

South Australia's Kerbside Waste Performance Report 2017-18



**Government
of South Australia**

Green Industries SA

Acknowledgements

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Executive Summary

This report presents data on kerbside waste and recycling collection services in South Australia provided by the 19 Adelaide metropolitan and 49 regional councils in the 2017-18 financial year and analyses performance and improvements in waste disposal efficiency and sustainability over the past 15 years.

The focus is only on waste material collected at kerbside in bins provided specifically for residual waste (landfill), co-mingled recyclables and green organics. Hard waste, street sweepings, Container Deposit Scheme (CDS) returns and waste collected at drop-off facilities and council-operated commercial services are excluded.

All 19 metropolitan councils have offered a three-bin service for a number of years, although some only provide a green organics bin on an opt-in basis. In the regions, approximately half offer a three-bin system, including many where these services are provided to townships only. One regional council offers a fourth bin for paper and cardboard only. There are also some differences between councils in terms of protocols.

Performance

In 2017-18:

- Approximately 660,500 tonnes of Municipal Solid Waste (MSW) was collected from kerbsides across the state. This equates to about 382 kilograms per person or 984 kilograms per serviced household.
 - » Of this, 301,100 tonnes were recovered as organics [55.2%] or recyclables [44.8%]. This represents a total recovery rate of 45.6%.
- In metropolitan Adelaide, approximately 501,100 tonnes of MSW was collected from kerbside. This equates to 386 kilograms per person or 1,006 kilograms per serviced household.
 - » Recoverables constituted 241,700 tonnes as organics [57.0%] or recyclables [43.0%], for a total recovery rate of 48.2%.
- In regional South Australia, approximately 159,400 tonnes of MSW was collected from kerbside. This equates to 369 kilograms per person or 731 kilograms per serviced household.
 - » Of this 59,500 tonnes were recovered as organics [42.5%] or recyclables [57.5%] which represents a total recovery rate of 37.3%.

Across South Australia, between 2002-03 and 2017-18:

- Total material collected through kerbside waste collections increased by 17%
- The amount of waste going to landfill fell by 19% [81,900 tonnes]
- Organics and recyclables collected grew by 166% and 120% respectively, largely due to the rollout of the three-bin system
- The overall kerbside collection recovery rate increased from 21.9% in 2002-03 to 45.6% in 2017-18.

The 2017-18 recovery rate of 45.6% is below the South Australia's Waste Strategy 2015-2020 (GISA 2015) target of 60% waste diversion from high performing bin systems by 2020, making it clear that there is still work to be done¹.

Analysis shows that the top performing councils in 2017-18 – some achieving nearly 60% recovery rates – were those that provide a weekly residual waste collection, fortnightly recyclables collection and fortnightly organics collection that includes food waste.

Some groupings of councils have recovery rates seven to 10 percentage points lower than others due to their use of an opt-in system for organics collections.

Recommendations

The findings of this report suggest that the following changes are necessary to improve the diversion of waste from landfill:

1. Adopting a standardised three-bin system across all metropolitan councils to include as a minimum service to all households: **a.** fortnightly collection of co-mingled recyclables **b.** fortnightly collection of organics, including food waste.

This will have an immediate impact on raising the kerbside diversion rate. Universal rollout of area-wide food waste diversion systems will raise waste diversion rates and may narrow the gap between best and least performing councils.

2. Standardised, consistent materials collected in kerbside bin-based services across all metropolitan councils

The state-wide Which Bin campaign launched in May 2019 will aid the consistency of education and awareness efforts as it has a standard list of materials that can be placed in the recycling and organics bins. This will reduce confusion for residents about which bin to use, reduce contamination of the recyclables stream and organics stream and divert more food waste from the residual stream.

Time and effort are being wasted in tailoring the message to individual councils' residents to accommodate the different bin services on offer within a council area. To build up a culture of waste minimisation and behaviour change takes time and requires reinforcement of the key messages. Costs can be reduced in the longer term by providing the same message to all households across all councils.

3. Standardisation of bin infrastructure to comply with AS 4123.7

The standard promotes the adoption of common colour coding of waste, recycling and organics kerbside bin collection services across Australia and is intended to support correct recycling 'automatic' and 'unthinking' behaviour.

Green Industries SA (GISA) provides a number of programs and activities to assist local government. Information can be found in GISA's 2018-19 Business Plan at: www.greenindustries.sa.gov.au/publications-corporate

¹ It should be noted that South Australia's Waste Strategy 2015-20 has an MSW diversion rate of 70%, which includes kerbside bins, hard waste, resident drop, CDS, etc.

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1. Introduction

1.1 Purpose

Information on waste streams collected at kerbside is needed to help monitor progress towards the municipal waste targets set out in South Australia's Waste Strategy 2015-2020 (GISA 2015) and to inform decision making, particularly in relation to development of programs and incentives to improve recycling rates and to target areas most in need.

This report presents data on kerbside waste and recycling collection services provided by the 19 Adelaide metropolitan and 49 regional councils in the 2017-18 financial year and analyses performance and improvements in waste disposal efficiency and sustainability. It also reports on trends over a 15-year period.

The focus is only on waste material collected at kerbside in bins provided specifically for residual waste (landfill), co-mingled recyclables and green organics. Hard waste, street sweepings, Container Deposit Scheme (CDS) returns and waste collected at drop-off facilities and council-operated commercial services are excluded.

As such, the recovery rate stated in this report differs from that cited in the South Australia's Recycling Activity Survey 2017-18, which includes these other components of the total Municipal Solid Waste (MSW).

It also should be noted that MSW is only one of the three sectors that contribute to SA's total waste, with each having its own recovery rate. In 2017-18, 83.6% of all waste material was diverted from landfill for recycling and other purposes (Rawtec 2019).

Residential residual waste accounts for 43% of the total solid waste that goes to landfill. The remainder is commercial and industrial waste (25%) and construction and demolition waste (32%).

1.2 Background

The environmental benefits of a three-bin waste collection system are well established and the 19 metropolitan councils have offered this service for a number of years. In regional areas, 50% of councils have three-bin systems and all have at least one bin collected at kerbside. One regional council even has a 4-bin system where the extra bin is solely for cardboard and paper. Differences do exist between councils even where the same number of bins are provided.

In low-density residential areas, most councils provide a 140L bin for waste and 240L bins for comingled recyclables and organics. However, organics bins are optional in some areas and must be purchased by residents.

All councils collect residual waste bins weekly and recyclables fortnightly, but in 2017-18 organics collections vary: some are fortnightly, others every four weeks.

Similarly, some councils encourage food waste to be placed in the organics bin (and provide kitchen caddies with compostable liners for this purpose) but others, particularly where four-weekly collection is in place, do not.

The average landfill recovery rate from the three-bin system across the 19 metropolitan councils was 48.2% in 2017-18. The top performing councils – some achieving nearly 57% – were those that provide a weekly residual waste collection, fortnightly recyclables collection and fortnightly organics collection including food waste. Regionally, the recovery rate varies from zero (single bin service for residual waste only) to rates that are on par with metropolitan Adelaide (three-bin systems).

Councils often contract collection services to external contractors, many of which are private companies. The contractors collect the waste and recyclables and take them to transfer stations or Material Recovery Facilities (MRFs) for sorting and processing. The quantities are weighed at weighbridges and charged back to individual councils².

1.3 Context

Since 2005 Green Industries SA (GISA) – formerly Zero Waste SA – has funded metropolitan and rural councils to implement improved kerbside collection systems for residents. In particular, there has been an increased emphasis on diversion from landfill using better performing kerbside systems.

By 30 June 2018, about \$17.3 million had been provided to 64 councils through grants such as the *Kerbside Performance Incentives Program*, the *Kerbside Performance Plus (Food Organics) Incentives Program* which focuses on food diversion from residual to organics bins, the *Kerbside Recycling Campaign*, *Regional Transport Relief Fund* and *Regional Infrastructure/Implementation* programs.

The Local Government Association of SA (LGA) has a strong interest in municipal waste management and recycling, as these services are valued by residents and present a significant cost to councils. As councils provide waste management and recycling services to their residents, they are the primary custodians of the kerbside waste data.

The SA Local Government Grants Commission (SALGGC) also requests waste data from councils, which is provided on an annual basis. GISA used this data to quantify costs incurred by councils for kerbside collections and for reporting waste quantities for regional councils.

² In regulations under the Environment Protection Act, if a council sends less than 10,000 tonnes to landfill per year, the waste quantities can be estimated based on a population formula [SA EPA 2009]

1.4 Methodology

This report collates waste and recycling data from GISA, councils, contractors and the SALGGC.

