

New South Wales Litter Report 2004



**Department of
Environment and Conservation (NSW)**

This Litter Report was prepared by the Waste Data Team, Department of Environment and Conservation (NSW).

For technical information on the matters discussed in this paper, contact the DEC Waste Data Team on (02) 9995 5000.

Published by:

Department of Environment and Conservation (NSW)

59–61 Goulburn Street Sydney

PO Box A290

Sydney South 1232

Phone: (02) 9995 5000 (switchboard)

Phone: 131 555 (NSW only—information & publications requests)

Fax: (02) 9995 5999

E-mail: info@environment.nsw.gov.au

Website address: www.environment.nsw.gov.au

The Department of Environment and Conservation (NSW) is pleased to allow this material to be reproduced in whole or in part, provided the meaning is unchanged and its source, publisher and authorship are acknowledged.

ISBN 1 74137 097 3

DEC 2004/115

December 2004

Table of Contents

Key Results	1
Background	2
1. Introduction	3
2. Methodology	4
3. Results	10
4. Discussion	18
Appendix 1	21
Appendix 2	23
Appendix 3	24
References	27

List of Tables

Table 1: CCAT Factors	6
Table 2: Litter Protocol Site Types	8
Table 3: Locations selected for the Litter Protocol	9
Table 4: Common Littered Items by Material Type	16

List of Figures

Figure 1: NSW Average CCAT Score	10
Figure 2: NSW Summary CCAT Scores	11
Figure 3: Regional CCAT Scores	12
Figure 4: Site Type CCAT Scores	13
Figure 5: Types of Litter Counted for the CCAT (by number of items present)	15
Figure 6: Presence of Littered Material	16
Figure 7: Composition of Litter by Weight	17
Figure 8: Composition of Litter by Volume	17

Key Results

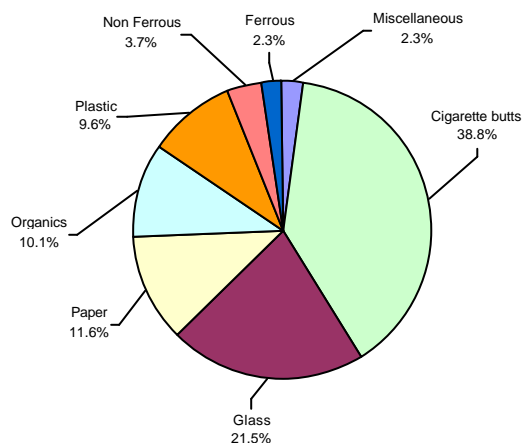
An assessment of littering behaviour was conducted using the Clean Communities Assessment Tool (CCAT). The assessment produced summary scores for each site, which were then averaged across regions and site types. The scores are based on a five point scale, from (1) not at all clean to (5) extremely clean.

The average CCAT summary score for NSW is 3.8, which is at the upper end of the moderately clean rating. This is similar to the average CCAT summary score for the Victorian Litter Monitoring Protocol and reflects the commitment of the NSW Government and community in addressing litter issues through active enforcement of litter regulations, community workshops and education/media campaigns. Regional CCAT summary scores were not significantly different from each other.

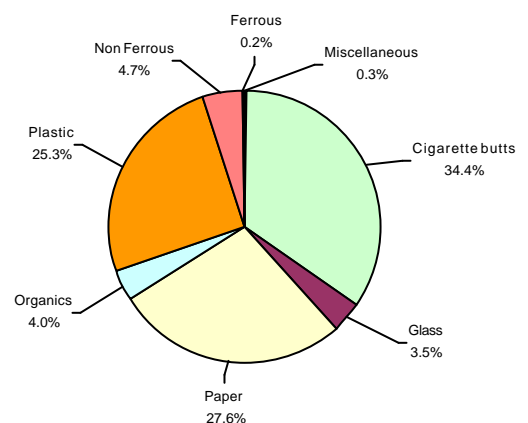
The best performing sites were beaches, parks and waterfronts. Sites that did not perform as well include roadside stops, transport sites (bus stops, ferry terminals and rail easements), and landmark sites.

A second assessment collected information on the amount and type of litter dumped within selected sites. The composition of the litter found is shown in the pie charts below.

Composition of Litter by Weight



Composition of Litter by Volume



By weight, cigarette butts were the largest category (38.8%). This finding was also reflected in the volume assessment, where cigarette butts made up 34.4% of the sample.

Background

This is the first report in the series of biennial reports on littering to be known as the NSW Litter Reports. The legislative requirements for the NSW Litter Report and actions taken to implement them can be found in Appendix 1.

The methodology used to develop the report aims to provide a baseline to build a picture of long-term trends in litter composition and littering behaviours through comparable subsequent surveys. This information will provide an indicator of the effectiveness of government, industry and community initiatives to reduce litter.

The methodology is a combination of the Clean Communities Assessment Tool (CCAT) and the Litter Characterisation Survey, which together are referred to as the Litter Protocol.

The Clean Communities Assessment Tool is owned by Community Change Consultants Pty Ltd and they undertook this part of the study.

The Litter Characterisation Survey was developed by the Department of Environment and Conservation (NSW) (the DEC) and conducted by APrince Consulting Pty Ltd in accordance with the NSW Department of Commerce State Procurement Panel Contract S0256275 for Waste Auditing Services.

This report summarises the results of the study and is based on unpublished survey reports provided to DEC (NSW) by each of the consultants.

DEC (NSW) would like to acknowledge the work of both Community Change and APrince Consulting in collecting the information used to compile this report.

1. Introduction

1.1 Litter in NSW

'Litter' is any solid waste object (disposable item or resource) that can be held or carried in a person's hand that is left behind or placed in an inappropriate location. Any such material or item disposed of in an inappropriate manner is to be regarded as litter – the end outcome of an environmentally undesirable disposal action.
(Beverage Industry Environment Council, 2002).

Litter includes a wide variety of solid waste materials. Common types of litter include cigarette butts, cigarette packaging, chewing gum, confectionery wrappers, glass pieces and soft drink containers (both plastic and metal).

1.2 Action to reduce litter

The NSW Government has been taking action to reduce litter in and around our homes, workplaces and the broader environment. Some of the initiatives designed to tackle litter include:

- Changes to environmental regulations to increase fines for littering, prevent littering on private land and decrease the quantity of unwanted advertising material that often ends up as litter.
- Media campaigns to make people aware of the impacts of litter on the environment and encourage behaviours that reduce littering.
- Local and regional community education activities that build on media campaigns such as resource kits and community workshops.
- Information and training for regulatory agencies, such as councils and government agencies, to enable them to better target litterbugs and prevent littering.
- Regulatory activities focussed on particular littering activities, such as the recent launch of Operation Litter Bug to target litter on major arterial roads in Western Sydney.

