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Northern Territory EPA

Review of containers regulated under the NT Container Deposit Scheme

February 2014

- IMPORTANT NOTES-

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Executive Summary

This report has reviewed the kinds of beverage containers that the Northern Territory Container Deposit Scheme (NT CDS) has applied to during the first two years of its operation.

This review has found:

- Containers currently regulated by the NT CDS cover up to 90% of beverage container litter observed in the NT litter stream by the KAB Litter Index survey.
- An appreciable drop in NT beverage container litter appeared following introduction of the NT CDS but (due to limited data) it is too early to say whether this change is outside a prior trend in litter reduction that had been occurring.
- Return rates for the NT CDS have increased since its first year of operation. Once the scheme matures, it could achieve return rates of up to 80% and capture between 50 and 60 million containers each year for resource recovery in the NT.
- An additional 15-20 million containers could potentially be captured by expanding the NT CDS to include (all) currently exempt (or non CDS) containers.
    - This could potentially increase diversion of waste from landfill disposal to resource recovery in the NT by up to 3,000 tonnes/yr.
    - It should also contribute to a further reduction in container littering rates.
- If such a change were to be contemplated, we recommend that the following exempt containers are initially considered for addition to the NT CDS.
    - Glass wine & spirit bottles
    - Larger (1L+) juice & flavoured milk containers (cardboard & plastic)
- Adding these two types of containers alone could enable the NT CDS to potentially recover another 6-7 million additional drink containers each year and would represent about 80% by weight (2,000– 2,500 tonnes/yr) of the currently exempt containers sold or consumed in the NT.
- Under the above recommendation, plain milk containers would continue to remain exempt.
- It is also recommended that, if the above changes are considered, wine bladders might also be looked at for addition to the NT CDS.
    - This could provide for a consistent approach to the handling of alcoholic beverages across all container types.
    - However, the suitability of this container type for recycling would need to be carefully evaluated.

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1 Introduction

1.1 Context

The Northern Territory Container Deposit Scheme (CDS) was introduced by *The Environment Protection (Beverage Containers and Plastic Bags) Act 2011* (NT) (the Act). This Act was passed by the NT Legislative Assembly on 24 February 2011, and operation of the CDS commenced on 3 January 2012.

Section 50 of the Act states that:

> *"(1) Within two years of the start of the CDS, the Minister must review the kinds of containers to which the CDS applies";*
>
> and
>
> *"(3) The Minister must table a copy of a report of a review in the Legislative Assembly within 6 sitting days after completing it."*

1.2 Scope

Rawtec was engaged by the Northern Territory Environment Protection Authority (NT EPA) to prepare a report that reviews the kinds of containers to which the CDS has applied during its first two years of operation. It is intended that this report would meet the above-mentioned requirements of Section 50 of the Act; and therefore, it will be tabled by the Minister for this purpose in the NT Legislative Assembly.

The NT EPA requested that Rawtec address the following issues in the report.

- An overview of any proposed changes to the kinds of containers regulated under the South Australian (container deposit legislation or CDL) Scheme;
- Overview the effectiveness of the existing NT regulated containers under the scheme;
- Recommendations for changes to the kinds of containers regulated under the NT CDS;
- Recommendations for any additions to the kind of containers that are regulated;
- Understanding of the number of additional containers that could enter into the CDS due to these recommendations; and
- Identification of the benefits of making these changes.

In assessing the above, it was expected that the following scope of inquiries would be undertaken.

- Liaison with the South Australian (SA) EPA, which administers the SA CDL scheme, (to):
    - Discuss any potential changes or inclusions to the (SA CDL) scheme planned for the future; and
    - Discuss any industry feedback that the SA EPA has received in the past two years.

- Review the Keep Australia Beautiful (KAB) National Litter Index data (to):
    - Identify any non CDS containers that are appearing in the NT litter stream; and
    - Identify changes in the litter steam since the commencement of the NT CDS.
- Analysis of available data to assess:
    - Litter rates of regulated containers prior to the CDS being introduced;
    - Reduction of litter of regulated containers following the CDS's implementation;
    - Additions that should be made to the CDS's regulated containers;
    - The number of additional containers that would be captured; and
    - The benefits of making these additions to the CDS (e.g. reducing litter, increased resource recovery, reduction in landfill).

1.3 Organisation of Report

This report is organised and presented as follows.

Section 2:	***The NT CDS Scheme*** – Provides an overview of the NT CDS scheme including brief comparison of similarities & differences to the CDL scheme operating in SA.
Section 3:	***Results of Inquiries*** – Presents the key results of analysis and assessments to address the scope of inquiries for the report specified by the NT EPA (see Section 1.2 above).
Section 4:	***Key outcomes & Recommendations*** – Sums up the main observation and findings from the Inquiries and specifically addresses each of the requested issues.

2 NT CDS Scheme

2.1 Overview

The objectives of the NT CDS are to reduce litter caused by beverage containers and also enable these containers to be recycled instead of disposed to landfill. It does this, by applying a 10 cent deposit to approved containers. This deposit can be redeemed by taking the container to an approved collection depot.

At the collection depot, approved containers received are sorted by beverage supplier and according to material type. The collection depot sends the sorted containers to each of the NT CDS Coordinators that accepts the relevant container types. These Coordinators pay the collection depot back the 10 cent deposit for each container plus an additional handling fee to cover the collection depot's processing costs. The Coordinators prepare and send the returned containers for recycling, reuse or other appropriate disposal.

The NT CDS requires that all beverage suppliers which sell regulated drink containers obtain approval for their containers. As part of this approval, they must establish 'waste management arrangements' with NT CDS Coordinators. Under these arrangements, the Coordinators agree to accept their containers from the collection depots and organises for the containers to be recycled, re-used or appropriately disposed, for which the beverage supplier pays the Coordinator to provide this service. This cost of the NT CDS to the beverage supplier is likely to be passed on to the consumer in the sale price of the beverage.

The approved containers that are currently included in the NT CDS are listed in Table 2.1 overleaf. This table also includes a list of selected containers which are exempt but which might be of relevance to this study when considering additional containers that could enter the NT CDS in the future.