Metropolitan councils provide GISA with a monthly breakdown, in tonnes, of residual waste, co-mingled recyclables and organics whereas regional councils' tonnages are sourced from the SALGGC. Some regional councils' data was supplied to GISA in follow-ups of the data quality to clarify problems arising with data provided to SALGGC. Small amounts of commercial and industrial waste collected by councils are not counted separately as these are considered negligible and it is not possible to separate these quantities. As the waste material streams are weighed on weighbridges, the accuracy of metropolitan Adelaide data is relatively high. While many regional councils waste goes over a weighbridge, the data supplied for some regional areas comprised all MSW waste, rather than only kerbside collected. It is also noted that the data quality for some regional councils is not as high as metropolitan data, due to the lack of weighbridges in some areas.

Data in this report has been adjusted to ensure it is kerbside only that is reported. All waste and recycling quantities in this report have been rounded to the nearest one-hundred for consistency and accuracy³.

Data provided annually by councils to the SALGGC is the source of many of the details of council waste services, such as bin systems and frequency of collection. As councils can offer a range of different waste services, this report summarises the main kerbside services offered to residents.

GISA has grouped councils by geographic location and other existing associations into regions taking into consideration household numbers. It should be noted that co-operative arrangements between councils in relation to waste management may exist outside the council groupings used in this report.

The three-bin recovery rate is defined as the percentage of waste that is recovered for recycling from the total kerbside waste. It can be expressed as:

$$\text{3-Bin Recovery Rate} = \frac{\text{organics + recyclables}}{\text{organics + recyclables + residual}} \times 100\%$$

Similarly, the two-bin recovery rate was used as a way to examine trends in the recovery rate without the effects of variations in annual rainfall. It is expressed as:

$$\text{2-Bin Recovery Rate} = \frac{\text{recyclables}}{\text{recyclables + residual}} \times 100\%$$

Demographic data [population and household figures] is based on figures from the Australian Bureau of Statistics [ABS]. Some households are in unincorporated areas and do not receive council kerbside services, so these figures are not included in this report.

The Estimated Resident Population by local government area is used for population data in this report, and 'occupied dwellings' is used for serviced-households figures from 2016 census data.

³ Some totals in tables may not add up exactly due to rounding of numbers.

2. Findings

2.1 South Australia's Kerbside Waste and Recycling Services

South Australia has 68 councils, 19 of which are metropolitan and 49 regional. In 2017-18, 43 councils across the State offered three-bin systems to their constituents compared with 16 in 2003-04. All councils now offer at least a single-bin (landfill) collection. This improvement in recycling services offered is summarised in **Table 1**.

Table 1. Summary of SA's Kerbside Bin Systems in 2017-18 and 2003-04

	Total		Metropolitan		Regional	
	2003-04	2017-18	2003-04	2017-18	2003-04	2017-18
Four-bin	0	1	0	0	0	1
Three-bin	16	43	15	19	1	24
Two-bin	18	17	4	0	14	17
Single-bin	33	7	0	0	33	7
No bin	1	0	0	0	1	0
Total	68	68	19	19	49	49

2.2 Metropolitan Kerbside Waste and Recycling Services

In 2017-18, all 19 metropolitan councils offered access to the three-bin system (up from 15 in 2003-04), although three – Playford, Salisbury and Gawler – only provided an organics service on request and the Adelaide Hills Council only covered about two-thirds of households (mostly in townships) for organics.

An estimated 55% of rate payers in Playford, Salisbury and Gawler chose to pay for an organics bin under Northern Adelaide Waste Management Authority's (NAWMA) voluntary service (NAWMA 2018), with participation increasing since 2011-12. It is estimated that about 90% of metropolitan households now have three bins in use, a figure which is expected to rise further in 2020 as Northern subregion councils move to a full three-bin rollout.

Most metropolitan councils provide a weekly residual service, fortnightly recyclable collections and fortnightly organics collections. In 2017-18 Onkaparinga collected organics bins on a four-weekly basis.

All use yellow lids for recycling bins and most use green for organics bins, but only 12 councils (covering 63% of households) use red lid for residual waste, as set out in Australian Standard AS 4123.7. The other seven use blue lids which, according to the standard, are for cardboard and paper only (See **Appendix 1**).

Using AS 4123.7 bin colours has been found to reduce waste sent to landfill, increase recycling and support consistent education campaigns to reduce resident confusion about how to correctly use kerbside bins collection services (MWRRG 2017).

2.3 South Australia's Waste Management Costs

The South Australian Local Government Grants Commission (SALGGC) surveys SA's local government councils each year to make recommendations to the Minister for Local Government on the distribution of untied Commonwealth Financial Assistance Grants to local councils in South Australia. SALGGC reports publicly on the amount spent by each council in 15 different categories of which waste management is one. Determining kerbside-only costs from the figures supplied should be possible, but in many cases the data provided by some councils lacks detail to cost services for kerbside alone. The only uniform indicator of council costs is the waste management total which is inclusive of other waste management issues besides kerbside.

In 2017-18, the 68 SA local government councils spent \$198.4 million in operating expenses on waste management of which \$130.1 million was incurred in Metropolitan Adelaide and \$68.3 million spent by regional councils. Included in these amounts are ordinary solid waste collection and disposal, recycling collection and disposal, organics collection and disposal, waste disposal facility, other waste management, so the figures do not relate to kerbside collections alone.

SA local government councils also earn revenue while managing the waste facilities, mainly in regional areas (\$44.7 million) as opposed to the metropolitan Adelaide councils. In regional areas, there are more council owned and managed landfills and transfer stations and these accept waste from commercial and industrial and construction and demolition sources as well as MSW streams.

Table 2. South Australia's LG Councils total operating expenditure on waste management 2017-18

	Metropolitan	Regional	Total
Operating expenditure (\$ millions)	\$130.1	\$68.3	\$198.4

Source: SALGGC (2018)

2.4 South Australia's Kerbside Quantities

In SA in 2017-18, approximately 660,500 tonnes of municipal waste was collected from kerbside, 501,100 tonnes from metropolitan areas and 159,400 tonnes from regional areas (Table 3). The 19 metropolitan councils account for 76% of the total kerbside waste collected in SA.

Table 3. South Australia's Total Kerbside Waste Quantities, 2017-18

Collection	State – SA (tonnes)	Metropolitan (tonnes)	%	Regional (tonnes)	%
Residual Waste	359,300	259,400	72%	100,000	28%
Organics	166,100	137,800	83%	28,300	17%
Recyclables	135,000	103,900	77%	31,200	23%
Total Tonnes	660,500	501,100	76%	159,400	24%
Recovery Rate	45.6%	48.2%		37.3%	

Sources: SALGGC [2018] and GISA [2018]

South Australians produced approximately 382 kg per person of MSW at kerbside, or 984 kg per household serviced (Table 4).

Table 4. South Australian kerbside waste collections per household and per person, 2017-18

Collection	State – SA (tonnes)	Waste Per Capita (kg/pp/yr)	Waste Per Household (kg/hh/yr)
Residual Waste	359,300	208	535
Organics	166,100	96	247
Recyclables	135,000	78	201
Total Tonnes	660,500	382	984

2.5 Metropolitan Adelaide

2.5.1 Metropolitan Adelaide Kerbside Quantities

In 2017-18, residents in the metropolitan area generated 501,100 tonnes of kerbside materials, of which 48.2% was recovered as recyclables or organics, a 1.7% decrease from the previous year [Table 6]. This was driven by a 13% decrease in organics.

Approximately 386 kg of MSW was collected per person, or 1,006 kg per household serviced [Table 5].

Table 5. Metropolitan Adelaide kerbside waste collections per household and per person, 2017-18

Collection	Metro Adelaide (tonnes)	Waste Per Capita (kg/pp/yr)	Waste Per Household (kg/hh/yr)
Residual	259,400	200	521
Organics	137,800	106	277
Recyclables	103,900	80	208
Total	501,100	386	1,006

Seasonal fluctuations in monthly collection trends [Figure 1] can affect quantities: for example, garden waste in spring and autumn and general waste around Christmas and Easter. Weather conditions, particularly rainfall, also can affect quantities of garden waste. As 2017-18 was a relatively dry year [see rainfall figures in Table 15], the three bin recovery rates are down compared to the previous years.

Fluctuations in the three-bin recovery rate over 2017-18 are shown in Figure 2. The impact of a dry summer can be seen. The slight pick-up in organics in May is likely due to milder weather encouraging garden growth and waste from deciduous trees.

