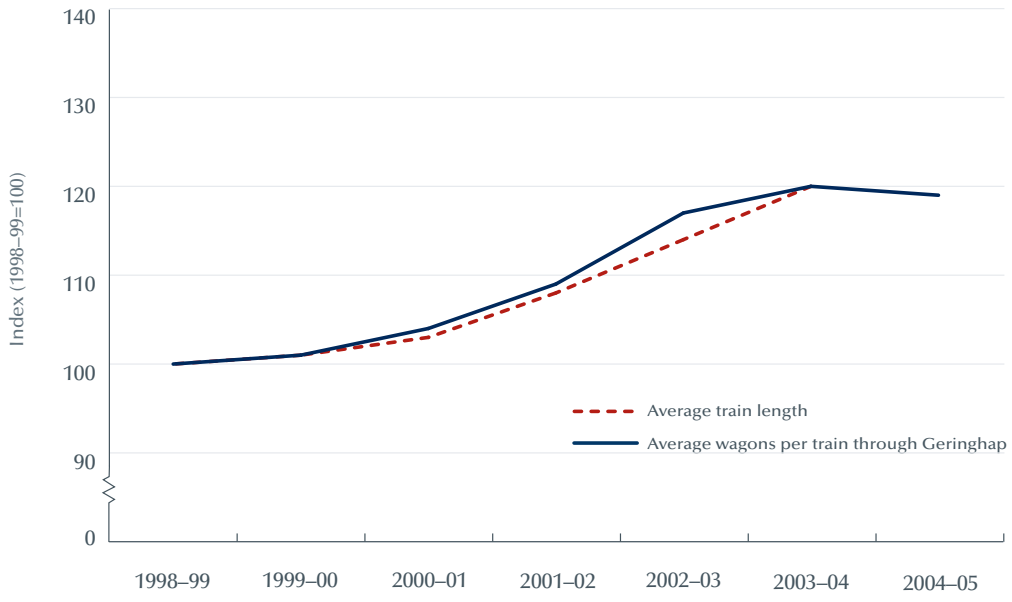
The recordings are updated daily and are freely available on the internet[2]; these can be readily downloaded into a spreadsheet. (See the appendix for an example of the recordings as they appear online). In this paper, for the few days that recordings were not taken, it has been assumed that trains have run as scheduled, with the number of wagons equal to the average number of wagons recorded for that train number in that month. Similarly, in cases where the train has been recorded but the number of wagons has not, the number of wagons is taken to be the average number of wagons recorded on trains of that service number in that month.

Reliability of the data

While the individual sightings cannot be verified, certain aggregates can be checked for consistency with information published by the ARTC.

To test the reliability of the data, annual figures for average train length have been compiled from the sightings data, and compared to figures sourced from the ARTC annual reports (ARTC 2003, 2004). The high correlation between changes in train length through time as reported by the ARTC and as recorded at Gheringhap Loop (see figure 1) suggests that the recordings are reliable. Based on the ARTC average train length and the wagon counts from the Gheringhap Loop train sightings, the implied average wagon length (including coupling) is between 20 and 21 metres, which is realistic. For example, the average length of all Chicago Freight Car Leasing Australia's wagons is 20 metres.[3]

Figure 2 Comparison of annual wagon numbers per train and train lengths



Source: ARTC (2003, 2004); Gheringhap Loop train sightings and BTRE estimates.

2 *See www.railpage.org.au/ghaploop/ and gheringhaploop.customer.netspace.net.au.*

3 *BTRE estimate based on length and number of wagons for each wagon type, available in the rollingstock section of the CFCLA website <http://www.cfcla.com.au/containerflats.pdf>.*

Observations from the data

Track usage

The services using the standard-gauge track through Gheringhap since January 1998 have included:

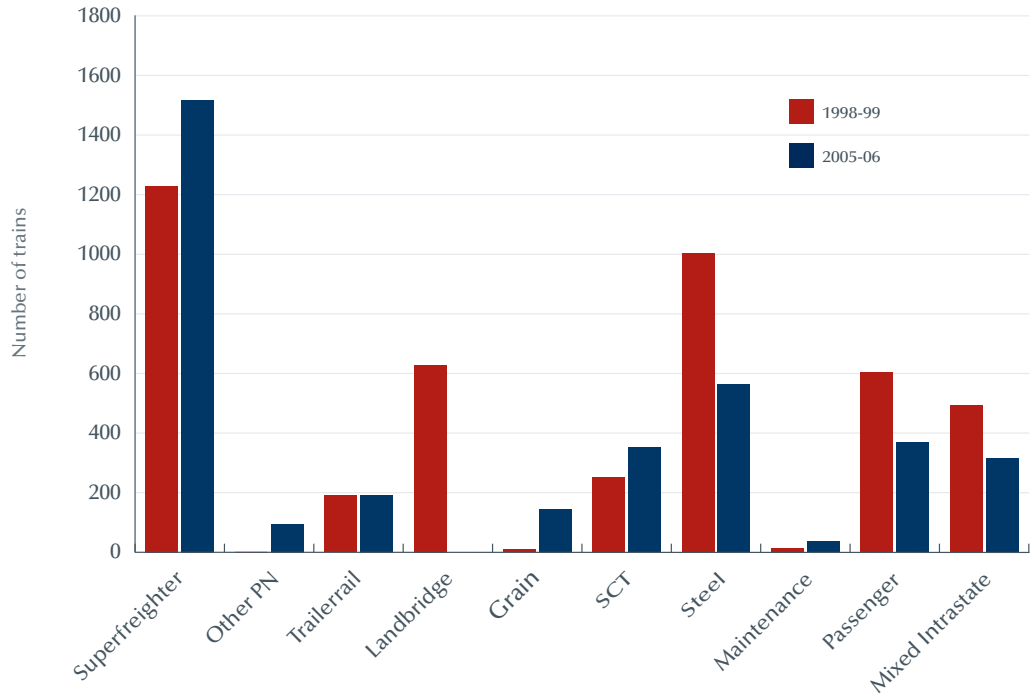
- An intermodal ('superfreighter') container service between Melbourne and Perth, operated by National Rail until 2002 and then by Pacific National.
- An express container service between Melbourne and Perth, operated by National Rail until 2002 and then by Pacific National.
- A 'SteelLink' service, operated for Bluescope/OneSteel by National Rail until 2002, and since by Pacific National.
- Two 'landbridging' container services between the Port of Melbourne and Port of Adelaide, one operated by TNT and then Patrick[4], and one operated since May 2005 by P&O Ports.[5]
- A pallet and other specialised service between Melbourne and Perth operated by SCT Logistics (formerly Specialized Container Services). This has operated continuously between January 1998 and the present.
- The Overland passenger service between Melbourne and Adelaide, and sometimes luxury passenger services between Melbourne and the Northern Territory (these have included the 'Ozback Explorer' and 'The Ghan').
- A container service, operated for Wimmera Container Lines by Pacific National (formerly by Freight Australia), between Horsham and Melbourne, primarily carrying grain.
- Irregular grain services between western Victoria and Melbourne, operated by Pacific National (formerly by Freight Australia).

The total number of trains using the standard-gauge track has increased from 5 867 in the year ending March 1999 to 6 373 in the year ending March 2006. Figure 3 compares the number of services in 1998–99 and 2005–06 by operator and/or service/commodity type.

4 *Patrick has been acquired by Toll Holdings.*

5 *P&O Ports has been acquired by Dubai Ports World.*

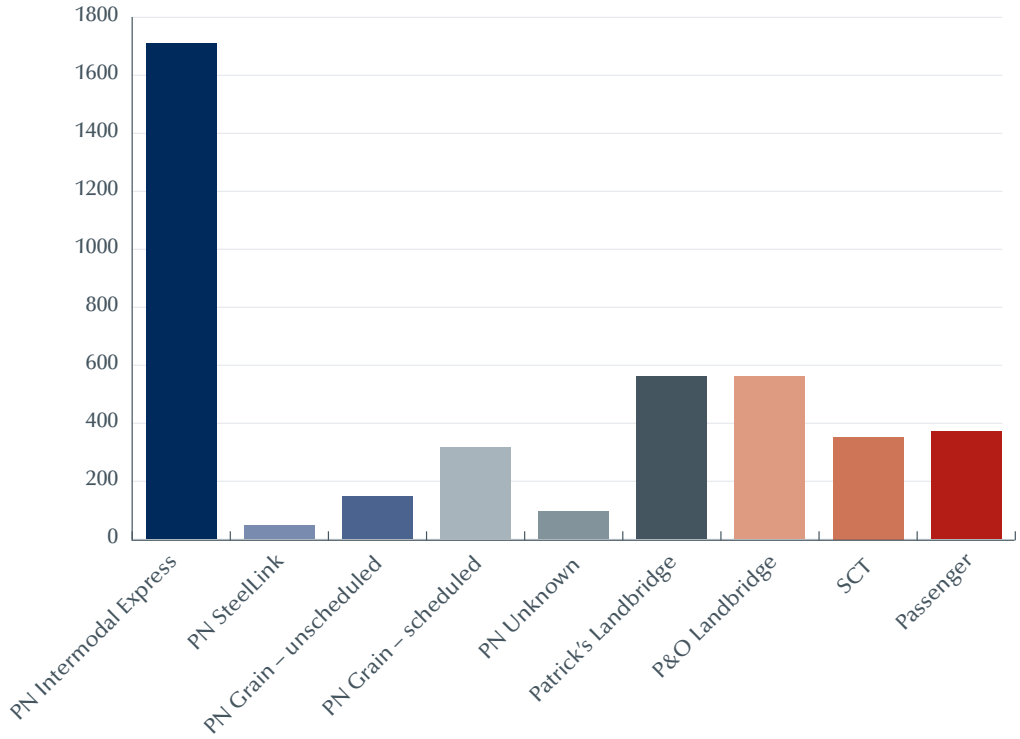
Figure 3 Comparison of track usage by type of train, 1998–99 and 2005–06



Source: Gheringhap Loop train sightings and BTRE estimates.

