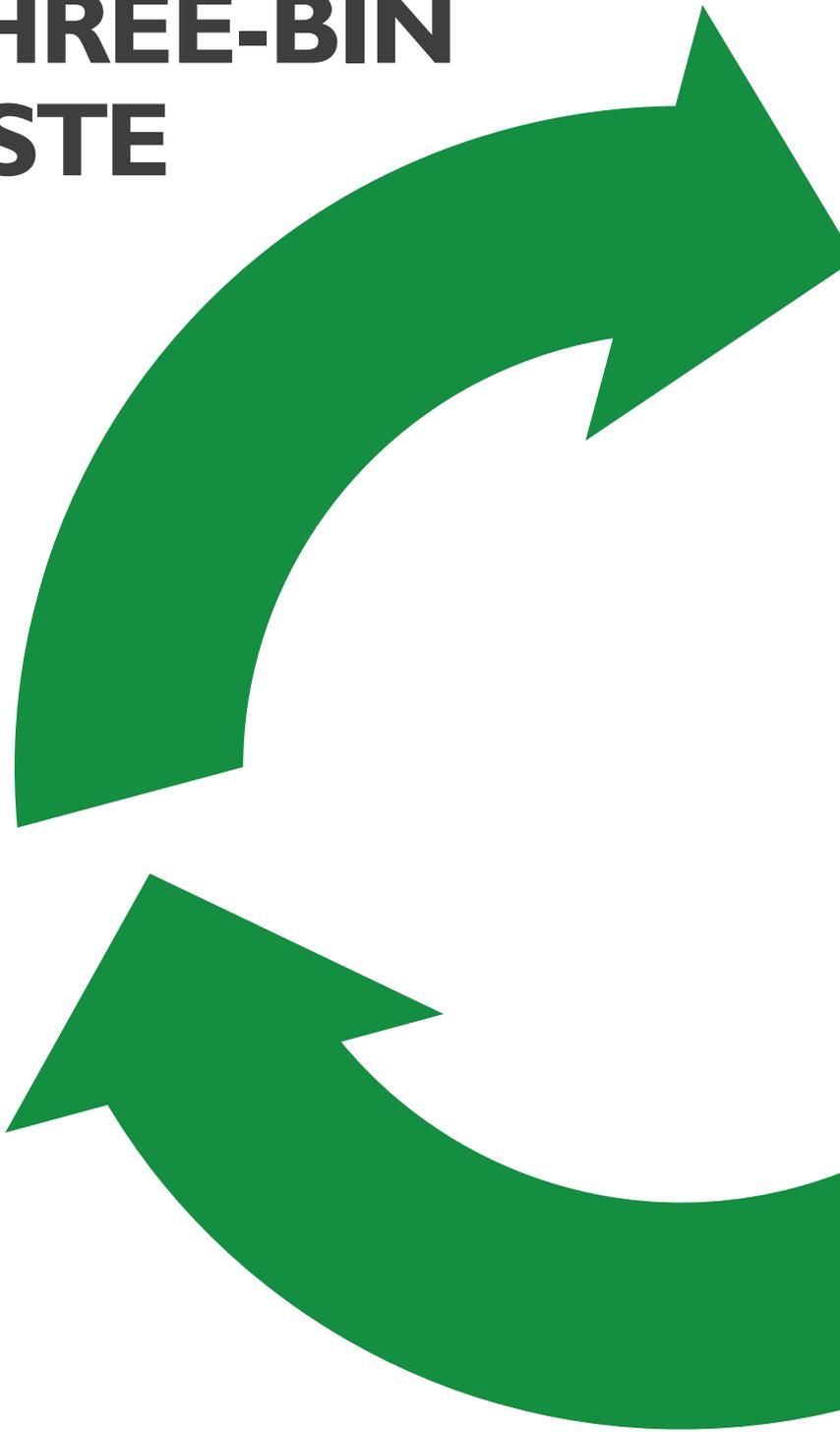


Zero Waste SA

SOUTH AUSTRALIA'S KERBSIDE THREE-BIN SYSTEM WASTE REPORT 2012-13



Government of South Australia
Zero Waste SA

AVOID • REDUCE • REUSE • RECYCLE

Acknowledgments

Zero Waste SA acknowledges the South Australian councils and the South Australian Local Government Grants Commission for providing the data used in this report. The information in this report is entirely dependent on the accuracy of the data provided by councils and their contractors collecting kerbside waste.

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Head Office

8th Floor
99 Gawler Place
ADELAIDE SA 5000

Telephone (08) 8204 2051
Facsimile (08) 8204 1911

Email: zerowaste@zerowaste.sa.gov.au
Internet: www.zerowaste.sa.gov.au

ABN: 76 149 388 126

Report prepared by:
Zero Waste SA

Copies of the report can be obtained from:
www.zerowaste.sa.gov.au

I Executive Summary

This report presents data and analysis of kerbside waste management and recycling services by South Australian (SA) local government in the 2012-13 financial year. It aims to analyse kerbside waste levels and performance for the community, local, State and Australian governments; and provides a measure of the improvements made by local government in waste disposal efficiency and sustainability.

In SA, 77.4% of all waste generated is recovered (instead of going to landfill) over three different sectors of waste - Municipal Solid Waste (MSW), Commercial and Industrial, and Construction and Demolition (Rawtec 2014). MSW is only one of these three sectors, each of which can have an individual recovery rate. Monitoring changes in the MSW quantities collected is important, as these have an impact on the State's total recovery rate.

The emphasis of this report is on municipal waste collected at kerbside in bins, specifically residual waste (garbage), recycling and green organics, and excludes hard waste quantities, street sweepings, waste collected at drop-off facilities, and council operated commercial services. Data is sourced from councils, waste contractors, the South Australian Local Government Grants Commission, and the Australian Bureau of Statistics. When making comparisons, the information is presented at regional or sub-regional rather than individual council level.

Highlights of the 2012-13 period

- Approximately 666,500 tonnes of Municipal Solid Waste was collected from kerbsides across the whole State:
 - » 489,500 tonnes from metropolitan areas, and
 - » 177,000 tonnes from regional areas.
- Of the 666,500 tonnes of kerbside waste collected:
 - » 296,400 tonnes of materials was recovered (approximately 50% organics and 50% recyclables), and
 - » 371,600 tonnes of waste went to landfill. The State achieved a kerbside collection recovery rate of 44.5% (table EI).
 - » Individual councils do achieve recovery rates of nearly 60% for some months of the year, but the average is lowered consequently due to the seasonal nature of organic wastes produced.
 - » As this rate does not include other aspects of MSW such as resident waste drop-offs, Container Deposit Legislation (CDL) beverage containers, hard waste, street sweepings; the overall recovery rate for MSW is much higher (see SA Recycling Activity Survey 2012-13 which estimate the metropolitan recovery rate as 57.5%).

TABLE EI: South Australia's total kerbside bin waste quantities 2012-13

Collection	State – SA (tonnes)	Metropolitan (tonnes)	Regional (tonnes)
Residual Waste	371,600	251,800	119,700
Organics	149,200	124,600	24,600
Recyclables	147,200	114,200	33,000
Total Tonnes	666,500	489,500	177,000
Recovery Rate	44.5%	48.8%	32.5%

Sources: SALGGC (2014) and Zero Waste SA (2014)

The overall recovery rate in metropolitan areas was 48.8%¹ where all 19 councils offering the more efficient 3-bin systems (some are opt-in) to residents. However, this is still below the metropolitan municipal waste target of 70% by 2015 showing that there is still a considerable challenge in order to achieve the target.

¹ The recovery rates quoted in this report should not be confused with the 57.5% Metropolitan MSW recovery rate quoted in the South Australia's Recycling Activity Survey 2012-13 Financial Year Report (Rawtec 2014) as this current report examines only kerbside collections.

Table E2: Recovery rates achieved by individual metropolitan councils

Suburb	2012-13	Comments
	56.4%	Full roll out of caddy
Leafy	55.4%	No caddy at this point
Leafy	55.3%	Full roll out of caddy
Leafy	53.8%	Full roll out of caddy
Leafy	52.8%	Opt-in caddy
	52.8%	Opt-in caddy
	52.7%	No caddy at this point
	52.3%	Opt-in caddy
	52.1%	Full roll out of caddy
	50.6%	Full roll out of caddy
Leafy	49.8%	No caddy at this point
	49.3%	Full roll out of caddy
	48.4%	No caddy at this point
Dry	45.0%	Opt-in green service (pay)
Leafy	44.0%	Caddy, but not full organics coverage
	44.0%	Four weekly green, no food
Dry	43.2%	Opt-in green service (pay)
	35.4%	Caddy but not full coverage
Dry	34.3%	Opt-in green service (pay)

Table E2 shows the recovery rates for each metropolitan council and relation to the type of organics bin system and the vegetation level in the council area.

Regional areas had an average recovery rate of 32.5%. The highest recovery rates were achieved in regions with the highest proportions of three-bin systems – Southern and Hills (41.0% recovery) and South East (40.4%).

Long term trends

During the last nine years there has been significant improvements in waste and recycling services provided to SA residents (figure E1). The 3-bin system – comprising residual waste, recyclables, and organics – is considered best practice in waste collection systems for material segregation in low density residential areas.

- » By 2012-13, 36 SA councils offered 3-bin systems compared with 16 councils in 2003-04.
- » Twenty-six councils had 2-bin systems compared with 18 in 2003-04; and six councils had a 1-bin system in 2012-13 compared with 33 in 2003-04.
- In the nine years to 2012-13, total kerbside waste collected by councils decreased by 1%. Landfilled quantities fell by -36% (132,900 tonnes less than in 2003-04). Organics collected grew by 44% as did recyclables (43% more).
- The State's kerbside recovery rate has shown improvements from 24.8% (in 2003-04) to 44.5% in 2012-13.

Conclusions

The 3-bin system, together with food caddies, represents the observed best practice and achieved the best recovery rates. Councils with full household coverage of organics service achieved significantly higher recovery rates than those with opt-in service.

Various factors influence the recovery rate at a local level or regional level including:

- Economic / social
- Weather and geography – density of housing and natural rainfall affects opportunities for vegetation growth
- Packaging types for consumer goods
- Deploying a uniform 3-bin system with food caddies will lead to greater recovery rates
- Some metropolitan councils achieve recovery rates 6 to 8 percentage points lower than others due to their use of opt-in system for organics collections
- Regional councils have lesser numbers of 3-bin system deployed (restricted to townships) or fewer bins as they are constrained by infrastructure and distances for transport.