Table 6. Metropolitan Adelaide Councils: comparisons of 2016-17 and 2017-18 Kerbside Quantities

Collection	2016-17 (tonnes)	2017-18 (tonnes)	% Change from 2016-17
Residual Waste	265,500	259,400	-2.4%
Organics	155,700	137,800	-13.0%
Recyclables	109,100	103,900	-5.0%
Total Metropolitan Materials	530,300	501,100	-5.8%
Recovery Rate	49.9%	48.2%	-1.7%

Figure 1. Metropolitan Adelaide Monthly three-bin Kerbside Quantities, 2017-18

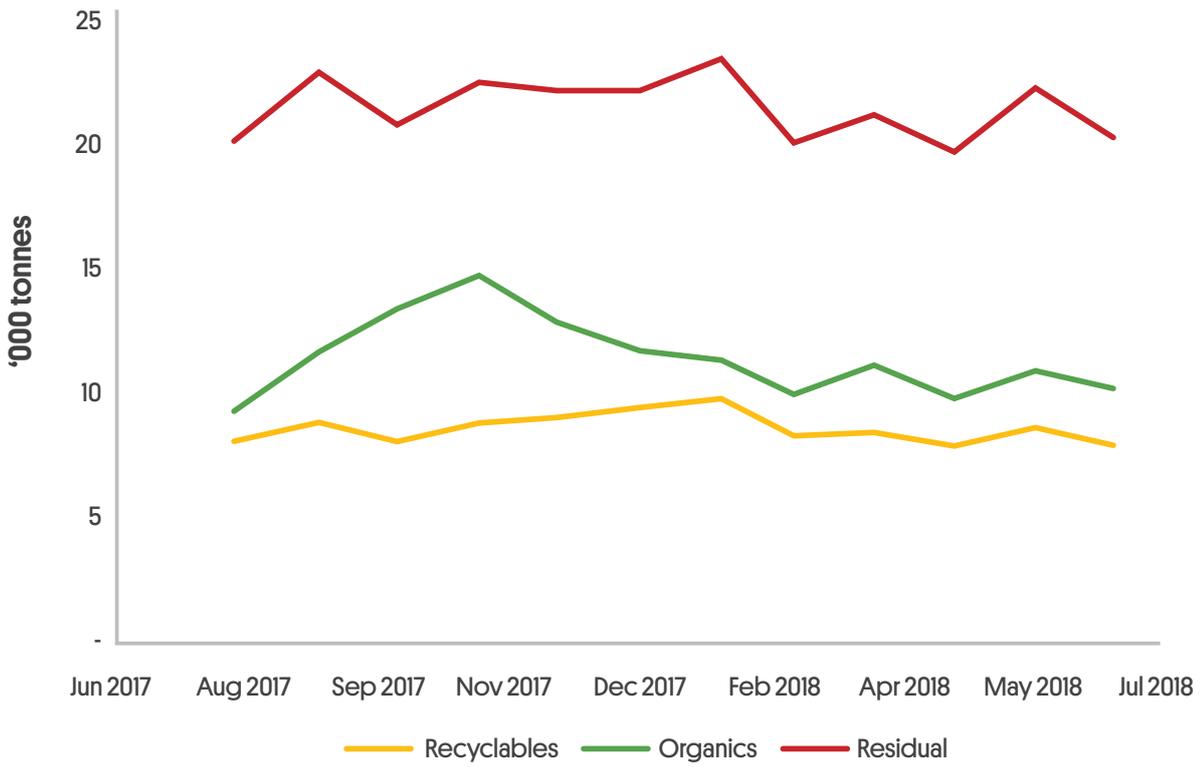
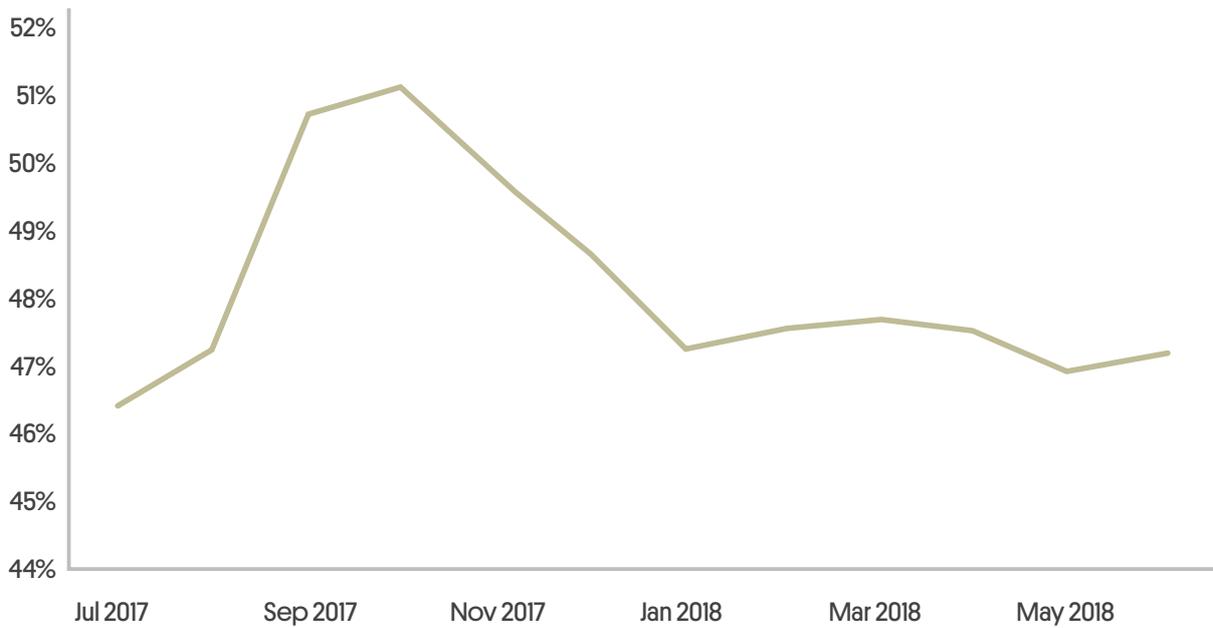


Figure 2. Metropolitan Adelaide Average three-bin Recovery Rate by Month, 2017-18



2.5.2 Metropolitan Adelaide Sub-Regions

To provide some comparisons between councils, sub-regional aggregations have been used (**Table 7, Figure 4**). Since 2004-05, populations in all metropolitan sub-regions have increased (ABS 2019), which has contributed to an increase in total waste generated. Per capita and per household analysis has been undertaken and can be seen in **Table 8**.

Table 7. Metropolitan Sub-regions, Population and Households, 2017-18

Sub-Regions and councils	Population [2018]	Households [2016]
Central Eastern – Adelaide, Adelaide Hills, Campbelltown, Burnside, Norwood Payneham and St Peters, Prospect, Unley, Walkerville	266,801	103,710
Northern – Gawler, Playford, Salisbury, Tea Tree Gully	359,693	132,273
Southern – Marion, Mitcham, Onkaparinga	331,050	127,052
Western – West Torrens, Charles Sturt, Holdfast Bay, Port Adelaide Enfield	340,639	135,206
Total	1,298,183	498,241

Sources: ABS [2016] and ABS [2018]

The Central Eastern group had the highest three-bin recovery rate at 51.8% and the Northern group the lowest at 44.1% (**Table 9, and Figure 4**). Factors affecting the recycling rate are discussed in **Section 3**.

Table 9 also shows the previous year's three-bin and two-bin recovery rates and while most subregions are down, Southern has improved recovery rates and is expected to improve further due to the introduction of fortnightly organics collections across Onkaparinga Council area.

Monthly three-bin recovery rates for the sub-regions show seasonal trends in all areas. There is a steady difference of 7 to 10 percentage points between the sub-regions with the highest recovery rate and the lowest (see **Figure 3**) confirming the effectiveness of using an organics bin, particularly with provision of kitchen caddies. Indicative two-bin recovery rates are also provided as a comparison in order to examine trends in the recovery rate without the effects of variations in annual rainfall (see **Table 10**).

Table 8 provides a summary of the kerbside quantities presented at kerbside in each of the four subregions as well as their individual rates of waste per person and household.