Table 2.1: List of regulated containers included in the NT CDS as interpreted from a guidance chart published by the NT EPA (Undated). This list also includes exempted containers that were shown in this guidance chart and which are relevant to this report. To aid interpretation, shading in the table is used to differentiate between these approved [green] and exempt [orange] containers. Some beverage types (i.e. wine and spirits) are shaded both colours where some container materials are exempt (i.e. glass). **Also shown in the table is a summary of how the NT CDS is understood to align with the SA CDL Scheme as interpreted from CDL provisions in relevant South Australian legislation[1].**

NT CDS			SA CDL SCHEME	
Beverage type	**Container Material**	**Container Capacity**	**Same (or aligned)?**	**If different, how?**
NON-ALCOHOLIC BEVERAGES				
• **Carbonated soft drinks**	All	≤ 3 L	✓	
• **Non-carbonated soft drinks**	All	≤ 3 L	✓	
• **Pure fruit/vegetable juice**	All	< 1 L	✓	
• **Flavoured milk**	All	< 1 L	✓	
• **Water (still or carbonated)**	Aseptic packs / casks (cardboard, plastic &/or foil)	< 1 L	✓	
	Other	≤ 3 L	✓	
• **Unflavoured milk**	EXEMPTED		✓	
• **Juice concentrates**	EXEMPTED		✓	
• **Health tonics included Australian Register of Therapeutic Goods**	EXEMPTED		✓	
ALCOHOLIC BEVERAGES				
• **Beers / ales/ stouts**	All	≤ 3 L	✓	
• **Wine (straight)**	Plastic & Aluminium	≤ 3 L	✓	
	Glass	EXEMPTED	✓	
	Aseptic packs / casks (cardboard, plastic &/or foil)	< 1 L	✓	
	Sachets (plastic &/or foil)	< 250 mL	✓	
• **Wine-based beverages**	Aseptic packs / casks (cardboard, plastic &/or foil)	< 1 L	✓	
	Other materials	< 1 L	✓	
• **Other (fermentation derived) alcoholic beverages**	All	≤ 3 L	✓	
• **Spirituous**	Glass	EXEMPTED	✓	
	Other materials	≤ 3 L	✓	
• **Spirit-based beverages (including RTD)**	All	≤ 3 L	✓	

[1] Relevant South Australian legislation: *Environment Protection Act 1993* (South Australian Government, 2013) & *Environment Protection Regulations 2009* (South Australian Government, 2012)

2.2 Alignment with SA CDL Scheme

The SA CDL Scheme, which has operated since 1977, works very similarly to the NT CDS:

- It has the same deposit of 10 cents per drink container;
- The regulated containers are the same;
- The administrative and operational structure and arrangements are virtually identical:
    - Containers are returned to collection depots where the 10 cent deposit is redeemed;
    - These collection depots sort and send the containers to a 'Super-collector' which fills the same role as a NT CDS Coordinator; and
    - Beverage suppliers of regulated containers must obtain approval and enter into a contractual arrangement with a 'Super-collector' to receive and organise recycling or appropriate disposal of their containers.

2.3 NT & SA Intergovernmental Agreement

In December 2011, an Intergovernmental Agreement (IGA) was established between the South Australian and Northern Territory Governments regarding operation of Container Deposit Schemes in each jurisdiction.

The Agreement provides for mutual assistance and, where possible, alignment of each jurisdiction's Container Deposit Schemes. This includes promoting consistency in the regulation, administration and/or development of the Schemes. From a practical perspective, this would include each jurisdiction attempting to ensure that similar types of containers are regulated.

3 Results of Inquiries

3.1 Liaison with SA EPA

A meeting between Rawtec and senior officers of the SA EPA was held on 12 December 2013. Senior officers of the NT EPA also participated in the meeting by phone.

The meeting discussed the purpose of, and scope of inquiries related to this report. The meeting also touched on a range of other peripheral matters pertinent to administration, operation and performance of Container Deposit Schemes in each jurisdiction.

The key findings from this meeting relevant to the scope of inquiries for this report were:

- There were presently no planned changes or inclusions (of approved or exempt containers) to the SA CDL Scheme.
- There has been a range of feedback received by the SA EPA in the past several years about what containers should be approved or exempt under the SA CDL Scheme. The main or most common feedback issues are summarised below.
    - There were those that believe that glass containers containing wine should be included and not exempt. The main rationale given by proponents for this change was be it would remove a perceived 'market inconsistency' for alcoholic beverages in the current Scheme, along with enabling greater recovery of glass and reducing contamination of other recyclables in kerbside collection.
    - There was interest from some parties to see the CDL Scheme expanded to include additional containers, such as larger (> 1 L) juice and flavoured milk containers, and even unflavoured milk. It was proposed that such change would further reduce litter problems and improve landfill diversion and resource recovery rates for these containers, along with providing consistency and minimising confusion to the community about what containers are covered by the CDL scheme.

3.2 Data Analysis

3.2.1 Overview of KAB National Litter Index survey data

To identify the effect that the NT CDS has had on litter in the NT, the KAB National Litter Index was analysed. The KAB National Litter Index survey[2] collects and records litter data annually from different sites across Australia in the months of November and May. The survey has occurred every year since November 2005, but data for the NT has only been collected from 2006-07. In the NT, the survey data is collected across 76 sites covering an area of 116,172 m^2. Each litter item identified by the survey is coded and counted to provide an overall number of litter items collected, and the volume of each litter stream overall is also estimated. In this respect, the KAB National Litter Index survey indicates both the number of litter items counted and their estimated volume. The number of litter items counted gives a useful guide to how frequently an item presents in the litter stream, whereas estimated volume can be said to provide a better insight to how visible (in the environment) the litter item might be.

The litter item codes used by the KAB National Litter Index survey allow relevant beverage containers currently regulated and also exempt (i.e. non CDS) under the NT CDS in the litter stream to be identified and analysed. Appendix 1 lists the KAB National Litter Index survey codes identified as drink containers and classifies which containers were considered to be currently regulated or exempt. This list in Appendix 1 also includes the volume conversion factors used by the KAB National Litter Index survey to estimate the volume of these containers.

Table 3.1 overleaf also gives an example of results obtained from using this list (Appendix 1) to analyse the KAB National Litter Index May 2013 survey data for NT. It shows the number of items (counted) and estimated volume of beverage containers that were observed, and separately identifies the regulated containers and exempt containers. Table 3.1 indicates that, in this survey period, beverage containers were 2% by number of the total litter items, but 35% by volume. Furthermore, the number of exempt containers was 11% by number and 24% by volume.

[2] For more information about the KAB National Litter Index survey and how it operates, please refer to the most recent Annual Report – Detailed Edition for 2012/13 (Keep Australia Beautiful, 2013). This report and previous years' KAB National Litter Index survey data can be accessed at: http://kab.org.au/litter-research/national-litter-index-2/.

Table 3.1: Example of analysis for May 2013 KAB Litter Index survey data for drink containers. The analysis shows total items counted and estimated volume for each container type. Regulated [shaded green] and exempt [shaded orange] containers are separately identified. The table includes [shaded blue at bottom] assessment of % of drink containers relative to total litter items counted by the survey, and the % of exempt containers.

