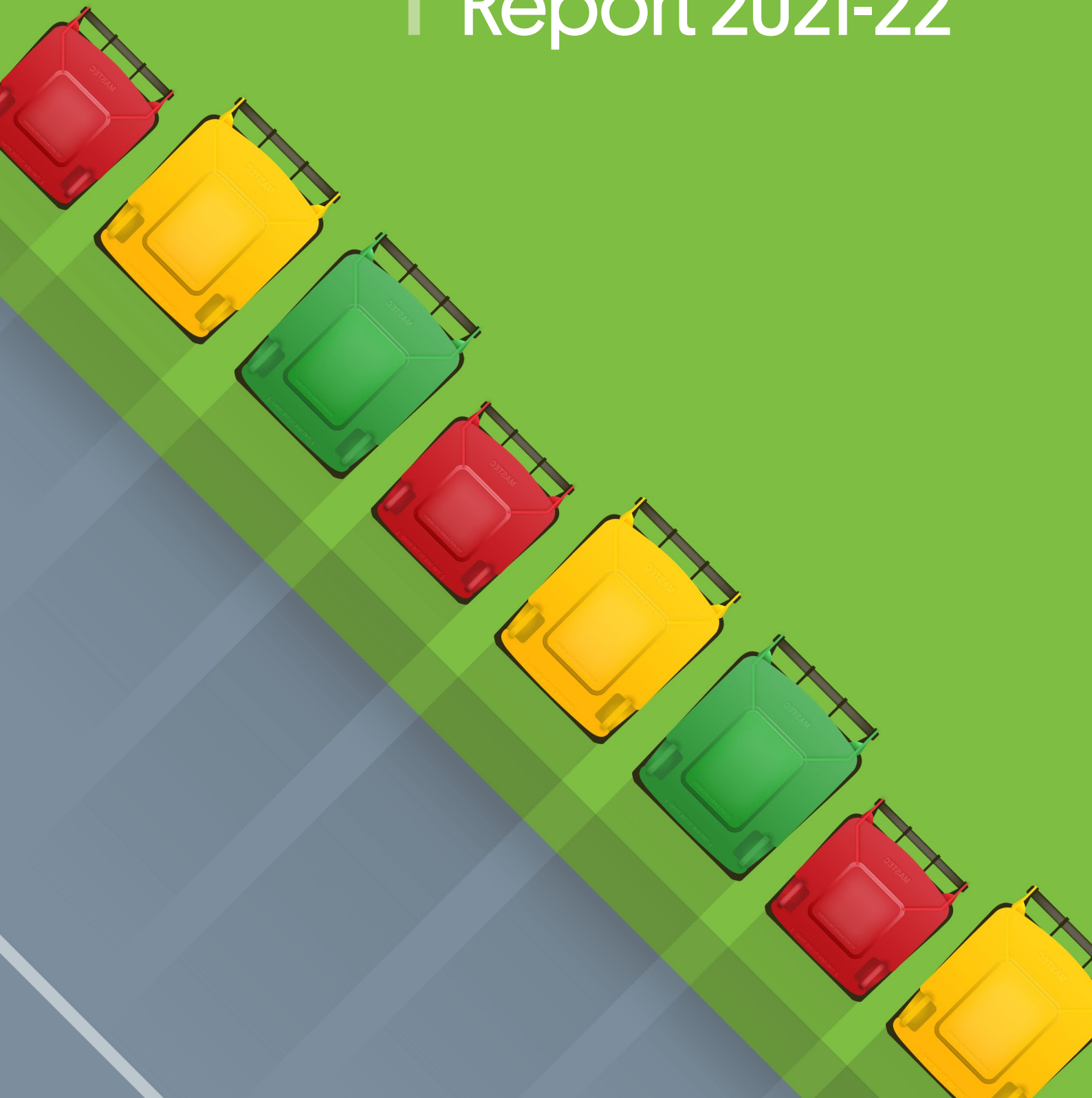
Government of South Australia

Green Industries SA

# Metropolitan Adelaide's Kerbside Waste Performance Report 2021-22



## Acknowledgements

The information in this report is entirely dependent on the accuracy of the data provided by Adelaide metropolitan councils, and the contractors collecting kerbside waste. Green Industries SA acknowledges their assistance.


Government of South Australia

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# Executive Summary

This report presents data on kerbside waste and recycling collection services in South Australia provided by the 19 metropolitan Adelaide councils in the 2021-22 financial year. It analyses performance and improvements in council waste management efficiency and sustainability over the past 18 years.

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

All 19 metropolitan Adelaide councils offer a three-bin service that has been gradually introduced from about 2001, although some only provide an organics (green and/or food) bin on an opt-in basis. There are also some differences between councils in terms of bin ownership, full versus optional adoption, and collection frequency.

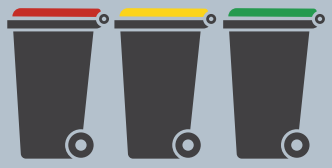
Green Industries SA is committed to working with Local Government councils to improve waste and recycling management to achieve the targets set in the *South Australia's Waste Strategy 2020-25*.

Reporting is based on the gross waste quantities reported in councils' kerbside performance data and provided without further alteration. This data therefore depicts quantities that are inclusive of contamination. The complete data enables the examination and analysis of householder behaviours and bin usage, trends and patterns and the relationship and dependency on geography and socioeconomic factors.

# Performance

## In 2021-22 in metropolitan Adelaide:

**94%** of households have a 3-bin system



**527,400** tonnes of MSW was collected from kerbside

### This equates to about:

**418** kilograms per person

OR

**1,019** kilograms per serviced household

### Of the total MSW collected, metropolitan Adelaide recovered:

**168,900** tonnes of organics

**102,600** tonnes of recyclables

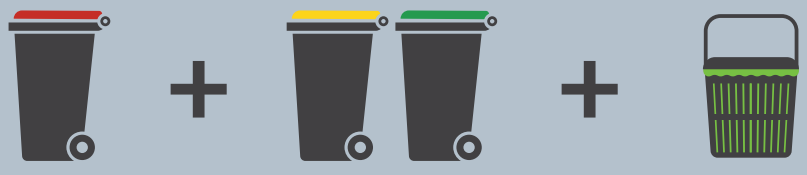
### This represents a total recovery rate of

# 51.5%

The recovery rate is below the *South Australia's Waste Strategy 2020-2025* (GISA 2020) household bin systems target of 70% waste diversion by 2025, making it clear that there is still work to be done.

For the first time, nearly **80%** of metropolitan Adelaide councils achieve 3-bin recovery rates greater than 50%.

The top performing councils, some achieving nearly 60% recovery rate, were those that provide:



**Weekly collection** + **Fortnightly collection** + **Food waste system**

# 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. More recent council trial evidence that arose during the compilation of this report has shown that, as a best practice kerbside service provision, weekly collection of organics could lead to significantly increased recovery rates approaching 70%[1].

   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 has aided 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.