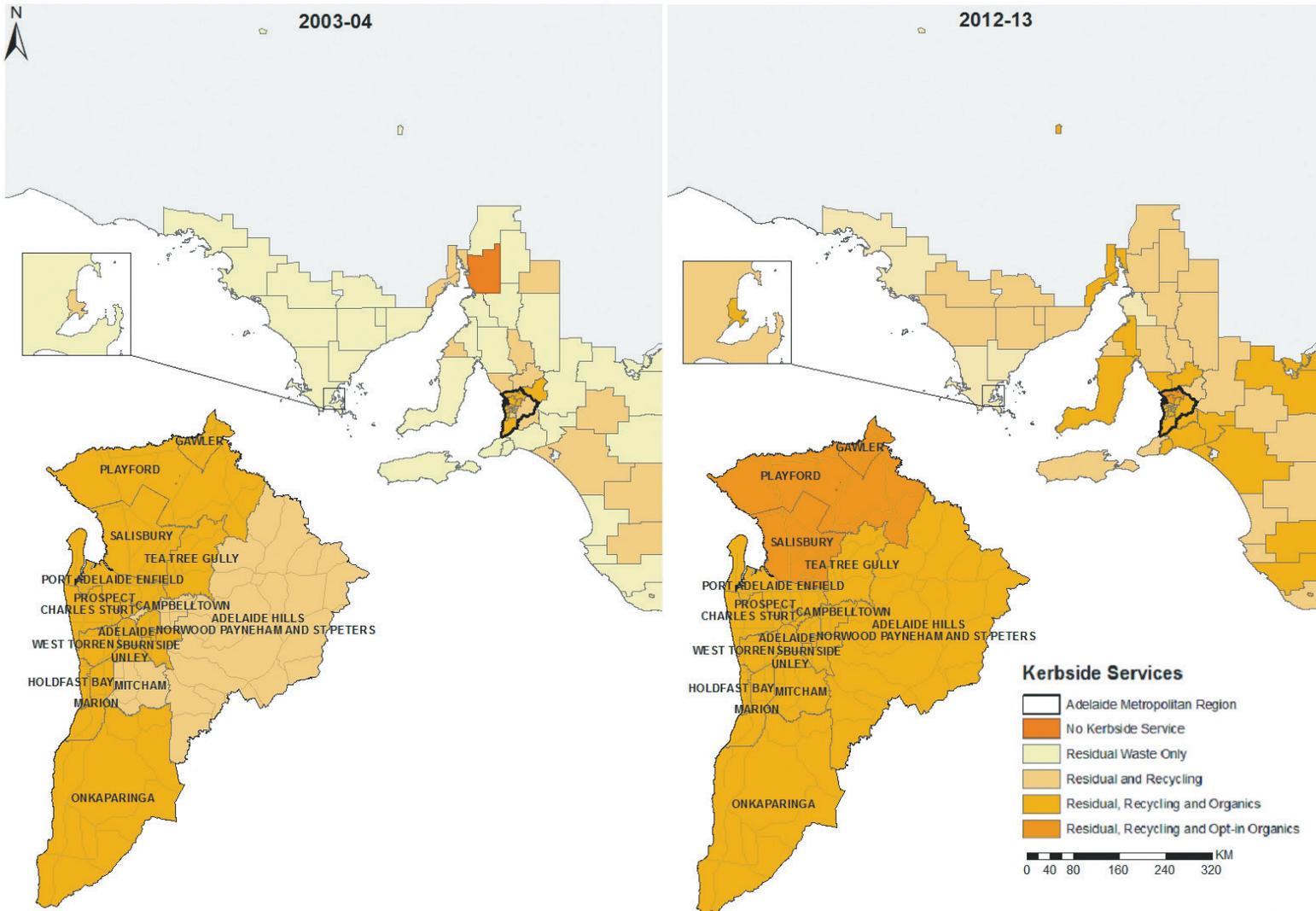


Figure E1 Local Government Kerbside Waste Collection Services Maps, 2003-04 and 2012-13

Contents

1	Executive Summary	3
2	Introduction	8
2.1	Background	8
2.2	Purpose	8
2.3	Context	8
2.4	Methodology	9
3	Findings	10
3.1	State – South Australia’s Kerbside Waste	10
3.1.1	South Australia’s Kerbside Waste Services	10
3.1.2	South Australia’s Total Kerbside Waste Generated	11
3.2	Metropolitan Kerbside Waste	14
3.2.1	Metropolitan 3-bin Kerbside Waste Services	14
3.2.2	Metropolitan Kerbside Waste Generated	15
3.2.3	Metropolitan 3-bin System Recovery Rate Performance	17
3.2.4	Metropolitan Contamination Rates	18
3.2.5	Metropolitan Sub-Regions	19
3.3	Regional Kerbside Waste	21
3.3.1	Regional Kerbside Waste Services	21
3.3.2	Regional Kerbside Waste Collected	22
3.3.3	Local Government Regions	23
4	Conclusions	26
5	Appendix	27
5.1	Regional Groupings – Population and Household Numbers	27
5.2	Kerbside Waste Services – Bin systems and Collection Frequency	30
6	Glossary	35

Tables

Table 1	Summary of Council Kerbside Bin Systems in 2012-13 and 2003-04	10
Table 2	South Australia's Total Kerbside Waste Quantities, 2012-13	11
Table 3	State, Metropolitan and Regional Kerbside Waste Generation Per Capita and Per Household, 2012-13 (kilograms per year)	12
Table 4	State 2012-13 and 2011-12 Kerbside Waste Quantities (tonnes)	12
Table 5	South Australia's Nine Year Trend in Recovery Rates of Kerbside Waste	14
Table 6	Metropolitan Councils: 2012-13 and 2011-12 Kerbside Waste Quantities	16
Table 7	Recovery Rates for Each Individual Metropolitan Council	17
Table 8	Metropolitan Sub-regions, Population and Households, 2012	19
Table 9	Metropolitan Sub-Regions: Total Waste Collected, Per Capita and Per Household in 2012-13	19
Table 10	Regional Councils: 2012-13 and 2011-12 Kerbside Waste Quantities	22
Table 11	Local Government Regions: Populations and Households, 2012-13	23
Table 12	Local Government Regions - Total Kerbside Waste Collected, Per Capita and Per Household, 2012-13	24
Table 13	Summary of Regional Council Bin Systems: Number of Councils with System Type in 2012-13	25
Table 14	Metropolitan Sub-Regions – Estimated Resident Population and Occupied Dwellings, 2012	27
Table 15	LGA Regions, Estimated Resident Population and Occupied Dwellings, 2012-13	28
Table 16	Metropolitan Councils: Kerbside Collection Services to Residential Properties, 2012-13	30
Table 17	Metropolitan Councils – Bin Systems in 2012-13 and 2003-04	31
Table 18	Regional Councils – Kerbside Services to Residential Properties, 2012-13	32
Table 19	Regional Councils - Bin Systems in 2012-13 and 2003-04	33

Figures

Figure 1	Local Government Kerbside Waste Collection Services Maps, 2003-04 and 2012-13	11
Figure 2	South Australia's Nine Year Trend of Kerbside Waste Quantities	13
Figure 3	South Australia's Five Year Trend for Per Capita Kerbside Waste	13
Figure 4	South Australia's Nine Year Trend of Residual Waste per Capita	14
Figure 5	Metropolitan Monthly 3-bin Kerbside Waste Quantities, 2012-13	15
Figure 6	Metropolitan Councils: Average Recovery Rate by Month, 2012-13	15
Figure 7	Metropolitan Councils: Nine Year Trend of Kerbside Waste Quantities	16
Figure 8	Metropolitan Councils: Recovery Rate by Year, 2003-04, 2010-11, 2011-12 and 2012-13	18
Figure 9	Metropolitan Sub-regions: Kerbside Recovery Rates in 2012-13	20
Figure 10	Monthly 3-bin Kerbside Recovery Rates by Sub-Region	20
Figure 11	Number of Regional Councils with Each Bin System in 2012-13 versus 2003-04	21
Figure 12	Regional Councils: Nine Year Trend of Kerbside Waste Quantities to 2012-13	23
Figure 13	LGA Regions: Kerbside Waste Recovery Rates in 2012-13	24

2 Introduction

2.1 Background

South Australian (SA) councils provide kerbside waste and recycling services to residential households and some small businesses and organisations. The waste collected is part of the Municipal Solid Waste (MSW) stream of which the residual component forms 38% of the total solid waste that goes to landfill. Commercial and Industrial waste (26%) and Construction and Demolition waste (36%) make up the rest of waste that goes to landfill (Rawtec 2014).

In SA, 77.4% of all waste generated is recovered (instead of going to landfill) over the three different sectors of waste (Rawtec 2014). MSW is only one of these three sectors and can have a different recycling rate to the total recycling rate. Monitoring changes in the MSW recovery rate is important, as these rates have an impact on the State's total recovery rate.

The information in this report deals only with municipal waste collected at kerbside in bins specifically residual waste (garbage), recycling and organics; but excluding hard waste. The waste collected at kerbside by councils is primarily residential. Some councils may include a small number of bins from commercial and industrial properties, but these are considered to be negligible.

Other sources of MSW such as street sweepings and waste taken to drop-off facilities by residents are not included in this analysis. Some councils provide hard waste, hazardous waste, electronic waste, which are also specifically excluded from this analysis.

Councils in SA offer a range of kerbside bin systems, these are primarily:

- 3-bin – residual waste (140L), recyclables (240L), organics (240L)
- 2-bin – residual waste and recyclables, or
- 1-bin – residual waste only.

Council kerbside waste collection services can be offered on a weekly basis, fortnightly or monthly (every 4 weeks or 13 services per year).

Conventional wisdom supposes that the 3-bin system is the best for diverting material from landfill and that this has recently been enhanced with food waste diversion. This report assesses this assumption by examining the recovery rate as a performance indicator for the various existing bin systems in place in South Australia.

2.2 Purpose

This report analyses South Australia's kerbside 3-bin waste management and recycling service data for 2012-13 on a State, regional, and sub-regional level. It focuses on the 2012-13 financial year, but also compares previous financial year quantities and longer term quantity trends. The report examines bin systems offered by councils over a nine year period.

Information on the waste data streams is needed to help monitor the State's ongoing progress towards the municipal waste targets set in the *South Australia's Waste Strategy 2011-2015* (Zero Waste SA 2011) and is also useful for decision making, for example, planning programs/incentives to improve the State's recycling rates and to target areas most in need. The trend analysis in this report measures the improvements made by local government in waste disposal efficiency. Aggregated data is used to show the improvements for the State and regions as a whole and does not rank individual councils on their recycling performance.

2.3 Context

Since it was established in 2003, Zero Waste SA (ZWSA) has encouraged resource recovery of municipal waste in SA, by providing funding to councils to encourage the implementation of improved kerbside collection systems for residents. Kerbside services have changed over the last nine years with source separation being the prime objective. The 3-bin system is considered best practice in waste collection systems for material segregation (NSW EPA, 2012).

By the end of June 2013, approximately \$4.4 million was provided by Zero Waste SA to 55 councils through the original Kerbside Incentives Program to encourage the uptake of best practice kerbside systems. Since 2009, the kerbside program has focussed on food to encourage food waste recycling in the organics bins through the Kerbside Performance Plus (Food Organics) Incentives Program. The latter program (first piloted on six metropolitan councils and four regional councils) has since provided approximately \$1.7million to 15 councils.

The Local Government Association (LGA) is another major stakeholder as it provides services, support and advocacy for South Australian council activities (LGA 2014). It has a strong interest in municipal waste and recycling, as these services are regarded as a significant cost to councils. Councils provide the waste and recycling services to their local residents and are primary custodians of the kerbside waste data.

They often contract services to external waste service providers, many of which are private companies. The waste service providers collect the waste and recyclables from residents, and take it to transfer stations or Material Recovery Facilities (MRFs) for sorting and processing. The quantities are weighed at weighbridges and charged back to councils².

The SA Local Government Grants Commission (SALGGC) also requests waste data from councils. It is responsible for making recommendations to the Minister for State/Local Government Relations on the distribution of untied Commonwealth financial assistance grants to local governing authorities in South Australia in accordance with State and Federal legislative requirements (SALGGC 2014). It coordinates grants administration to councils and relies on the waste and recycling data provided to help allocate grant monies. All councils provide quantity and service details to the SALGGC on an annual basis.

A high recovery rate is desirable from an environmental point of view but other factors must be considered as well. Some underlying assumptions often made when carrying out comparisons can blur the interpretation:

- All metropolitan councils have a 3-bin system (offered, but not 100% coverage)
- Stream composition stays the same with time, i.e., it is fair to compare the recyclables bin of any two years equally
- Economic factors (such as household spending) don't change.

2.4 Methodology

This report collates data from a number of sources:

- Zero Waste SA
- Local Government Association
- Councils
- Waste contractors
- South Australian Local Government Grants Commission.

Waste and recycling data is supplied to ZWSA on a regular basis from some councils and waste collection providers. This usually comes in a monthly breakdown (in tonnes) of residual waste, organics, and recyclables and is held in ZEUS³. Some councils collect a small amount of Commercial and Industrial waste which is not counted separately as it is considered negligible. As the waste is weighed

on weighbridges (and is the basis of contractor charging), the accuracy of this (mainly metropolitan) data is relatively high. All waste and recycling quantities in this report have been rounded up to the nearest one-hundred for consistency.