NT - MAY 2013		Regulated or Exempt	Total Items	Total Volume - Litres
Glass	Alcoholic sodas / spirit-based mixers, all sizes	Regulated	0	0.00
	Beer, all colours of glass, <750ml	Regulated	14	6.71
	Beer, all colours of glass, 750ml+	Regulated	1	0.81
	Cider/fruit based etc.	Regulated	0	0.00
	Flav.wtr/fruit j. dr/sprts dr, (non-carb), <1 litre	Regulated	2	1.62
	Flav.wtr/fruit j. dr/sprts dr, (non-carb), 1 litre+	Regulated	0	0.00
	Flav. water/soft drink (carbonated) <1 litre	Regulated	5	1.51
	Flav. water/soft drink (carbonated) 1 litre+	Regulated	0	0.00
	Fruit juice, < 1 litre	Regulated	2	0.57
	Fruit juice, 1 litre+	Exempt	0	0.00
	Plain water (carbonated or non-carb.), <1 litre	Regulated	0	0.00
	Plain water (carbonated or non-carb.), 1 litre+	Regulated	0	0.00
	Wine & spirit, all sizes	Exempt	4	3.57
	Wine cooler, all sizes	Regulated	1	0.37
Metal	Alcoholic sodas & spirit-based mixers	Regulated	7	3.93
	Beer, aluminium, all types, all sizes	Regulated	16	6.90
	Cider/fruit based etc.	Regulated	1	0.43
	Flav. water/soft drink, (carbonated), all sizes	Regulated	19	8.20
	Flav. water/soft drink, (non-carb), all sizes	Regulated	5	1.91
Paper/ Paperboard	Cartons, flavoured milk < 1 litre	Regulated	5	3.75
	Cartons, flavoured milk 1 litre+	Exempt	1	1.01
	Cartons, fruit juice, < 1 litre	Regulated	2	1.25
	Cartons, fruit juice, 1 litre+	Exempt	0	0.00
	Cartons, milk, plain (white) all sizes	Exempt	2	2.03
	Flav. water/fruit j. drink/sports drink, non-carb, <1 litre	Regulated	2	0.52
	Flav. water / fruit j. drink/ sports drink, (non-carb), 1 litre+	Regulated	0	0.00
Plastic	Drink pouches	Exempt	1	0.09
	Flav. milk, <1 litre	Regulated	1	0.53
	Flav. milk, 1 litre+	Exempt	4	8.55
	Flav.wtr/fruit j. dr, sprts dr etc.(non-carb) <1 litre	Regulated	5	2.78
	Flav. wtr/fruit j. dr, sprts dr etc.(non-carb) 1 litre+	Regulated	1	1.65
	Flav. water/soft drink (carbonated) <1 litre	Regulated	5	3.11
	Flav. water/soft drink (carbonated) 1 litre+	Regulated	1	1.65
	Fruit juice <1 litre	Regulated	0	0.00
	Fruit juice, 1 litre+	Exempt	0	0.00
	Plain water (carbonated or non-carb) <1 litre	Regulated	0	0.00
	Plain water (carbonated or non-carb) 1 litre+	Regulated	0	0.00
	White milk, all sizes	Exempt	0	0.00
	Wine cask bladders	Exempt	0	0.00
ANALYSIS	**Total for Containers**		107	63.45
	Total Litter Items		5407	180.83
	% Containers in Litter Stream		2%	35%
	Total Regulated Containers		95	48
	Total Exempt Containers		12	15
	% Exempt containers		11%	24%

3.2.2 Non CDS (or exempt) containers in NT litter stream

From Appendix 1 and as indicated in Table 3.1, beverage containers in the NT litter stream counted by the KAB National Litter Index survey and identified as exempt (or non CDS) for the purpose of this assessment were:

- Fruit juice, 1+ litre – Glass, plastics & cardboard;
- Wine & spirit, all sizes – Glass only;
- Milk, plain (white) all sizes – Cardboard & plastic;
- Flavoured milk, 1+ litre – Cardboard & plastic;
- Plastic drink pouches or sachets; and
- Wine cask bladders.

3.2.3 Changes in litter stream since NT CDS

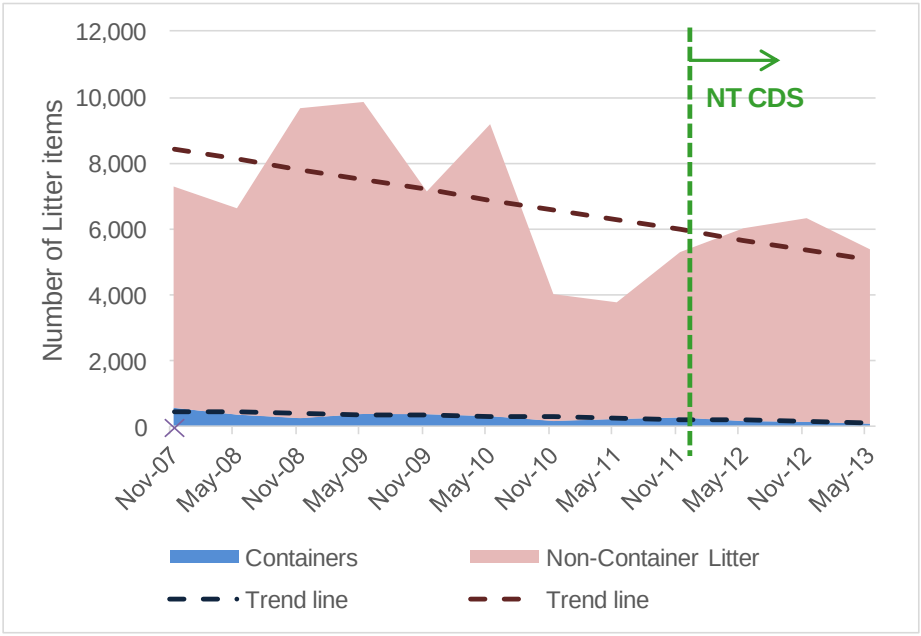
Figure 3.1 overleaf contains separate graphs of the number (a) and estimated volume (b) of the NT litter stream taken from KAB litter index for November 2007 to May 2013. These graphs also show (number and volume) components of the litter stream for beverage containers (regulated and exempt). The 3 January 2012 commencement date for the NT CDS scheme is indicated in each graph.

These graphs suggest that:

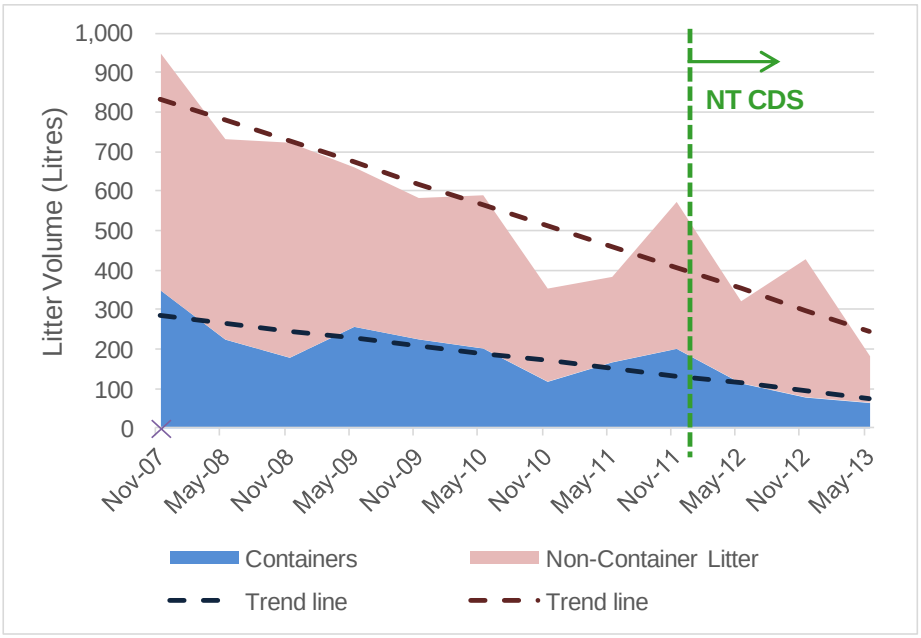
- Total number and estimated volume of the NT litter stream, as observed by the KAB Litter Index survey, has steadily decreased over the past 6 years; and
- This trend appears to have continued since introduction of the NT CDS.

