# PATREC PERSPECTIVES

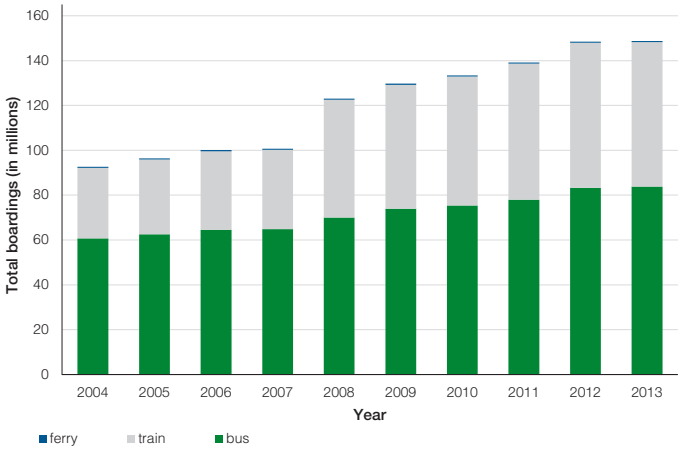
## Perth Public Transport Patronage: "Off The Rails" or "Back On Track"?

**Through an analysis of public transport trends over the last decade and in particular the last year, the aim of this Perspective is to determine the validity of the assertion that train patronage is declining. Firstly, the success story of bus, train and ferry patronage in metropolitan Perth is considered. Secondly, the drop in train patronage in 2013, which received wide media attention, is examined to ascertain if alarmist views are substantiated. Finally, further research opportunities to enhance the understanding of trends and dynamics are identified in order to inform policy to increase public transport patronage.**

## A SUCCESS STORY

### An Increasing Patronage

**Graph 1. Total patronage in Transperth (2004-2013)**




*PATREC compilation based on PTA datasets.*[1]

- Transperth public transport global patronage has increased by 61% in a decade, while the Perth metropolitan population has grown from 1.52 million (2004) to 1.97 million (2013)[2] inhabitants; a 32% growth.
- The comparison suggests that the use of public transport patronage is increasing faster than population growth.
- The patronage on ferries has remained constant, at around half a million boardings each year.
- Bus patronage shows a sustained positive trend. Each year buses attract more passengers, increasing from 61 to 84 million boardings in a decade.
- Patronage on trains has increased dramatically, more than doubling from 31 million to almost 65 million boardings in a decade.

### Top Performer – Perth Public Transport Use Expands Faster

**Table 1. Boardings per capita (b/c) in the five biggest Australian metropolitan areas from 2004/5 to 2011/12**

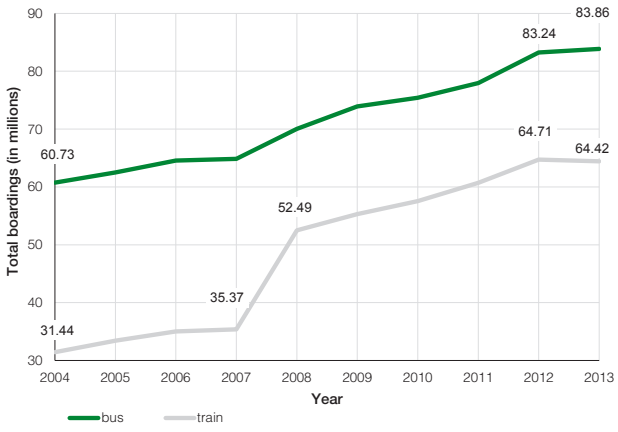
| | b/c 2004/5 | b/c 2011/12 | Change (%) |
|---|---|---|---|
| Sydney | 110 | 112* | +2 |
| Melbourne | 100 | 129 | +29 |
| Brisbane (SEQ) | 53 | 60 | +13 |
| Perth | 62 | 79 | +26 |
| Adelaide | 52 | 50 | -4 |

*PATREC compilation based on own calculations (for Perth) and Loader (2013) (for the other cities).*[3] *[*2010/11]*

- In Perth there was a per capita increase in patronage of 26% from 2004/5 to 2011/12, second only to Melbourne which performed slightly better in the same period (29%).
- In the use of public transport per capita Sydney and Brisbane experienced some increase, while Adelaide, a decline.
- However, the level of per capita public transport use in Perth is comparatively lower than in the two biggest metropolitan areas in Australia, but higher that in Brisbane and Adelaide.