The annual data provided to the SALGGC by all councils is the source for the annual figures for most regional councils; and many of the details of all council waste services, such as bin systems and frequency of collection. As councils can offer a range of different waste collections, this report has summarised the main kerbside services offered to residents.

The data quality for some regional councils is not as high as metropolitan data, due to the lack of weighbridges in some areas⁴. Some of the annual figures provided to the SALGGC from regional councils are estimated and some are derived from waste weighed on weighbridges. The error margin for regional council data in this report is approximately +10%.

Regional councils are represented by geographic associations to collaborate on common interests. Recovery rates and waste generation data in this report are presented at the regional association level. To create an equivalent aggregation for the metropolitan area, ZWSA has grouped metropolitan 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 recovery rate is defined as the component of waste that is recovered for recycling from the total kerbside waste. It can be expressed as:

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

Demographic data - population and households - are based on figures from the Australian Bureau of Statistics (ABS). Some households are in unincorporated areas and do not receive council kerbside waste services, so these figures are not included in this report. Approximately 2,800 occupied dwellings are affected by this or 7,300 people (table 11 and 15).

The 'Estimated Resident Population' by local government area is used for population data in this report (2012 is the latest available data released), and 'occupied dwellings' is used for serviced-households figures from 2011 census data. As this is a non-census year, annual 'new residential building approvals' from each local government area are added to the census baseline to provide estimates for use in per household analysis.

² See comments on weighbridges footnote 4, below.

³ ZWSA needs information to plan funding and services and consequently invested in a data management and reporting systems, ZEUS (Zero Waste SA Environment User System). This system was implemented in 2009 and contains data such as waste, recycling and landfill quantities, grant details, illegal dumping and hazardous waste modules, amongst others. The reporting aspect allows analysis at a state-wide level down to project level.

⁴ 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).

3 Findings

3.1 State – South Australia’s Kerbside Waste

3.1.1 South Australia’s Kerbside Waste Services

South Australia has 68 councils, 19 of which are metropolitan and 49 regional.

In 2012-13, 36 councils across the State offered 3-bin systems to their constituents compared with 16 in 2003-04. The number of 2-bin systems offered by councils also increased over this period, and 1-bin systems decreased from 33 to 6 councils. This improvement in recycling services offered is summarised in table 1 and mapped in figure 1.

Table 1 Summary of Council Kerbside Bin Systems in 2012-13 and 2003-04

Bin system	Total		Metropolitan		Regional	
	2003-04	2012-13	2003-04	2012-13	2003-04	2012-13
3-bin	16	36	15	19	1	18
2-bin	18	26	4	0	14	25
1-bin	33	6	0	0	33	6
0-bin	1	0	0	0	1	0
Total	68	68	19	19	49	49

Source: SALGGC (2014) and SA EPA (2002)

Although all 19 metropolitan councils offer a 3-bin system, not all residents have an organics service as three councils have an opt-in policy. This resulted in at least 51,000 metropolitan households having only a 2-bin system.

The overall contents of waste bins in regional areas have a different waste profile to those in metropolitan areas, due to a range of factors including the mix of bin systems (1, 2, or 3 bins) in use in regional areas, average annual rainfall, and lower occupancy per dwelling in regional areas.

For example, in 2012-13, 37% of regional councils had 3-bin systems compared with all of metropolitan councils (including opt-in systems), 51% of regional councils had 2-bin systems, and 12% of regional councils had a 1-bin system.

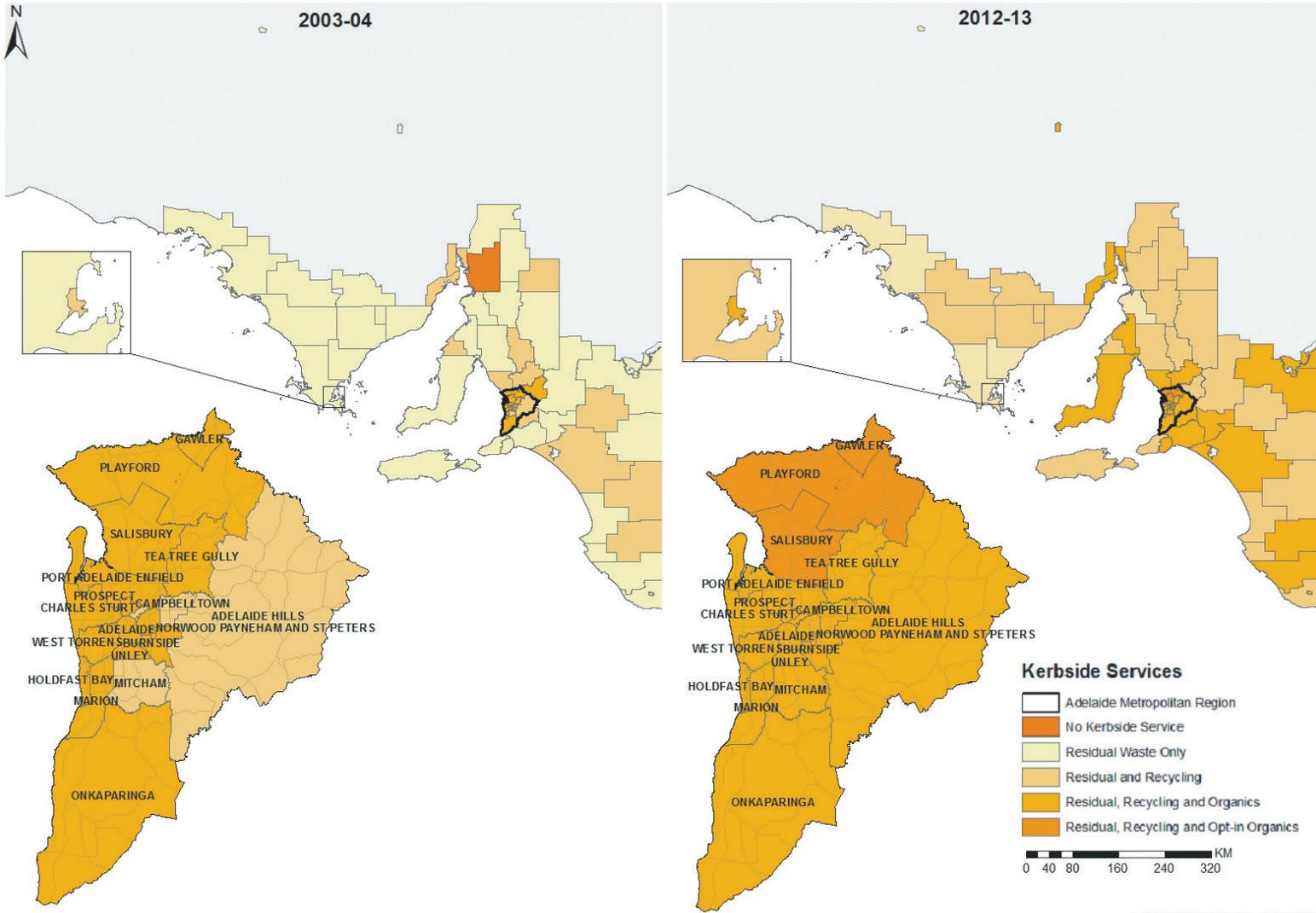


Figure 1 Local Government Kerbside Waste Collection Services Maps, 2003-04 and 2012-13

3.1.2 South Australia’s Total Kerbside Waste Generated

In SA, approximately 666,500 tonnes of municipal waste was collected from kerbside, 489,500 tonnes from metropolitan areas and 177,000 tonnes from regional areas (table 2). The 19 metropolitan councils account for 73% of the total kerbside waste collected in SA.

Table 2 South Australia’s Total Kerbside Waste Quantities, 2012-13

Collection	State – SA (tonnes)	Metropolitan (tonnes)	%	Regional (tonnes)	%
Residual Waste	371,600	251,800	68%	119,700	32%
Organics	149,200	124,600	84%	24,600	16%
Recyclables	147,200	114,200	78%	33,000	22%
Total Tonnes	666,500	489,500	73.4%	177,000	26.6%
Recovery Rate	44.5%	48.8%		32.5%	

Sources: SALGGC (2014) and ZWSA (2014)

The kerbside waste consisted of:

- 296,400 tonnes of recovered materials (approximately 50% organics and 50% recyclables), and
- 71,600 tonnes of waste that went to landfill.

This resulted in a recovery rate of 44.5% for the State.

In areas covered by council waste services, South Australians generated approximately 404 kg of kerbside waste per person, or 1,012 kg per household per annum (table 3).

Regional areas collected more kerbside waste per person (429 kg/yr) than metropolitan areas (396 kg/yr), but more significantly sent 68% of its waste to landfill (compared to metropolitan areas, 51%) which reflects the lower-bin number options in service in regional areas.

Table 3 State, Metropolitan and Regional Kerbside Waste Generation Per Capita and Per Household, 2012-13 (kilograms per year)

	Residual Waste	Organics	Recyclables	Total Waste
State– SA				
Kg per capita	225	90	89	404
Kg per household	564	227	224	1,012
Metropolitan				
Kg per capita	204	101	92	396
Kg per household	515	255	233	1,001
Regional				
Kg per capita	290	60	80	429
Kg per household	708	145	195	1,046

Sources: SALGGC (2014) and ABS (2014)

Difference from the Previous Year

Total kerbside waste collected by councils was similar for both years. Landfilled quantities were slightly lower (2%) in the same period, with 6% organics and 1% more recyclables collected in 2012-13 (table 4).

Table 4 State 2012-13 and 2011-12 Kerbside Waste Quantities (tonnes)

Collection	2011-12	2012-13	% Change From 2011-12
Residual Waste	377,700	371,600	-2%
Organics	140,500	149,200	6%
Recyclables	145,500	147,200	1%
Total	663,700	666,500	0%

Sources: SALGGC (2014) and ZWSA (2014)

Long-term Trends

In the nine years to 2012-13, total kerbside waste collected by councils decreased by 1%. Landfilled quantities fell by 36% or 104 kg per person – see figure 4 – (total of 132,900 tonnes less compared to 2003-04). Organics collected and recovered grew by 44% (or 36 kg per person) as did recyclables (43% or 35 kg per person) (figure 2). Rainfall affects the amount of organics produced, with less waste collected in drier seasons.

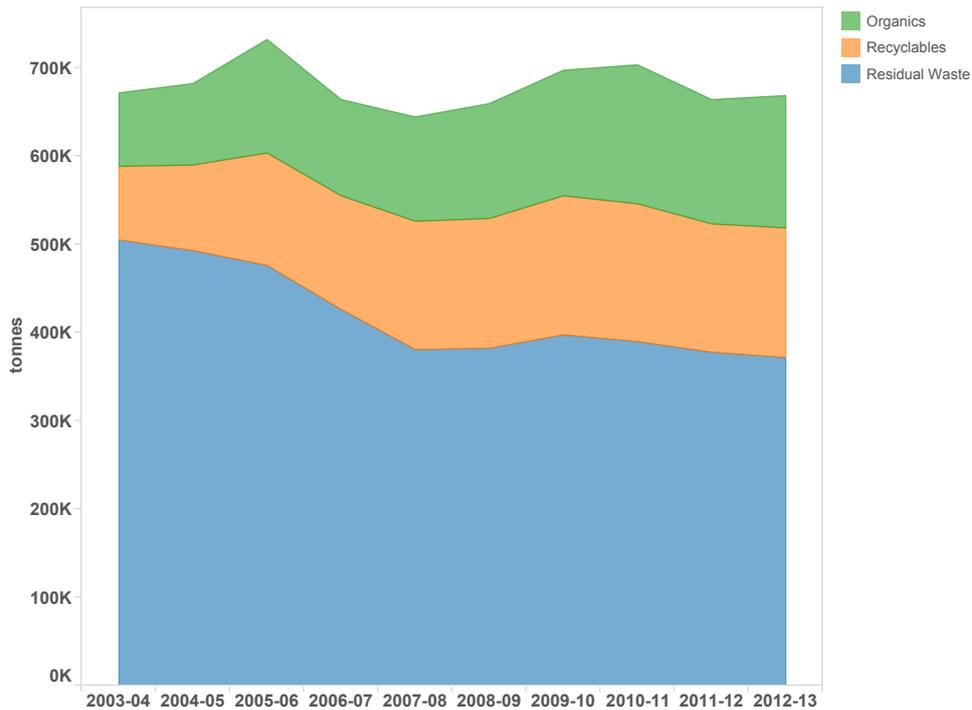


Figure 2 South Australia's Nine Year Trend of Kerbside Waste Quantities

The same trends can be seen in figure 3 for annual per capita waste collection. This indicates that while the consumption of resources by South Australian households has remained relatively stable over the period, improved recycling services have increased the amount of resources recovered and helped to reduce the amount of waste being disposed to landfill.