With only three survey data points available since the 3 January 2012 commencement date, it is considered too early to say whether there has been a significant change in litter rate reduction following introduction of the NT CDS.

These graphs also show that beverage containers have been a relatively small component of the NT litter stream by number (i.e. < 5-10%), but a more substantial contributor by estimated volume (i.e. up to 40% in some years).



(a) By number



(a) By volume

Figure 3.1: Total litter and drink containers in NT litter stream observed by the KAB Litter Index survey from November 2007 to May 2013: (a) by number of items and (b) by estimated volume. The commencement date for the NT CDS of 3 January 2012 is indicated in each graph. Linear trend lines for total litter and NT CDS relevant container data (over the November 2007 to May 2013 period) are also shown.

3.2.4 Litter rates of regulated containers prior to NT CDS

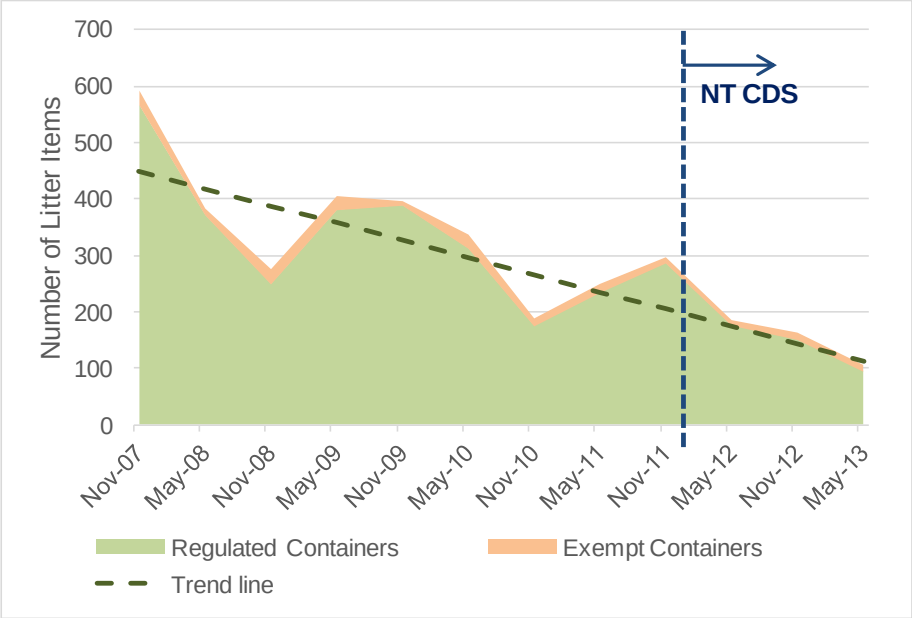
Figure 3.2 overleaf shows similar graphs (for number and estimated volume) as in Figure 3.1 but with a close up on the beverage container litter counts that differentiates between regulated and exempt (non CDS) containers.

This figure shows that even before introduction of the CDS:

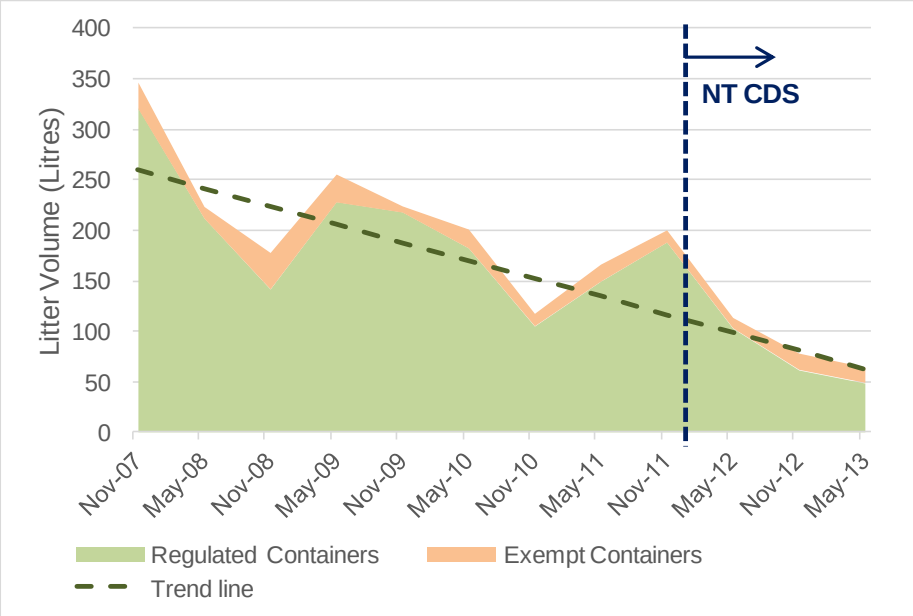
- Litter rates for regulated containers were steadily reducing, in line with decreases that were being seen in the total litter count.
- Corresponding litter rates for exempt containers were generally a minor fraction (by both number and estimated volume) of the total drink container litter rates (although this has fluctuated more widely from year to year for estimated volume).
- Reductions in litter rates for exempt containers during this period appeared to match those occurring for regulated containers.

3.2.5 Reduction of regulated containers in litter following CDS implementation

Figure 3.2 also suggests that container litter rates fell immediately following introduction of the NT CDS. But it is too early to say whether this change was greater than the existing trend (of reducing container litter rates) already occurring in the years before.



(a) By number



(a) By volume

Figure 3.2: Regulated and exempt (i.e. non CDS) drink containers in NT litter stream observed by the KAB Litter Index survey from November 2007 to May 2013: (a) by number of items and (b) by estimated volume. The commencement date for the NT CDS of 3 January 2012 is indicated in each graph. A linear trend line (over the November 2007 to May 2013 period) for regulated containers (only) is shown.

3.2.6 Exempt containers most commonly appearing in the litter stream

To better understand the frequency of exempted beverage containers appearing in the NT litter stream, the counts and estimated volume for these items in KAB Litter Index surveys from November 2007 to May 2013 were aggregated (i.e. summed or totalled) and ranked (from highest to lowest). The results are summarised in Table 3.2 below.

These results suggest that the following exempt or non CDS containers have appeared most frequently (by number) in the NT litter stream:

- Wine & spirit glass bottles (18%);
- Plastic drink pouches or sachets (18%);
- Wine cask bladders (18%);
- Larger (1L +) (plastic & cardboard) containers for flavoured milk (16.6%);
- Larger (1L +) (plastic & cardboard) containers for juice (16.6%);
- White milk containers (all sizes, plastic & cardboard) (14.6%).