To enable government, industry and the community to continue to improve their management of littering problems, accurate information is needed on where littering is happening, what kinds of materials are being deposited and how effective anti-littering initiatives are.

1.3 The NSW Litter Monitoring Protocol

The NSW Litter Monitoring Protocol (the Litter Protocol) has been developed to systematically collect information on litter across NSW. It will not attempt to estimate the *total* quantity of litter dumped in NSW each year, or measure the effectiveness of specific anti-litter initiatives. Rather, it aims to build up a picture of long-term trends in litter through comparable surveys over a number of years.

The Litter Protocol has brought together two distinct litter data collection methods; the Clean Communities Assessment Tool (CCAT) and the Litter Characterisation Survey. The combination of these two methods provides data on the composition of litter (by volume and weight) as well as monitoring change in littering behaviour.

The 2004 NSW Litter Report provides the results of the first year of the study, which will be conducted biennially. Because the aim of the Litter Protocol is to measure changes in litter composition and littering behaviour over time, the analysis presented in this report (being the first report) is simple and should not be interpreted as a comprehensive study into the state of litter in NSW. The true value of the data collected through the Litter Protocol will be realised on the completion of future surveys when trends may emerge.

2. Methodology

2.1 Overview

The NSW Litter Monitoring Protocol (the Litter Protocol) aims to identify long term trends in litter through collection of information using comparable surveys over a number of years.

Data collection was done at sites deemed significant in terms of littering activity and will provide data on the factors in a location influencing littering actions as well as characteristics of litter found on the ground. It takes into account litter accumulation points as well as locations that appear to stay 'clean' most of the time.

There was no existing methodology to measure the factors that contribute to litter disposal actions as well as the physical composition of litter. Therefore, the Litter Protocol has employed two distinct methods for data collection:

1. The Clean Communities Assessment Tool (CCAT) developed by Community Change Consultants Pty Limited; and

2. The Litter Characterisation Survey developed by the Department of Environment and Conservation (NSW).

2.2 Clean Communities Assessment Tool (CCAT)¹

The Clean Communities Assessment Tool (CCAT) has been developed by Community Change Consultants Pty Ltd to monitor changes in disposal actions on a regular basis through a systematic rating of four key factors in the location under investigation. The key factors are:

1. **Context** (sense of community and cleanness of the location)

The context rating provides an indication of levels of community identity and support for responsible management of the environment, resource recovery and litter prevention. It takes into account the level of comfort in a location, the prevalence of graffiti and the overall 'cleanness' of a site.

2. **Facilities** (quality of infrastructure and BINfrastructure²)

The maintenance and provision of facilities (comprised of ratings of infrastructure and BINfrastructure) in a location has an impact on disposal actions. 'Facilities' incorporates assessments of the effects of streetscape, public space and bins (recycling, litter and cigarette butt bins) on disposal actions.

3. **Attitudes and Perceptions** (opinions, knowledge and attitudes)

Community perceptions, awareness, knowledge and attitudes about the locations, including the perceived importance of keeping them litter free, also influence actions. This factor also includes community assessments of the adequacy of facilities in the location.

4. **Actions** (indications of disposal activities in area)

Observations of people's actual practices in a location provide a means for checking assumptions and self reports against actual actions and activities. Ongoing monitoring of actions in an area enables assessment of the type of items consumed by people in the public space and the typical disposal actions associated with these items.

Each key factor consists of composite ratings based on a five-point scale of cleanness with assessments ranging from 'not at all', 'slightly', 'moderate', 'very' and

¹ CCAT is copyright Community Change Consultants Pty Ltd.

² BINfrastructure is a term first coined by Community Change and is used to describe the functionality, presentation and effectiveness of bins.

'extreme' levels of clean. The higher the CCAT rating for an aspect of the situation, the greater the likelihood it will be clean and remain clean.

A composite rating for key factors (1) – (3) in a location provides a summary of the factors that influence actions in an area.

The impact of changes to specific factors such as improved BIN infrastructure, better use of fines, better targeted education campaigns focusing on community disposal actions, and knowledge of litter prevention campaigns can be monitored over time and compared for effectiveness.

Table 1 provides an outline description of the interpretation of results for CCAT key indicators at the extreme high end (CCAT = 5) and low end (CCAT = 1) of the scale.

Table 1: CCAT Factors

Key Indicator	Factor	High (CCAT=5)	Low (CCAT=1)
Summary CCAT	Features combined in a summary rating	Area likely to be extremely clean, well maintained and encourage litter prevention.	Area is highly littered and is likely to encourage litter accumulation.
Context	Summarises community identity and involvement	Strong sense of pride, ownership over the space	Poor sense of ownership and area is not clean
Facilities	Summarises results for bins and furniture	Extremely well maintained, litter free facilities that are easily used and well positioned	Inadequate facilities, poorly maintained
Infrastructure	Furniture, streetscape and landscaping	Furniture is extremely well maintained, clean and appropriate	Poorly maintained and surrounded by litter
BIN infrastructure	All litter, recycling and butt bins	Bin design, position and maintenance is highly appropriate to area and usage patterns	Inadequate number, configuration, positioning or servicing of bins
Public Perceptions and Attitudes	Summary of community views on area	Area is perceived as extremely well looked after and serviced	Area is seen as inadequately presented

Key Indicator	Factor	High (CCAT=5)	Low (CCAT=1)
Attitudes to Place	Views of interviewees on the area and expected actions	Strong expectation exists for people to do the right thing with used items	No expectation to do the right thing
Attitudes Towards Facilities	Perceptions of interviewees about appropriateness of bins and furniture	Facilities are viewed as highly appropriate and meeting needs of community	Community sees a need to improve facilities

2.3 Litter Characterisation Survey

The Litter Characterisation Survey collects specific information on the amount and type of litter dumped within selected sites. All the litter within a selected 48m² area was collected from each site, which had also been used in the CCAT assessment. A summary of the approach is provided below and further details of the survey methodology are contained in Appendix 2.

The 60 sites collected represent the core group of sites to be included in future surveys. They were recognised as significant in terms of littering activity, were commonly found across NSW, and were consistent with sites selected for the Victorian litter protocol (Curnow, Spehr & Casey, 2003).