Table 8. Metropolitan sub-regions - Total Kerbside Waste Collected, per capita and per household, 2017-18

Metropolitan Sub-region	Recyclables (tonnes)	Organics (tonnes)	Residual (tonnes)	Total Waste (tonnes)	Waste Per Capita (kg/pp/yr)	Waste Per Household (kg/hh/yr)
Central Eastern	22,262	30,368	48,956	101,586	381	980
Northern	27,201	31,337	74,273	132,810	369	1,004
Southern	26,107	35,513	68,574	130,194	439	1,145
Western	28,285	40,602	67,586	136,474	401	1,009
Total	103,855	137,820	259,390	501,064	-	-
Average					386	1,006

Sources: ABS (2016) and ABS (2018)

Table 9. Metropolitan sub-regions – comparison of recovery rates in 2017-18 with those in 2016-17

Metropolitan Sub-region	2017-18		2016-17	
	3-bin rate %	2-bin rate %	3-bin rate %	2-bin rate %
Central Eastern	51.8	31.3	53.5	32.4
Northern	44.1	26.8	45.6	27.1
Southern	47.3	27.6	48.8	27.9
Western	50.5	29.5	52.7	30.1
Metro Average	48.2	28.6	49.9	29.1

Figure 3. Metropolitan Adelaide monthly three-bin Kerbside Recovery Rate by subregion, 2017-18

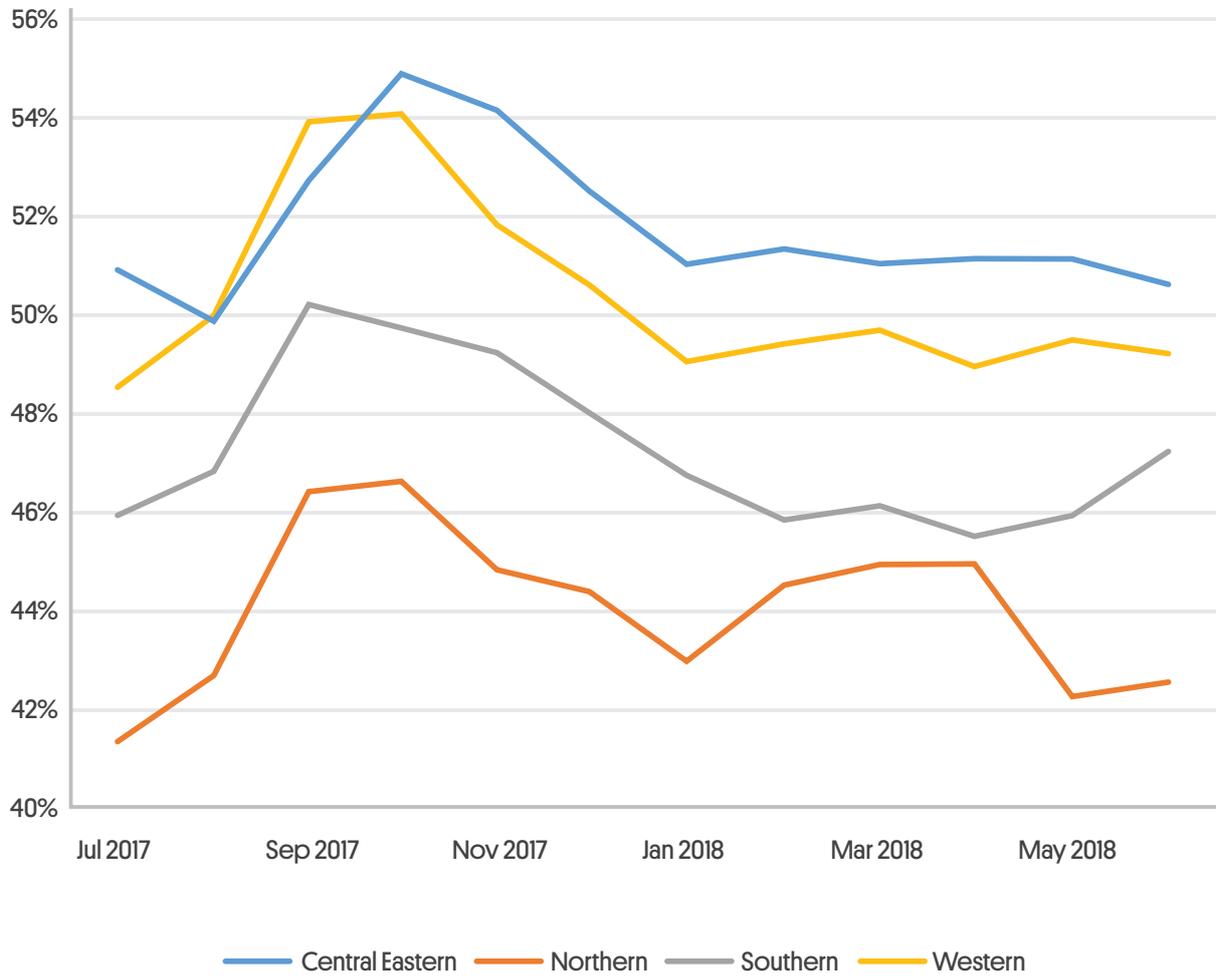
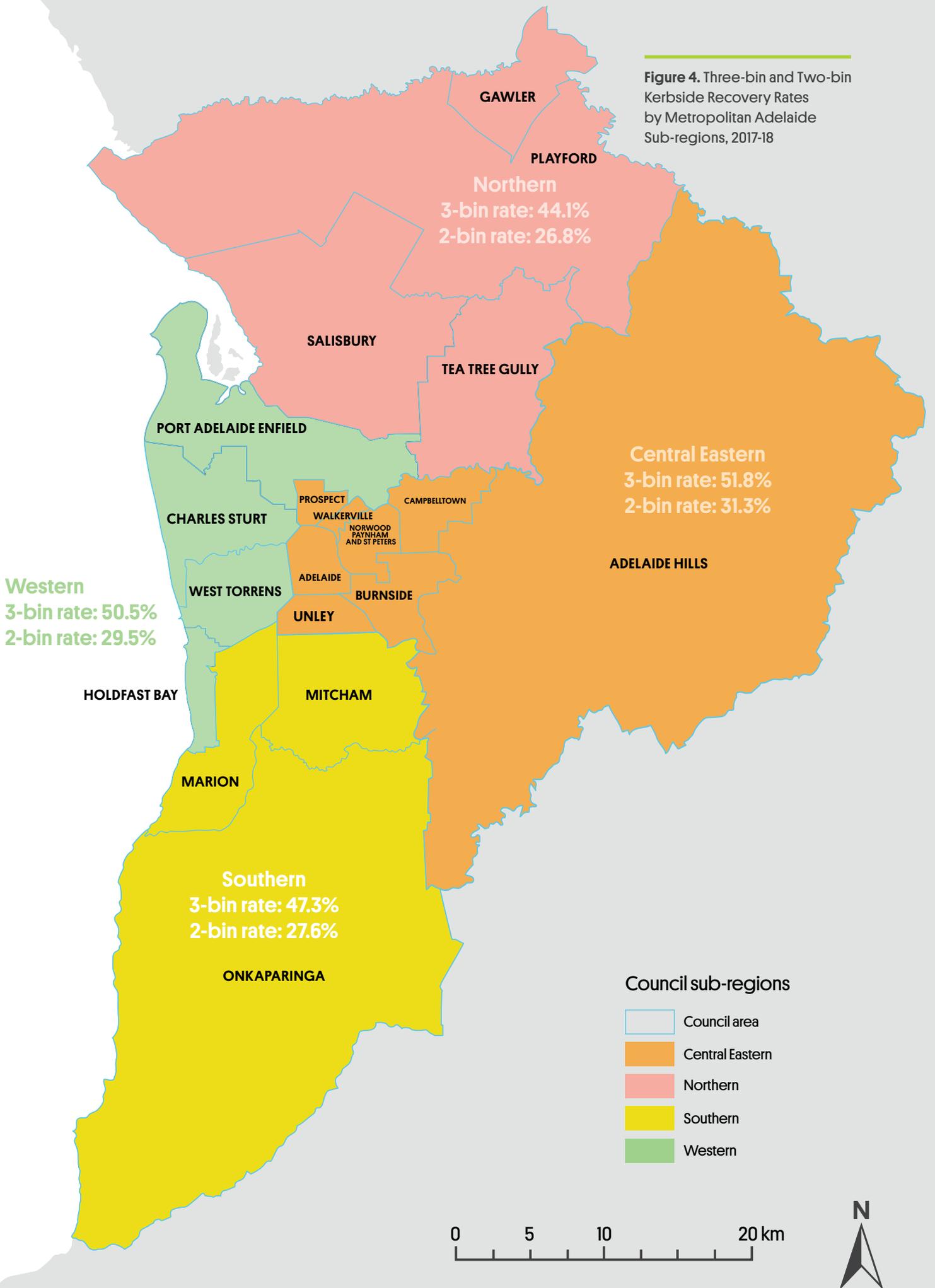


Figure 4. Three-bin and Two-bin Kerbside Recovery Rates by Metropolitan Adelaide Sub-regions, 2017-18



2.5.3 Metropolitan Adelaide Recovery Rate Performance

Table 10 shows the recovery rate for each of the 19 councils (unnamed) with a description of the organics and food waste diversion service they offer residents. All but four are in the “leafy” category, meaning they have higher rainfall and more residential gardens.