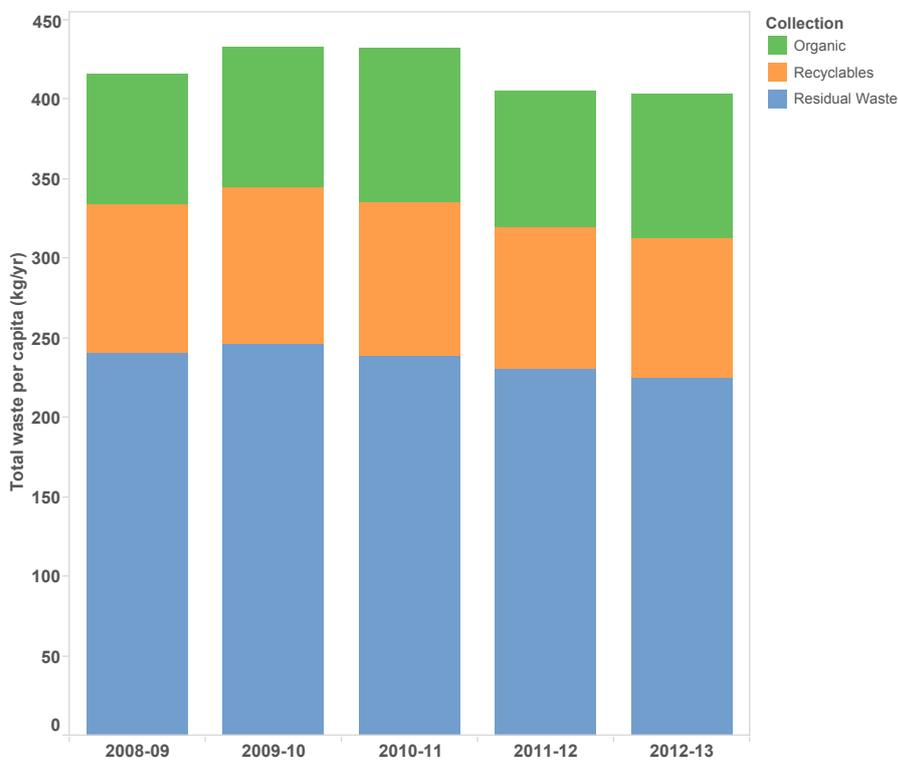


Figure 3 South Australia's Five Year Trend for Per Capita Kerbside Waste

Waste to landfill trends on a per capita basis is shown in figure 4. This clearly shows a reduction in the residual waste collected per person over the nine year period in South Australia. A slight increase in the recovery rate from one year to the next should not be viewed with concern if this downward trend in residual waste per capita is also observed.

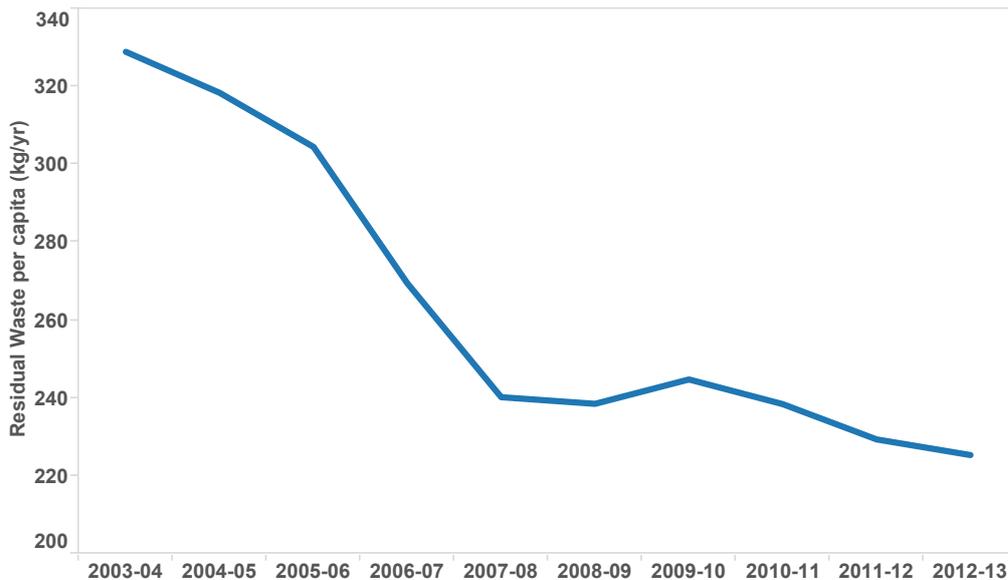


Figure 4 South Australia's Nine Year Trend of Residual Waste per Capita

The State's resource recovery rates over the last nine years have shown improvements from 24.8% to 44.5% (table 5).

Table 5 South Australia's Nine Year Trend in Recovery Rates of Kerbside Waste

Financial Year	State – SA %	Metropolitan %	Regional %
2003-04	24.8%	31.6%	11.9%
2004-05	27.9%	36.0%	12.4%
2005-06	35.1%	44.8%	12.1%
2006-07	35.9%	45.4%	16.3%
2007-08	41.1%	47.4%	24.3%
2008-09	42.1%	48.0%	26.8%
2009-10	43.1%	48.0%	29.4%
2010-11	44.7%	49.0%	33.5%
2011-12	43.1%	48.3%	28.9%
2012-13	44.5%	48.8%	32.5%

Sources: SALGGC (2014) and ZWSA (2014)

3.2 Metropolitan Kerbside Waste

3.2.1 Metropolitan 3-bin Kerbside Waste Services

By 2012-13, all 19 metropolitan councils offered access to 3-bin systems to their constituents, up from 15 in 2003-04 (table 1, p13). Some councils used a split bin system for waste segregation but have now replaced that with the 3-bin system. The majority of metropolitan councils provide a weekly residual service, fortnightly recyclable collections and fortnightly organics collections (table 16, p36).

In Playford, Salisbury and Gawler councils, there is an opt-in service for organics where only 19%, 57% and 41% of rate payers respectively choose to pay for a third organics bin (NAWMA 2013). In the metropolitan area, it's estimated that 89% of households have an organics bin (i.e. approximately 51,000 of a total 483,000 metropolitan households do not receive an organics service).

Other differences in kerbside collection services can be in the frequency of collections. For example, residents in Onkaparinga have a monthly organics collection rather than fortnightly.

3.2.2 Metropolitan Kerbside Waste Generated

In 2012-13, SA's metropolitan areas generated 489,500 tonnes of kerbside waste with 48.8% being diverted for recycling. Per person, approximately 396 kg of MSW was collected, or 1,001 kg for every household serviced per year.

The metropolitan kerbside waste consisted of:

- 238,800 tonnes of recovered materials (approximately 48% organics and 52% recyclables), and
- 251,800 tonnes of waste was landfilled (table 6, p21).

Seasonal fluctuations can be seen in the monthly collection trends (figure 5) which can affect waste quantities such as organics in spring, and general waste around Christmas and Easter (e.g. packaging waste).

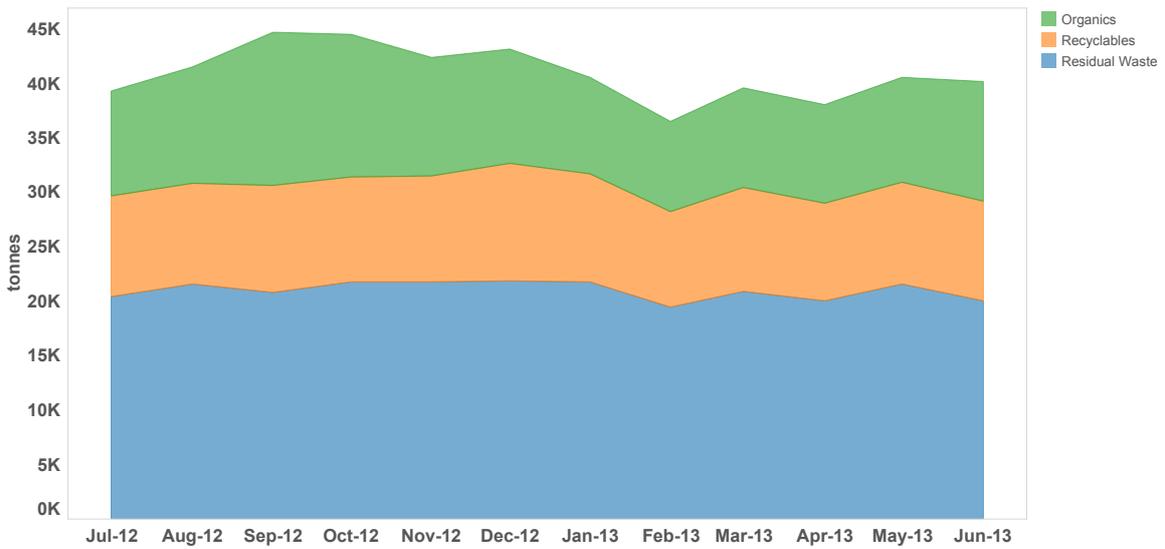


Figure 5 Metropolitan Monthly 3-bin Kerbside Waste Quantities, 2012-13

Figure 6, shows the recovery rate achieved by metropolitan councils over the financial year. Spring months show a peak, when organics quantities are high and boost the recovery rate. Lower rates are observed in summer holiday periods, when many residents may be away and hot/dry weather is predominant.

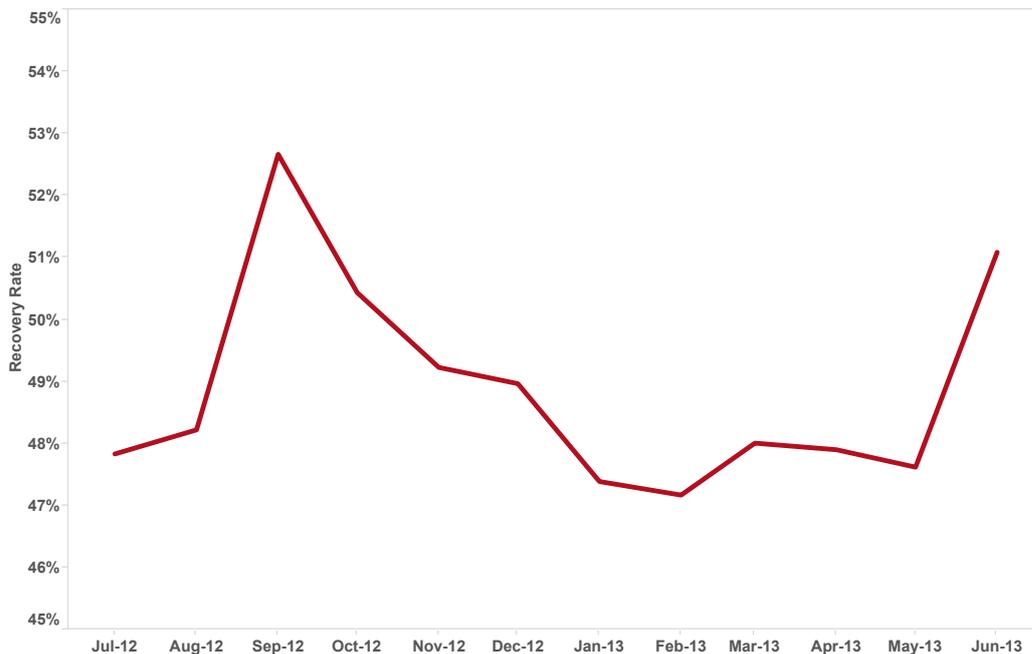


Figure 6 Metropolitan Councils: Average Recovery Rate by Month, 2012-13

Differences from the Previous Year

Total kerbside waste collected in 2012-13 by metropolitan councils was similar when compared to the previous year (1% difference). Landfilled quantities were also similar to the previous year, although 6% more organics were collected and 3% less recyclables (table 6).