   Inconsistent messaging where advice and language could vary from council to council was leading to confusion on the easiest way to comply with proper recycling practice. Simplifying and standardising messaging is essential to improve awareness and knowledge to entrench the culture of waste minimisation. Normalising the behaviour of recycling and improving the awareness takes time and requires constant reinforcement of the key messages. Costs on communication and education are also reduced in the longer term by providing the same message in the same format and the same brand 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' behavior.

   *South Australia's Waste Strategy 2020-2025* recognises the importance to set up consistent systems and technology for MSW and one of the priority actions identified is to ensure that kerbside bins are compliant with the relevant Australian standard on mobile waste containers.

1 See SA Better Practice Guide: Sustainable Kerbside Service, available at https://www.greenindustries.sa.gov.au/resources/sa-better-practice-guide-sustainable-kerbside-services

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# 1 Introduction

## 1.1 Purpose

Information on waste streams is needed to help monitor progress towards the municipal waste targets set in *South Australia's Waste Strategy 2020-25* (GISA 2020) and to inform decision making, particularly in relation to 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 councils in the 2021-22 financial year and analyses performance and improvements in waste disposal efficiency and sustainability. It also reports on trends over an 18-year period.

The focus is only on waste collected at kerbside in bins provided specifically for residual waste (landfill), co-mingled recyclables and green and/or food 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 *Circular Economy Resource Recovery Report 2021-22 (CERRR)*, 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 recycling rate. In 2021-22, 81.9% of all waste was diverted from landfill for recycling and other purposes (Blue Environment 2023).

Residential residual waste accounts for 44% of the total solid waste that goes to landfill. The remainder is commercial and industrial waste (18%) and construction and demolition waste (39%).

## 1.2 Background

The environmental benefits of a three-bin waste collection system are well established and the 19 metropolitan Adelaide councils have offered this service for a number of years. Differences do exist between councils even where the same number of bins are provided, due to different collection frequency and service provision for green and food organics, use of kitchen caddies, and area wide rollout versus opt-in.

Most councils provide a 140L bin for residual waste and 240L bins for comingled recyclables and organics respectively. In 2021-22, all metropolitan Adelaide councils collected residual waste bins weekly and recyclables fortnightly, but organics collections varied: all were fortnightly, but some were still opt-in or required to be purchased by residents.

The average diversion rate at kerbside by householders from the three-bin system across the 19 metropolitan councils was 51.5% in 2021-22. The effective diversion rate, allowing for misplaced material in the organics and recyclables bins, was 47.5%. The top performing councils – some achieving nearly 60% – were those that provide a weekly residual waste collection, fortnightly recyclables collection and fortnightly organics collection including food waste.

Councils often contract collection services to external contractors, many of which are private companies. The contractors collect the residual bins which are transported to landfill transfer stations, mixed-recycling bins which are taken to Material Recovery Facilities (MRFs) for sorting and processing and green organics bins to composting facilities. The quantities are weighed at weighbridges at each location and individual councils are charged a service fee.

## 1.3 Context

Since 2005 Green Industries SA has funded metropolitan and regional 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 2022, $37.3 million had been provided to 67 councils and 12 of their subsidiaries through a range of GISA grants programs such as: *Circular Economy Market Development; E-Waste Collections and Incentives; Illegal Dumping Prevention; Kerbside Performance Incentives;* the *Kerbside Performance Plus (Food Organics) Incentives* which focuses on food diversion from residual to organics bins; *Kerbside Recycling Campaign; Plastic Bags Reduction; Recycle Right Household Education; Regional Transport Subsidies Program; Regional Infrastructure/Implementation; Business Sustainability Program and Reuse;* and *Recycling/Metropolitan Infrastructure* (**Table 1**).

**Table 1.** Grants provided to councils through GISA

| | Number of councils | Funding amount ($ millions) |
|---|---|---|
| Adelaide Metropolitan | 19 | 26.1 |
| South Australia | 67 | 37.3 |

All 19 metropolitan Adelaide councils provide their kerbside waste data directly to GISA for the purpose of this report.

# 2 Findings

## 2.1 Metropolitan Kerbside Waste and Recycling Services

In 2021-22, all 19 metropolitan Adelaide councils offered access to the three-bin system (up from 15 in 2003-04). Playford, Salisbury and Gawler collectively have reached 77% of their households and Adelaide Hills Council covered about two-thirds of households (mostly in townships) for organics service.

It is estimated that about 94% of metropolitan households now have three bins in use, a figure which has risen as Northern sub-region councils have committed to achieving a full three-bin rollout.

All metropolitan Adelaide councils in 2021-22 offered a weekly residual service, fortnightly recyclable collections and fortnightly organics collections.

All used yellow lids for recycling bins and most used green (lime or dark green) for organics bins, but only 12 councils (covering 63% of households) used red lids for residual waste, as set out in Australian standard AS 4123.7 (see **Table 2**). The other seven use blue lids which, according to the standard, are for cardboard and paper only.

Using AS 4123.7 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).

**Table 2.** Some kerbside bin colours as recommended in AS 4123.7

| Type of materials | Body | Lid |
|---|---|---|
| Garbage/General waste | Dark Green or Black | Red |
| Green Waste/Organics | Dark Green or Black | Lime Green |
| Recyclables | Dark Green or Black | Yellow |
| Paper/cardboard | Dark Green or Black | Blue |

# 2.2 Metropolitan Adelaide Kerbside Quantities

In 2021-22 in the metropolitan area, 527,400 tonnes of materials were presented at kerbside (a 1.0% increase over 2020-21), 51.5% of which was recovered as recyclables or organics (**Figure 1**). This was driven by a 4.2% increase in organics due to improvements in organics collections by some councils and a slight increase in annual rainfall giving rise to more organic waste collected. The issue of incorrectly presented material is discussed in **section 2.4**.

Approximately 418 kg of kerbside waste was collected per person, or 1,019 kg per household serviced.

**Figure 1.** Summary of Adelaide Metropolitan kerbside bins performance

| | Residual | Organics | Recyclables | Total Materials | Recovery Rate |
|---|---|---|---|---|---|
| **2021-22 quantity** (tonne) and change since 2020-21 | 255,900 ▼ 0.6% | 168,900 ▲ 4.2% | 102,600 ▲ 0.2% | 527,400 ▲ 1% | 51.5% ▲ 0.9% |
| **Per capita** (kg/pp/yr) | 203 | 134 | 81 | 418 | |
| **Per household** (kg/hh/yr) | 495 | 326 | 198 | 1,019 | |

Expected seasonal fluctuations can be seen in the monthly collection trends (**Figure 2**). Rainfall was slightly higher in 2021-22 over 2020-21 (see rainfall figures in **Table 4**). Therefore three bin recovery rates increased compared to the previous years as a result of this rainfall and further rollouts of a fortnightly organics bin service which were deployed to segregate and collect these organics.

Fluctuations in the three-bin recovery rate over 2021-22 are shown in **Figure 3**. The spike in March is the combined effect of a drop in the presentation of residual waste and an increase in organics presented.