More than half of these councils have three-bin recovery rates greater than 50%.

In general, the best performing councils have full organics bin coverage, supplemented with a food caddy. However, direct comparisons are difficult due to different underlying factors such as geography, average weekly household income, use of food caddies and rainfall.

Figure 5. Metropolitan Adelaide Kerbside three-bin Recovery Rates, 2017-18 compared to previous years

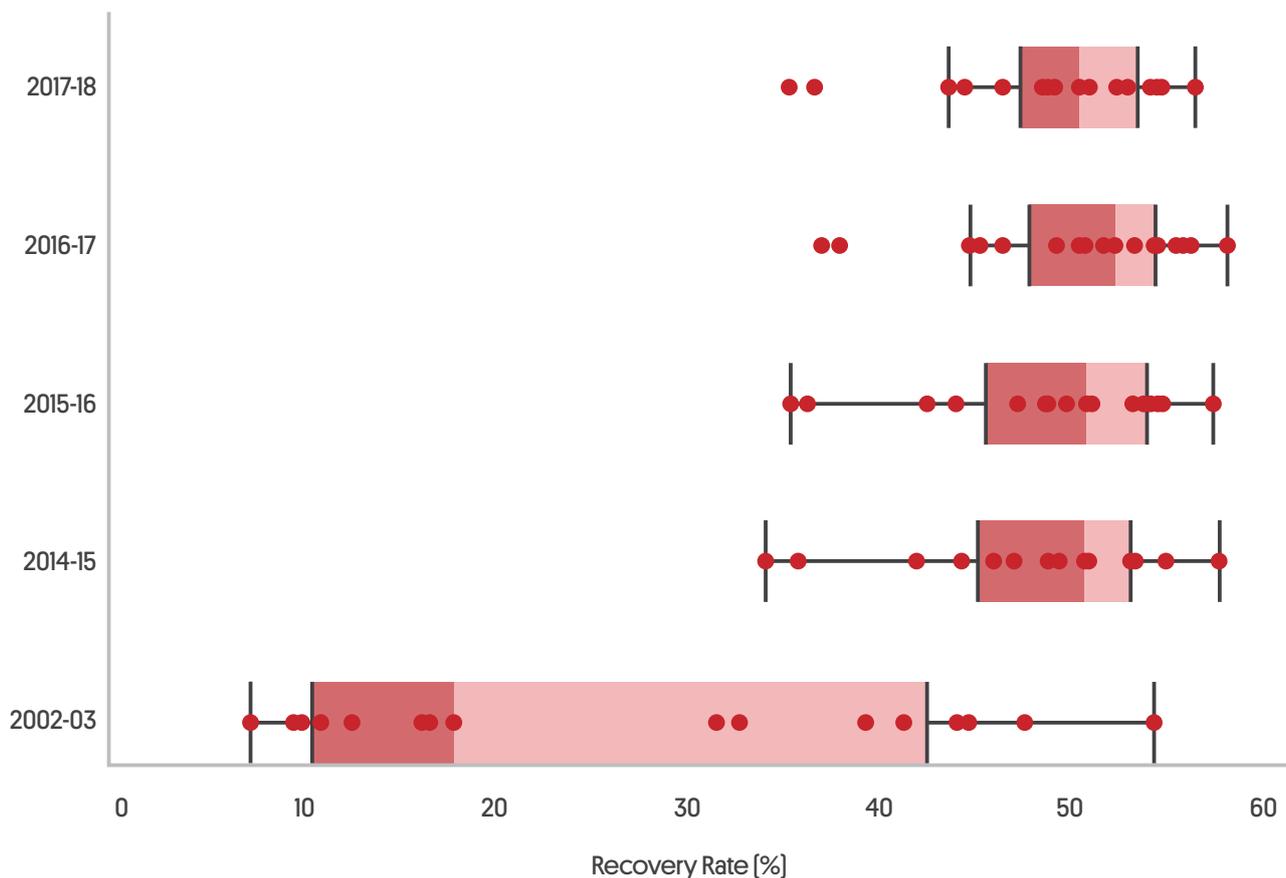


Figure 5 above shows the distribution of the three-bin recovery rates by Adelaide Metropolitan councils, comparing 2002-03 with the three years to 2017-18. As previously noted, there was significant improvement over the period, though rates have stabilised recently. The median rate was 50.5% in 2017-18.

Table 10. Recovery Rates Achieved by each Metropolitan Adelaide Council, 2017-18.

Category	3-bin	2-bin	Comments
Leafy	56.5%	33.3%	Full roll out of caddy
Leafy	55.5%	32.9%	Opt-in caddy for sale
Leafy	54.8%	33.9%	Opt-in caddy for sale
	54.5%	29.5%	Opt-in caddy for sale
	54.2%	34.6%	Full roll out of caddy
	53.0%	30.2%	Full roll out of caddy
Leafy	52.5%	32.1%	Full roll out of caddy
	51.1%	28.8%	Residents register and pay \$5 for caddy
	50.7%	27.9%	Free caddy and compostable bags
	50.5%	29.3%	Opt-in caddy. One off offer
	49.3%	29.0%	Full roll out of caddy
	48.9%	29.2%	Opt-in caddy for sale
	48.7%	31.2%	Caddy, but only for those with greens service
	48.5%	25.6%	Residents can pick up free caddy and compostable bag from the council
	46.5%	29.8%	Residents who participate in FOGO collection can collect a caddy for free
	44.5%	25.8%	Residents who participate in FOGO collection can collect a caddy for free
	43.7%	26.7%	Opt-in caddy from 2020
	36.7%	25.1%	Residents who participate in FOGO collection can collect a caddy for free
	35.4%	28.3%	Residents receiving organics collection can pick-up free Kitchen Basket & ongoing supply of compostable bags

2.6 Regional Kerbside Waste and Recycling Services

In 2017-18, of the 49 regional councils, 24 councils offered a three-bin service compared with one council in 2003-04, and 17 had two-bin systems, up from 14 in 2003-04. Of the 24 councils with a three-bin system, 10 offered this service to town residents only and other residents in the council area received a two-bin service. The number of councils with a one-bin system has decreased to seven from 33 in 2003-04 (Table 1). A number of regional areas provide residents with drop off waste directly to transfer stations which would affect the reported recovery rate.

Table 11. Regional services offered by local councils by bin type

Service Type	Bin		
	Recycling	Organics	Residual
Weekly	-	-	43
Fortnightly	39	20	6
Monthly	3	5	-
No service	7	24	-

The frequency of waste collections offered in regional townships is shown in Table 11. This table lists the main kerbside service offered for townships, but if there was no kerbside collection service, the main alternative was noted such as drop-off facilities or an 'at call' service. All 49 regional councils provide a residual kerbside collection with 43 councils collecting residual waste weekly and six fortnightly.

Recyclables are collected fortnightly by 39 councils (including one opt-in), monthly by three councils, and seven councils have drop-off facilities only for recyclables. Organics are collected at drop-off facilities at 24 councils, and 20 councils collect organics fortnightly from kerbside. Five councils have a monthly collection service for kerbside organics.

Since 2011, GISA has contributed grants to assist 46 of these councils to expand their kerbside services. This number does not include grants to associations or commercial services within a local government area for improvements that would directly affect the council's kerbside collections.