Table 6 Metropolitan Councils: 2012-13 and 2011-12 Kerbside Waste Quantities

Collection	2011-12 (tonnes)	2012-13 (tonnes)	% Change from 2010-11
Residual Waste	251,400	251,800	0%
Organics	117,400	124,600	6%
Recyclables	117,200	114,200	-3%
Total Metropolitan Waste	486,000	489,500	1%

Sources: SALGGC (2014) and ZWSA (2014)

Long Term Trend

Over the nine year period to 2012-13 (figure 7), the major changes include:

- total metropolitan kerbside waste was 10% higher (up 48,200 tonnes),
- landfilled quantities fell by 20% (down 50,200 tonnes),
- recyclables grew by 36% (41,500 tonnes more), and
- organics increased by 47% (up 58,100 tonnes).

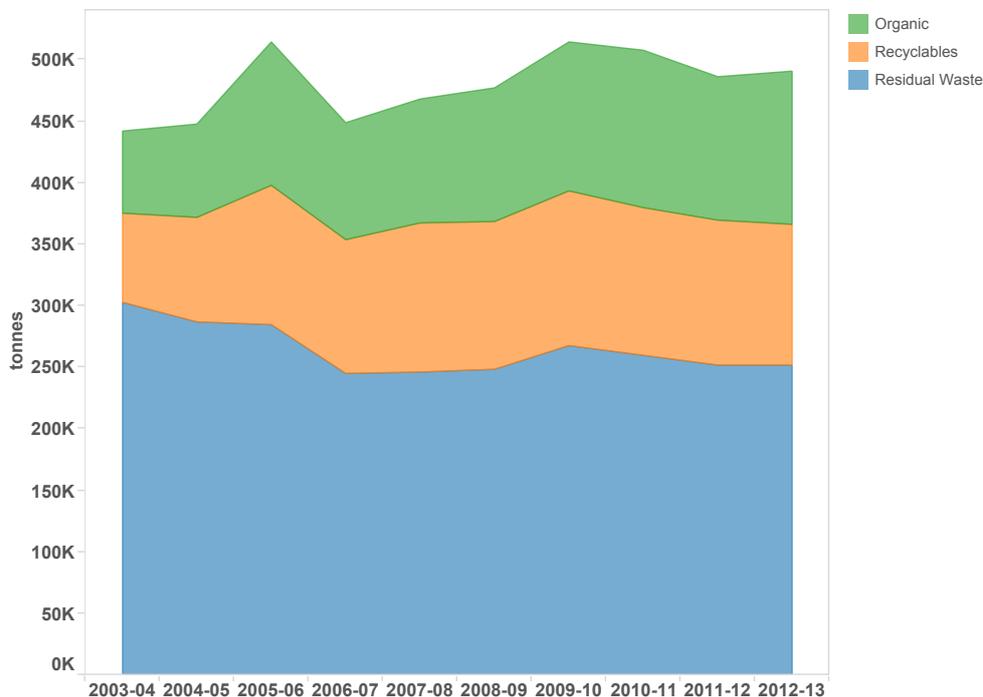


Figure 7 Metropolitan Councils: Nine Year Trend of Kerbside Waste Quantities

Although the recovery in metropolitan areas increased significantly from 31.6% in 2003-04 to 48.8% in 2012-13 (table 5, p18), the recovery rate is still below the metropolitan municipal waste target of 70% by 2015 (ZWSA 2011). This shows that there is still a considerable challenge in order to achieve the target. Some individual councils also do achieve recovery rates of nearly 60% for some months of the year, but the annual average is lowered due to the seasonal nature of organic wastes produced.

The recovery rates quoted in this report should not be confused with the 57.5% Metropolitan MSW recovery rate quoted in the *South Australia's Recycling Activity Survey 2012-13 Financial Year Report* (Rawtec 2014) as this current report examines only kerbside collections and omits, hard waste, e-waste and other aspects of MSW. The *Recycling Activity Survey* covers all aspects of MSW data, not just kerbside collections.

3.2.3 Metropolitan 3-bin System Recovery Rate Performance

Table 7 Recovery Rates for Each Individual Metropolitan Council

Suburb	2012-13	Comments
	56.4%	Full roll out of caddy
Leafy	55.4%	No caddy at this point
Leafy	55.3%	Full roll out of caddy
Leafy	53.8%	Full roll out of caddy
Leafy	52.8%	Opt-in caddy
	52.8%	Opt-in caddy
	52.7%	No caddy at this point
	52.3%	Opt-in caddy
	52.1%	Full roll out of caddy
	50.6%	Full roll out of caddy
Leafy	49.8%	No caddy at this point
	49.3%	Full roll out of caddy
	48.4%	No caddy at this point
Dry	45.0%	Opt-in green service (pay)
Leafy	44.0%	Caddy, but not full organics coverage
	44.0%	Four weekly green, no food
Dry	43.2%	Opt-in green service (pay)
	35.4%	Caddy but not full coverage
Dry	34.3%	Opt-in green service (pay)

Table 7 shows the recovery rate for each of the 19 metropolitan councils with a description of the organics/ food waste service offered to residents. Over half of them have annual average greater than 50%. The best performers are from councils with full organics bin coverage of households and supplemented with a food caddy. The label 'leafy' in the above table refers to higher rainfall and more residential gardens.

In the drier council areas with opt-in organics collections there are additional organics recoveries occurring as some of these councils have resident drop-off options which would capture a portion of this waste.

Figure 8 shows the distribution of the recovery rates by individual metropolitan councils from 2003-04 to the 3 recent years to 2012-13. It can be seen that great improvements have been made in the spread of the 19 council recovery rates reported and the median recovery rates (52% in 2012-13).

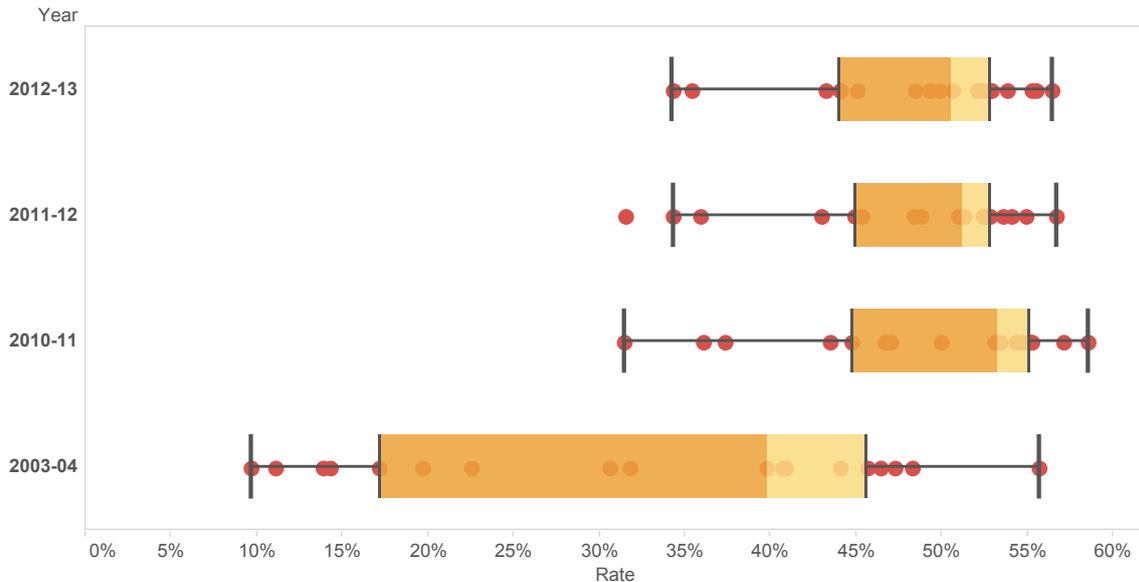
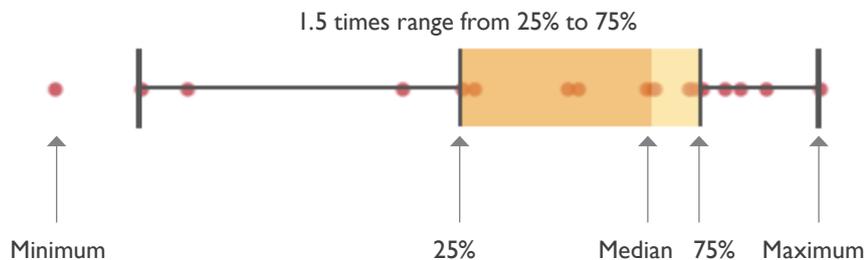


Figure 8 Metropolitan Councils: Recovery Rate by Year, 2003-04, 2010-11, 2011-12 and 2012-13

Box plots

A box plot presents a view of the spread of the recovery rate values from the minimum to the maximum value. A box is drawn around the middle 50% of values and a line drawn through this box (where the colours change) shows the position of the median (or middle value). The whiskers extend on each side of the box to the minimum or maximum values unless the values go beyond 1.5 times the distance between 25% and 75%. This allows possible outliers to be highlighted.



3.2.4 Metropolitan Contamination Rates

A number of metropolitan council kerbside waste audits have been undertaken between 2011 and 2014 and these have been combined to indicate that contamination in recyclables bins was around 13% by weight and approximately 2% of green organics bins. Industry consultations have confirmed that these figures are approximately correct and that contamination of recycling bins, and to a lesser extent organics bins, continues to be an issue. Contamination is a problem as, in addition to lowering the effective recovery rate, it interferes with sorting at transfer stations and also resources are wasted that may otherwise be recycled.

The audits also show that about 30% of the contents of some residual bins is due to food waste. Significant improvements in the recovery rate would be achieved if this material was placed in the green organics bin.

3.2.5 Metropolitan Sub-Regions

To provide some comparisons between councils, sub-regional aggregations have been used⁵ (table 8).

Table 8 Metropolitan Sub-regions, Population and Households, 2012

Sub-Region	Population	Households
Central Eastern - Adelaide, Adelaide Hills, Campbelltown, Burnside, Norwood Payneham and St Peters, Prospect, Unley, Walkerville	259,554	103,603
Northern – Gawler, Playford, Salisbury, Tea Tree Gully	337,273	127,877
Southern - Marion, Mitcham, Onkaparinga	316,948	124,359
Western - West Torrens, Charles Sturt, Holdfast Bay, Port Adelaide Enfield	322,320	133,306
Total	1,236,095	489,145

Source: ABS (2014)

Annual per capita waste collection figures in metropolitan regions showed the Northern group collected the least kerbside waste (372 kg per person), and the Western group the most (413 kg per person) (table 9).

Table 9 Metropolitan Sub-Regions: Total Waste Collected, Per Capita and Per Household in 2012-13

Sub-Region	Total Waste (tonnes)	Waste Per Capita (kg/yr)	Waste Per Household (kg/yr)
Central Eastern	102,200	394	987
Northern	125,400	372	981
Southern	128,700	406	1,035
Western	133,100	413	999
Total	489,500	396	1,001

Sources: ABS (2014) and ZWSA (2014)

Recovery rates showed the Central Eastern group had the highest rate (52.4%) and the Northern councils had the lowest at 43.6% – see figure 9. Currently all metropolitan councils offer a 3-bin system, however the variation in some of the reported recovery rates can be accounted for by the opt-in service, or collection frequency offered by some councils. Also, councils with more vegetation (i.e. 'leafy suburbs') tend to have higher recovery rates than councils in other areas (e.g. in the plains) due to less organics being collected and recycled. Other socio-economic factors that may contribute are not addressed in this report.