Figure 4 shows the share of total train movements past Gheringhap Loop in the month of March 2006, by operator and/or service/commodity. In March 2006, 76 per cent of trains passing the Gheringhap Loop were operated by Pacific National or Patrick.

Figure 4 Track usage by train operator, March 2006



Source: Gheringhap Loop train sightings and BTRE estimates.

Wagon numbers and average loads

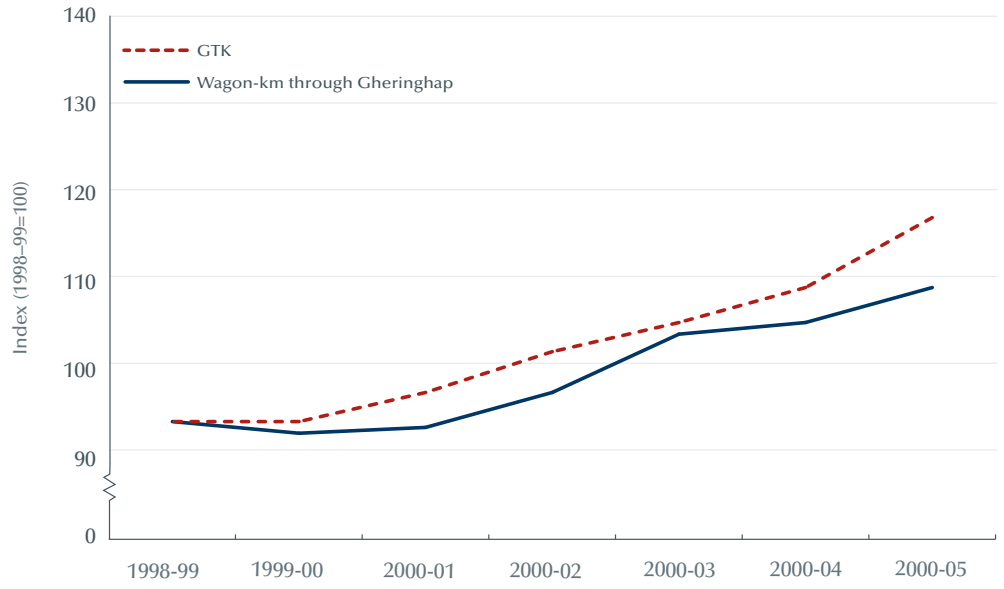
The Gheringhap Loop train sightings data provide wagon numbers for most trains passing the site but not information on loads. Given knowledge of total tonnages moved on the corridor (available in the ARTC annual reports), the wagon counts allow us to estimate average wagon loads.

The total number of wagons passing through Gheringhap along the standard-gauge line has increased faster than the total number of trains, from around 15 000 wagons in March 1998 to around 22 000 wagons in March 2005. However, the growth in 'wagon kilometres' along the ARTC line between Melbourne and Adelaide (that is, the number of wagons passing through Gheringhap weighted by the length of their journey on the ARTC line) has not been as strong or as consistent as the growth in gross tonne-kilometres reported by the ARTC (see figure 5).[6] The recent increase in the gap between the wagon-kilometre index and the gross tonne-kilometre index implies that the average (gross) weight per wagon has risen from around 51 tonnes in 1998–99 to around 62 tonnes in 2004–05.

This significant increase in average wagon load may be due to increased back-loading on this corridor. The increased wagon utilisation could be one factor contributing to the 22 per cent reduction in the real cost of access per NTK over the same period reported by ARTC (Marchant 2004). It also coincides with a period of consolidation of the rail industry, with National Rail, Toll Holdings and most Patrick Corporation services being consolidated into Pacific National.