The collected litter was sorted into material type, counted, weighed and recorded. Litter classification was based on a set of major material types, with sub-categories within each major material type. All litter collected was sorted by the sub-category material type for weight and volume measurement.

The site types selected for the Litter Protocol are shown in Table 2. Definitions for each site type are in Appendix 3. Possibilities exist in the longer term to expand on these core site types to collect information on sites of special interest, such as festivals, sporting events, parades etc.

Table 2: Litter Protocol Site Types

<ul style="list-style-type: none">• Beaches• Landmarks• Malls• Markets• Parks• Public buildings• Roadside stops• Shops• Smoking areas	<ul style="list-style-type: none">• Tertiary institutions• Transport links<ul style="list-style-type: none">- Ferry terminals- Rail easements- Bus stops• Waterfronts<ul style="list-style-type: none">- Constructed waterfronts- Natural waterfronts
---	--

2.4 Location Selection

The selection of locations was based on the initial identification of three regions within NSW:

- Sydney Metropolitan Area (Sydney);
- Extended Sydney Region³; and
- Regional/Rural NSW (Regional NSW) – all remaining areas.

The selection of the number of locations within each region was based on population data from the Australian Bureau of Statistics⁴. Population distribution across the regions was 56% Sydney, 19% Extended Sydney Region and 25% Regional NSW.

Locations were selected within regions from a number of considerations:

- Population distribution
- Geographical coverage across NSW
- Availability of site types
- Potential level of littering activity
- Resource optimisation
- Consultation with DEC (NSW) Regional Offices.

The Clean Communities Assessment Tool (CCAT) was used to measure 200 sites across NSW. The assessments were conducted during May-June 2004. The final

³ The Extended Sydney Region includes Newcastle and Hunter catchment, Wollongong and Illawarra catchment and the Blue Mountains.

⁴ ABS, 2004

location selection resulted in 53% of locations in Sydney, 22% in the Extended Sydney Region and 25% in Regional NSW.

The Litter Characterisation Survey collected litter from a sub sample of 60 sites from the 200 sites selected for the CCAT. The litter was collected from these sites in June 2004. The final location selection resulted in 50% of locations in Sydney, 25% in the Extended Sydney Region and 25% in Regional NSW.

Table 3: Locations selected for the Litter Protocol

Location	Clean Communities Assessment Tool (CCAT)	Litter Characterisation Survey
Sydney Metropolitan Area	106	30
Council of the City of Sydney	30	10
The Council of the Shire of Baulkham Hills	12	12
Liverpool City Council	12	
Manly Council	8	8
Marrickville Council	12	
Parramatta City Council	12	
Penrith City Council	12	
Waverley Council	8	
Extended Sydney Region	43	15
Blue Mountains City Council	10	
Gosford City Council	8	
Newcastle City Council	11	10
Cessnock City Council (Kurri Kurri)	5	5
Wollongong City Council	9	
Regional/Rural NSW	51	15
Coffs Harbour City Council	10	
Bellingen Shire Council	5	
Dubbo City Council	11	
Wellington Council	5	
Wagga Wagga City Council	11	10
Junee Shire Council	5	5
Roadside Stops	4	
TOTAL	200	60

3. Results

3.1 CCAT Results

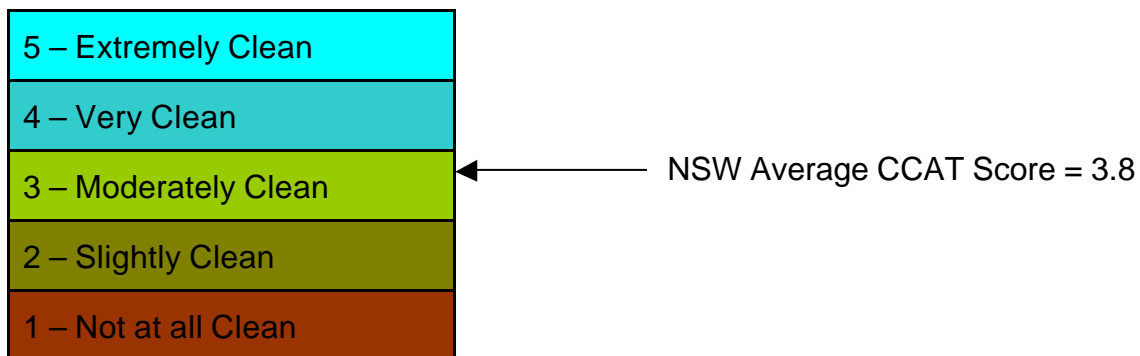
3.1.1 NSW CCAT Score

CCAT summary scores from all 200 sites surveyed were averaged to provide a state wide CCAT score. CCAT summary scores are based on a five point scale, from (1) not at all clean to (5) extremely clean.

The average CCAT summary score for NSW is 3.8, which is at the upper end of the moderately clean rating as shown in Figure 1 below. This is similar to the average CCAT summary score for the Victorian Litter Monitoring Protocol⁵.

This encouraging result for NSW was not unexpected given the commitment of the NSW Government and community in addressing litter issues through active enforcement of litter regulations, community workshops, education campaigns and successful media campaigns. The most recent of these was 'Don't be a Tosser'. Litter reduction has also been given additional momentum through inclusion in the Waste Avoidance and Resource Recovery Strategy as one of four main outcome areas: *to reduce the total volume and tonnages of litter reported annually*.⁶