⁵ Adelaide City Council was not added to a sub-regional grouping in the breakdown analysis. As a capital city council, and with many multi-unit dwellings, its waste profile is not typical of the other suburb based council areas. It was however, included in the State totals, per capita and per household analysis.

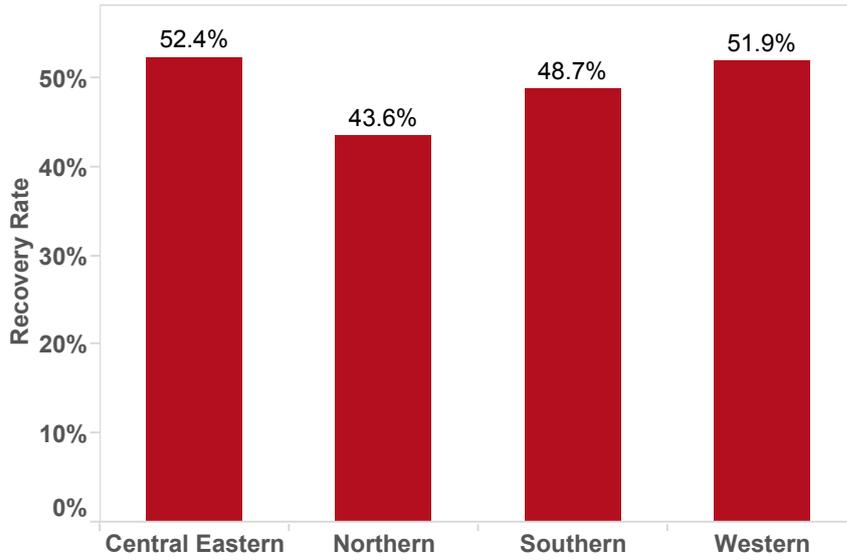


Figure 9 Metropolitan Sub-regions: Kerbside Recovery Rates in 2012-13

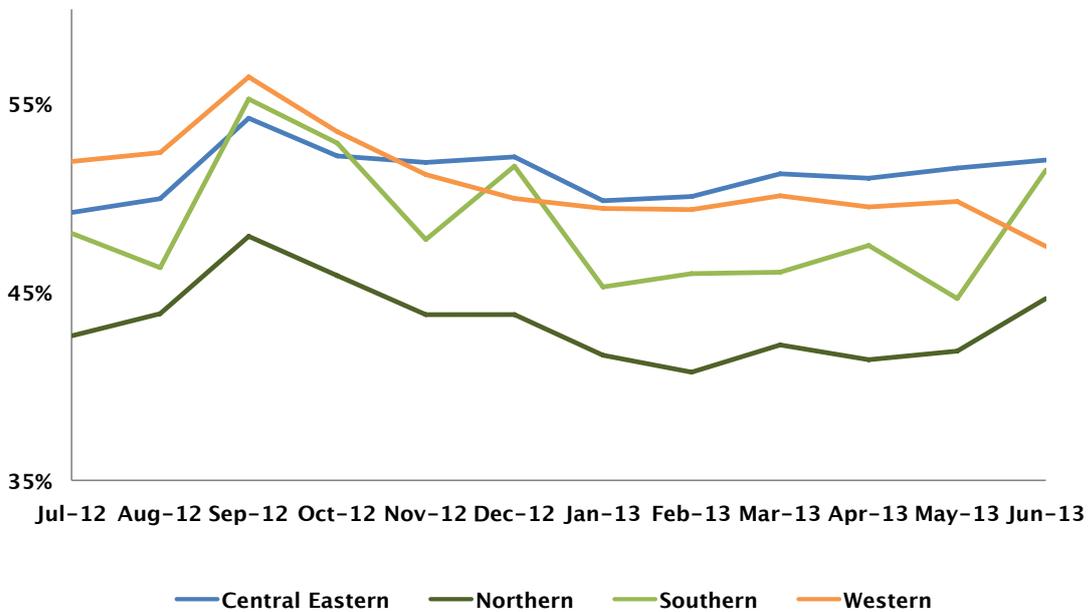


Figure 10 Monthly 3-bin Kerbside Recovery Rates by Sub-Region

The seasonal trend is evident in all of the areas, and there is a steady difference of 6 to 8 percentage points between the area with the most organics collected and area with the least – see figure 10.

3.3 Regional Kerbside Waste

3.3.1 Regional Kerbside Waste Services

In 2012-13, of the 49 regional councils, 18 councils offered a 3-bin service compared with one council in 2003-04, and 25 had 2-bin systems, up from 14 in 2003-04. The number of councils with a 1-bin system has decreased to six from 33 in 2003-04 (figure 11).

A number of regional areas provide residents with drop off waste directly to transfer stations which may affect the reported recovery rate.

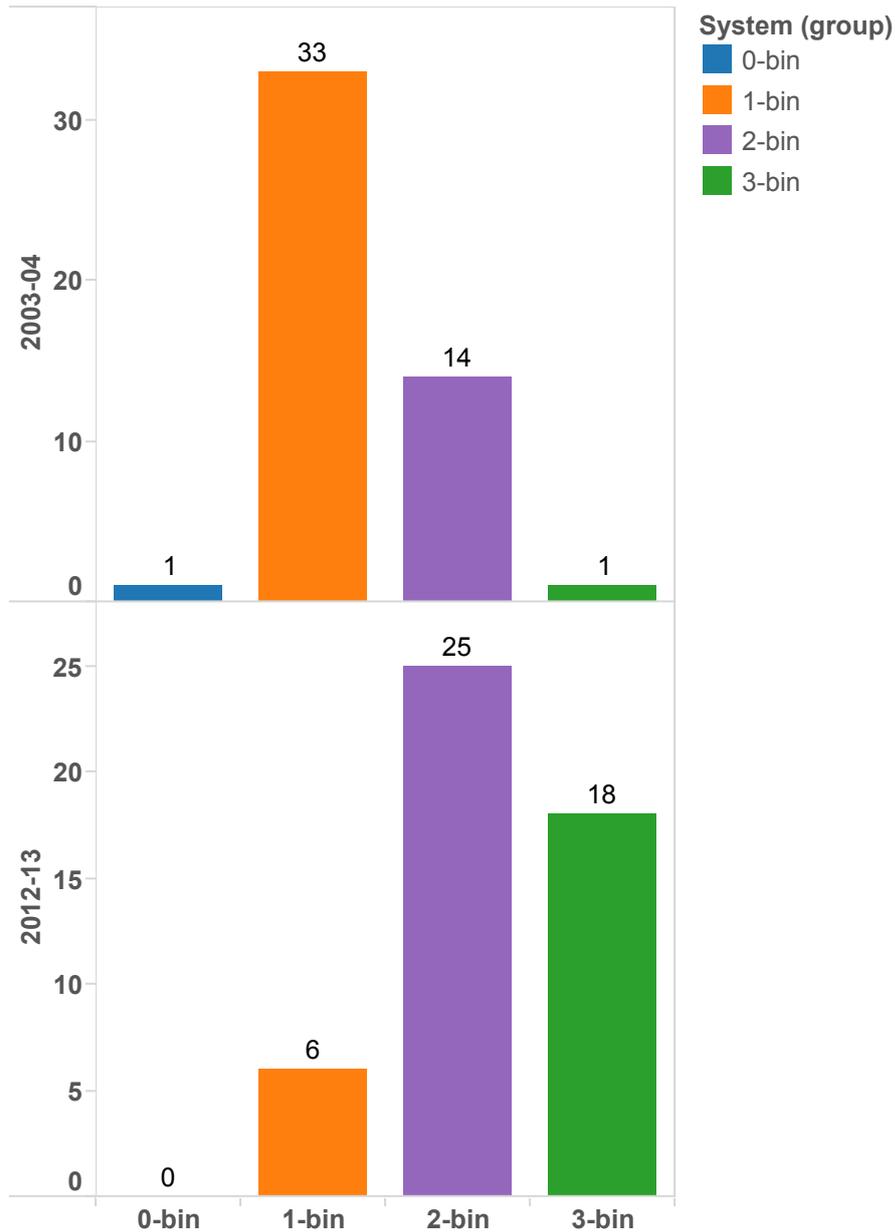


Figure 11 Number of Regional Councils with Each Bin System in 2012-13 versus 2003-04

The frequency of waste collections offered in regional townships is shown in table 18 (p38). 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.

The majority (47 of the 49) of regional councils provide a weekly residual kerbside collection. Two councils provided fortnightly residual kerbside collections.

Recyclables are collected fortnightly by 35 councils, monthly by seven councils, weekly by one, and four councils have drop-off facilities only for recyclables.

Organics are collected at drop-off facilities at 24 councils, and 13 councils collect organics fortnightly from kerbside. Five councils have a monthly organics kerbside collection service.

Since 2011, ZWSA has contributed grants to assist 16 of these councils to expand their kerbside services (councils noted in table 18).

3.3.2 Regional Kerbside Waste Collected

South Australia's regional councils collected approximately 177,000 tonnes of kerbside waste in 2012-13, of which 32.5% was recovered. Approximately 429 kg of MSW was collected per person or 1,046 kg for every household serviced, annually (table 3, p16).

The regional kerbside waste consisted of:

- 57,600 tonnes of recovered materials (approximately 43% organics and 57% recyclables), and
- 119,700 tonnes of waste that went to landfill (table 10).

Challenges to organics collections in regional areas result in much lower quantities collected than in the metropolitan area. These challenges include smaller, remote populations, large transportation costs, dry climatic conditions for many areas, and types of services (fewer organics services offered) provided by the councils.

Other options remove some of the organic waste, such as resident drop-off of organics for some councils as well as home composting.

Differences from the Previous Year

As can be seen in table 10, total kerbside waste collected by regional councils was similar to quantities collected in 2011-12. Landfilled quantities were lower (6%) over the same period, but more recyclables (14%) and organics (6%) quantities collected.

Table 10 Regional Councils: 2012-13 and 2011-12 Kerbside Waste Quantities

Collection	2011-12 (tonnes)	2012-13 (tonnes)	% Change from 2011-12
Residual Waste	126,800	119,700	-6%
Organics	23,200	24,600	6%
Recyclables	28,300	33,000	14%
Total	178,200	177,000	-1%

Sources: SALGGC (2014) and ZWSA (2014)

Long-term Trend

Over the nine year period to 2012-13, in the regional council areas:

- total kerbside waste collected fell by 30% (52,700 tonnes),
- landfilled quantities fell by 69% (82,600 tonnes less), and
- recovery rates in increased from 11.9% to 32.5% (table 5, p18).
- resources recovered increased:
 - » organics grew by 32% and
 - » recyclables by 68%.

These changes are reflective of an increase in recycling services in some regional areas. Figure 11 illustrates these changes in services offered.

Nine year trends of regional collections can be seen in figure 12.