The above items represent > 99% of the exempt containers seen in the NT litter stream during this period.

By estimated volume, however, Table 3.2 indicates that the relative proportions of exempt containers in the NT litter stream were somewhat different. From this perspective, larger juice containers (cardboard & plastic) were dominant (at *ca.* 30% by volume), whereas wine cask bladders were a lesser contributor (at 8%) and plastic drink sachets (or pouches) a more minor contributor (at 3.1%).

Table 3.2: Non CDS containers in litter stream accumulated from November 2007 to May 2013 by number and volume, ranked from highest to lowest

Rank	Number counted (summed)			Estimated volume (total)		
	ITEM	*n*	% of exempt containers (by number)	ITEM	V (Litres)	% of exempt containers (by volume)
1	Wine & spirit, all sizes - Glass	36	18.1%	Fruit juice, 1 litre+ - Plastic	53.4	25.5%
2	Drink pouches - Plastic	36	18.1%	Wine & spirit, all sizes - Glass	32.1	15.3%
3	Wine cask bladders - Plastic	36	18.1%	Flav. milk, 1 litre+ - Plastic	32.1	15.3%
3	Fruit juice, 1 litre+ - Plastic	25	12.6%	White milk, all sizes - Plastic	32.1	15.3%
4	Cartons, flavoured milk 1 litre+ - Cardboard	18	9.0%	Cartons, flavoured milk 1 litre+ - Cardboard	18.2	8.7%
5	Flav. milk, 1 litre+ - Plastic	15	7.5%	Wine cask bladders - Plastic	16.6	7.9%
6	White milk, all sizes - Plastic	15	7.5%	Cardboard	14.2	6.8%
7	Cartons, milk, plain (white) all sizes - Cardboard	14	7.0%	Cartons, fruit juice, 1 litre+ - Cardboard	6.2	3.0%
8	Cartons, fruit juice, 1 litre+ - Cardboard	3	1.5%	Drink pouches - Plastic	3.1	1.5%
9	Fruit juice, 1 litre+ - Glass	1	0.5%	Fruit juice, 1 litre+ - Glass	1.7	0.8%

3.2.7 Additions that could be made to the CDS's regulated containers

3.2.7.1 What could be added?

Table 3.2 (on the previous page) listed the currently exempt containers seen in the NT litter stream over the past 6 years and ranked them according to number of items counted and their estimated volume. This table indicates which items could be added, as well as the potential order from highest to the lowest contributor to litter rates.

3.2.7.2 Why make additions?

In contemplating whether additions could or should be made to exempt containers, it should first be considered what the rationale (or objective) for making such additions would be. Potential reasons for making additions could include to:

1. Directly lower litter rates of exempt containers because these would now be returned for recycling instead of littered;
2. Indirectly reduce littering of currently regulated containers;
3. Contribute to reductions of the overall litter rate due to the "synergistic" effect of the NT CDS that encourages the public not to litter and recognise the value of recycling (over landfill disposal);
4. Encourage higher return rates of containers under the NT CDS scheme, which would improve the utilisation of CDS depots and associated infrastructure;
5. Maximise the resource recovery of materials in exempt containers that might otherwise be littered or disposed via the waste stream to landfill; and
6. Remove confusion for the public caused by anomalies where certain beverage containers are covered by the NT CDS scheme, but other identical containers are not simply because they contain a beverage class that is exempted.

Each of these reasons is briefly discussed in the following sections.

3.2.7.2.1 Lower litter rates of exempt containers?

Figure 3.2 suggested that litter rates for both regulated and exempt containers were already reducing before introduction of the NT CDS, and it is considered too early to say whether the NT CDS has necessarily affected this pre-existing trend. Consequently, there was and already is an underlying trend towards less littering of exempt containers. In this respect, it would appear that the public have and are finding appropriate ways (e.g. via kerbside collection, direct disposal to landfill or a recycling facility, etc.) for disposing of these exempt containers. This does make some sense because many of the exempt containers are of larger volume (1L +) and are thus most likely used for home consumption where a waste disposal (but not necessarily recycling) option should be readily available.

It would therefore be difficult to demonstrate that adding any of the currently exempt containers to the NT CDS would necessarily directly contribute to lowering of their litter rates any more than is already occurring. If it did act to lower litter rates, it might only be reasonable to initially assume that this effect would yield a small improvement to the current rate of reduction in littering rate (of exempt containers) , e.g. 10-20%, over current trend.

3.2.7.2.2 Reducing litter rates of regulated containers?

As noted above, litter rates of regulated drink containers were trending downwards before the NT CDS was introduced and it is probably too soon to say whether the NT CDS has significantly affected this trend. However, it would be logical to expect that it would become more attractive to the public to collect and return existing regulated containers if some of the exempt containers were also covered under the NT CDS. This decision point would most likely occur in the home though (instead of public domain), and would most probably result in more regulated containers being diverted from existing home disposal options rather than from littering activity[3].

Consequently, it would also be hard to demonstrate that adding exempt containers to the NT CDS would necessarily contribute to lowering current litter rates for regulated containers as well. Like the comment above for exempt container litter rates, if it did act to lower litter rates of regulated containers, it might only be reasonable to assume a small improvement on the current trend, e.g. 10-20%.

3.2.7.2.3 Reducing in overall litter rate?

Figure 3.1 suggested that litter rates in the NT already appeared to be declining before introduction of the NT CDS, and a similar trend has continued since. Again, it is hard to say that adding exempt drink containers to the NT CDS would necessarily improve the current trend in overall litter rates.

However, it should be noted that even though the beverage container component of this overall litter stream is relatively small by number (≤5-10%) it appears to contribute more substantially by estimated volume (*ca.* 30-40%). Therefore, a small reduction in littering of both regulated and exempt containers, particularly larger containers in the exempt category, could significantly reduce the estimated volume of the overall litter stream. In this respect, the number of items recorded in the KAB Litter Index provides a useful indicator of littering frequency, whereas the estimated volume presents an indication of litter visibility. Consequently, reducing the littering rate of these larger exempt containers could possibly reduce the public perception of litter as being present in the environment.

3.2.7.2.4 Higher return rates for containers?

Return rates for the NT CDS in 2012 were between 11% and 35% depending on container material, with an average return rate of 28.6% (NT EPA, 2012). In the first half of 2013, average return rates of up to 40-60% were seen (NT EPA, 2013). These return rates can be compared with average return

[3] It is recognised that there are some locations in the NT where exempt containers of 1+ L could be more regularly used outside home consumption which may result in greater litter reductions that might otherwise be seen elsewhere.

rates of *ca.* 80% regularly achieved by the SA CDL scheme (SA Environment Protection Authority, 2013) which has been operating since 1977.

Accordingly, return rates under the NT CDS should already be rising naturally, and it would be anticipated that these rates should eventually reach similar values seen in SA CDL scheme as the NT CDS matures. This may reasonably take up to 5-10 yrs to realise.

Adding exempt containers to the NT CDS could reasonably be expected to boost return rates – both in the short-term and longer term – as well as improving the return rates of already regulated containers by making it more attractive for the public to collect these containers and visit collection depots. This could act to accelerate increases in return rates for the NT CDS to higher levels sooner.