6 *Wagon kilometres have been estimated by multiplying the number of interstate wagons by 774km (the distance from Mile End, Adelaide to Dynon, Melbourne) and the number of grain wagons by 360km (the distance from Melbourne to Dimboola).*

Figure 5 Comparison of growth in total wagon-km and total gross tonne kilometres, Melbourne–Adelaide line



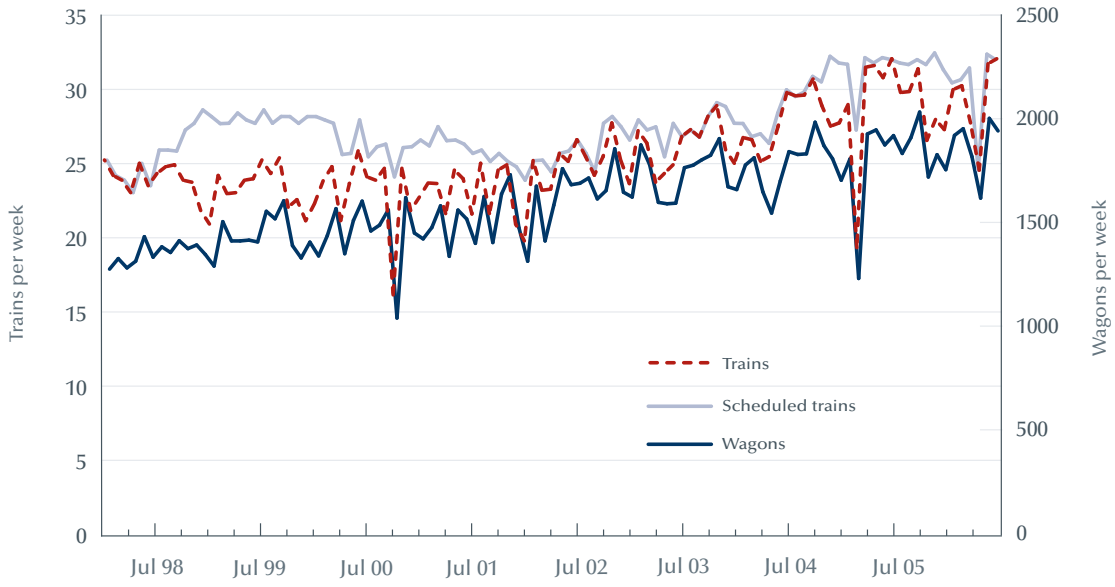
Source: Gheringhap Loop train sightings, BTRE estimates, ARTC (2003, 2004 2005).

The growth in average wagon loads means the wagon counts from the Gheringhap Loop train sightings data cannot be used to estimate trends in freight tonnage on the Melbourne–Adelaide corridor without making additional assumptions about wagon loads.

Melbourne–Perth/Adelaide non-bulk services

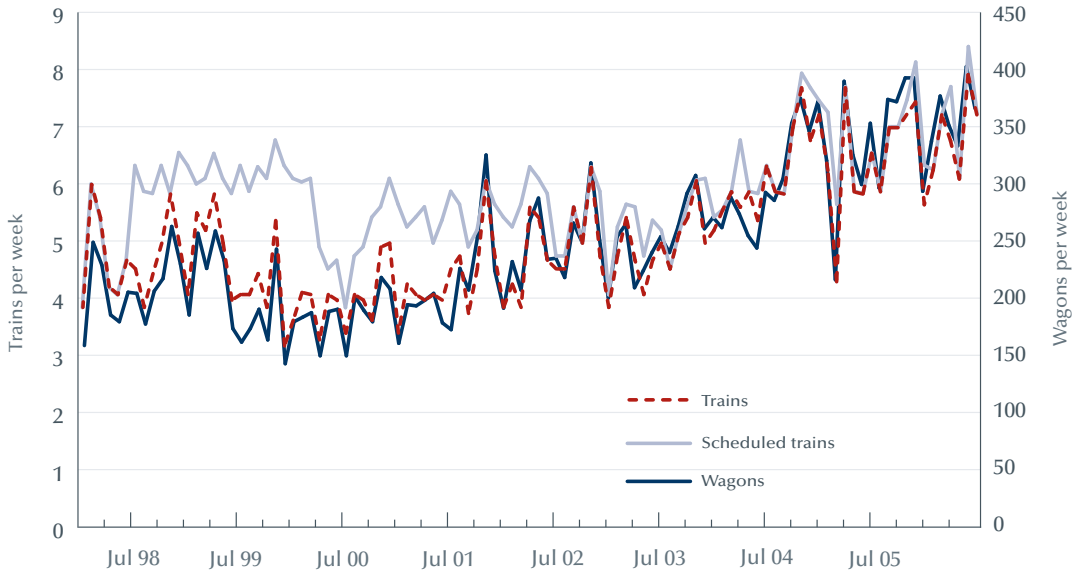
Non-bulk rail transport between Melbourne and Perth/Adelaide is undertaken by Pacific National and SCT Logistics. The number of SCT-hauled wagons past Gheringhap Loop has grown at an average annual rate of 8.0 per cent (see figure 7), compared with 2.7 per cent for the two Pacific National services combined (see figure 6). This could reflect different underlying growth rates in the consumption of the products carried by each service, greater substitutability between road and rail for the products carried by the SCT Logistics services or the fact that SCT Logistics were a relatively new operator in 1998.

Figure 6 National Rail/Pacific National 'superfreighter' services per week, January 1998 to June 2006



Source: Gheringhap Loop train sightings and BTRE estimates.