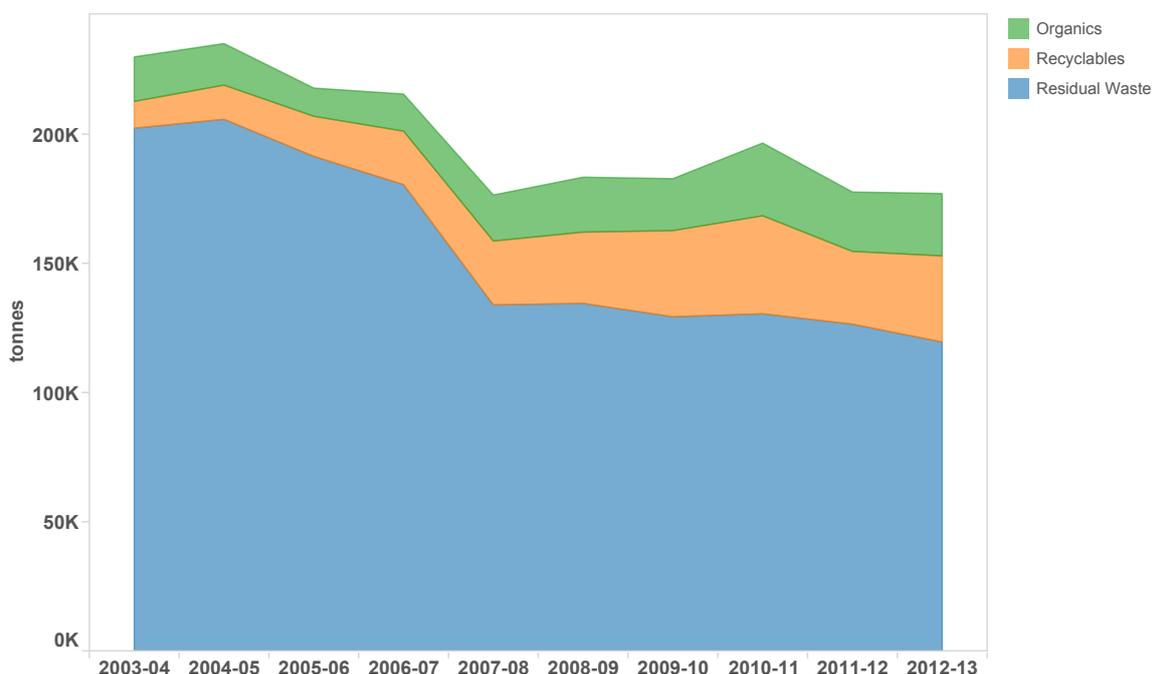


Figure 12 Regional Councils: Nine Year Trend of Kerbside Waste Quantities to 2012-13

3.3.3 Local Government Regions

Local government has formed regional subsidiaries representing their constituent councils and the regional councils are aggregated into five of these (table II). These associations are constituted under Section 43 of the *Local Government Act 1999* and have formed to assist mutual co-operation between member councils for the benefit of the communities in their region. ZWSA has used these groupings to provide analysis of waste generation and recovery rates.

Table II Local Government Regions: Populations and Households, 2012-13

LGA Region	Population	Households
Central – Barossa, Barunga West, Clare and Gilbert Valleys, Copper Coast, Flinders Ranges, Goyder, Light Regional, Mallala, Mount Remarkable, Northern Areas, Orroroo Carrieton, Peterborough, Port Pirie, Wakefield, Yorke Peninsula	121,910	50,117
Eyre Peninsula – Ceduna, Cleve, Elliston, Franklin Harbour, Kimba, Lower Eyre Peninsula, Port Augusta, Port Lincoln, Streaky Bay, Tumby Bay, Whyalla, Wudinna	71,717	29,582
Murray Mallee – Berri Barmera, Coorong, Karoonda East Murray, Loxton Waikerie, Mid Murray, Renmark Paringa, Murray Bridge, Southern Mallee	69,045	28,572
Outback – Coober Pedy, Roxby Downs	6,700	2,447
South East – Grant, Kingston, Mount Gambier, Naracoorte Lucindale, Robe, Tatiara, Wattle Range	64,585	25,852
Southern & Hills – Alexandrina, Kangaroo Island, Mount Barker, Victor Harbor Yankalilla,	78,942	32,624
Total in Regional Council Areas	412,899	169,194
Total Other – Anangu Pitjantjatjara Yankunytjatjara, Maralinga Tjarutja Community Inc, Unincorporated SA	7,305	2,811

Sources: ABS (2014)

The Eyre region collected the least annual quantities of kerbside waste per person (351 kg), and the Outback group collected the most (1,433 kg/pp) (table 12).

Table 12 Local Government Regions - Total Kerbside Waste Collected, Per Capita and Per Household, 2012-13

Local Government Region	Total Waste (tonnes)	Waste Per Capita (kg/yr)	Waste Per Household (kg/yr)
Central	48,200	395	961
Eyre	25,200	351	851
Murray Mallee	33,000	479	1,157
Outback	9,600	1,433	3,924
South East	27,600	427	1,066
Southern & Hills	33,500	424	1,027
Total Non-metro	177,000	429	1,046

Sources: SALGGC (2014), ZWSA (2014) and ABS (2014)

The greatest recovery rate was achieved by the Southern and Hills region (41.0%), followed by the South East region (40.4%)– see figure 13.

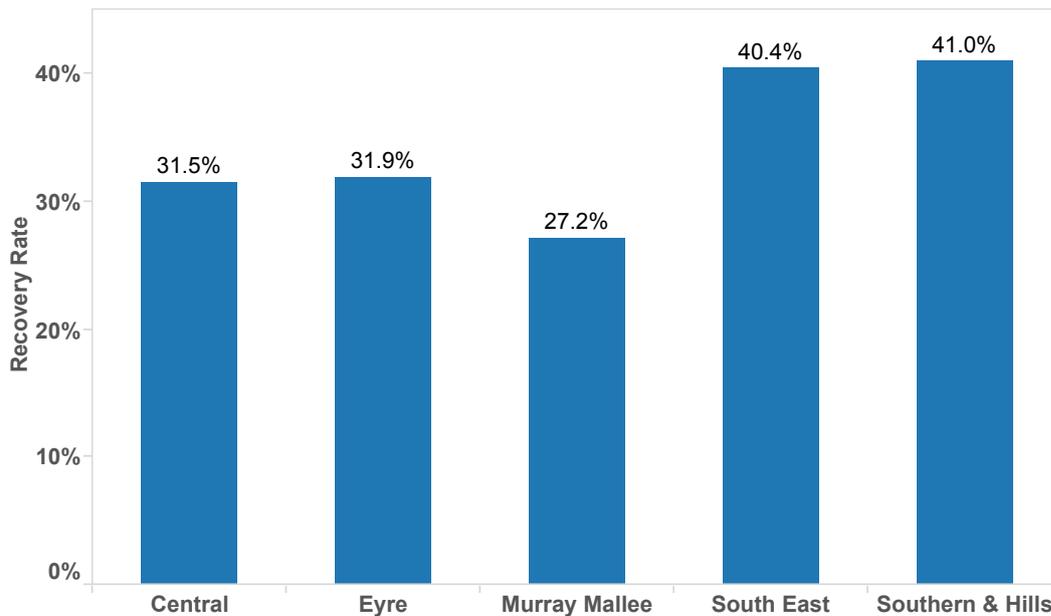


Figure 13 LGA Regions: Kerbside Waste Recovery Rates in 2012-13⁶

Bin systems in sub regional areas have different profiles, which would contribute to differences in recycling rates. A summary of the bin system offered by the various LGA regions can be seen in table 13. The Southern and Hills region has the highest proportion of 3-bin systems (60% of councils).

⁶ The Outback area was not included in figure 13 as it does not have a typical waste profile.

Table 13 Summary of Regional Council Bin Systems: Number of Councils with System Type in 2012-13

Local Government Region	3-bin	2-bin	1-bin	0-bin	Total
Central	4	10	1	0	15
Eyre Peninsula	2	6	4	0	12
Murray Mallee	5	3	0	0	8
Outback	1	0	1	0	2
South East	3	4	0	0	7
Southern & Hills	3	2	0	0	5
Total Regional	18	25	6	0	49

Source: SALGGC (2014)

4 Conclusions

This report has examined the effectiveness of the kerbside bin system in place in SA local government councils. It has not attempted to measure the entire municipal solid waste stream but concentrated on collections of the bins using the recovery rate as an indicator. The most effective system of those in use is the 3-bin system which can achieve up to 60% recovery rate at certain times of the year. Increasingly regional councils are implementing a higher number of bin systems to achieve better recovery rates. One driver for this has been EPA direction on proper operation of landfills which has resulted in some landfill sites being converted to transfer stations with landfill numbers fewer than in the past.

All metropolitan councils have a 3 bin system but some are opt-in only for the organics service. It was found that the councils that have the best recovery rates were those in which all households have a 3-bin system with food caddy.

The consumption of resources by South Australian households has remained relatively stable over the period, improved recycling services have increased the amount of resources recovered and helped to reduce the amount of waste being disposed to landfill.

The recovery rate is just one number that measures recycling performance. Various factors influence the rate at a local level or regional level:

- Economic / social, such as household spending.

- 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 is replaced by lighter plastics.

- 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 greater metropolitan area, some groupings of councils have recovery rates 6 to 8 percentage points lower than others due to their use of opt-in system for organics collections.

- Deploying a uniform 3-bin system with food caddies will lead to greater recovery rates.

- Regional councils have less numbers of implementations of the 3-bin system (restricted to townships) or fewer bins as they are constrained by infrastructure and distances for transport.

In addition to the recovery rate over time, the residual waste per person should also be viewed when considering long term trends.

5 Appendix

5.1 Regional Groupings – Population and Household Numbers

Table 14 Metropolitan Sub-Regions – Estimated Resident Population and Occupied Dwellings, 2012

	Population	Households
Adelaide	21,590	9,745
Adelaide Hills	39,798	14,072
Burnside	44,263	19,712
Campbelltown	50,393	17,360
Norwood Payneham and St Peters	36,594	15,899
Prospect	20,904	8,182
Unley	38,620	15,449
Walkerville	7,392	3,184
Central Eastern	259,554	103,603
Gawler	21,271	8,882
Playford	83,006	31,745
Salisbury	134,300	50,111
Tea Tree Gully	98,696	37,130
Northern	337,273	127,877
Marion	86,721	35,896
Mitcham	65,331	24,700
Onkaparinga	164,896	63,763
Southern	316,948	124,359
Charles Sturt	109,956	45,256
Holdfast Bay	36,509	15,804
Port Adelaide Enfield	118,330	47,944
West Torrens	57,525	24,302
Western	322,320	133,306
Total Metropolitan	1,236,095	489,145

Sources: ABS (2014)

Table 15 LGA Regions, Estimated Resident Population and Occupied Dwellings, 2012/13

Name	Population	Households
Barossa	22,703	9,060
Barunga West	2,479	1,116
Clare and Gilbert Valleys	8,933	3,626
Copper Coast	13,401	3,626
Flinders Ranges	1,697	797
Goyder	4,218	1,780
Light	14,196	5,102
Mallala	8,565	3,105
Mount Remarkable	2,893	1,275
Northern Areas	4,554	1,932
Orroroo Carrieton	886	391
Peterborough	1,745	845
Port Pirie	17,671	7,338
Wakefield	6,783	2,695
Yorke Peninsula	11,186	5,181
Central	121,910	50,117
Ceduna	3,625	1,523
Cleve	1,743	716
Elliston	1,062	513
Franklin Harbour	1,291	569
Kimba	1,098	432
Lower Eyre Peninsula	5,071	1,929
Port Augusta	14,425	5,773
Port Lincoln	14,574	5,848
Streaky Bay	2,208	891
Tumby Bay	2,629	1,111
Whyalla	22,716	9,766
Wudinna	1,275	511
Eyre	71,717	29,582
Berri and Barmera	10,724	4,458
Coorong	5,659	2,341
Karoonda East Murray	1,043	434
Loxton Waikerie	11,467	4,730
Mid Murray	8,248	3,694
Murray Bridge	20,347	8,127
Renmark Paringa	9,453	3,918
Southern Mallee	2,104	870
Murray Mallee	69,045	28,572

Cooper Pedy	1,768	840
Roxby Downs	4,932	1,607
Outback	6,700	2,447
Grant	7,995	2,885
Kingston	2,375	1,011
Mount Gambier	25,881	10,668
Naracoorte and Lucindale	8,365	3,286
Robe	1,437	661
Tatiara	6,743	2,580
Wattle Range	11,789	4,761
South East	64,585	25,852
Alexandrina	24,603	10,458
Kangaroo Island	4,531	2,022
Mount Barker	30,933	11,644
Victor Harbor	14,376	6,406
Yankalilla	4,499	2,094
Southern & Hills	78,942	32,624
Total in Regional council areas	412,899	169,194
Anangu Pitjantjatjara	2,692	632
Maralinga Tjarutja	75	29
Unincorporated SA	4,538	2,150
Total other	7,305	2,811