**Figure 2.** Metropolitan Adelaide Monthly three-bin Kerbside Quantities, 2021-22

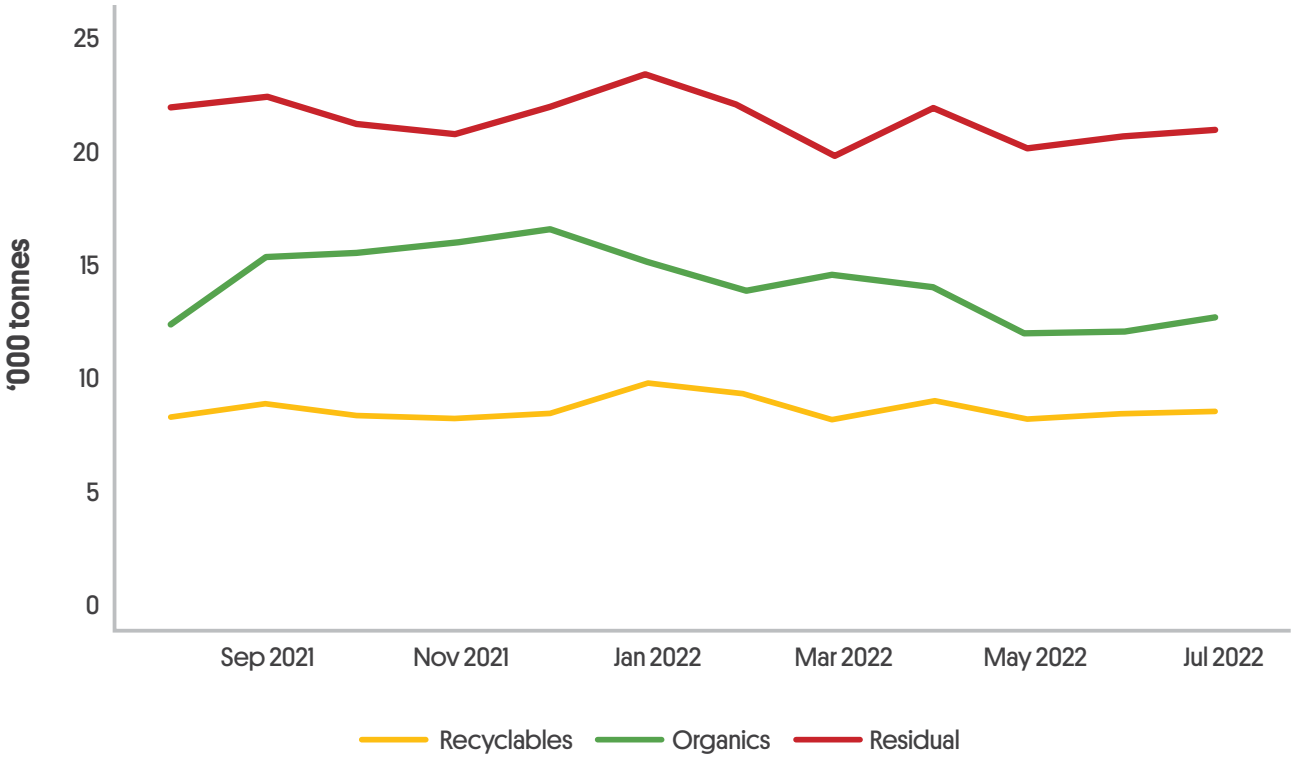
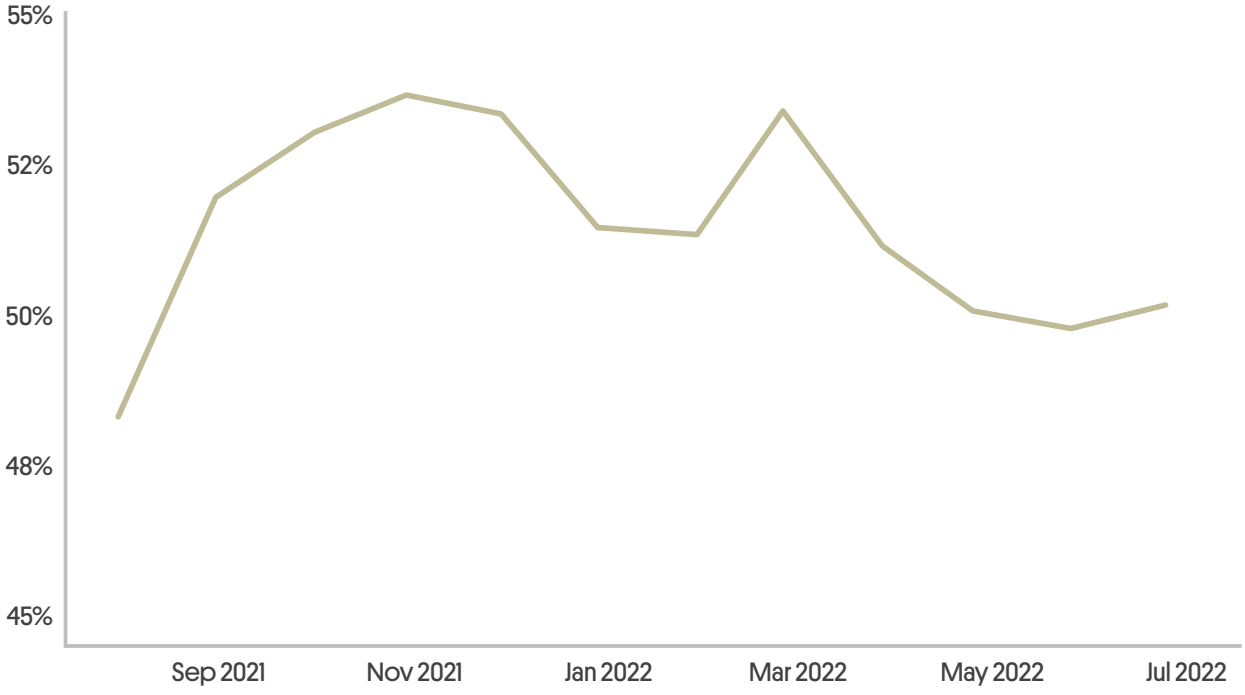