## Mounting Global Patronage Is Based Mainly on Train Patronage Expansion

**Graph 2. Patronage in bus and train (2004-2013)**




*PATREC compilation based on PTA datasets.*[1]

- Compared to the sustained but slow growth in bus patronage, train patronage shows a dramatic increase.
- While in 2004 the difference between the two modes was twofold, now the ratio is 3:4.
- The steep increase in patronage for trains occurred from 2007 to 2008 due to the opening of the Mandurah line, which added more than 15 million new boardings to the railway transport mode.
- Since 2008, the increasing patronage for trains has run parallel to that of the buses, which indicates that in overall terms there has been no significant shift between public transport modes since the incorporation of the Mandurah line into the system.

## Train Patronage Expanded More Than Predicted

**Table 2. Forecasted patronage done in 2004**

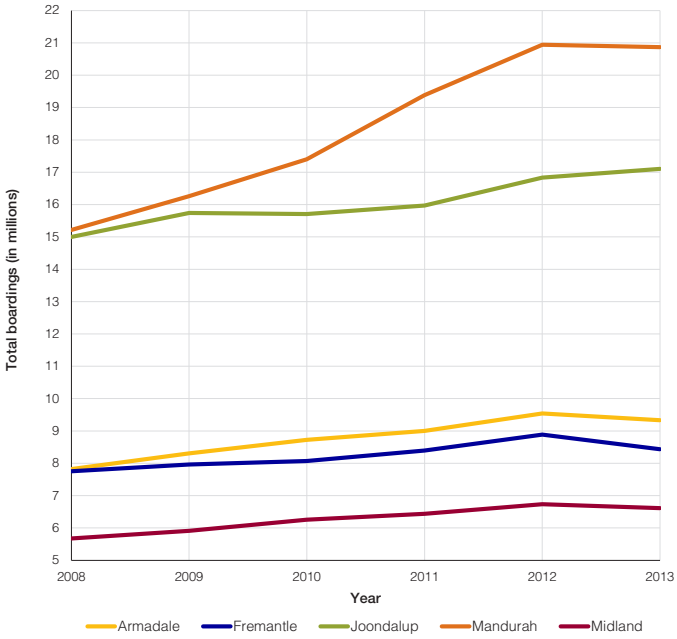
| | Base case (in millions) | | | "Rail option" (in millions) | | |
|---|---|---|---|---|---|---|
| | 2006 | 2021 | 2031 | 2006 | 2021 | 2031 |
| Bus | 41.04 | 63.98 | 79.27 | 29.68 | 53.56 | 69.48 |
| Train | 33.48 | 41.38 | 51.44 | 47.40 | 62.55 | 72.65 |

*PATREC (2004: 17).*[4]

- The achievement of almost 65 million boardings in 2012 by train lines was far larger than forecast. A model by PATREC (2004) predicted more than 62.5 million for 2021 under the "rail option" scenario;[4] a figure which was already achieved one decade earlier. In this sense, the role of the Mandurah line to capture new boardings has been considered by McIntosh et al. (2013: 43) as "successful".[5]
- This model by PATREC (2004) also forecasted that rail patronage would overtake bus in 2006 under the "rail option".[4] But this surpassing of bus patronage by train has not occurred in practice and Graph 2 suggests that this is not likely to occur in the following years.
- Bus remains a robust structural component of the public transport system in Perth.

## All Lines Show Increase of Patronage, Albeit at Different Rates

**Graph 3. Perth train lines patronage (2008-2013)**




*PATREC compilation based on PTA datasets.*[1,6]

- The opening of the Mandurah line in late December 2007 had a major impact on the Perth train system. In its first year it overtook the previously busiest line in terms of passengers (Joondalup line) and since then it has expanded significantly. Patronage in 2013 was 37% higher than in 2008, equivalent to almost 6 million new boardings.
- The other corridors showing high increases in patronage over this six-year overview period are the Armadale line (19% increase in patronage, equivalent to 1.5 million more boardings) and the Midland line (17% increase, 1 million more boardings).
- The Joondalup line has expanded by 14% in six years. Although as a percentage the expansion seems modest, it has incorporated more than 2 million new boardings since 2008.
- The Fremantle line, the first one managed as a modern suburban rail line after its reopening in 1983, shows a stagnation in patronage in the last 6 years, remaining at a constant level of 8 million boardings per year.