3.2.7.2.5 Maximising resource recovery?

Gains in resource recovery could be achieved from diverting containers from littering to disposal for resource recovery via kerbside collection or return to a NT CDS collection depot. The gains in resource recovery, which is usually measured by mass, would depend not only on the number of additional containers but also their weight. Heavier containers such as glass would contribute more to resource recovery than lighter cardboard or plastic containers. In view of this, Table 3.3 overleaf re-produces the list of exempt containers in the litter stream as presented in Table 3.2, but re-ranks them according to the possible weight of recyclable material they might contain[4]. Table 3.3 suggests that targeting glass wine and spirit bottles could potentially yield the greatest diversion by weight of exempt containers from the litter stream to resource recovery.

The quality of material obtained by increasing resource recovery should also be considered. In this respect, return of the container to a NT CDS collection depot, where it is streamed by material type and is likely not to be as contaminated as containers disposed via kerbside collection, would probably be preferable.

3.2.7.2.6 Avoiding confusion cause by anomalies

The NT CDS requires that containers of certain beverage types must be approved, whereas identical containers containing other beverages are exempt. An example of this situation is pure juice and fruit juice drinks. Fruit juice drink containers are regulated and must be approved, whilst the same containers with pure juice are exempt. These anomalies can cause confusion for the public when deciding which containers can or cannot be returned to collection depots, and it would be preferable to avoid them.

[4] These unit weights were initially estimated from unit weights commonly assumed for regulated containers in the SA CDL Scheme (SA Environment Protection Authority, 2013) which were modified to account for the larger volumes of exempt containers of the same material. Weight measurements were also performed to confirm that the unit weight estimates were of the right order of magnitude.

Table 3.3: Non CDS containers in litter stream accumulated from November 2007 to May 2013 by potential weight of recyclable material, ranked from highest to lowest

Rank	Weight (recyclable material)		
	ITEM	m (kg)	exempt containers (by
1	Wine & spirit, all sizes - Glass	14.4	70.1%
2	Fruit juice, 1 litre+ - Plastic	1.3	6.1%
3	White milk, all sizes - Plastic	1.2	5.8%
3	Flav. milk, 1 litre+ - Plastic	0.9	4.4%
4	Wine cask bladders - Plastic	0.9	4.4%
5	Cartons, flavoured milk 1 litre+ - Cardboard	0.6	2.9%
6	Cartons, milk, plain (white) all sizes - Cardboard	0.5	2.3%
7	Fruit juice, 1 litre+ - Glass	0.5	2.2%
8	Cartons, fruit juice, 1 litre+ - Cardboard	0.2	0.9%
9	Drink pouches - Plastic	0.2	0.9%

3.2.7.3 Which additional containers?

Which additional containers could be added would therefore depend on the rationale or objective for doing so. Table 3.4 below lists and ranks which currently exempt containers possibly offer the greatest potential for achieving each of the objectives above. This high-level analysis consistently ranks both glass wine and spirit bottles and larger fruit juice and flavoured milk bottles as the exempt containers, which if added to the NT CDS, could maximise achievement of each objective or rationale.

Table 3.4: Qualitative rank for each exempt container type in terms of potential contribution towards achieving listed objective or rationale if diverted from the litter stream

Objective or rationale	Exempt container type rank				
	Glass wine & spirit bottles	*Larger fruit juice & flavoured milk bottles*	*Plain white milk containers*	*Wine cask bladders*	*Drink sachets*
A. Lowering litter rates (by number)	**1**	2	5	4	3
B. Increasing return rates (by number)	SAME AS ABOVE (or A)				
C. Reducing litter visibility (by estimated volume)	2	**1**	3	3	5
D. Maximising litter diversion to resource recovery (by weight)	**1**	2	4	4	5

3.2.8 Numbers of additional containers that could be captured

To consider the number of exempt containers that could potentially be captured by expanding the NT CDS, sales data for each different type of exempt container in NT was estimated. This estimation was made from interpretation and analysis of relevant publicly sourced information, including:

- Total or per capita or beverage sales data in Australia or NT for each type of exempt container[5];
- Available market share data for product types &/or container sizes within each beverage category5;
- Based on the above and with reference to KAB Litter Index unit volume conversions, typical or modified container unit volumes that might apply in each case (see Appendix 1); and
- Population statistics for Australia and the NT[6].

This sales data estimate is summarised in Table 3.5 below by type of exempt container in order of largest consumed/sold item to smallest. This estimate suggests that in the order to 20-25 million exempt containers are currently sold each year in the NT.

Table 3.5: Estimate of sales (in million of containers) of exempt containers in the NT

RANK	ITEM	*No containers (Millions)*	% of total
1	White milk, all sizes - Plastic	7.1	30.4%
2	Cartons, milk, plain (white) all sizes - Cardboard	6.9	29.5%
3	Wine & spirit, all sizes - Glass	6.7	28.7%
3	Fruit juice, 1 litre+ - Plastic	1.0	4.4%
4	Cartons, fruit juice, 1 litre+ - Cardboard	0.9	3.8%
5	Wine cask bladders - Plastic	0.5	1.9%
6	Drink pouches - Plastic	0.2	0.7%
7	Cartons, flavoured milk 1 litre+ - Cardboard	0.07	0.3%
8	Flav. milk, 1 litre+ - Plastic	0.04	0.2%
9	Fruit juice, 1 litre+ - Glass	0.04	0.2%
TOTAL		23.4	100.0%

[5] Primary data sources included the following references; a range of secondary sources were also used to cross-check data from these primary sources (but are not listed here). Wine & spirit consumption & market share data: 8504.0 - Shipments of Wine and Brandy in Australia by Australian Winemakers and Importers, Sep 2013 (Australian Bureau of Statistics, 2013); ABS 4307.0.55.001 - Apparent Consumption of Alcohol, Australia, 2010-11 (Australian Bureau of Statistics, 2011); Alcohol use in the Northern Territory (NT Government, 2010). White and flavoured milk consumption & market share data: Australian Dairy Domestic Sales Summary (Dairy Australia, 2014); Media article: Cartons favoured for flavoured milk (Packaging News, 2013); Juice consumption data: FJA Submission to Senate Committee Inquiry into the Citrus Industry in Australia (Fruit Juice in Australia, 2013).

[6] Source: ABS 3101.0 - Australian Demographic Statistics, Jun 2013 (Australian Bureau of Statistics, 2013)

The sales estimate for exempt containers in Table 3.5 can be compared against the sales data previously reported for already regulated containers of approximately 70 million (NT EPA, 2012). This suggests that total sales for beverage containers in the NT each year is in the order to 90 to 100 million, which is consistent with other published data[7].

Based on this estimated exempt container consumption/sales value, Table 3.6 below projects how many additional containers could be diverted into the NT CDS scheme for a range of different return rates. For example, if the return rate for glass wine & spirit containers was 80%, then potentially another 5.4 million containers could potentially be diverted into the NT CDS.