Figure 7 SCT Logistics trains and wagons per week, January 1998 to June 2006



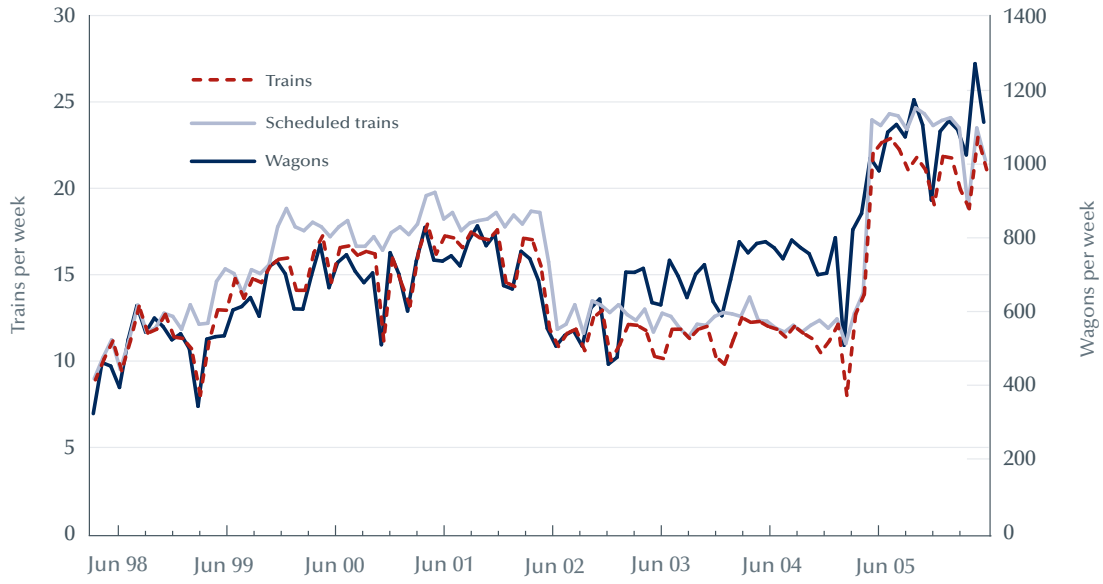
Source: Gheringhap Loop train sightings and BTRE estimates.

Landbridging services

Figure 8 shows the number of landbridging services and wagons passing Gheringhap Loop between January 1998 and June 2006. The number of landbridging services generally increased between 1998 and 2002. There was a reduction in the number of landbridging services following the formation of Pacific National in February 2002. There was a sharp increase in the length of Patrick's landbridging trains between January and February 2003, such that the total number of wagons was restored approximately to its pre-2000 level.

The number of landbridging trains passing through Gheringhap increased significantly in around May 2005, with the introduction of a service operated by P&O Ports. It appears that the number of landbridging wagons carried by Patrick has not fallen following the introduction of the P&O Ports service.

Figure 8 Landbridging services per week, January 1998 to June 2006



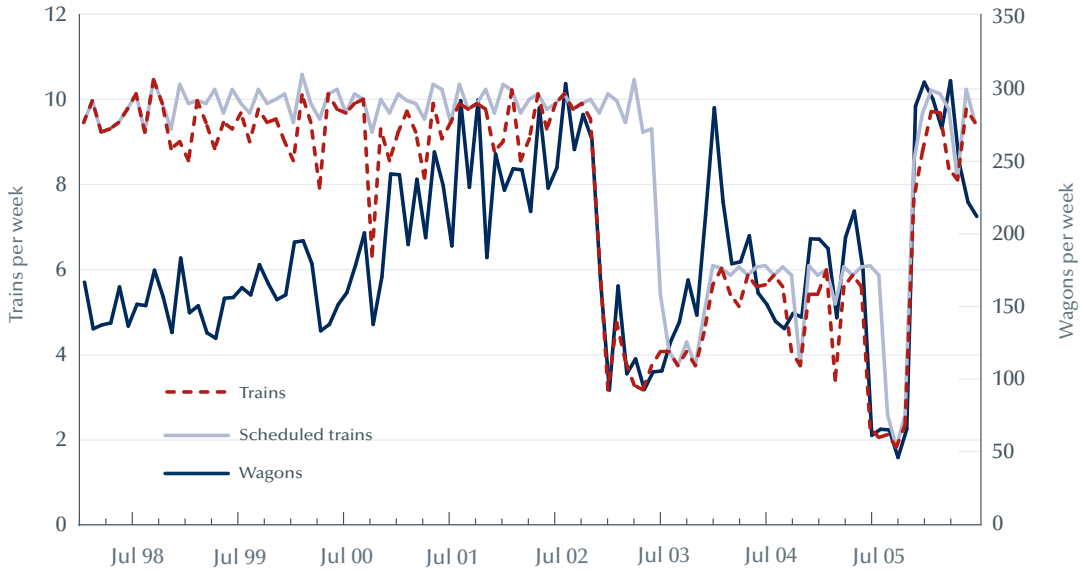
Source: Gheringhap Loop train sightings and BTRE estimates.