Table 12. Local Government Regions: Populations and Households, 2017-18

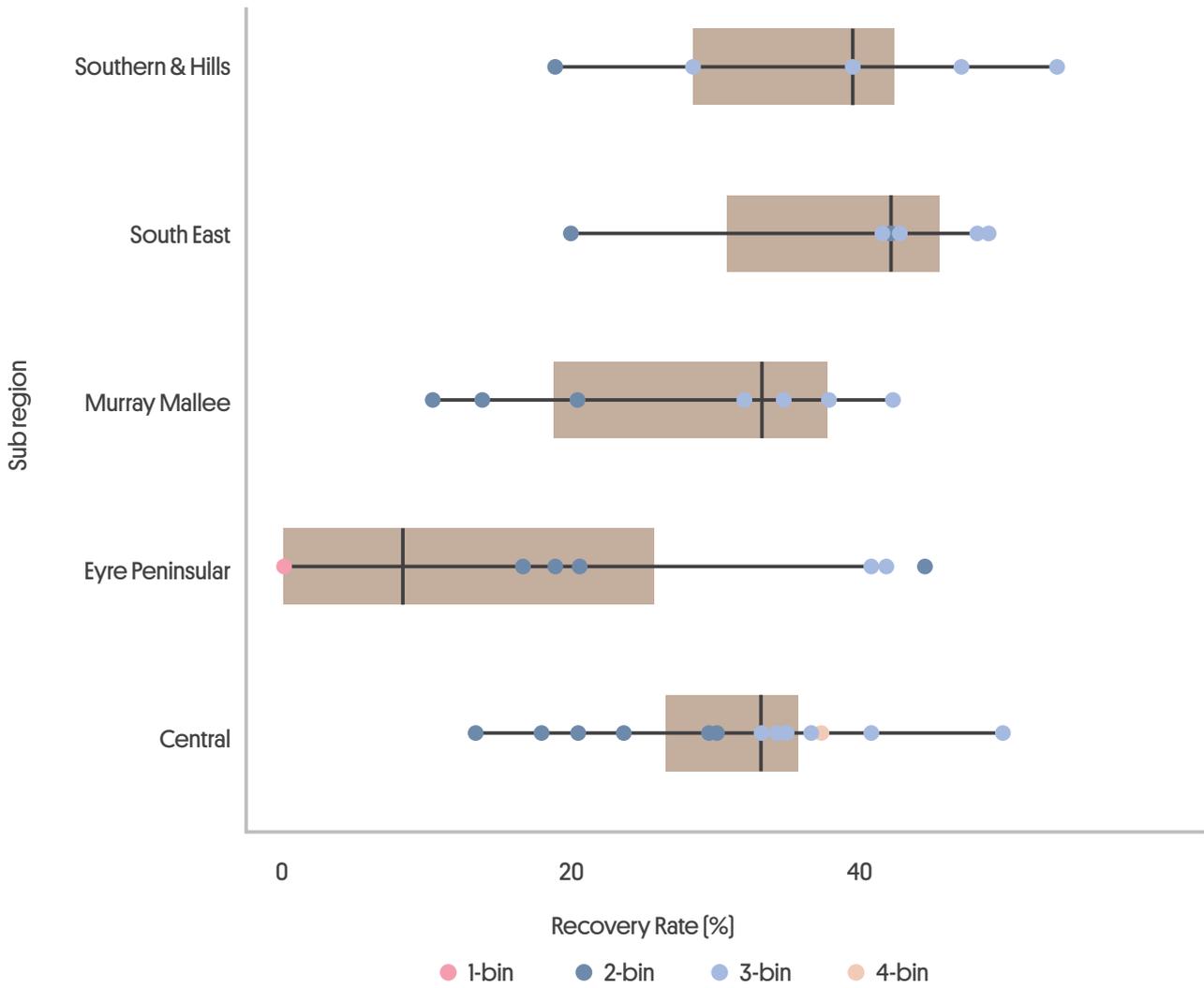
Sub-Regions and councils	Population (2018)	Households (2016)
Central – Adelaide Plains, Barossa, Barunga West, Clare and Gilbert Valleys, Copper Coast, Flinders Ranges, Goyder, Light Regional, Mount Remarkable, Northern Areas, Orroroo Carrieton, Peterborough, Port Pirie, Wakefield, Yorke Peninsula	127,746	64,744
Eyre Peninsula – Ceduna, Cleve, Elliston, Franklin Harbour, Kimba, Lower Eyre Peninsula, Port Augusta, Port Lincoln, Streaky Bay, Tumby Bay, Whyalla, Wudinna	71,123	36,693
Murray Mallee – Berri Barmera, Coorong, Karoonda East Murray, Loxton Waikerie, Mid Murray, Renmark Paringa, Murray Bridge, Southern Mallee	72,265	36,394
Outback – Coober Pedy, Roxby Downs	5,859	3,166
South East – Grant, Kingston, Mount Gambier, Naracoorte Lucindale, Robe, Tatiara, Wattle Range	66,863	31,899
Southern & Hills – Alexandrina, Kangaroo Island, Mount Barker, Victor Harbor, Yankalilla	88,241	45,212
Total	432,097	218,108

Sources: ABS [2016] and ABS [2018]

Table 13. Local Government Regions - Total Kerbside Waste Collected, Per Capita and Per Household, 2017-18

Local Government Region	Recyclables (tonnes)	Organics (tonnes)	Residual (tonnes)	Total Waste (tonnes)	Waste Per Capita (kg/yr)	Waste Per Household (kg/yr)
Central	10,334	5,957	30,363	46,654	365	721
Eyre Peninsula	3,810	2,724	17,700	24,234	341	660
Murray Mallee	4,714	3,575	15,994	24,283	336	667
Outback	186	998	2,133	3,317	566	1,048
South East	4,588	7,274	14,810	26,672	399	836
Southern & Hills	7,556	7,737	18,954	34,247	388	757
Total	31,188	28,265	99,954	159,407		
Regional Average					369	731

Figure 6. Range of recovery rates of councils within each sub-region



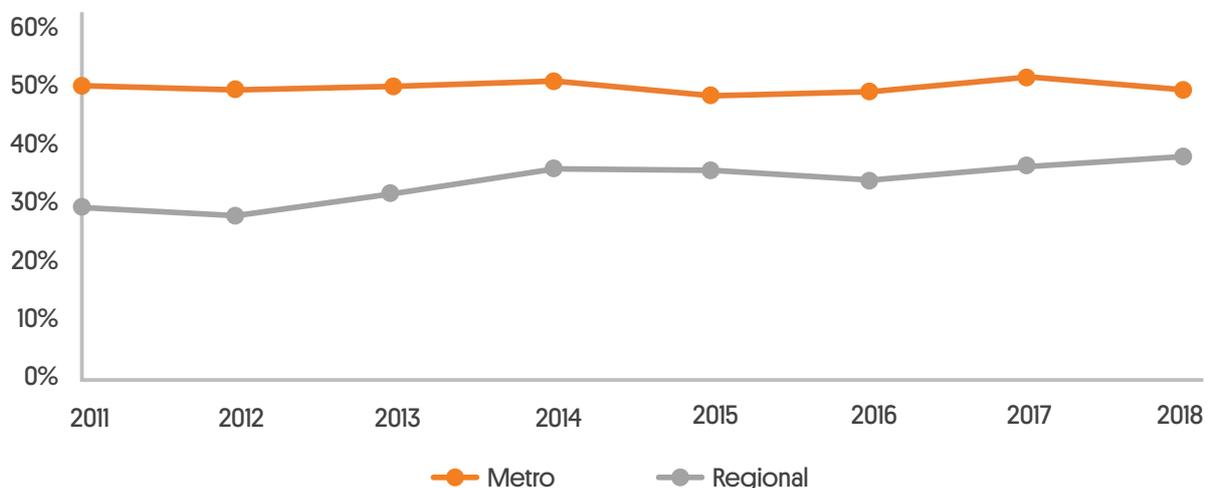
2.7 Long term trends

The long-term recovery rate for Adelaide Metro, Regional and whole of SA trends are shown in **Table 14**. The recovery rate has improved only slightly for the Adelaide metropolitan area but has increased by 11% for regional areas. Regional improvements are due to increased numbers of three-bin services introduced by councils whereas fluctuations in Adelaide metro's rate are due largely to weather factors and garden organics produced. These trends are represented graphically in **Figure 7**. As most of the waste collected is from metropolitan Adelaide households compared to regional numbers, the trend for the whole of SA is not shown in the graph as the trend is similar to that of Adelaide.

Table 14. Recovery rates for South Australia, Adelaide Metro and Regional areas for 8-year period

Year	Recovery Rate [%]		
	SA	Metro	Regional
2010-11	44.1	49.0	28.8
2011-12	43.2	48.3	27.7
2012-13	44.4	48.7	31.0
2013-14	46.0	49.4	35.1
2014-15	44.7	47.8	34.8
2015-16	44.5	48.2	33.1
2016-17	46.4	49.9	35.6
2017-18	45.6	48.2	37.3

Figure 7. Comparison of three-bin recovery rates for Metro Adelaide and Regional areas from 2010-11 to 2017-18



3 Factors Affecting Recovery Rates

3.1 Food Waste Collection Systems

Table 10 indicates where food caddy systems have been deployed and how effective these have been for the Adelaide Metro area. Currently most of these councils offer free caddies, although in some councils, this is on an opt-in basis rather than council-wide roll-out. For some councils, the availability of food caddy systems on their websites could be more prominent to make it easier for residents, but food caddies may have been promoted in other ways.