Table 3.6: Potential number (in millions) of additional containers captured by the NT CDS for different return rates

ITEM	*Additional containers returned (millions)*		
	20%	40%	80%
Wine & spirit, all sizes - Glass	1.3	2.7	5.4
Drink pouches - Plastic	0.03	0.06	0.13
Wine cask bladders - Plastic	0.09	0.18	0.36
Fruit juice, 1 litre+ - Plastic	0.21	0.41	0.82
Cartons, flavoured milk 1 litre+ - Cardboard	0.014	0.03	0.06
Flav. milk, 1 litre+ - Plastic	0.008	0.017	0.034
White milk, all sizes - Plastic	1.4	2.8	5.7
Cartons, milk, plain (white) all sizes - Cardboard	1.4	2.8	5.5
Cartons, fruit juice, 1 litre+ - Cardboard	0.2	0.4	0.7
Fruit juice, 1 litre+ - Glass	0.008	0.016	0.031

In practice, however, the return rates for the each container types are likely to be different. Based on current experience with SA's CDL Scheme for return rates with different container materials, Table 3.7 speculates on the actual return rates that might be achieved when the NT CDS matures and reaches similar performance as the SA CDL scheme. It then estimates the maximum additional number of containers that might likely be captured each year by the NT CDS (once the scheme matures), as well as the estimated mass of recovered containers. The table suggests that if all currently exempt containers were included in the NT CDS, an additional 15-20 million, or up to 3,000 tonnes, of containers could potentially be captured.

[7] A separate estimate of the number of beverage containers consumed in Australia was also derived from data in a 2010 report for the Environment Protection & Heritage Council (EPHC, 2009). This separate estimate suggested that total consumption each year of beverage containers across Australia is in the order to 10 billion containers. Assuming similar per capita beverage container consumption in the NT to that elsewhere in Australia, this also gives an annual consumption/sales value for NT of 100 million beverage containers, virtually identical to the estimate obtained by this assessment.

Table 3.7: Potential maximum (at scheme maturity) number (in millions) of additional containers captured by the NT CDS at return rates typically seen in the SA CDL scheme for different material types

ITEM	*Container Redemption rate (millions)*	*Additional containers*	
		No. (millions)	Mass (tonnes)
Wine & spirit, all sizes - Glass	85%	5.7	2278
Drink pouches - Plastic	60%	0.1	0.5
Wine cask bladders - Plastic	60%	0.3	6.8
Fruit juice, 1 litre+ - Plastic	80%	0.8	41
Cartons, flavoured milk 1 litre+ - Cardboard	60%	0.0	1.4
Flav. milk, 1 litre+ - Plastic	60%	0.0	1.5
White milk, all sizes - Plastic	80%	5.7	454
Cartons, milk, plain (white) all sizes - Cardboard	60%	4.1	139
Cartons, fruit juice, 1 litre+ - Cardboard	60%	0.5	34
Fruit juice, 1 litre+ - Glass	85%	0.03	15
TOTAL	82%	17.3	2972

3.2.9 Benefits of making these additions

3.2.9.1 Reducing litter

The potential benefit to reducing litter by adding exempt containers to the NT CDS has already been considered in Section 3.2.7. It is logical to expect that including currently exempt containers would improve litter outcomes, but it is not necessarily guaranteed. It was speculated that a potential improvement in the current trend of 10-20% might be at least expected.

3.2.9.2 Increased resource recovery

Increased resource recovery of containers should be achieved by adding exempt containers to the NT CDS. With many of these exempt containers usually consumed at home, much of this increased resource recovery could occur from existing kerbside waste or comingled recycling collection systems, and not the litter stream. In section 3.7 above, it was estimated that adding all currently exempt containers could capture up to 3,000 tonnes of extra material per year (once the NT CDS matures). Not all of this diversion to NT CDS would be new material, however, as some of it is already captured by comingled kerbside collection systems (or by commercial recycling collection services) where they exist. In the NT, kerbside collection of dry comingled recyclables is now generally available in both Darwin and Palmerston. At the present time, there is limited (publicly available) data that describes how well these recycling collection services perform, and what components of this collected material are CDS containers. Coming to a reliable estimate of how much of this 3,000 tonnes might be new resource recovery would therefore be speculative. But a good estimate could be made with further research, additional analysis and time. In our opinion, we suspect that only 10-20% of these exempt containers are currently captured by recycling systems in

place. Consequently, new resource recovery achievable (based on a 3,000 tonne value) might be up to 2,000 – 2,500 tonnes per year. However, this potential quantum of new resource recovery could diminish where performance improvements in current kerbside (and commercial) recycling collection services also occurred.

3.2.9.3 Reduction in landfill

Reduction in landfill is tied to new diversion of materials in the waste stream from landfill to recycling – which would essentially be of the same magnitude as new resource recovery as discussed above.

4 Key outcomes & recommendations

The following summarise the key outcomes and findings from this study with respect to the key issues that were required to be addressed.

1. ***On overview of any proposed changes to the kinds of containers regulated under the South Australian Scheme***

   There are currently no proposed changes to the kinds of containers that are regulated under the SA CDL Scheme.

2. ***Overview of the effectiveness of the existing NT regulated containers under the scheme***

   The NT CDS performance appears to be gradually improving, having risen from *ca.* 20% return rates in its first year to between 40 and 60% in its second year. It should be expected that within 5-10 yrs it will mature to the same performance as seen by the SA CDL Scheme. This outcome should see an average return rate of up to 80%, which could capture 50-60 million beverage containers.

   Given that the NT does not currently have widely established kerbside or commercial recycling services in many areas, the NT CDS therefore ensures that many of these containers are successfully diverted from landfill disposal to resource recovery.

   The NT CDS also appears to currently regulate about 90% of beverage containers seen in the litter stream. It therefore has effective coverage when it comes to containers which might be causing litter problems. To date, however, it is considered too early to say whether the NT CDS has appreciably reduced litter rates in the NT anymore than would have occurred otherwise. It may take another several years of litter data before any improvement achieved by the scheme on litter rates can be confirmed.

3. *Recommendations for changes to the kinds of containers (currently) regulated under the NT CDS*

The containers currently regulated under the NT CDS align with those of the SA CDL scheme. Therefore, removing or exempting any of these containers would lead to discrepancies or anomalies between the jurisdictions. This outcome would be inconsistent with the objective of the current IGA to ensure that similar types of containers are regulated. It is therefore recommended that no change to the kinds of containers regulated under the NT CDS is considered at the present time.

4. *Recommendations for any additions to the kinds of containers regulated under the NT CDS*

As noted above, the NT CDS presently appears to cover the majority of beverage containers that are seen in the NT litter stream. It has also been observed that container and total litter rates were already reducing before the NT CDS was introduced, and it is too early to say whether this NT CDS has appreciably affected this pre-existing trend. Consequently, it is considered premature to recommend whether changes should be made to include exempt containers if litter reduction was the sole objective for making the change.