## Train Patronage Increases with Population Growth

**Table 3. Comparison of patronage variation per train line and population variation per train corridor (2008-13)**

| | Train patronage change (%) | Population change (%) |
|---|---|---|
| Armadale | 19.31 | 19.70 |
| Fremantle | 8.79 | 8.55 |
| Joondalup | 14.03 | 16.53 |
| Mandurah | 37.18 | 18.90 |
| Midland | 16.62 | 16.78 |

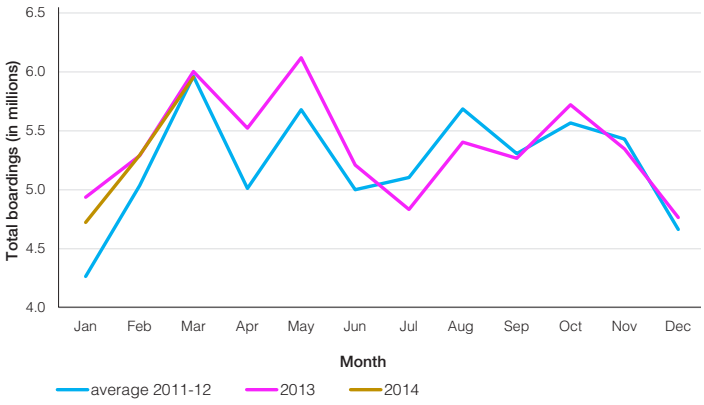
*PATREC compilation based on PTA and ABS datasets.*[1, 2]

- A simple correlation (Pearson's *r)* between the rates of variation of train patronage and population change yields a positive result of 0.66. This suggests that train patronage depends on population growth.
- The correlation is higher (*r*=0.97) if the Mandurah line is subtracted. This line is not comparable with the others as it is new. The expansion is substantial as it serves a corridor that previously had no train service, as it has been mapped by Loader (s.d.). [7]
- The comparatively minor increase on the Fremantle line is not surprising taking into account the modest population growth experienced.
- The Joondalup line extension to Butler is currently under construction. Given that patronage increases each time a new populated area is serviced by a railway expansion, a patronage growth is likely to occur on this line.
- It is likely that increasing levels of train patronage are more strongly linked to increases in catchment population and rail capacity than to travel demand management policy.

# THE 2013 PATRONAGE DROP… THE END OF THE SUCCESS STORY?

## A Closer Look to the 2013 Patronage Decline

**Graph 4. Monthly comparison of train patronage**




*PATREC compilation based on PTA datasets.*[1]

- After years of notable growth for train patronage, it dropped in 2013 (Graph 2). The contraction was not severe but it breaks with the trend over the last decade.
- The pattern observed for 2013 is consistent with normal monthly patronage trends, dependant on holiday periods (Graph 4).
- When comparing monthly average patronage for 2011 and 2012 with 2013, it is noticeable that until June 2013 patronage was higher than the average of the two former years. This in line with the increasing year-on-year trend over the past decade. However, for July and August 2013 there were half a million fewer boardings than the July and August averages of the previous two years.
- This shrinkage is attributable to the shutdowns of parts of the network for a few days in both mid-July and early August 2013 due to the sinking of the Fremantle line at Perth Central Station.
- Although the patronage level recovered in August 2013, levels remained at similar levels to the previous two years, not reflecting the general trend as experienced every month from January to June of higher monthly patronage in 2013 than the average of 2011 and 2012.
- There is no indication in Graph 4 to support the assertion that commuters "are jumping off trains in record numbers" due to overcrowding, among other reasons.[8] In the end, the decrease was not massive (annually, -0.45%). Moreover, passengers seem to have returned to the train after the disruption. In addition, patronage numbers recorded from January to March 2014 are virtually the same as for the same period in 2013, albeit at lower rates than the 2008-12 trend (Graph 2).