Figure 1: NSW Average CCAT Score

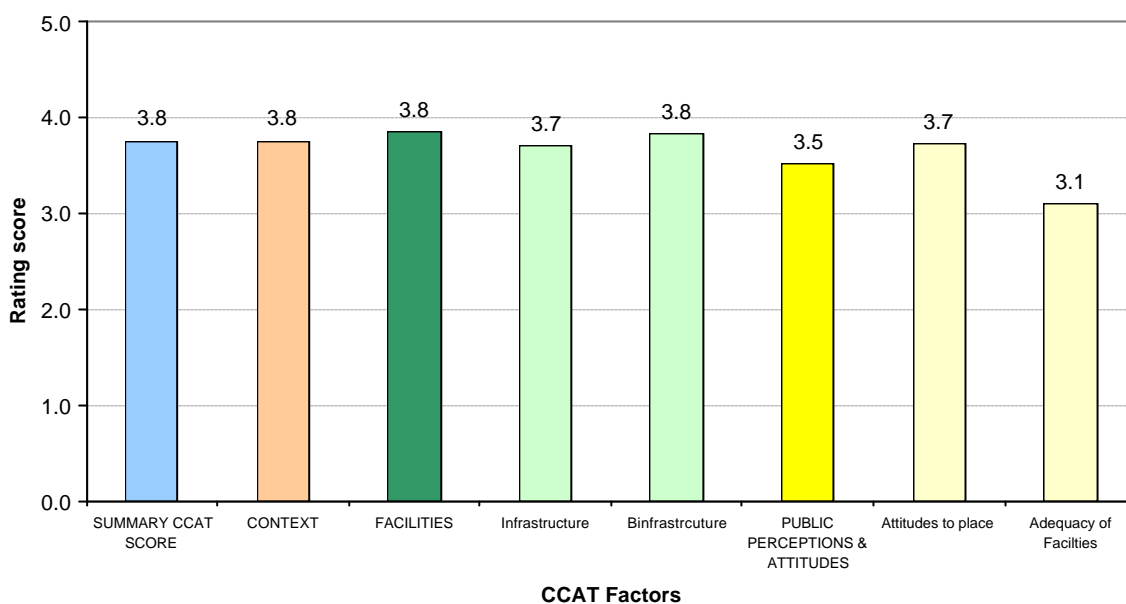


The CCAT summary score of 3.8 includes three factor scores: Context, Facilities, and Public Perceptions and Attitudes. The average result for each separate component of the CCAT across all 200 sites is presented in Figure 2.

⁵ The average CCAT summary score for the Victorian Litter Monitoring Protocol is described as between Level 3 (moderately clean) and Level 4 (very clean) (Curnow, Spehr & Casey, 2003).

⁶ Outcome Area 4: 'Reduce litter and illegal dumping', Resource NSW, 2003

Figure 2: NSW Summary CCAT Scores



From the scores, it appears that the community has higher expectations of the quality of facilities required in public spaces. The lower Public Perceptions and Attitudes score has been affected by the Adequacy of Facilities component score of 3.1. This score was arrived at through personal interviews⁷ of users within a site in regards to whether they deemed the facilities provided to be adequate. In contrast, the average Facilities score, assessed at 3.8, was provided by the Community Change assessors.

When considering the CCAT scores in Figure 2, it should be remembered that the scores provided are averages for the whole of NSW. So whilst there are sites that are managing litter well, there are also an equal number of sites that require improvements. To assist in identifying how sites can be improved Community Change has provided individual site assessments for all of the 200 sites assessed and provided recommendations on how to improve each site. NSW is the first state to use CCAT benchmarks as part of a planned guide for strategic intervention at the local level.

Individual litter reports will be provided to each Local Council where sites were assessed within their jurisdiction.

⁷ 731 personal surveys were conducted in 198 of the CCAT locations. Only in two sites was it not possible to conduct interviews.

3.1.2 Regional CCAT Scores

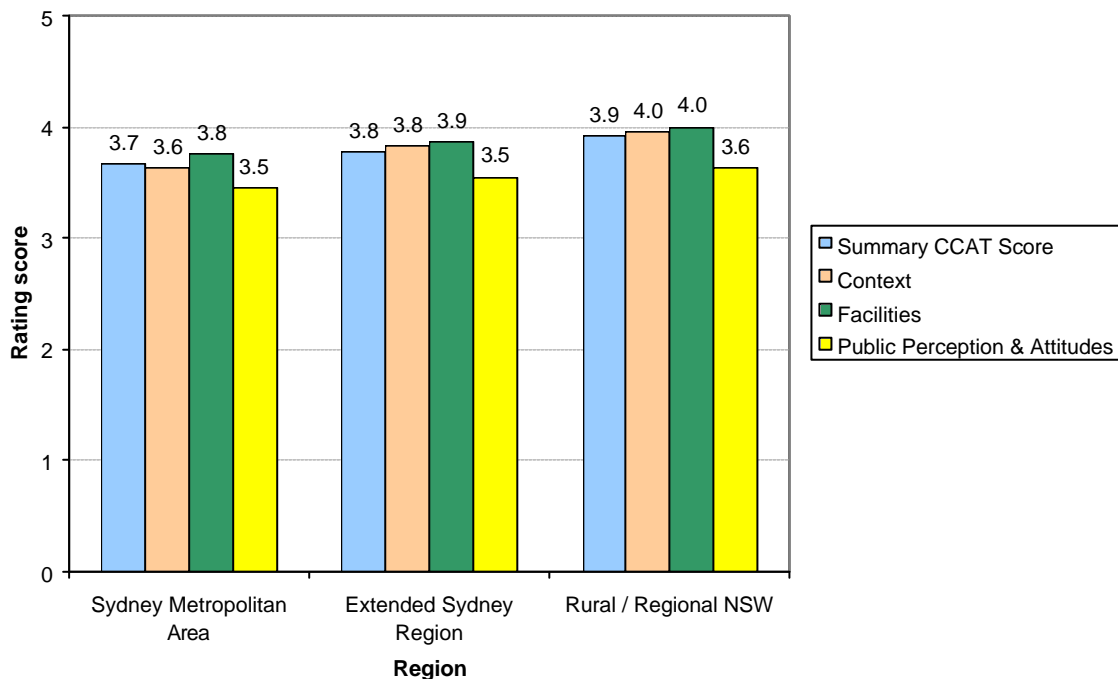
Regional average CCAT ratings were compiled for Sydney, the Extended Sydney Region and Regional NSW.

The summary CCAT scores did not show any significant regional differences. Regional NSW (3.9) performed slightly better than the Extended Sydney Region (3.8), which was slightly better again than Sydney (3.7).

Similarly, the individual factor ratings for each region did not show significant differences. The largest difference is for the context rating between Regional NSW (4.0) and Sydney (3.6), which suggests that on average sites in Regional NSW are cleaner.

Summary CCAT scores and factor scores for each region are shown in Figure 3 below.

Figure 3: Regional CCAT Scores



Future surveys collecting data within each region should begin to identify whether there is a real difference between sites in Sydney, the Extended Sydney Region and Regional NSW.