**Figure 3.** Metropolitan Adelaide Average three-bin Recovery Rate by Month, 2021-22



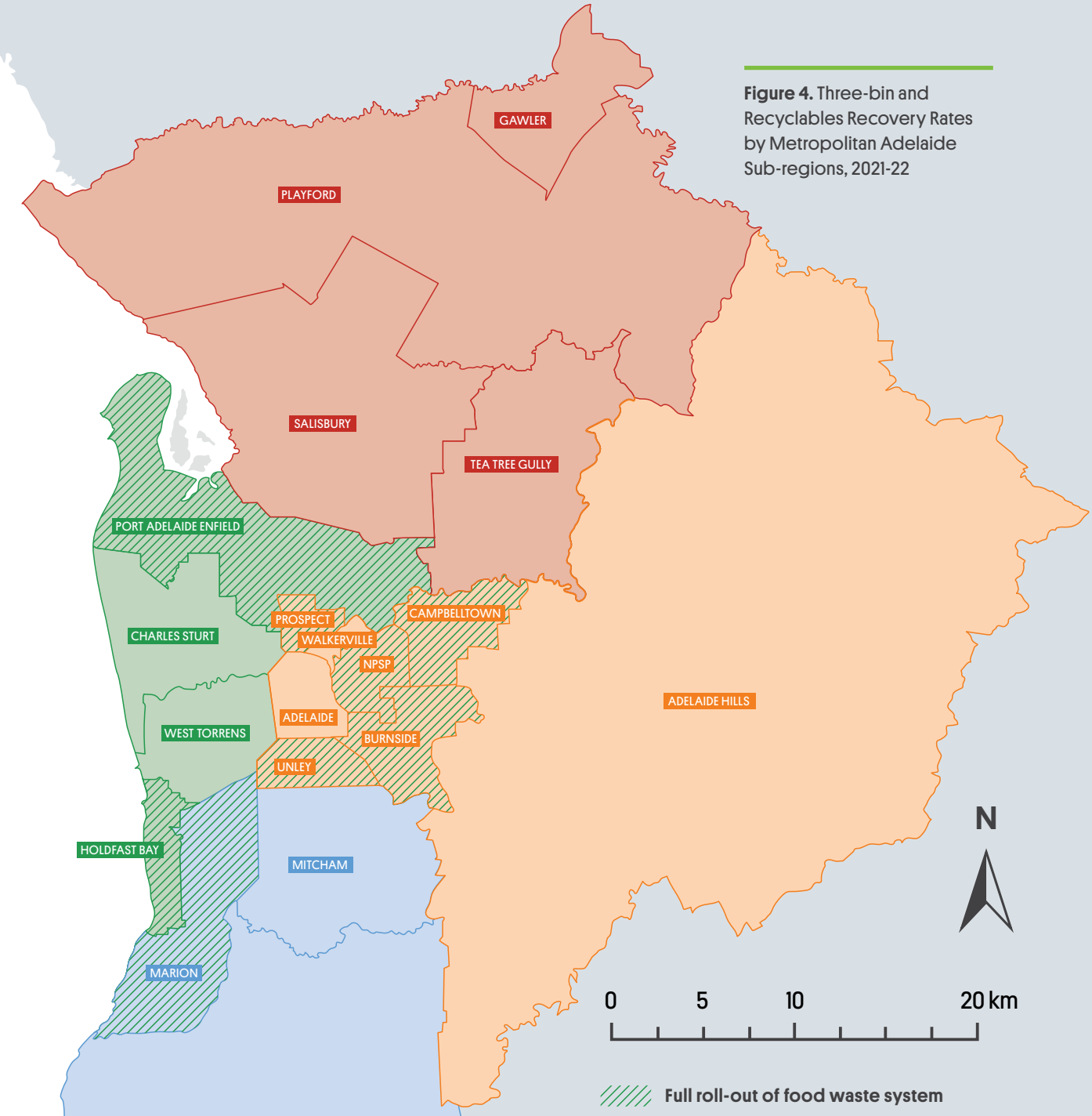



**Figure 4.** Three-bin and Recyclables Recovery Rates by Metropolitan Adelaide Sub-regions, 2021-22

## 3-bin and recyclables recovery rates by council sub-regions

| | 3-Bin coverage | 2021-22 3-Bin | 2021-22 Recyclables | 2020-21 3-Bin | 2020-21 Recyclables |
|---|---|---|---|---|---|
| Central Eastern | 91% | 54.1 | 31.8 | 54.6 | 32.5 |
| Northern | 77% | 47.1 | 26.1 | 45.7 | 25.8 |
| Southern | 100% | 53.4 | 28.6 | 52.0 | 28.2 |
| Western | 100% | 52.0 | 29.1 | 51.3 | 28.5 |

# 2.3 Metropolitan Adelaide Recovery Rate Performance

**Table 3** shows the three different recovery rates for each of the 19 metropolitan councils with the previous year's figures as a contrast. A description of the organics and food waste diversion service they offer residents is also provided. The councils are ranked from highest performer to lowest by the 3-bin recovery rates, but colour coding also provides relative ranking for their recyclables and organics recovery rates. This shows some of the compounding issues that make up the 3-bin recovery rates. For example, the lowest ranked council does not have as much residential garden area and cannot collect organics quantities at levels equivalent to other councils. However, their recyclables recovery rate is close to the Metropolitan Adelaide median value. This is further investigated in **Figure 9**.

For the first time, nearly 80% of these councils have three-bin recovery rates greater than 50%. The best performing councils have full organics bin coverage, supplemented with a food caddy and are located in an area with a high greenness index. Additionally, trials have shown that weekly organics collection has raised the 3-bin recovery rates.

**Figure 5** provides the 3-bin recovery rates from the 19 Metropolitan Adelaide councils over a number of years. Although expressed as a 3-bin rate, in a decreasing number of councils householders may have had a two-bin only at kerbside as some systems were opt-in.