Source: ABS (2014)

5.2 Kerbside Waste Services – Bin systems and Collection Frequency

Table 16 Metropolitan Councils: Kerbside Collection Services to Residential Properties, 2012-13

Council	Residual	Organics	Recyclables
Adelaide City	W	F	F / W
Adelaide Hills	W	F	F
Burnside	W	F	F
Campbelltown	W	F	F
Charles Sturt	W	F	F
Gawler	W	F (o)	F
Holdfast Bay	W	F	F
Marion	W	F	F
Mitcham	W	F	F
Norwood, Payneham and St Peters	W	F	F
Onkaparinga	W	M	F
Playford	W	F (o)	F
Port Adelaide Enfield	W	F	F
Prospect	W	F	F
Salisbury	W	F (o)	F
Tea Tree Gully	W	F	F
Unley	W	F	F
Walkerville	W	F	F
West Torrens	W	F	F

Service frequency: W=weekly, F=fortnightly, M=monthly (every 4 weeks), o=opt-in

Sources: SALGGC (2014) and ZWSA (2014)

Table 17 Metropolitan Councils – Bin Systems in 2012-13 and 2003-04

Metropolitan Council	2012-13	2003-04
Adelaide	3	3
Adelaide Hills	3	2
Burnside	3	3
Campbelltown	3	2
Charles Sturt	3	3
Gawler	3	3
Holdfast Bay	3	3
Marion	3	3
Mitcham	3	2
Norwood Payneham and St Peters	3	3
Onkaparinga	3	3
Playford	2	3
Port Adelaide Enfield	3	3
Prospect	3	3
Salisbury	3	3
Tea Tree Gully	3	3
Unley	3	3
Walkerville	3	2
West Torrens	3	3

Sources: SALGGC (2014) and SA EPA (2002)

Table 18 Regional Councils – Kerbside Services to Residential Properties, 2012-13

Council	Residual	Organics	Recyclables
Alexandrina [†]	W	M	M
Barossa	W	-	F
Barunga West	W	M	M
Berri Barmera [†]	W	F	F
Ceduna	W	drop	-
Clare and Gilbert Valleys [†]	W	-	F
Cleve District [†]	W	drop	F
Cooper Pedy	W	-	drop
Coorong	W	F	F
Copper Coast [†]	W	drop	F
Elliston	W	-	F
Flinders Ranges	W	drop	F
Franklin Harbour [†]	W	drop	M
Goyder [†]	W	drop	F
Grant	F	drop	F
Kangaroo Island	W	drop	M
Karoonda East Murray	W	at call	W
Kimba [†]	W	drop	F
Kingston	W	drop	F
Light Regional	W	F	F
Lower Eyre Peninsula	W	drop	drop
Loxton Waikerie [†]	W	F	F
Mallala	F	F	F
Mid Murray [†]	W	-	F
Mount Barker [†]	W	F	F
Mount Gambier	W	F	F
Mount Remarkable	W	drop	F
Murray Bridge	W	F	F
Naracoorte Lucindale	W	F	F
Northern Areas [†]	W	drop	F
Orroroo Carrieton [†]	W	drop	F
Peterborough	W	drop	F
Port Augusta	W	F	F
Port Lincoln	W	drop	F
Port Pirie ^{†*}	W	drop	drop
Renmark Paringa [†]	W	F	F
Robe	W	drop	F
Roxby Downs	W	M	F
Southern Mallee	W	drop	M

Streaky Bay	W	drop	drop
Tatiara	W	drop	F
Tumby Bay	W	-	-
Victor Harbor†	W	M	M
Wakefield	W	drop	F
Wattle Range	W	F	F
Whyalla	W	F	F
Wudinna	W	drop	F
Yankalilla	W	drop	M
Yorke Peninsula	W	M	F

Service frequency: W=weekly, F=fortnightly, M=monthly, drop=drop of only to transfer station/depot/landfill, at call, - = no service listed

†Highlighted councils have since used grant monies to expand the range of services to residents

* Port Pirie Council introduced a 3-bin system in April 2013.

Source: SALGGC (2014)

Table 19 Regional Councils - Bin Systems in 2012-13 and 2003-04

Regional Council	2012-13	2003-04
Alexandrina	3	1
Barossa	2	3
Barunga West	3	1
Berri Barmera	3	1
Ceduna	1	1
Clare and Gilbert Valleys	2	2
Cleve	2	1
Cooper Pedy	1	1
Coorong	3	2
Copper Coast	2	2
Elliston	2	1
Flinders Ranges	2	1
Franklin Harbour	2	1
Goyder	2	1
Grant	2	1
Kangaroo Island	2	1
Karoonda East Murray	2 (bin + crate)	2
Kimba	2	1
Kingston	2	1
Light Regional	3	2
Lower Eyre Peninsula	1	1
Loxton Waikerie	3	1
Mallala	3	2
Mid Murray	2	1

Mount Barker	3	2
Mount Gambier	3	2
Mount Remarkable	2	0
Murray Bridge	3	1
Naracoorte Lucindale	3	2
Northern Areas	2	1
Orroroo Carrieton	2	1
Peterborough	2	2
Port Augusta	3	2
Port Lincoln	2	2
Port Pirie	1 [†]	1
Renmark Paringa	3	1
Robe	2	1
Roxby Downs	3	1
Southern Mallee	2	1
Streaky Bay	1	1
Tatiara	2	2
Tumby Bay	1	1
Victor Harbor	3	1
Wakefield	2	1
Wattle Range	3	1
Whyalla	3	2
Wudinna	2	1
Yankalilla	2	1
Yorke Peninsula	3	1

Sources: SALGGC (2014) SA EPA (2002)

[†] Port Pirie Council introduced a 3-bin system in April 2013.

6 Glossary⁷

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.

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.

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 (MSW)

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.

For the purpose of this report, MSW is waste collected by municipal kerbside bin collection services specifically residual waste (garbage), recycling and green organics, and excludes hard waste quantities, street sweepings, waste collected at drop off facilities, and commercial services.

Recyclables

Household recyclables (comingled) collected from kerbside mainly comprises of mixed paper, newspaper, magazines, cardboards, plastic films and bottles, steel and aluminium cans, and glass containers (bottles).

Recovered material

Material that would have otherwise been disposed of as waste, but has instead been collected and reclaimed as a material input, in lieu of a new primary material, for a recycling or manufacturing process.

Recovery rate (or diversion rate)

The resource recovery rate is calculated by dividing the tonnes of recyclables and green organics recycled, by the tonnes of recyclables, green organics and garbage collected from the kerbside.

Source separation of materials

Sorting different waste materials (e.g. cardboard, metals, paper, organic material) where the waste is generated, to facilitate reuse, recycling or processing which reduces contamination.

⁷ Glossary definitions sourced from:

1. Rawtec (2014), *South Australia's Recycling Activity Survey 2012-13 Financial Year Report* available from: <http://www.zerowaste.sa.gov.au/resource-centre/publications>
2. Sustainability Victoria (2013), *Victorian Local Government Annual Survey* available from: <http://www.sustainability.vic.gov.au/publications-and-research/research/council-waste-and-recycling-data>
3. NSW EPA (2013), *NSW Local Government Waste and Resource Recovery Data Report 2011-12 as reported by councils* available from: <http://www.epa.nsw.gov.au/warr/datareport.htm>
4. ZWSA (Zero Waste SA 2011), *South Australia's Waste Strategy 2011-2015*, available from: <http://www.zerowaste.sa.gov.au/resource-centre/publications>

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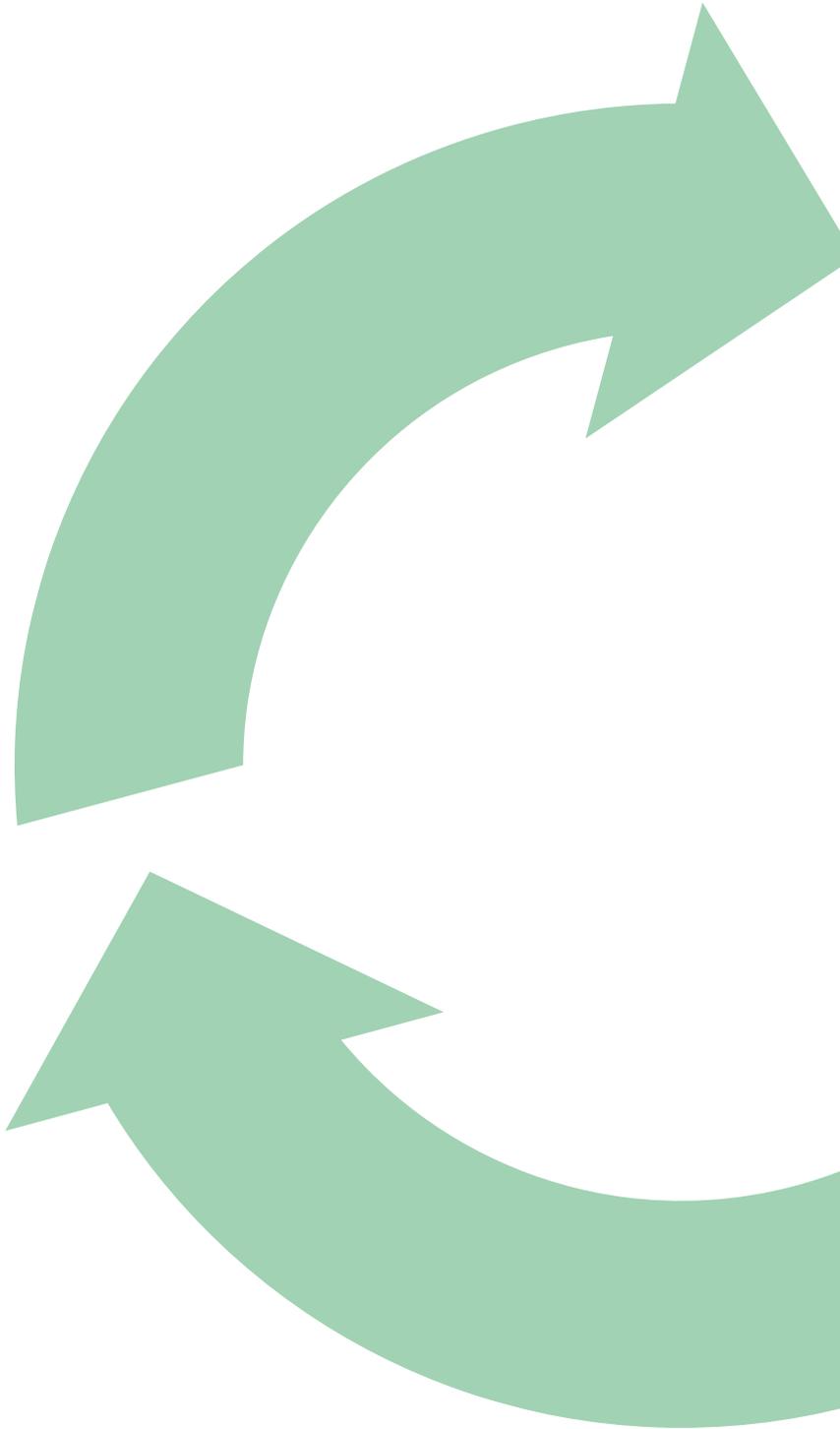
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SA EPA (Environment Protection Regulations 2009), (clause 75), http://www.legislation.sa.gov.au/LZ/C/R/ENVIRONMENT_PROTECTION_REGULATIONS_2009/CURRENT/2009.227.UN.PDF

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Contact Us

Level 8, 99 Gawler Place
ADELAIDE SA 5000

Telephone (08) 8204 2051
Facsimile (08) 8204 1911

zerowaste@zerowaste.sa.gov.au
www.zerowaste.sa.gov.au



Government of South Australia
Zero Waste SA