3.1.3 Site Type CCAT Scores

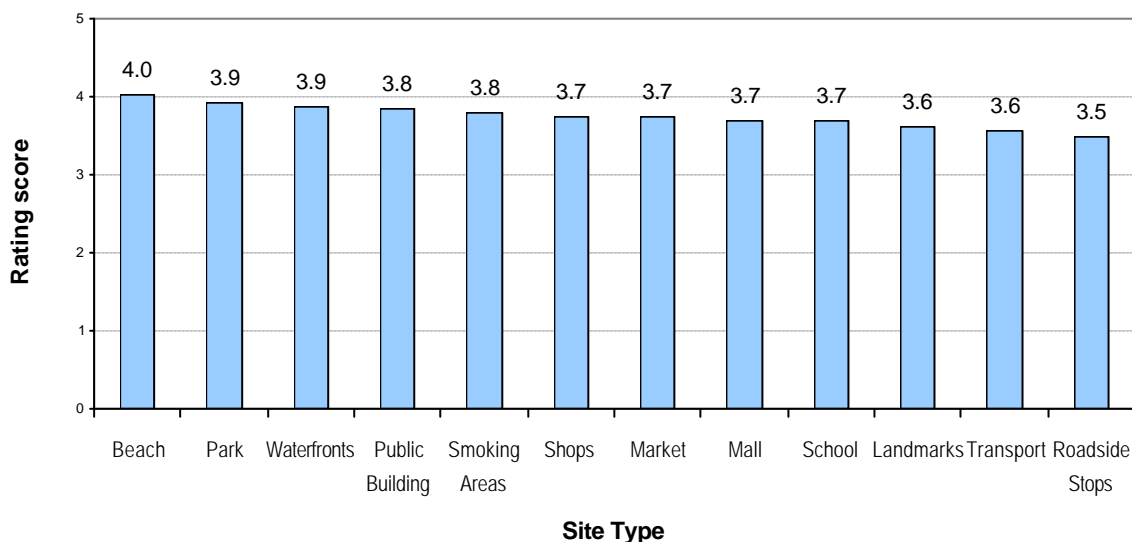
The average CCAT summary scores for each site type included in the study show that the best performing sites are beaches⁸, parks and waterfronts. Average CCAT summary scores for each site type can be found in Figure 4 below.

It is also interesting to note that beaches, parks and waterfronts were the top rating sites in relation to positive public perceptions and attitudes, which could indicate that people tend to be more litter responsible in natural sites associated with leisure and recreational activities.

Site types that did not perform so well include roadside stops, transport (bus stops, ferry terminals, rail easements) and landmark sites. These sites also rated poorly in terms of the infrastructure sub-factor score, which could possibly reflect the result of removal of infrastructure in transport and landmark sites due to security concerns.

Smoking sites are an interesting case where the summary CCAT score of 3.8 would indicate that smoking sites are no more or less clean than other site types. However, the public perception and attitudes factor score for smoking sites has rated a low 3.2.

Figure 4: Site Type CCAT Scores



⁸ The survey was undertaken in May-June 2004, which is a low usage period for beach sites.

3.1.4 Disposal Actions

During the assessment of a site the Community Change assessors observed disposal actions within the site. Disposal actions were recorded as either positive or inappropriate.

Examples of positive disposal actions include correct use of bins, picking up litter and use of recycling facilities, whilst inappropriate actions include littering or dumping of trader waste into public bins.

Throughout the survey there were 1,026 disposal actions observed in 169 of the locations. Of these disposal actions, 764 or 74% were positive, and 26% were recorded as inappropriate.

Across the regions there was a slightly greater tendency for people in Regional NSW (76%) to positively dispose of litter than in Sydney (74%) and the Extended Sydney Region (72%).

3.1.5 CCAT Litter Count

The CCAT methodology also included a litter count of items for each site within a selected 48m² area. This was included as part of the context score.

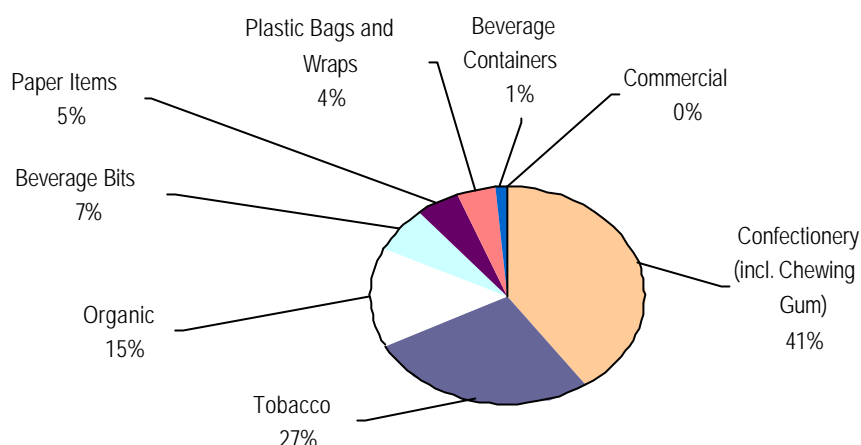
The litter count data is not directly comparable with the specific litter characterisation survey due to differences in methodology. The CCAT method counts items such as bird faeces as organic material and chewing gum as confectionery items. Chewing gum was not collected in the litter characterisation survey because of the difficulties of removing chewing gum from sites and then separating it from other materials during the sorting process.

The results of the CCAT litter count reveal that the items most frequently littered are:

- confectionery items (including chewing gum) (41%);
- tobacco products (27%); and
- organic material (15%).

Figure 5 shows the composition of litter by count. It must be noted that the most common item in the confectionery category was chewing gum.

Figure 5: Types of Litter Counted for the CCAT (by number of items present)