## The 2013 Patronage Drop per Line

**Table 4. Comparison of patronage variation per train line**

| | 2012-2013 annual % variation | 2012-2013 (Jul to Sep) % variation | 2013-2014 (Jan to Mar) % variation |
|---|---|---|---|
| Armadale | -2.20 | -7.69 | -2.50 |
| Fremantle | -5.04 | -14.83 | -0.62 |
| Joondalup | 1.64 | -7.49 | -0.78 |
| Mandurah | -0.35 | -5.53 | 0.05 |
| Midland | -1.81 | -5.27 | 2.09 |

*PATREC calculations based on PTA datasets.*[1,6]

- The line showing the greatest contraction from 2012 to 2013 is the Fremantle line, both for the whole year and for the period of the shutdown. However, from January to March 2014 it is at almost the same levels as the same period in 2013.
- The Midland and Armadale lines patronages were lower annually by around -2%, but the former is higher in the first quarter of 2014 in relation to the first quarter of 2013; the latter is the only significantly contracting line in the first quarter of 2014 in relation to past year levels.
- The patronage reduction in the Mandurah line is almost imperceptible annually, and the patronage of the first months of 2014 is consistent with 2013.
- The Joondalup line was the only line that did not experience a patronage drop from 2012 to 2013, despite in the period of the shutdown contracted to similar levels as other ones.

## BUILDING ON THE SUCCESS: RESEARCH IDEAS

- 2014? The figures for this year need to be monitored whether there is full recovery to pre-July/August 2013 train levels.
- Capacity. The extent to which capacity influences patronage trends needs further investigation.
- Mode share. Although the increase in train patronage has been substantiated, its expansion with regard to other modes (in particular, bus and car) requires further investigation.
- Episodes of disruptions. The analysis of the figures around the episode of July-September 2013 indicates that commuters returned to train travel after the shutdowns. However, research might be done in order to understand how these episodes affect the transport system as a whole.
- New indicators and measures. Total boardings are a very broad indicator of patronage. Alternative indicators such as number of trips should be explored. Patronage data needs to be more disaggregated, in spatial terms beyond the train line, or among ridership types.

### Reference notes


1 Data from: Public Transport Authority: *Transperth Patronage*. http://www.pta.wa.gov.au/NewsandMedia/TransperthPatronage/tabid/218/Default.aspx (Retrieved on 2/04/2014).
2 Amalgamated population of the 32 LGAs of the current Greater Perth GCCSA. Data from: Australian Bureau of Statistics (2014): *Regional Population Growth, Australia, 2003-2013 – cat no. 3218.0.* http://abs.gov.au (Retrieved on 2/04/2014).
3 Loader, C. (2013): "Public transport patronage trends in Australasian cities", *Charting Transport*. http://chartingtransport.com/2010/11/13/public-transport-patronage-trends/ (Retrieved on 2/04/2014).
4 PATREC (2004): *Perth's South West Metropolitan Railway: Balancing Benefits and Costs*. http://patrec.org/publication_docs/2004%20-%20Perth%E2%80%99s%20South%20West%20Metropolitan%20Raiway%20Balancing%20benefits.pdf (Retrieved on 2/04/2014).
5 McIntosh, J. *et al.* (2013): "Why Fast Trains Work: An Assessment of a Fast Regional Rail System in Perth, Australia", *Journal of Transportation Technologies,* 3: 37-47.
6 Figures on train patronage per lines prior to 2011 were kindly provided by the Public Transport Authority, upon request. The figures of total train patronage shown in Graphs 1, 2 and 4 are not consistent with the sum of the individual figures per train line in Graph 3 and Tables 3 and 4. For this reason, they have to be discussed independently. The variation in the numbers is due to special event services and rail replacement travels, which are not included in individual train line figures.
7 Loader, C. (*s.d.*): "Spatial changes in Perth journey to work 2006-2011", *Charting Transport.* http://chartingtransport.com/2012/11/02/spatial-changes-in-perth-journey-to-work-2006-2011/ (Retrieved on 2/04/2014).
8 Acott, K. (15/02/2014): "Fewer take the train to work", *The West Australian*.


PATREC


The Planning and Transport Research Centre (PATREC) is a collaboration between three public universities of Western Australia: The University of Western Australia, Curtin University and Edith Cowan University. It also receives financial support from the Department of Transport, Main Roads Western Australia and The Western Australian Planning Commission.



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