A full rollout of organics bins across Adelaide would be expected to lift the recovery rate significantly. Councils with opt-in organics collections should complete the organics bins rollout to all households before more food caddies are deployed. These councils will continue to achieve low recovery rates at kerbside until they do so.

In regional areas, 12 councils offer an opt-in service to at least townships. Details can be found in **Appendix 1**.

A few councils encourage home composting systems as an alternative to disposal in the organics bins. No details are available on the uptake rate but, in practice, less waste should be presented at kerbside.

3.2 Garden vegetation

High levels of garden organics tend to boost overall recovery rates (**Table 10**). For example, a Hills council with leafy suburbs has the best three-bin recovery rate, but when organics (the third bin) are discounted, it performs worse than a western suburbs council. Councils with opt-in organics services tend to have lower three-bin recovery rates. Some drier council areas also have alternative recovery options such as resident drop-off facilities, which would not be reflected in three-bin figures.

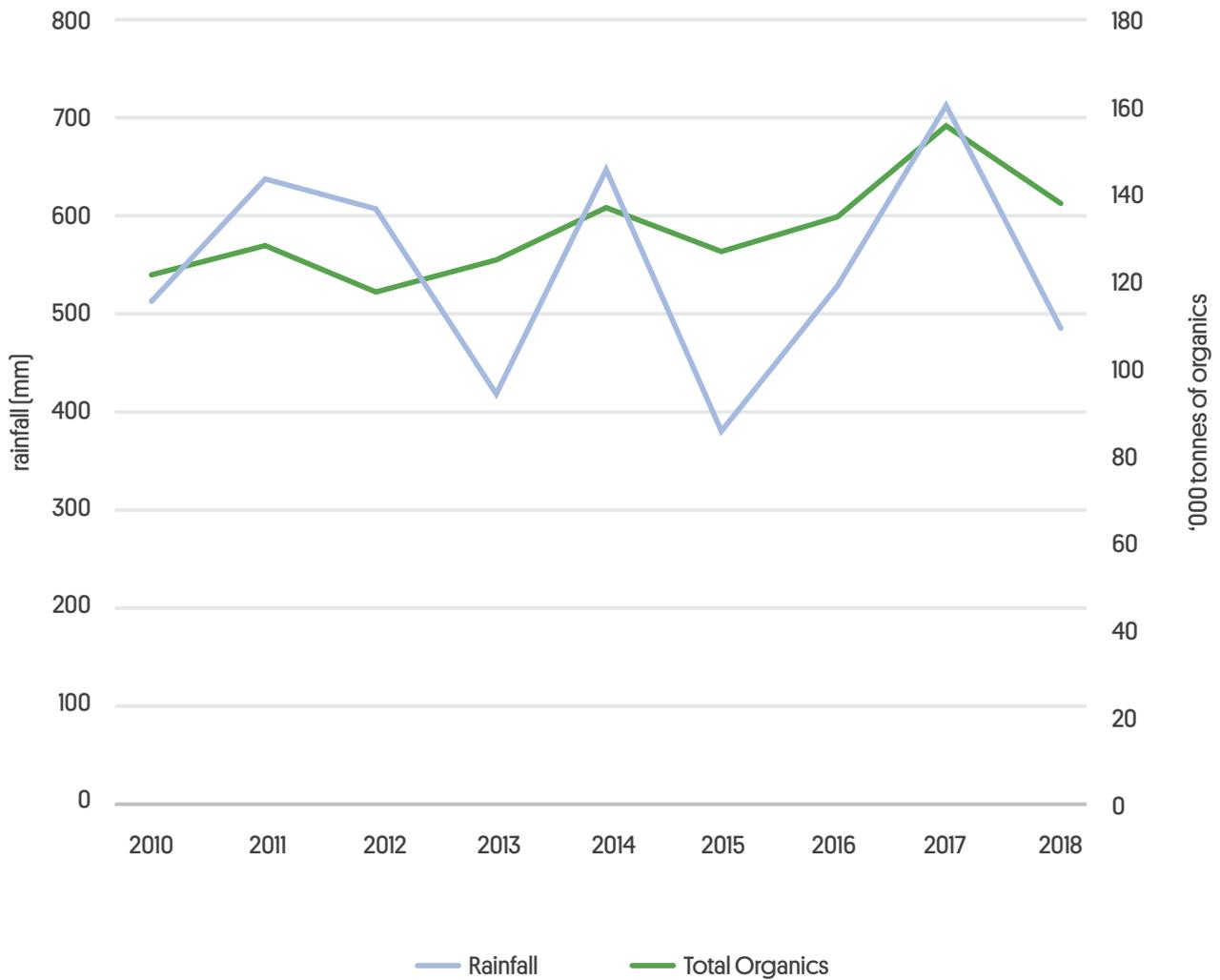
Adelaide's rainfall was lower in 2017-18 relative to previous years (**Table 15**), contributing to a 13% decrease in organics collected compared with 2016-17 [a wet rainfall year].

Table 15. Total Rainfall (mm) Recorded at Kent Town for Financial Years (periods Ending June 30)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018
Rainfall	511.2	637.8	608.6	412.6	646.6	376.8	523.4	716.0	486.8

Figure 8 shows annual rainfall and total organics recovered at kerbside for the years 2009-10 to 2017-18. Volumes of organics collected drop in dry years, although this is offset by watering of gardens and rainfall patterns across the year.

Figure 8. Comparison of organics collected and rainfall by financial year from 2009-10



3.3 Recyclables

In recent years, there has been a trend to reduce the weight of glass and steel packaging or to replace these materials with lighter plastics, and consumers are buying fewer newspapers and magazines (newspaper sales fell 44% between 2005 and mid 2018) as consumers receive more information electronically.

This has led to a decrease in the volume and, in particular, the weight of material being recycled – though this may be offset to some extent in the future by increased amounts of cardboard as the trend towards online shopping increases.

Less waste can mean lower recovery rates if less recyclables are presented at kerbside. To offset this drop, less material must be presented in residual bins and changes to householder behaviour such as food diversion are essential.

3.4 Economic and demographic

Economic and demographic factors influence the amount of kerbside waste and recovery rates. Residual waste per person has remained steady in recent years, but total kerbside waste has increased with population increases. Each council has a mix of residents – from young families to older couples – which affects the profile of waste presented.

Households with larger incomes have the potential to produce more waste as they can spend more on consumer goods (more packaging and other waste), and particularly food. With more waste generated there is the possibility of more recyclables generated. Additionally, more organics can be produced from gardens being watered in dry years. All these individual factors create a situation where the recovery rate for these residents can go up, but ironically they may be generating more waste overall.

ABS analysis from the 2016 census shows that some councils have slowing population growth (e.g. Prospect), while others are attracting young families and have increasing populations (e.g. Onkaparinga and Marion). Each situation presents its own demographic and infrastructure challenges.

High-rise developments affect bin system rollouts, and as there are no gardens per household, three-bin recycling rates decrease in areas with large numbers of these developments (e.g. central Adelaide).

The recovery rate is related to household income, and councils with higher household incomes have tended to adopt a full three-bin system with food caddy to all households.

Many other factors underlie this situation – such as awareness programs and education levels of households – but this report cannot examine them in detail.

3.5 Contamination Rates

A number of kerbside waste audits were undertaken in recent years to determine the behaviour of residents in using the waste bins. Audits have been carried out by both metropolitan and regional councils.

Combined, they indicate that contamination was around 13% by weight (post collection) in recyclables bins and 2% in green organics bins. Industry consultations have confirmed that these figures are consistent with their findings and that contamination of recycling bins, and to a lesser extent organics bins, continues to be an issue.

In addition to lowering the effective recovery rate, contamination interferes with sorting through materials recovery facilities (MRFs) and commercial composting facilities. This wastes resources that may otherwise be recycled or devalues its worth in potential markets.

The audits also show that 30-40% of the contents of the residual bins is food waste. Significant improvements in the recovery rate would be achieved if this material was placed in the green organics bin. Some audits have shown that the residual bin can contain as much as 69% recyclable and organic material.

3.6 Three, four, or more?

South Australia has shown it is capable of good recovery rates of kerbside material from a three-bin system and these rates have steadily improved overall as more councils adopt the system. This improvement occurs particularly where food caddies are fully rolled out to households to divert food organics. Concerns over contamination are still raised by MRFs and composters as high contamination rates devalue recycled material and various proposals have been put forward to address the problem. Infrastructure grant funding is made available through GISA to improve efficiency and contaminate removal processes.

One solution presented to improve kerbside recovery rates and reduce contamination of recyclable streams is to increase the number of bins offered to households. In 2020, Victoria announced it will introduce a fourth bin at kerbside in 2021 to collect glass bottles and jars separately.