3.2 Litter Characterisation Survey Results

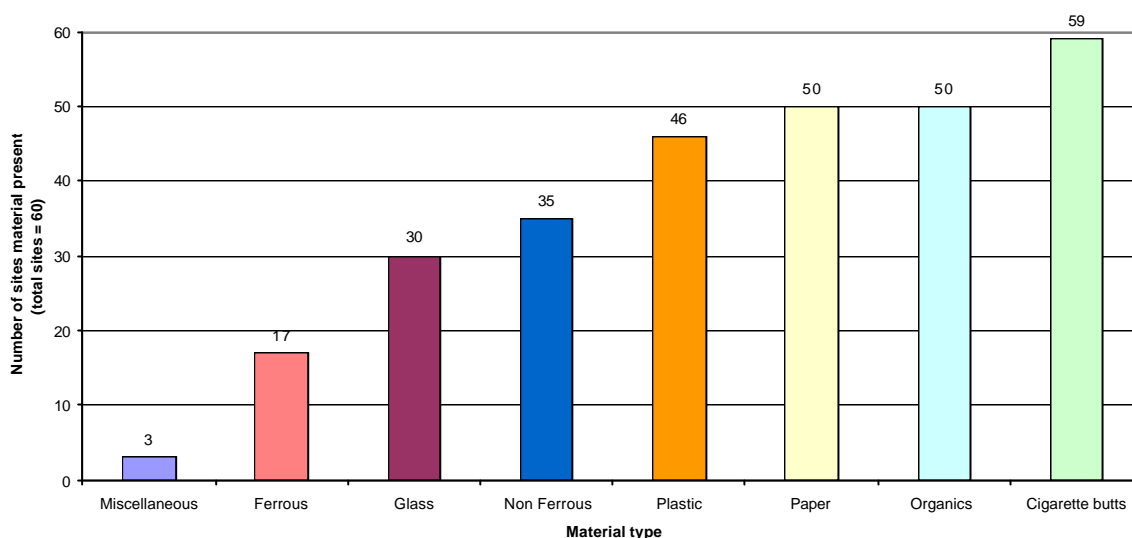
A sub sample of 60 sites was selected from the initial 200 sites used for the CCAT Assessments to collect, sort and measure the composition of litter. Litter was collected within each of the 60 sites from the same 48m² area that was used in the CCAT litter count. Details of the survey methodology are provided in Appendix 2.

The composition of litter by weight and volume presented in this report is indicative and should not be considered as comprehensive for policy or regulatory activities. The variable quantities of litter collected from each site mean the results in this survey need to be repeated in future years before we can have full confidence in the results as representative of litter across NSW. As the survey is repeated in future years and by increasing the number of sites litter is collected from, it is expected that the reliability of the data will improve.

3.2.1 Presence of Litter

Almost 3,100 individual items of litter were collected from the 60 sites at an average of 52 items per site. The most prevalent littered items were cigarette butts, found at 59 of the 60 sites, followed by organics and paper (both at 50 sites), plastics (46), Non Ferrous (35), Glass (30) and Ferrous materials (17). Figure 6 shows the presence of littered material from the 60 selected sites.

Figure 6: Presence of Littered Material



The more common items collected as litter in the waste audits are presented by material type in Table 4 below.

Table 4: Common Littered Items by Material Type

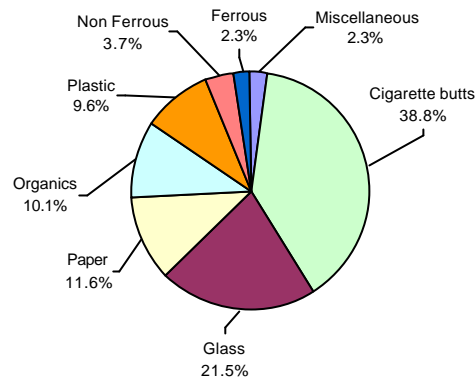
Material Type	Common items
Paper	Disposable paper products including confectionery wrappers and tissues.
Organics	Food including orange peel, nut shells and chewing gum ⁹ . Wood including match and ice cream sticks.
Glass	Glass containers and miscellaneous broken glass.
Plastic	Plastic containers, film, straws and miscellaneous scrap plastic.
Ferrous	Paper clips, wire, nails and bolts.
Non Ferrous	Foil, assorted lids and caps, ring pulls and the occasional can.
Miscellaneous	Batteries and pieces of ceramics.
Cigarette butts	

3.2.2 Litter Composition by Weight

The litter survey revealed that by weight the largest category was cigarette butts at 38.8% followed by glass (21.5%), paper (11.6%), organics (10.1%), plastic (9.6%), non ferrous (3.7%), ferrous (2.3%) and miscellaneous (2.3%). Figure 7 shows the composition of litter by weight.

⁹ Chewing gum is under represented due to the difficulties of collecting chewing gum from sites, then separating from other materials for sorting and weighing. The CCAT litter count rated confectionery items as the most prevalent littered item with chewing gum as the major component.

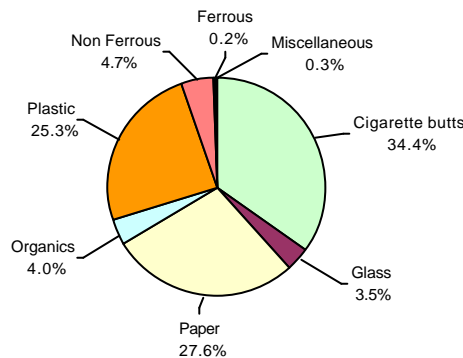
Figure 7: Composition of Litter by Weight



3.2.3 Litter Composition by Volume

The litter survey revealed that by volume the largest category was cigarette butts at 34.4% followed by paper (27.6%), plastic (25.3%), non ferrous (4.7%), organics (4.0%), glass (3.5%), miscellaneous (0.3%) and ferrous (0.2%). Figure 8 shows the composition of litter by volume.

Figure 8: Composition of Litter by Volume



Glass comprises 21.5% of litter by weight but only 3.5% by volume because most glass collected was broken and the density of glass makes it much heavier than both paper and plastics.

4. Discussion

Because litter can be dumped anywhere (a non-point source pollutant stream) the extent of the problem is difficult to quantify.

The Litter Protocol provides an indicator of the state of litter in sites of significance in NSW. It was never intended to be the definitive measure of litter but it is expected that by repeating this study over a number of years, information on the factors that contribute to an item being littered and what that item is likely to be will be identified.

The results from this first litter study using the Clean Communities Assessment Tool (CCAT) indicate that public spaces across NSW on average are moderately clean - a score of 3.8 on the five point CCAT rating scale where (1) is not at all clean and (5) is extremely clean.

This is an encouraging result and reflects the success of NSW Government programs on litter as well as those of other organisations.

The success of media campaigns from '*Do the Right Thing*' to the current '*Don't be a Tosser*' have encouraged the NSW community to value a litter free environment.

The changes to littering offences regulations under the *Protection of the Environment Operations Act 1997* in July 2000 have resulted in a massive increase in fines being issued, from fewer than 800 fines issued in 1999 to 8,700 fines issued in 2003-04¹⁰.

The NSW Waste Avoidance and Resource Recovery Strategy (Resource NSW, 2003) has maintained the focus on litter by identifying litter prevention as one of four main outcome areas.

Operation Litter Bug is targeting littering, illegal dumping and uncovered loads along the major arterial roads in Western Sydney.

4.1 Littering Behaviour

There was no significant difference in the CCAT summary scores in the three regions (Sydney, Greater Sydney Region and Regional NSW) identified for the survey.