From a resource recovery perspective, however, including currently exempt containers in the NT CDS may offer the opportunity to significantly increase the diversion of these containers from landfill disposal to resource recovery. Table 4.1 overleaf re-lists the currently exempt containers in the order of greatest to least potential contribution to resource recovery by mass or tonnes that might be achieved by the NT CDS. Only part of this potential resource recovery would be new resource recovery depending on current overlap in disposal of these drink containers via existing kerbside and commercial recycling collection services. Taking this potential overlap into account, we estimate that it up to 2,000 to 2,500 tonnes of new resource recovery might occur by including (all) currently exempt containers in the NT CDS.

In terms of which exempt containers should or could be added to the CDS, the following comments are made.

- The largest contributor (77% by mass in Table 4.1) to potential new resource recovery seen would be glass wine & spirit containers. As an alcoholic beverage it is usually classed as discretionary expenditure, and it may be more palatable from a political perspective to add to the NT CDS. These items are also more likely to be consumed in the public domain, and thus, contribute to litter. They were the number one ranked exempt item seen in the NT litter stream according to KAB Litter Index survey data (refer Table 3.2).

{Cont. overleaf}

Table 4.1: Potential maximum (at NT CDS maturity) resource recovery (tonnes/yr) that could be achieved from exempt beverage containers

ITEM	*Additional containers*	
	Mass (tonnes)	**%**
Wine & spirit, all sizes - Glass	2278	77%
White milk, all sizes - Plastic	454	15%
Cartons, milk, plain (white) all sizes - Cardboard	139	5%
Fruit juice, 1 litre+ - Plastic	41.2	1.4%
Cartons, fruit juice, 1 litre+ - Cardboard	34	1.2%
Fruit juice, 1 litre+ - Glass	15	0.5%
Wine cask bladders - Plastic	6.8	0.2%
Flav. milk, 1 litre+ - Plastic	2	0.1%
Cartons, flavoured milk 1 litre+ - Cardboard	1	0.05%
Drink pouches - Plastic	0.5	0.02%
TOTAL	2972	100.00%

- Plain milk containers are ranked next (at *ca.* 20%) in terms of potential new resource recovery that could be gained. However, there could be objections in adding to the retail cost of what is considered an essential food item. Consumption of plain milk is also usually occurs in the home (or office), where disposal and/or recycling options should be available.
- Larger juice and plain and flavoured milk containers collectively contribute 3-4 % to potential new resource recovery that could be gained. These are also likely to be regarded as a discretionary expenditure item. Similarly, these beverages are more likely to be consumed in the public domain and contribute to litter. Collectively, these items were a major contributor to the NT litter stream observed by the KAB Litter Index survey.
- Wine bladders and drink sachets are only minor contributors to the opportunity for potential resource recovery. They are also likely to contain residuals at end of use that may be difficult to remove. Wine cask bladders were also highly represented in the NT litter stream.

Based on these comments, if there was desire to change the kinds of containers covered by the NT CDS, it is recommended that the first “cabs off the rank” to be considered should be glass wine & spirit containers and larger juice and flavoured milk containers. With the inclusion of wine and spirit containers, there may also be merit in a considering wine bladders and drink sachets (250 mL +) containing alcoholic beverages, which would bring a degree of consistency to handling of alcoholic drink products. Plain milk containers and non-alcoholic plastic drink sachets could continue to be exempt.

5. The number of additional containers that would enter into the CDS due to these recommendations

It has been recommended above that glass wine and spirit bottles, juice and flavoured milk containers, wine bladders and alcoholic beverage drink sachets could be considered for future inclusion in the NT CDS. If such came to pass, this would result (as inferred from Table 3.7) in up to another 6-7 million containers being recovered by the NT CDS.

6. The benefits of making these changes

As discussed above, the principal benefit of making such changes as recommended above would be potential new resource recovery that could be achieved. The opportunity for improvement in litter rates could also be a benefit.

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Appendix 1: Containers in KAB Litter Index survey data

Table A1: KAB Litter Index survey: NT-CDS relevant containers showing items identified as regulated [shaded green] or exempt (i.e. non CDS) [shaded orange]

Material Type	Material Description	Currently Regulated or Exempt	Volume Conversion Factors (Volume/ Item)
Glass	Alcoholic sodas / spirit-based mixers, all sizes	Regulated	0.3743
	Beer, all colours of glass, <750ml	Regulated	0.4795
	Beer, all colours of glass, 750ml+	Regulated	0.8103
	Cider/fruit based etc.	Regulated	0.4543
	Flav.wtr/fruit j. dr/sprts dr, (non-carb), <1 litre	Regulated	0.8103
	Flav.wtr/fruit j. dr/sprts dr, (non-carb), 1 litre+	Regulated	1.654
	Flav. water/soft drink (carbonated) <1 litre	Regulated	0.3011
	Flav. water/soft drink (carbonated) 1 litre+	Regulated	1.654
	Fruit juice, < 1 litre	Regulated	0.2836
	Fruit juice, 1 litre+	Exempt	1.654
	Plain water (carbonated or non-carb.), <1 litre	Regulated	0.4148
	Plain water (carbonated or non-carb.), 1 litre+	Regulated	1.05925
	Wine & spirit, all sizes	Exempt	0.8914
	Wine cooler, all sizes	Regulated	0.3743
Metal	Alcoholic sodas & spirit-based mixers	Regulated	0.5619
	Beer, aluminium, all types, all sizes	Regulated	0.4314
	Cider/fruit based etc.	Regulated	0.4314
	Flav. water/soft drink, (carbonated), all sizes	Regulated	0.4314
	Flav. water/soft drink, (non-carb), all sizes	Regulated	0.3816
Paper/ Paperboard	Cartons, flavoured milk < 1 litre	Regulated	0.7497
	Cartons, flavoured milk 1 litre+	Exempt	1.01266
	Cartons, fruit juice, < 1 litre	Regulated	0.62475
	Cartons, fruit juice, 1 litre+	Exempt	2.07
	Cartons, milk, plain (white) all sizes	Exempt	1.01266
	Flav. water/fruit j. drink/sports drink, non-carb, <1 litre	Regulated	0.2621
	Flav. water / fruit j. drink/ sports drink, (non-carb), 1 litre+	Regulated	2.07
Plastic	Drink pouches (or sachets)	Exempt	0.08625
	Flav. milk, <1 litre	Regulated	0.5327
	Flav. milk, 1 litre+	Exempt	2.13669
	Flav.wtr/fruit j. dr, sprts dr etc.(non-carb) <1 litre	Regulated	0.55611
	Flav. wtr/fruit j. dr, sprts dr etc.(non-carb) 1 litre+	Regulated	1.654
	Flav. water/soft drink (carbonated) <1 litre	Regulated	0.62211
	Flav. water/soft drink (carbonated) 1 litre+	Regulated	1.654
	Fruit juice <1 litre	Regulated	0.5327
	Fruit juice, 1 litre+	Exempt	2.13669
	Plain water (carbonated or non-carb) <1 litre	Regulated	0.7879
	Plain water (carbonated or non-carb) 1 litre+	Regulated	1.54157
	White milk, all sizes	Exempt	2.13669
	Wine cask bladders	Exempt	0.46