**Figure 5.** Metropolitan Adelaide Kerbside Three-bin Recovery Rates, 2021-22

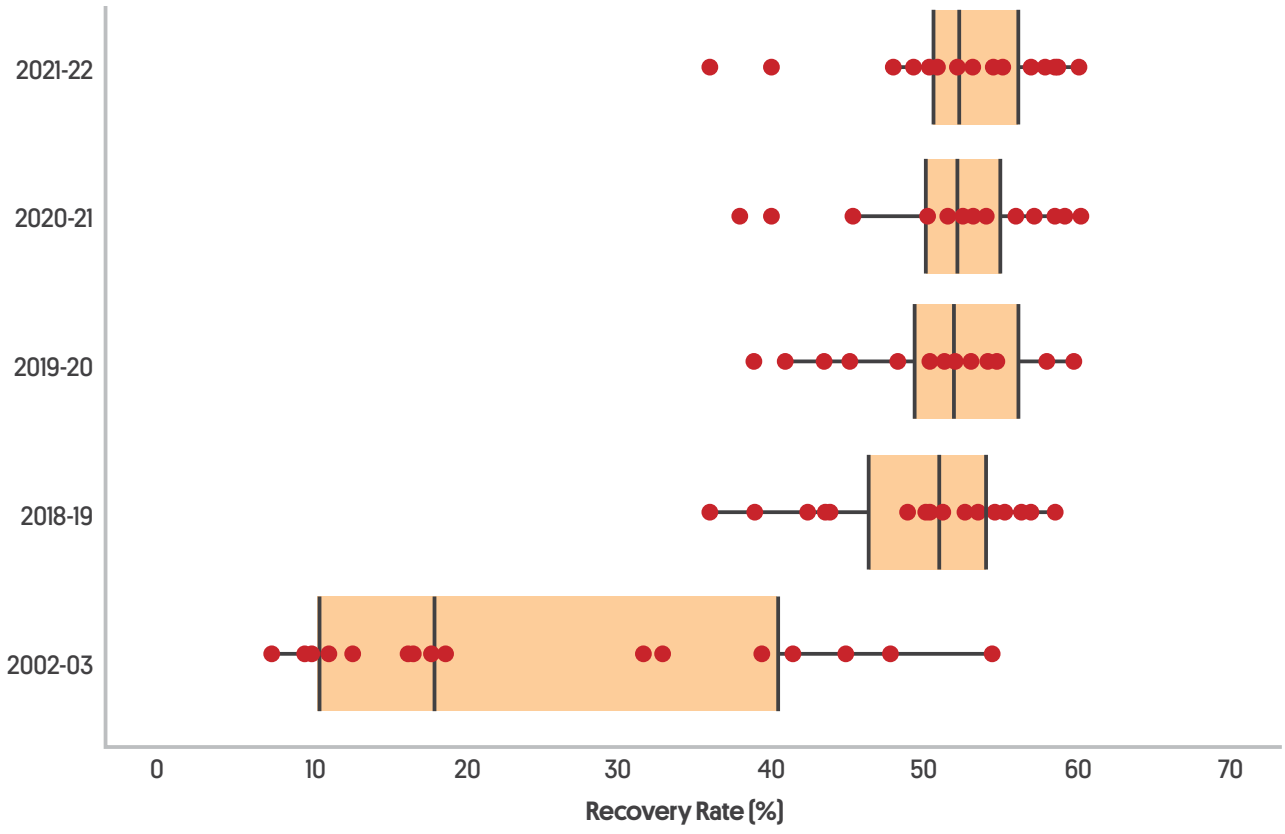


**Table 3.** Recovery Rates Achieved by each Metropolitan Adelaide Council, 2021-22.

| | | 2021-22 | | | 2020-21 | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sub-Regions** | **Change*** | **3-bin RR** | **Rec. RR** | **Org. RR** | **3-bin RR** | **Rec. RR** | **Org. RR** | **Greenness index** | **Food Waste System** |
| Central Eastern | ▲ | 59.9 | 35.5 | 48.5 | 58.4 | 35.2 | 46.3 | 0.171 | Area-wide |
| Central Eastern | ▼ | 58.7 | 34.7 | 47.2 | 60.1 | 35.8 | 48.8 | 0.200 | Area-wide |
| Southern | ▲ | 58.3 | 32.5 | 47.8 | 57.1 | 32.3 | 46.0 | 0.230 | Opt-in |
| Central Eastern | ▼ | 57.7 | 33.5 | 46.3 | 59.1 | 35.4 | 47.3 | 0.176 | Opt-in |
| Western | ▲ | 57.0 | 33.9 | 44.8 | 55.9 | 34.3 | 42.7 | 0.141 | Area-wide |
| Southern | ▲ | 55.0 | 29.7 | 44.5 | 52.1 | 28.4 | 40.9 | 0.163 | Area-wide |
| Central Eastern | ▲ | 54.9 | 30.0 | 44.1 | 53.9 | 29.4 | 42.9 | 0.152 | Area-wide |
| Central Eastern | ▲ | 54.4 | 32.6 | 41.5 | 53.9 | 32.8 | 40.6 | 0.146 | Area-wide |
| Western | ▲ | 53.1 | 29.5 | 41.7 | 51.7 | 28.5 | 40.2 | 0.138 | Opt-in |
| Western | ▲ | 52.3 | 28.3 | 41.2 | 50.4 | 26.7 | 39.5 | 0.148 | Opt-in |
| Central Eastern | ▼ | 52.3 | 31.7 | 38.7 | 53.0 | 33.1 | 38.8 | N/A | Opt-in |
| Northern | ▲ | 52.1 | 29.0 | 40.4 | 51.3 | 28.8 | 39.4 | 0.173 | Opt-in |
| Central Eastern | ▼ | 52.0 | 28.7 | 40.5 | 53.6 | 29.5 | 42.4 | 0.149 | Area-wide |
| Southern | ▲ | 50.8 | 26.7 | 40.1 | 50.0 | 26.7 | 38.8 | 0.178 | Opt-in |
| Northern | ▲ | 50.2 | 27.6 | 38.4 | 45.3 | 24.9 | 33.2 | 0.162 | Opt-in |
| Western | ▼ | 49.3 | 27.7 | 37.0 | 50.0 | 27.7 | 38.1 | 0.136 | Area-wide |
| Northern | ▲ | 47.8 | 25.1 | 36.8 | 45.4 | 24.2 | 33.8 | 0.147 | Opt-in |
| Northern | ◀▶ | 39.8 | 24.4 | 25.3 | 39.9 | 25.4 | 24.5 | 0.143 | Opt-in |
| Central Eastern | ▼ | 36.0 | 27.5 | 15.5 | 37.9 | 29.7 | 15.8 | 0.111 | Opt-in |

* Change of the 3-bin rate over the previous year. Larger arrows indicate changes greater than 1%.

In 2021-22, 12 out of the 19 councils managed to increase their 3-bin recovery rates.

# 2.4 Bin Presentation and Effective Recovery Rate Performance

Not all the material presented at kerbside was placed in the correct bin by householders. Sometimes this material is incorrectly perceived as "contamination" but it represents a lost opportunity. In addition to lowering the effective recovery rate, incorrectly placed material interferes with sorting at materials recovery facilities (MRFs) and commercial composting facilities. Apart from wasting resources that may otherwise be recycled, this also devalues its worth in potential markets. The analysis of the contents of the bins was detailed in Appendix 1 of *South Australia's Kerbside Waste Performance Report 2018-19* [GISA 2021]. The 2018-19 kerbside report identified that 2% of material in the organics bin on average cannot be recovered. Similarly, the recyclables bin on average has about 17% non-recyclable material. 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. An effective Metropolitan Adelaide diversion rate can be calculated and is presented in **Figure 6** below.