Grain services

An important component of the traffic on the Melbourne–Adelaide interstate rail line is intrastate grain movements. Grain from western Victoria can be transported via the broad-gauge Mildura line to Geelong and Melbourne; or the standard-gauge rail line to the ports at Portland, Geelong and Melbourne. In the latter two cases the standard-gauge trains pass through Gheringhap.

Pacific National operates a containerised service for Wimmera Container Lines to and from Horsham, mainly carrying export grain. Figure 9 shows the number of trains and wagons moving past Gheringhap Loop as part of this operation.

Figure 9 Containerised grain/mixed freight services per week



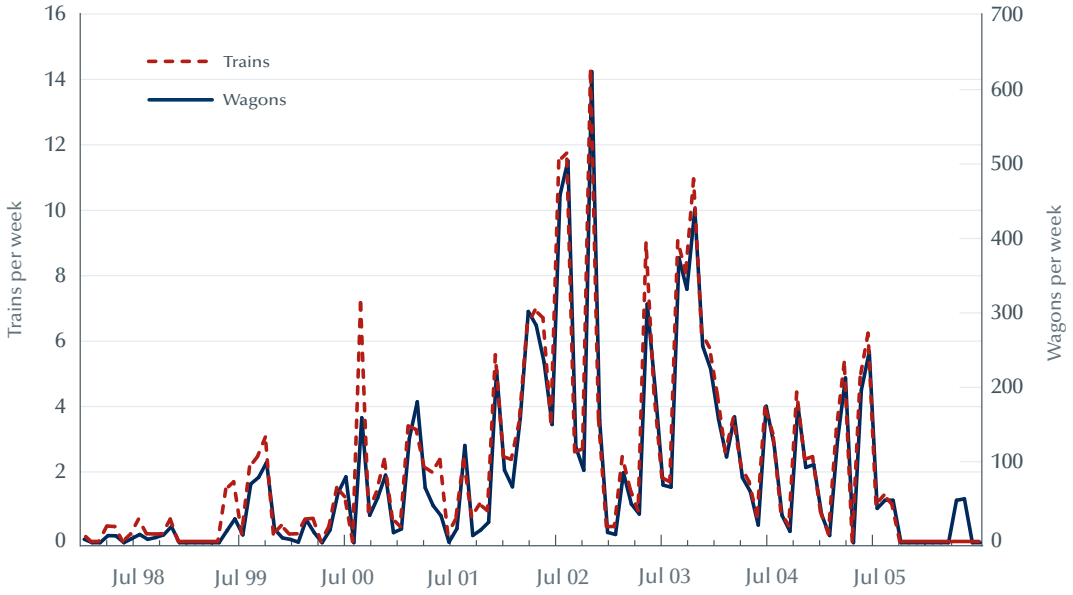
Source: Gheringhap Loop train sightings and BTRE estimates.

In addition to this scheduled service, Pacific National operates other (non-containerised) grain services on a more irregular basis. As figure 10 shows, there has been a gradual growth in this grain traffic along the standard-gauge line through Gheringhap since early 2001. The pattern of grain flows will have been affected by the following factors:

- The construction of AWB Limited's grain receival facility at Dimboola in 1999.
- The construction of a specialised grain handling facility at the Port of Melbourne in 2000 (part owned by AWB Limited).
- At some time prior to February 2003 the ARTC 'put in place a rail access regime that has allowed AWB Limited to reduce grain supply chain costs from its Dimboola Grain Centre by almost 25%' (AWB Limited 2003).

According to AWB Limited, almost all grain from Dimboola is exported through the Port of Melbourne, rather than being received at other previously Freight Australia-owned grain facilities on the standard-gauge system and moved to the non-AWB-owned port of Portland. Also, according to AWB Limited, grain traffic by rail to Portland has been negligible since 2000.