There is a possible balance between compaction of material to reduce costs and addressing contamination rates. In a study by A Prince for Zero Waste SA [2012], it was found that the average percentage of contamination in loads did not vary with compaction levels, probably due to contamination being primarily influenced by household behaviour, not waste collection. It did however find that the MRF contamination level was slightly higher than the kerbside contamination levels.

South Australia has had a container deposit scheme to divert a large proportion of glass from households in place for over 40 years. Combined with the three-bin system this has contributed to improvements in the kerbside recovery rate. However the three-bin system has not been fully implemented in all councils and greater diversion is still possible to reduce the amount of recyclables and organics presented in the residual bin at kerbside, particularly by increased provision of organics bins. A proper cost-benefit analysis would be required to determine whether additional bins offered to householders would show increased diversion rates and subsequent costs benefits.

4. Conclusions

This report examines the effectiveness of the kerbside bin systems in South Australia both in metropolitan Adelaide and regional councils, using the recovery rate as an indicator.

The most effective system of those in use is the fully implemented three-bin system.

All metropolitan councils have a three-bin system but some are opt-in only for the organics service. Increasingly, regional councils are offering a similar service, at least in townships. The councils that have the best recovery rates were generally those in which all households have a three-bin system with food waste system, which has achieved up to 60% recovery rate at certain times of the year.

The generation of kerbside waste materials by South Australian households has remained relatively stable over the study period. Improved recycling services have increased the amount of resources recovered and reduced the amount of material being disposed to landfill.

The recovery rate is an indicator of recycling performance. Both three-bin and two-bin recovery rates have been discussed and the latter attempts to show waste diversion without seasonal effects. Various factors influence the rate at a local level or regional level:

- Weather – rain tends to increase organics weight and inflates recovery rates
- Packaging – may reduce the recycling rate in the longer term as heavier material such as glass and steel cans are light-weighted or replaced by lighter plastics
- Less newsprint is being presented at kerbside
- Geography – density of housing and natural rainfall affects opportunities for vegetation growth
- Councils without any organics collections tend to have significantly lower recovery rates, but this may be partly off-set by resident drop-offs
- In the Adelaide metropolitan area, some groupings of councils have recovery rates seven to 10 percentage points lower than others due to their use of opt-in system for organics collections. Similar results are found in regional council collections
- Education programs, in addition to state-wide communications campaigns will assist councils to raise recovery rates through consistency of message across the state.
- Deploying a uniform three-bin system with food caddies will lead to greater recovery rates
- Economic and social attributes, such as household income and spending, influence the recovery rate. Additionally, the residual waste per person should also be viewed when considering long term trends. The data used for this report and some obtained from other sources show that there are still potential opportunities for greater diversion of recyclable material from the residual bins
- Uniformity in the waste message to residents across the whole SA community reduces confusion and increases good waste practices and recovery rates.

Appendix 1:

Regional kerbside bin provision and collection frequency

Council	Number of bin	Waste	Recycling	Organics	Food waste system
Adelaide Plains	Towns 3-bin, Rural 2-bin	F	F	F	Opt-in T
Alexandrina	Towns 3-bin	F	F	F	Opt-in T
Barunga West	3-bin	W	M	M	None
Berri Barmera	3-bin	W	F	F	None
Ceduna	1-bin	W	-	-	None
City of Mount Gambier	3-bin	W	F	F	Opt-in T
City of Port Lincoln	2-bin	W	F	-	None
Clare and Gilbert Valleys	2-bin	W	F	-	None
Cleve	2-bin	W	F	-	None
Cooper Pedy	1-bin	W	-	-	None
Coorong	3-bin	W	F	F	None
Copper Coast	3-bin [green opt-in]	W	F	M	None
Elliston	2-bin	W	F	-	None
Franklin Harbour	1-bin	W	-	-	None
Grant	2-bin	F	F	-	None
Kangaroo Island	Towns 3-bin	F	F	F	Opt-in T
Karoonda East Murray	2-bin	W	M	-	None
Kimba	2-bin	W	F [opt-in]	-	None
Kingston	2-bin	W	F	-	None
Light	Towns 3-bin, Rural 2-bin	W	F	F	Opt-in T
Lower Eyre Peninsula	1-bin	W	-	-	None
Loxton Waikerie	Towns 3-bin, Rural 2-bin	W	F	F	Opt-in T
Mid Murray	2-bin	W	F	-	None
Mount Barker	Towns 3-bin, Rural 2-bin	W	F	F	Opt-in T
Mount Remarkable	2-bin	W	F	-	None
Municipal of Roxby Downs	3-bin	W	F	M	None

Council	Number of bin	Waste	Recycling	Organics	Food waste system
Murray Bridge	Towns 3-bin, Rural 2-bin	W	F	F	None
Naracoorte Lucindale	3-bin	W	F	F	None
Northern Areas	2-bin	W	F	-	None
Orroroo Carrieton	2-bin	W	F	-	None
Peterborough	2-bin	W	F	-	None
Port Augusta	3-bin	W	F	F	None
Port Pirie	3-bin	W	F	F	None
Regional of Goyder	2-bin	W	F	-	None
Renmark Paringa	3-bin	W	F	F	None
Robe	2-bin	W	F	-	None
Southern Mallee	2-bin	W	M	-	None
Streaky Bay	1-bin	W	-	-	None
Tatiara	Towns 3-bin, Rural 2-bin	W	F	F	None
The Barossa	Towns 3-bin (green opt-in), Rural 2-bin	W	F	F	Opt-in T
The Flinders Ranges	2-bin	W	F	-	None
Tumby Bay	1-bin	W	-	-	None
Victor Harbor	Towns 3-bin	F	F	F	Opt-in T
Wakefield	3-bin	W	F	4-W	None
Wattle Range	3-bin	W	F	F	T
Whyalla	3-bin	W	F	F	Opt-in T
Wudinna	1-bin	W	-	-	None
Yankalilla	3-bin	F	F	F	T
Yorke Peninsula	3-bin	W	F	M	None

NB: The abbreviations in the table refer to (F)ortnightly, (M)onthly, (W)eekly and (T)ownships

Appendix 2:

Kerbside bin lid colours in Metropolitan Adelaide

Council	Residual	Organics	Recycling	Households
Adelaide	Red	Lime green	Yellow	10,004
Adelaide Hills	Blue	Green	Yellow	14,293
Burnside	Red	Green	Yellow	17,392
Campbelltown	Blue	Green	Yellow	19,853
Charles Sturt	Blue	Green	Yellow	46,305
Gawler	Red	Green	Yellow	9,493
Holdfast Bay	Red	Green	Yellow	15,765
Marion	Red	Green	Yellow	36,635
Mitcham	Blue	Green	Yellow	24,606
Norwood PSP	Red	Green	Yellow	15,569
Onkaparinga	Red	Green	Yellow	65,811
Playford	Red	Green	Yellow	33,624
Port Adelaide Enfield	Blue	Green	Yellow	48,805
Prospect	Red	Green	Yellow	8,091
Salisbury	Red	Green	Yellow	51,595
Tea Tree Gully	Red	Green	Yellow	37,561
Unley	Blue	Green or Grey	Yellow	15,399
Walkerville	Blue	Green	Yellow	3,109
West Torrens	Red	Green	Yellow	24,331

Glossary

Commercial and Industrial waste (C&I)

Comprises solid waste generated by the business sector as well as solid waste created by state and federal government entities, schools, and tertiary institutions.

Construction and Demolition waste (C&D)

Includes waste from residential, civil and commercial construction and demolition activities, such as fill material (e.g. soil), asphalt, bricks and timber. C&D waste excludes construction waste from owner/occupier renovations, which is included in the municipal waste stream.

Container Deposit Scheme (CDS)

A refundable charge imposed on a range of recyclable beverage containers. The deposit is included in the retail price and refunded when the container is returned to a collection point.

Food caddy

A kitchen benchtop food container for the collection of household food waste, to be placed in the organic waste bin.

Food organics

Organic waste derived from food preparation and/or surplus food.

Garden organics

Organics derived from garden sources e.g. grass clippings, tree prunings.

Hard waste

Large materials that are not suitable for collection in the kerbside three-bin system. Common items include furniture, appliances and mattresses.

Kerbside collection

Collection of household waste, recyclable materials (separated or co-mingled), and organic waste that are left at the kerbside for collection by local council collection service.

Municipal solid waste

Solid waste generated from domestic (household) premises and council activities such as street sweeping, litter and street tree lopping. May also include waste dropped off at recycling centres, transfer stations and construction waste from owner/occupier renovations.

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