**Figure 6.** Comparing presentation and effective recovery rates at kerbside.

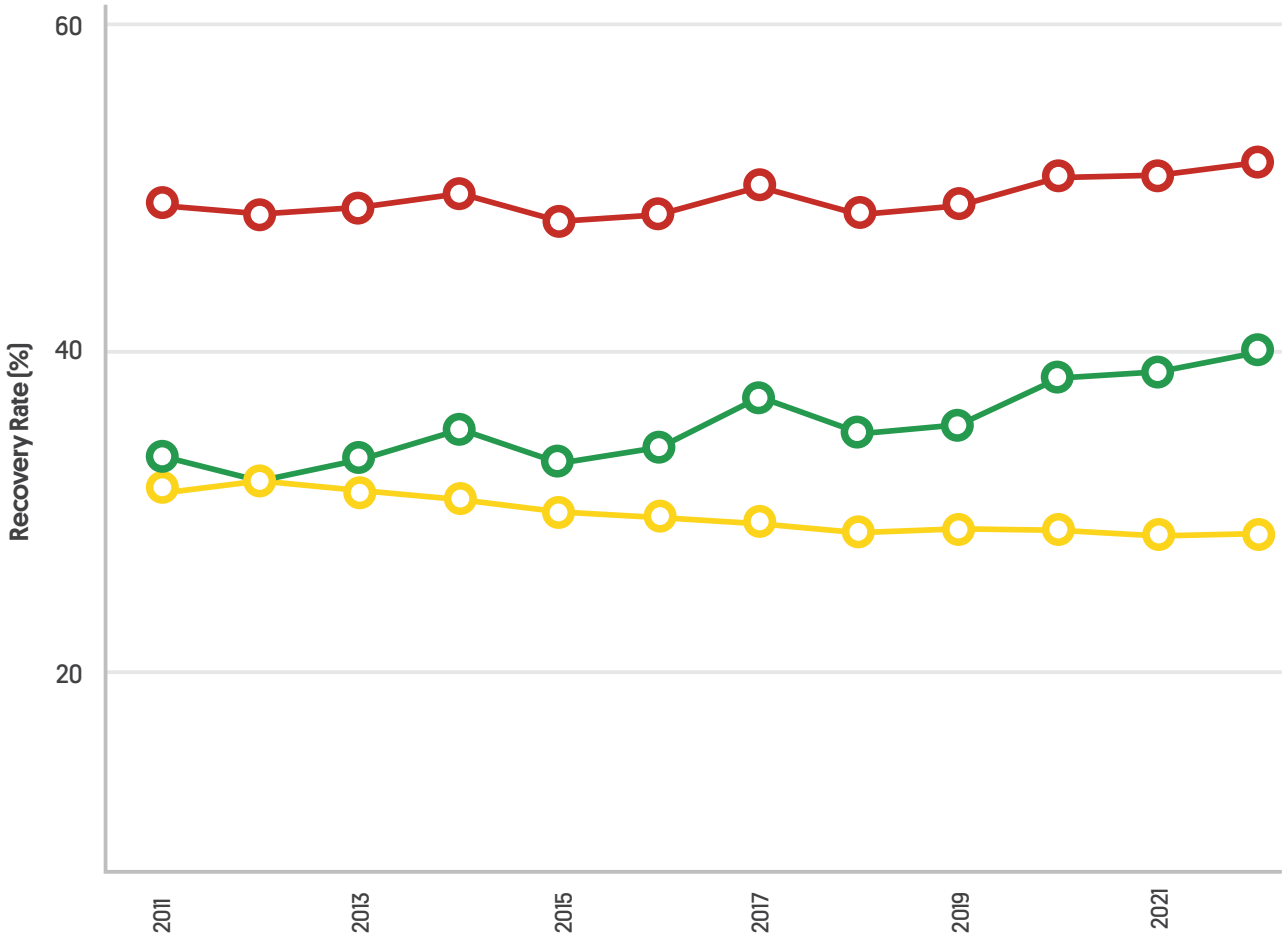
| | Residual | Organics | Recyclables | Total Materials | Recovery Rate |
|---|---|---|---|---|---|
| Presented (tonne) | 256,000 | 169,000 | 103,000 | 527,000 | 51.5% |
| Effective (tonne) | 277,000 | 165,000 | 89,300 | 527,000 | 47.5% |

Several kerbside waste audits were undertaken by both metropolitan and regional councils in recent years to determine the behaviour of residents in using the waste bins. The audits of metropolitan Adelaide kerbside bins have shown that the residual bin can contain from 35-60% organics (much of which is food organics), as well as around 12-14% recyclables. These materials should have been placed in the organics and recyclables bins respectively. Significant improvements in the recovery rate would be achieved if food waste was placed in the green organics bin. This shows that just considering food organics, conservatively, at least 100,000 tonnes of food material is available to be diverted from residual bins presented at metropolitan Adelaide kerbside.

# 2.5 Long Term Trends

The long-term recovery trends by bin type for metropolitan Adelaide is represented graphically in **Figure 7**. The three-bin recovery rate has improved 0.9% over the previous year for the metropolitan Adelaide area compared with 2.5% improvement against 2010-11 performance. Fluctuations in metropolitan Adelaide's rate tend to be due largely to weather factors and garden organics produced but improvements in garden and food organics collection systems are increasing recovery rates.

**Figure 7.** Comparison of three-bin recovery rates for Metro Adelaide from 2010-11 to 2021-22



# 3 Factors Affecting Recovery Rates

## 3.1 Food Waste Collection Systems

**Table 3** indicates where food caddy systems have been deployed and how effective these have been for the metropolitan Adelaide 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 council-wide rollout of food waste diversion systems and increased frequency of collection, including to multi-unit dwellings, across Adelaide will 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.

## 3.2 Garden vegetation

High levels of garden organics tend to boost overall recovery rates (**Table 3**). 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 recovery figures.

Adelaide's rainfall was higher in 2021-22 relative to previous years (**Table 4**), contributing to a 4.2% increase in organics collected compared with 2020-21.

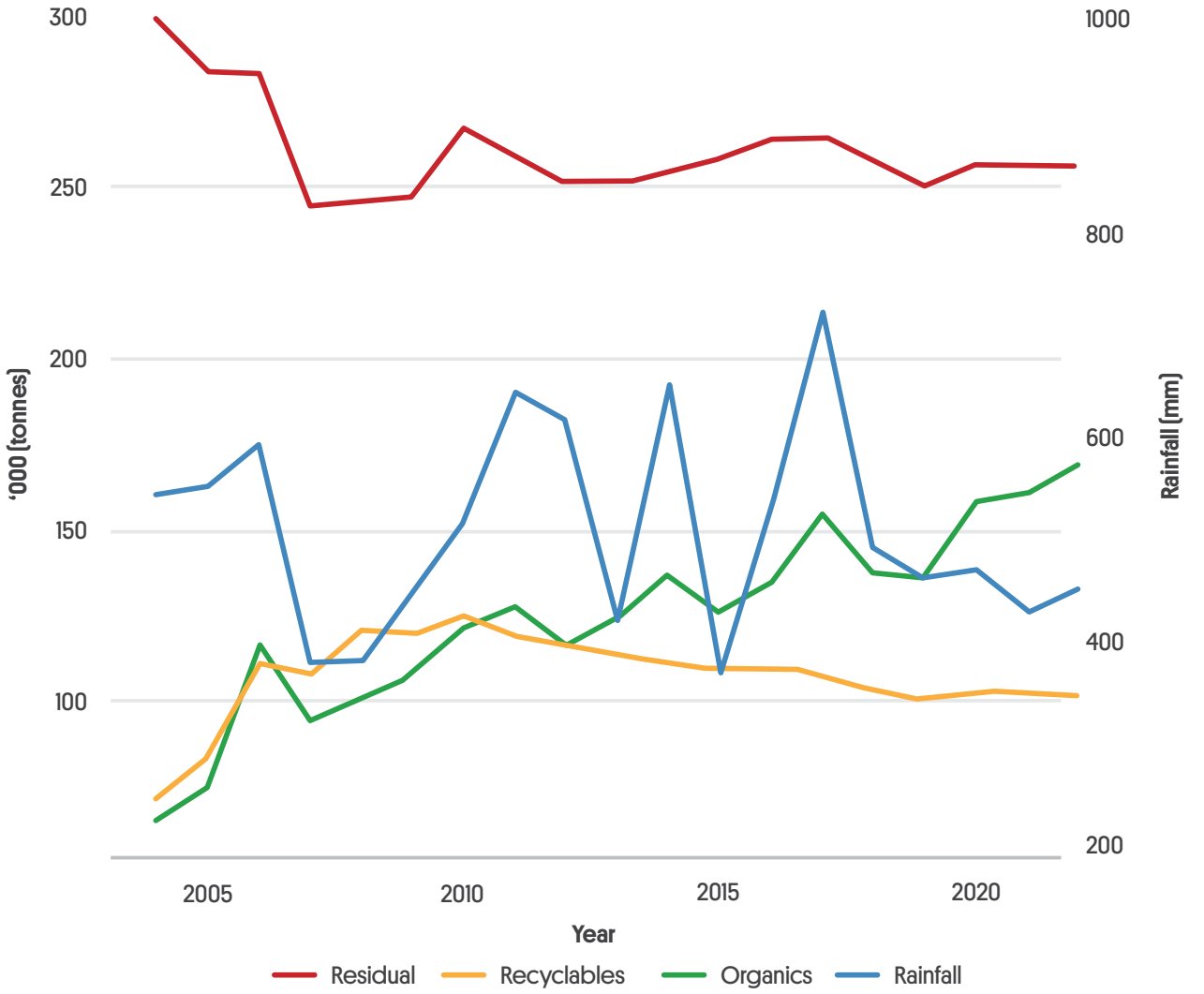
**Table 4.** Total Rainfall (mm) Recorded at Kent Town/ West Terrace for Financial Years (periods ending June 30)