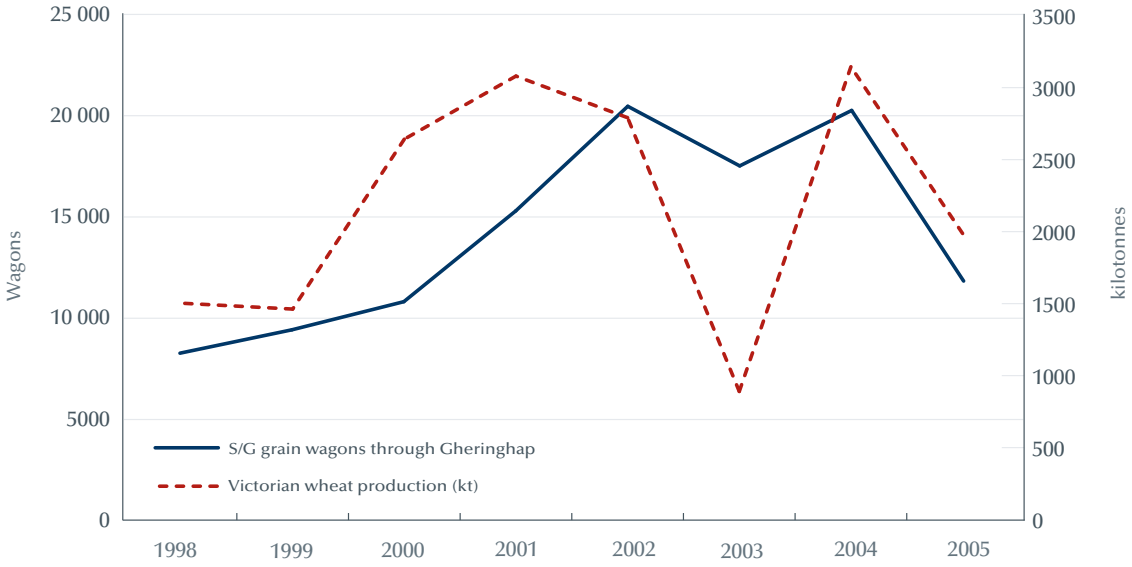
Figure 10 Unscheduled grain services per week



Source: Gheringhap Loop train sightings and BTRE estimates.

Figure 11 shows that the trend of grain traffic through Gheringhap Loop very approximately follows grain production in Victoria. The notable exception is in 2003 when total grain production was approximately one-third of grain production the previous year, yet the number of grain wagon movements past Gheringhap Loop was only down 14 per cent on the previous year.

Figure 11 Annual grain production in Victoria and number of standard gauge grain wagons past Gheringhap Loop

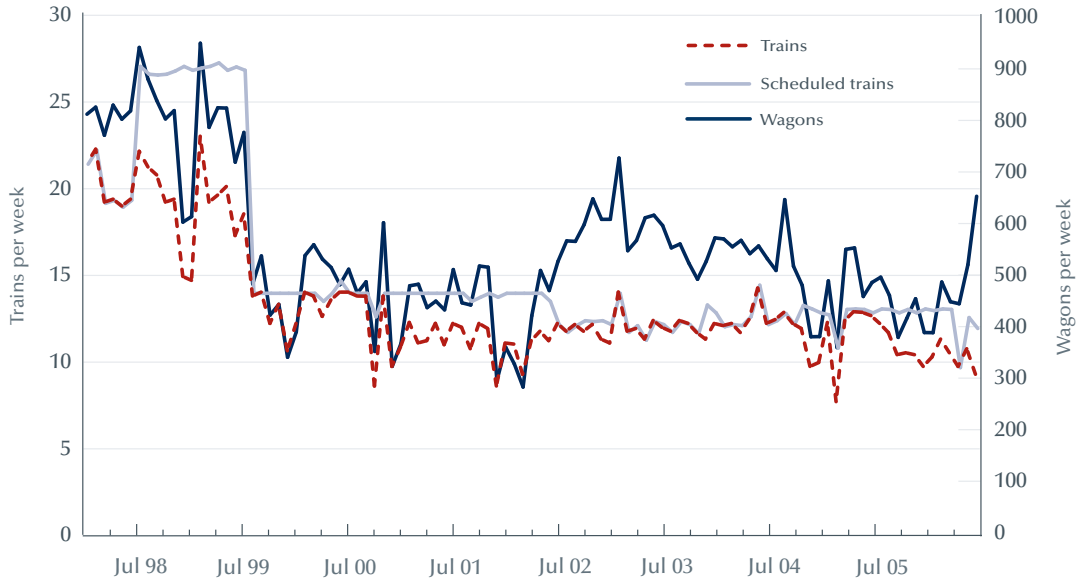


Source: Gheringhap Loop train sightings, ABS (2006) and BTRE estimates.

Steel services

According to the Gheringhap Loop train sightings, there has been a significant reduction in the volume of steel traffic travelling through Gheringhap since 1998, as shown in figure 12. According to the ARTC, following a new contract with BHP in February 1999, National Rail redirected its Whyalla–Newcastle SteelLink services from the Adelaide–Melbourne corridor to the Broken Hill corridor at some stage during 1999–2000 (ARTC 1999, 2000). This appears to fully account for the reduction in steel traffic recorded at Gheringhap.

Figure 12 Steel wagons per month



Source: Gheringhap Loop train sightings, ABS (2006) and BTRE estimates.

Concluding remarks

In the absence of timely rail data, the Gheringhap Loop train sightings provide the most up to date indicators of trends in rail freight activity on a key part of the interstate rail network. The close match between the number of wagons per train counted at Gheringhap Loop and the ARTC estimates of average train length on this corridor confirms that the data provides robust measures of the number of train movements and train composition.