¹⁰ Statistics on the number of litter fines issued are collated by DEC (NSW) from monthly processing data sourced from the Infringement Processing Bureau (IPB).

The CCAT score for site types showed that beaches (4.0), parks (3.9) and waterfronts (3.9) were the cleanest sites. The survey was conducted in the cooler months of May and June, so the results may be a reflection of the lower usage of these sites during the period or they could indicate that users of these sites have a positive attitude or attachment to the sites and therefore are less inclined to litter.

The sites that did not perform as well in the CCAT were roadside stops (3.5), transport sites (3.6) and landmark sites (3.6). These sites also had the lowest scores for facilities which reflects a lack of BIN infrastructure. Security concerns in transport and landmark sites and the isolation of roadside stops would have contributed to the lower facilities scores.

Disposal actions observed during the CCAT assessments indicate that 3 out of 4 people in NSW are disposing of potential litter appropriately.

4.2 Litter Composition

The composition of litter results were not surprising with cigarette butts identified as the single most littered item (by weight and volume) in NSW. This is consistent with the results of:

- Clean Up Australia's Rubbish Report, 2003: *...Cigarette butts once again feature as number one on the 'Least Wanted' list ... for the last five consecutive years, cigarette butts have featured as the most discarded item* (Clean Up Australia Ltd, 2003)
- Keep Australia Beautiful Victoria litter surveys: *In the past five years cigarette butts have been the highest item of litter found during KABV's litter surveys:*
 - *Cigarette butts make up over 76% of all litter surveyed in the Melbourne CBD, and*
 - *37% of all litter surveyed in Victoria* (Keep Australia Beautiful Victoria, 2004)
- Keep South Australia Beautiful's quarterly litter count across 151 sites in metropolitan and rural South Australia, which indicates that cigarette butts consistently comprise around 40% of total litter (Keep South Australia Beautiful, 2004).

The prominence of cigarette butts as litter in this study reinforces the decision to identify butts as a "waste of concern", suitable for management under extended producer responsibility schemes in the 2004 NSW Extended Producer Responsibility Priority Statement (DEC, 2004).

DEC (NSW) has also funded projects such as the Clean Harbour Partners Program with the City of Sydney Council to reduce the number of cigarette butts and quantity of litter entering the harbour through stormwater drains.

Other commonly littered items by weight included glass (miscellaneous broken glass and containers) and paper (disposable paper products such as confectionery wrappers).

Other commonly littered items by volume included paper products and plastics (miscellaneous scraps and containers).

The low quantity of litter collected at the sub category material level meant that the results were too variable to allow the composition to be reported confidently at this level. It is anticipated that enough litter will be collected over future surveys to be able to report the composition of litter by sub category. This will include collecting litter from a greater number of sites.

Chewing gum was also under represented in the organics material type due to the difficulties of removing chewing gum from sites and separating it from other materials during sorting and weighing. Specifically, chewing gum was not scraped off pavements (which are a significant source of gum). It is proposed in future surveys that chewing gum be collected by the use of scrapers and kept separate from the other material types.

4.3 Conclusion

The 2004 NSW Litter Monitoring Protocol provides base year data on the composition of litter and the factors contributing to generation of litter within sites of significance in NSW. This first year of data is only a snapshot of litter in NSW and does not allow trend analysis or conclusive results.

Future surveys will potentially identify trends in litter composition and behaviour, assisting policy development and development of anti-littering programs such as extended producer responsibility initiatives, educational campaigns or regulatory action and assist local councils in the litter management of public spaces.

Appendix 1

Legislative Context of the NSW Litter Report

The *Protection of the Environment Operations Act 1997* includes Section 146D on littering reports:

- (1) The EPA is required to furnish to the Minister a biennial report on littering.
- (2) The report is to contain estimates of the type of material that comprises litter deposited during the period concerned and the quantity (by weight and volume) of each such type of material, by reference to locations considered by the EPA to be places of significant littering activity.
- (3) The EPA must cause advertisements to be published setting out the proposed methodology to be used in compiling such reports and inviting comments from members of the public concerning the proposed methodology. The EPA must allow at least 30 days for such comments to be made, and must consider comments received within the time allowed.
- (4) The Minister is to cause a copy of each report to be laid before both Houses of Parliament within 30 sitting days after receiving the report.
- (5) If the Minister or the State Waste Advisory Council, after consideration of the report, is of the opinion that:
 - (a) the managers or other persons responsible for any of the locations referred to in subsection (2), or
 - (b) the producers of or other persons responsible for any products whose components or packaging comprise litter at any such locations, are not acting in a manner that minimises littering, the Minister may make recommendations aimed at improving litter avoidance strategies.

Action taken to implement the legislative requirements

The proposed method for compiling the information for the report (EPA, 2003) was advertised in the *Sydney Morning Herald* on 9 August 2003. The Department of Environment and Conservation (NSW) (DEC (NSW)) received 11 submissions in response to the advertisement. All submissions were supportive of a litter survey program but a number of submissions suggested that litter studies should include a behavioural component and that the proposal to measure generation and littering rates was too ambitious.

In response to the consultation process DEC (NSW) revised the methodology and developed the New South Wales Litter Monitoring Protocol (the Litter Protocol) to incorporate a behavioural component known as the Clean Communities Assessment Tool (CCAT), whilst also measuring the composition of litter through the DEC (NSW) designed Litter Characterisation Survey. The proposal to estimate littering and generation rates was not included in the Litter Protocol because the high number of factors affecting littering means that these rates could not be estimated with the required level of confidence.

The methodology aims to provide a baseline to build a picture of long-term trends in litter composition and littering behaviours through comparable subsequent studies. This information will provide an indicator of the effectiveness of government, industry and community initiatives to reduce litter.

Appendix 2

Litter Characterisation Survey Overview

The Litter Characterisation Survey was developed by DEC (NSW). Litter was collected from a 48m² area within each site. This was the same area used for the Clean Communities Assessment Tool litter count. Community Change provided maps of each site defining the area for litter collection. The collected litter was sorted into material type, counted, weighed and recorded.

Litter classification was based on a set of major material types, with sub-categories within each major material type (see table below). All litter collected was sorted by the sub-category material type for weight and volume measurement.

The litter was weighed on electronic scales calibrated to 0.1 grams and the volume estimated by space occupied in a container of known volume. For example, disposable paper products that half filled a 10 litre bucket would be estimated to have a volume of 5 litres. The estimate of volume was based on how the material was found, i.e. if an aluminium can was crushed it was estimated as crushed; if the aluminium can was not crushed it was estimated as such.