| Year | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|
| Rainfall (mm) | 413 | 647 | 377 | 523 | 716 | 487 | 456 | 451* | 425 | 446 |

**From 2019-20 rainfall measurements were made at West Terrace as the Bureau of Meteorology had closed Kent Town station.*

**Figure 8** shows annual rainfall and total of each of bins collected at kerbside for the years 2003-04 to 2021-22. Volumes of organics collected drop in dry years, although this is offset by watering of gardens and rainfall patterns across the year.

**Figure 8.** Trends of kerbside waste tonnages by bin for Metro Adelaide from 2003-04 to 2021-22

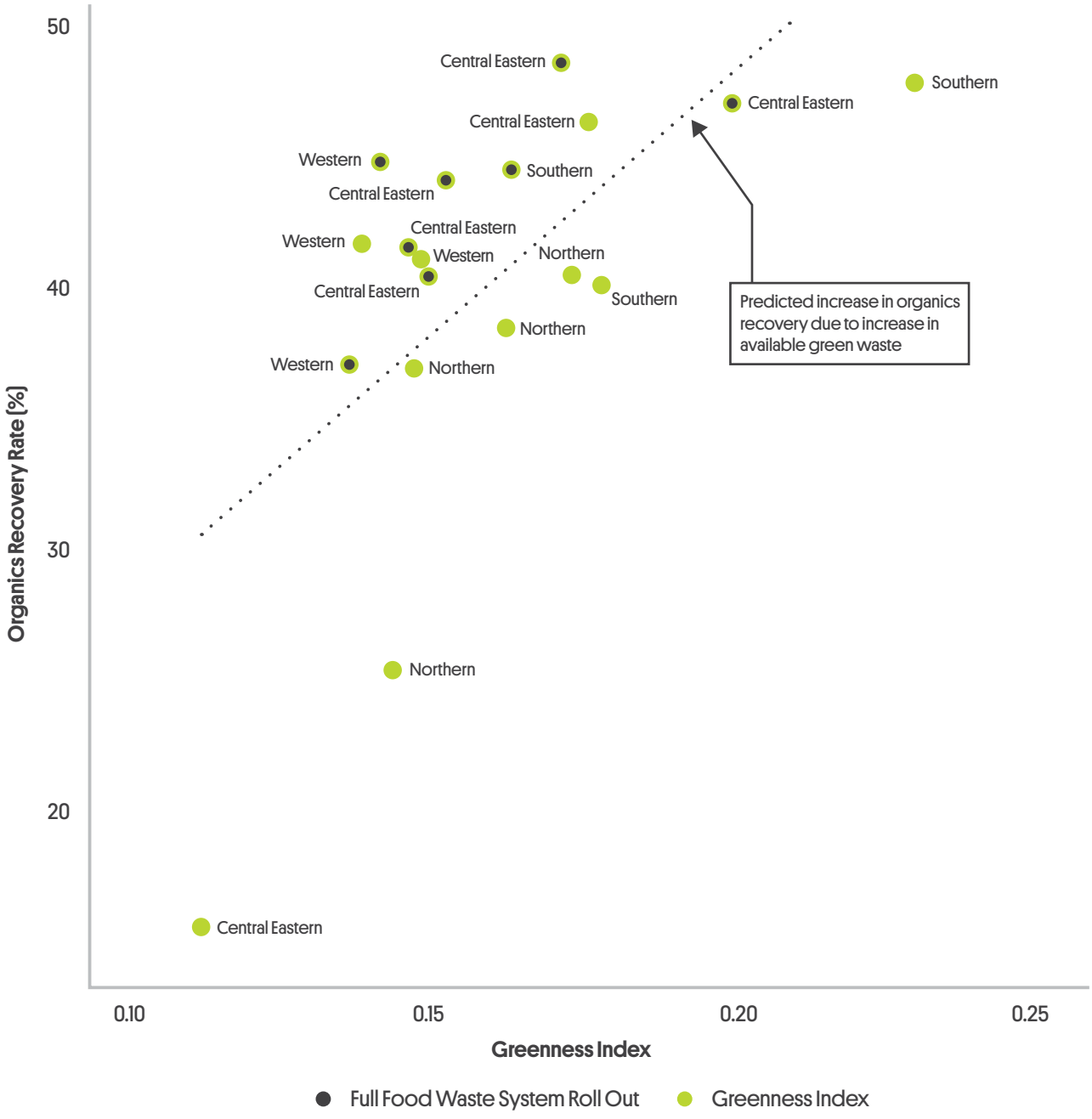



The organics recovery rate was plotted against the greenness index for each metropolitan Adelaide council (except Adelaide Hills) (**Figure 9**) to illustrate that the recovery rate is linked to levels of organic waste presented at kerbside, i.e., councils who can produce more green waste have more waste to recycle and could achieve better recovery rates. Conversely, councils with a residential area served by higher numbers of multi-unit dwellings and very little garden area per dwelling will score lower on a greenness index and are likely to score lower for recovery rates.

Highlighted in [**Figure 9**] are those councils who have a full food waste system deployed to their residents. Most of these councils scored above the trend line regardless of their greenness index which confirms that food waste diversion systems when rolled out across whole council areas do increase the recovery rate of waste at kerbside.

Food waste diversion systems when rolled out across whole council areas do increase the recovery rate of waste at kerbside.

**Figure 9.** Organics recovery rate against the greenness index for each Metropolitan council (except Adelaide Hills)



## 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 reading more information digitally which results in fewer physical copies of newspapers and magazines. Newspaper sales fell 44% between 2005 and mid 2018 [see Wikipedia (2019)].

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 extend in the future by increased amounts of cardboard as the trend towards online shopping increases, in particular during COVID-19 lockdowns.

Waste avoidance can lead to less waste produced which may lower the recovery rates if this results in less recyclables presented at kerbside. To offset this drop, less material must be presented in residual bins and changes to householder behaviour such as food waste 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. With more waste generated there is the possibility of more recyclables generated. 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.

Each council has a mix of residents – from young families to older couples – which affects the profile of waste presented. 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 recovery 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.