Sightings like the Gheringhap Loop train sightings could be used to observe short-term responses to changes in capacity or changes in market structure, such as the introduction of a new operator. The sightings also provide independent corroboration of trends in aggregate freight volumes on the corridor (and, given total freight volume, can be used to estimate average wagon loads).

The sightings confirm that operators tend to use all their allocated slots and tend to run trains close to the maximum allowable length, which suggests that published train schedules provide reliable indicators of the scale of individual operations. Unfortunately, without knowing average wagon loads for each operation, freight volumes for each

operation are difficult to infer from either schedules or train sightings. In cases where trains are not scheduled, such as for bulk agricultural goods, train sightings are presently the only publicly available source of data for freight volumes on specific routes.

Appendix: sample of online data

Table A.1 Extract of Gheringhap Loop train sightings data

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
						SUNDAY 10/4/2005			
MP5	9711	D	S/FRT	0046		NRXX+AN5(NR)		59P	S/G
AM5	9702	U	S/FRT	0752	(0623)	NR69+DL44(NR)		68P	S/G
PM5	9712	U	CNT/STL	0813	(0329)	NR64+NR58(SL)		74W	S/G
AM3	9756	U	PATRICKS	0854		NR22+BL28(PN) +NR107	EXTRA?	50W	S/G
	9791	D	CNT'S	1048	(0743)	XR555(PN)		27W	S/G
WP2	9821	D	STEEL		(1226)				S/G
PM9	9752	U	SCT	1241	(0725)	G536?+G529	EXTRA?	51W	S/G
PW4	9822	U	STEEL	1723	(1437)	NR49+DL40?(AN)		65W	S/G
	91??	D	GRAIN	1800		G512+XR553		50W	B/G
AM8	8702	U	OVERLAND	1933	(1930)	NRXX		10V	S/G
BA6	9827	D	S/FRT	1934	(1036)	NR59(SL) +NR64+NR96	BA6?, ARRV, 1915 CROSS AMB	64P	S/G
MA3	9755	D	PATRICKS	2054	(2042)	NR107?+BL28(PN) +NR22	64W	S/G	
MA5	9701	D	S/FRT	2233	(1921)	NR5X(SL) +NRXX+DL44(NR)		34P	S/G
MA8	8701	D	OVERLAND	2328	(2328)	NRXX		10V	S/G

Source: http://www.railpage.org.au/ghaploop/

Table A.2 Key to Gheringhap Loop train sightings data

Column	*Description of entry*
1	Interstate train code
2	Victorian train number
3	D for Down (from Melbourne) trains and U for Up (to Melbourne) trains
4	Type of train
5	Time the train goes past the down end of the standard gauge loop
6	Scheduled time for train past Gheringhap (some may be out of date)
7	Locomotive number(s)
8	Comment of interest about the train
9	Number of wagons and or carriages on the train
10	Track on which train is running (standard gauge or broad gauge)

Source: http://www.railpage.org.au/ghaploop/

References

ABS—see Australian Bureau of Statistics

ARA—see Australasian Railway Association

ARTC—see Australian Rail Track Corporation

Australasian Railway Association 2004, *Australian Rail Industry Report, 2003*, ARA Incorporated, Canberra.

Australasian Railway Association 2005, *Australian Rail 2004 Productivity Report,* ARA Incorporated, Canberra.

Australian Bureau of Statistics 2004, *Rail Freight Movements, Australia, Summary,* Catalogue No. 9220.0.55.001, ABS, Canberra.

Australian Bureau of Statistics 2006, *Agricultural State Profile, Victoria, 2004–05,* Catalogue No. 7123.2.55.001, ABS, Canberra.

Australian Rail Track Corporation 1999, *Annual Report 1999,* ARTC, Adelaide.

Australian Rail Track Corporation 2000, *Annual Report 2000,* ARTC, Adelaide.

Australian Rail Track Corporation 2003, *Annual Report 2003,* ARTC, Adelaide.

Australian Rail Track Corporation 2004, *Annual Report 2003–04,* ARTC, Adelaide.

Australian Rail Track Corporation 2005, *Annual Report 2004–05,* ARTC, Adelaide.

AWB Limited 2003, 'Submission to the Department of Transport and Regional Services on AusLink Green Paper', February 2003.

BTCE—see Bureau of Transport and Communications Economics

Bureau of Transport and Communications Economics 1996, *Quality of Rail Freight Services: the customer's perspective*, AGPS, Canberra.

Gheringhap Loop train sightings, G. Elliott, <http://gheringhaploop.customer.netspace.net.au> and <http://www.railpage.org.au/ghaploop/>, monthly updating.

Marchant, D. 2004, 'Developing a national interstate standard-gauge network', Presentation to AusRAIL 2004, Melbourne.