Material Type Classification

Major material types are in **bold**, followed by the sub-categories.

<p>Paper Newspaper Magazines Corrugated Cardboard Package Board Liquid Paper Containers Disposable Paper Product Print / Writing Paper Contaminated food paper</p>	<p>Plastic Plastic containers Films Plastic bags Foams Other (please specify)</p>
<p>Organic Food Other putrescible (please specify) Wood Clothing / Rags Leather Rubber</p>	<p>Ferrous Steel cans Other (please specify)</p> <p>Non ferrous Aluminium cans Other (please specify)</p>
<p>Glass Glass containers Other Glass (please specify)</p>	<p>Miscellaneous Batteries Ceramics Miscellaneous crumbs</p> <p>Cigarette butts</p>

Appendix 3

Site Types

Site types were selected for the Litter Protocol with the assistance of expert advice from Community Change, on the understanding that:

- these would form the core group of sites to be included in future surveys;
- the sites were recognised as significant in terms of littering activity;
- the sites were commonly found across NSW; and
- the selected sites would be consistent with sites selected for the Victorian Litter Monitoring Protocol¹¹.

Site Type Definitions

Site type definitions used in the Litter Protocol are as follows:

Beaches: the sandy area between the water and a boundary or border that clearly marks areas for recreation, this includes boardwalks adjoining the beach such as Manly beach. Parks adjoining beaches were excluded, such as Bronte Park, which is separate from Bronte Beach.

Landmarks: are characterised as having some significance in terms of the history or culture of the city they belong to and often do not have a primary activity associated with tourism. Landmarks are often meeting places, such as the El Alamein Fountain in the Fitzroy Gardens in Kings Cross or the ANZAC war memorial in Hyde Park. Landmark buildings are characterised by sightseeing or tourist activity although not designated as such. The Queen Victoria Building for instance is an icon building in Sydney and attracts visitors for this reason, however the main activity of the building is as a retail centre. Other landmarks are considered icons such as the Opera House, Bondi Pavilion or the Big Banana in Coffs Harbour.

Malls: a pedestrian thoroughfare or sheltered promenade with merchandise and food vendors lining the walkway or street, often with limitations on vehicle access, eg, Pitt St Mall.

Markets: open spaces or covered buildings where merchandise and food stalls provide fresh produce and a range of goods to the public, which often include seating and eating areas, eg, Manly Market.

¹¹ Curnow, Spehr & Casey, 2003. The advice and assistance of Nick Chrisant of EcoRecycle Victoria was appreciated in establishing the NSW Litter Monitoring Protocol.

Parks: grassy locations with shrubbery or garden beds, seats and tables and often with barbecue facilities and children's play equipment used for picnicking and recreation.

Public buildings: area around a building open to the public, which often includes places for people to sit and eat and within walking distance of food vendors, eg, library, GPO, council buildings, museum, courts, art galleries, etc.

Roadside stops: any public wayside or recreational area that borders a road and is used for rest breaks, often including toilets, barbecue areas, seating or gardens. A roadside stop is generally located on a highway in a regional area, a highway being defined as any main road outside a town speed limit sign.

Shops: shopping strip areas for selling goods or services, often with a vehicular thoroughfare in the middle of a shopping strip lined with merchandise and food vendors with wide footpaths and places for people to sit, eg, George St in The Rocks or Campbell Parade in Bondi.

Smoking areas: may include a formal or informal area outside an office building or tertiary institution for designated cigarette consumption. Smoking areas may be catered for either officially or unofficially by the placement of permanent or non permanent ashtrays.

Tertiary institutions: these include both TAFEs and universities. The boundary of the institution is defined as the area immediately in front of a tertiary institution's building, which often includes furniture and bins.

Transport: outdoor areas designed for waiting for transport, or transit areas with pedestrian traffic going to and from public transport and often with space for parking and manoeuvring vehicles, bus stops and tram stops

Ferry terminals: the area immediately in front of/outside a ferry terminal, as far as one can go before having to submit a ticket.

Railway easements: the area immediately in front of/outside a railway station defined by a boundary or a fence, which provides sheltered access to the public. A real or imaginary fenceline extending to a point of unauthorised entry is the limit of the railway easement.

Bus stops: a specific area, usually with a shelter, where a bus would pull up to collect passengers. Often bus stops are located near train stations but are assessed as a separate area from the easement.

Waterfronts: areas next to bodies of water (eg Sydney harbour areas, rivers, lakes or ponds) often with seats or areas used by the public for recreation and picnicking.

Constructed waterfronts: areas adjacent to waterfronts that have been specifically constructed for commercial purposes, with either cafes, take away restaurants or shops, eg areas around The Rocks and Darling Harbour.

Natural waterfronts: areas adjacent to waterfronts that occur naturally, where furniture or BBQ facilities may have been installed, eg, Coffs Creek, or ponds in parks that have been created for non-commercial recreation, eg the main pond in the Royal Botanic Gardens.

References

ABS 2004. **Regional Population Growth, Australia & New Zealand**. Australian Bureau of Statistics Cat No. 3218.0.

Beverage Industry Environment Council 2002. **Littering Behaviour Study Five, National Benchmark 2002**. www.biec.com.au

Clean Up Australia Ltd 2003. **Clean Up Australia Rubbish Report 2003**. www.cleanup.com.au

Curnow, R.C., Spehr, K.L. & Casey, D. 2003. **Victorian Litter Monitoring Protocol Pilot Test and Benchmarks Using the Clean Communities Assessment Tool**. A Community Change report to EcoRecycle Victoria. www.ecorecycle.vic.gov.au/asset/1/upload/VicLitterMonitorProtocol_Sep03.pdf

Department of Environment and Conservation (NSW) 2004. **Extended Producer Responsibility Priority Statement**. www.environment.nsw.gov.au/waste/epr/eprps04.htm

EPA 2003. **Consultation Paper NSW Litter Survey Program: Proposed method for surveying litter in New South Wales**, NSW Environment Protection Authority.

Keep Australia Beautiful Victoria 2004. **Litter – Cigarette Butt Fact File**. www.kabv.org.au

Keep South Australia Beautiful Inc. 2004. **Environmental Solutions - Litter Statistics**. www.kesab.asn.au

Resource NSW 2003. **Waste Avoidance and Resource Recovery Strategy, 2003**. www.resource.nsw.gov.au/strategy.htm