There are also many other factors that underlie this situation – such as awareness programs and education levels of households.

# 4 Conclusions

This report examines the effectiveness of the kerbside bin systems in metropolitan Adelaide using the recovery rate as an indicator. The most effective system in use during 2021-22, achieving up to 60% recovery rates, was the three-bin system with weekly residual collection, fortnightly recyclables and organics collection, which was supplemented with a kitchen caddy to further divert food waste.

All metropolitan Adelaide councils have a three-bin system but some are opt-in only for the organics service.

The generation of kerbside waste materials by households 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 recyclables recovery rates have been discussed and the latter attempts to show waste diversion without seasonal effects. Various factors influence the recovery 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, or with materials not recyclable at kerbside
- Less newsprint is being presented at kerbside
- Geography – density of housing and natural rainfall affects opportunities for vegetation growth
- The use of opt-in system for organics collections in some councils has led to performances where recovery rates are seven to 10 percentage points lower than those with full organics bin roll out, but the increasing number of households take-up is enabling these councils to close the gap.
- 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. More frequent organics collection will lift the recovery rates even further.
- 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 management message to residents across the whole SA community reduces confusion and increases good waste management practices and recovery rates.

# Appendix 1

## A1.1 Methodology

This report collates waste and recycling data from GISA and Adelaide Metropolitan councils.

Metropolitan Adelaide councils provide GISA with a monthly breakdown, in tonnes, of residual waste, co-mingled recyclables and organics collected at kerbside. As the waste material streams are weighed on weighbridges, the accuracy of metropolitan Adelaide data is relatively high.

All waste and recycling quantities in this report have been rounded to improve readability and reflect accuracy.

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:

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

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

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

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

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

Demographic data (population and household figures) is based on figures from the Australian Bureau of Statistics (ABS) and is based largely on the census result of 2021. 'Occupied dwellings' is used for serviced-households figures from ABS 2021 Census data.

# A1.2 Greenness Index

Different councils have varying geographical areas, rainfall and home garden areas per household. To help in assessing the effect of relative "greenness" of a council on the rate of recovery due to green waste, a greenness index was calculated for each metropolitan Adelaide council. Spatial analysis applied to imagery of the metropolitan Adelaide area produced Normalised Difference Vegetation Index (NDVI) values ranging from +1.0 to -1.0. Higher NDVI values indicate healthier, or greener, vegetation. Only 18 of the 19 metropolitan Adelaide councils are covered as the aerial survey did not include Adelaide Hills Council.

The survey was carried out in late September 2018 by Aerometrex for the Department for Environment and Water who authorised its use by GISA. The timing of the aerial capture of the imagery is appropriate for the purpose since local conditions ensure that vegetation is at its greenest and it is expected that this accurately reflects the difference between greener and drier areas.

To ensure a focus on residential waste presented at kerbside, only residential areas were selected from the land use dataset (Department for Infrastructure and Transport, 2019). This ensures results only include green waste arising from residential land and exclude parks, street trees, and other vegetation on publicly owned property.

The zonal statistics tool was used to calculate an average greenness value of all the residential properties within a council boundary for each local government area.

Note that deriving a future set of average greenness index values will depend on local conditions at that time, such as immediate past rainfall and the season. Consequently, any such calculations are expected to vary from those generated in this initial work.

# Glossary

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| **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. |
| **East Waste** | East Waste Management Authority is a regional subsidiary of local councils formed under the Local Government Act 1999 to provide effective waste collection services for its member councils: Adelaide Hill Council, City of Burnside, Campbelltown City Council, City of Norwood Payneham & St Peters, City of Mitcham, City of Prospect, City of Unley, and Town of Walkerville. |
| **Food caddy** | A kitchen benchtop food container for the collection of household food waste, to be placed in the organic waste bin. It also accepts AS 4736 / AS 5810 barrier bags and fibre-based materials. |
| **FOGO** | Food Organics Green Organics, a common name used for the green organics bin |
| **Food Organics** | Organic waste derived from food preparation and/or surplus food. It includes compostable items such as paper straws and contaminated pizza boxes. |
| **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 includes waste dropped off at recycling centres, transfer stations and construction waste from owner/ occupier renovations |
| **NAWMA** | Northern Adelaide Waste Management Association is a regional subsidiary of local councils formed under the Local Government Act 1999 to provide waste management and resource recovery services for the City of Salisbury, City of Playford and Town of Gawler. Its clients also include businesses, industry and regional councils. |

# References


Australian Bureau of Statistics [ABS] 2022, 2021 *Census QuickStats Dwelling Count*, https://abs.gov.au/census/find-census-data/quickstats/2021/AUS

Australian Bureau of Statistics [ABS] 2022, 3235.0 *Regional Population by Age and Sex*, Australia, released 28 June 2022, https://www.abs.gov.au/statistics/people/population/regional-population-age-and-sex/latest-release.

APC Environmental Management 2012, *Optimum Compaction Rate for Kerbside Recyclables*, https://www.greenindustries.sa.gov.au/resources/optimum-compaction-rate-for-kerbside-recyclables-[2012].

Department for Infrastructure and Transport [DIT] 2019, *Land Use Generalised data*, https://data.sa.gov.au/data/dataset/land-use-generalised.

GISA [Green Industries SA] 2020, *South Australia's Waste Strategy 2020-25*, https://www.greenindustries.sa.gov.au/resources/sa-waste-strategy-2020-2025.

Green Industries SA [GISA] 2022, *Monthly MSW Quantities (tonnes) 2021-22*, internal data.

Green Industries SA [GISA] 2022, *Regional Transport Subsidies Program*, internal data.

Green Industries SA [GISA] 2022, *Grants Provided to Councils and Their Subsidiaries*, internal data.

Green Industries SA [GISA] 2023, *SA Better Practice Guide: Sustainable Kerbside Service*, https://www.greenindustries.sa.gov.au/resources/sa-better-practice-guide-sustainable-kerbside-services

Northern Adelaide Waste Management Authority [NAWMA] 2022, *NAWMA Annual Report 2021-22*, https://www.nawma.sa.gov.au/about-nawma/corporate-documents.

Metropolitan Waste and Resource Recovery Group [MWRRG] 2017, *Metropolitan Waste and Resource Recovery Group Bin Standardisation Guide*, https://mwrrg.vic.gov.au/assets/resource-files/Bin-Standardisation-Guide.pdf.

SA Environment Protection Authority [SA EPA] 2002, *Consultancy Report: Survey and Audit of Kerbside Waste and Recycling Practices*, internal report.

SA Environment Protection Authority [SA EPA] 2021, CDS Discussion Paper, https://www.epa.sa.gov.au/files/15078_cds_discussion_paper_sep2021.pdf.

SA Environment Protection Authority [SA EPA] 2009, *Environment Protection Regulations 2009*, clause 75, https://www.legislation.sa.gov.au/lz?path=%2FC%2FR%2FEnvironment%20Protection%20Regulations%202009.

Wikipedia 2019, *List of newspapers in Australian by circulation*, https://en.wikipedia.org/wiki/List_of_newspapers_in_Australia_by_circulation.