



Litter Strategy Monitoring Wave 46 – September 2009 Report

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On behalf of: KESAB Environmental Solutions
Project No: 7239
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Section 1

Introduction

This document has been prepared by McGregor Tan Research to report on Wave 46 of the quarterly KESAB Litter Monitor. Surveys for the current Wave were conducted in South Australia during August 2009.

Background

Regular monitoring of the litter stream is necessary in order to maintain a clear picture of its components, such as the various material types that contribute to the litter stream as well as the distribution of litter across different area types. Keep South Australia Beautiful (KESAB) had been monitoring the State's litter stream for many years, but the level of detail required during the South Australian Government's moratorium on changes to Container Deposit Legislation was considerably greater than previously recorded.

An expanded monitoring program commenced in February 1998, and McGregor Tan Research was commissioned at that time to undertake the actual count and to report regularly on the outcomes. This expanded program was continued throughout 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009 and is planned to continue.

With the exception of August 2002, counts have been conducted quarterly, carried out in February, May, August and November of each year. Throughout the Monitor, care has been taken to maintain the data in a form compatible with KESAB's requirements.

During each Wave of the survey, litter counts are undertaken at 151 sites across South Australia. In conjunction with the national litter count, a review of all South Australian sites showed that 11 of the sites surveyed were disproportionately represented in the data. These original sites were found to be unusual in nature, and were replaced with 11 revised sites.

The data collection form utilised for the count was jointly developed by McGregor Tan Research and KESAB. A copy of this form is provided in Appendix 2.

In January 2003, Container Deposit Legislation (CDL) was extended to cover most beverages under 1 litre, such as juice cartons, fruit boxes, flavoured milk cartons, etc. As a result, a new method of analysing the data had to be adopted so that the changes to the CDL, and the effect on the total litter stream could be evaluated.

Prior to the August 2004 Litter Count, the data collection form was re-evaluated and re-designed to take into account the changes to the CDL and also to incorporate new categories for litter items that were previously coded as 'other' or in an inappropriate category. The changes that were made to the data collection form include:

- Plastic bags were separated into 3 types of litter:
 - Supermarket type lightweight shopping bags
 - Heavier glossy, typically branded carry bags
 - Sacks, sheeting and other bags
- Bottle and can tops were moved and separated from the Miscellaneous Category into both 'plastic bottle top' and 'metal bottle and can tops'.
- The following four litter types were also added to the Plastic category:
 - Bread bag tags
 - Lollipop sticks
 - Spoons/ cutlery
 - Drink pouches
- The Metal Cans category name was changed to Metal.
- Foil take away was moved from Miscellaneous to Metal.
- Cigarette butts were separated from the Miscellaneous Category.
- Two extra items were added to the Paper/paperboard category:
 - Paper bags
 - Shopper docket & related shopping paper

In previous waves, the data collection form separated each litter type into CDL and non-CDL categories. However, extended Container Deposit Legislation (CDL) has now meant that the litter categories alone (e.g. Flavoured milk, < 1 litre) can be used to establish whether or not beverage containers are covered under CDL or not.

In order to determine the effectiveness of the current CDL (as of January 2003), and for comparative purposes, it was necessary to re-calculate the number of current CDL items from the waves prior to the extension. References to CDL items in Waves prior to Wave 17 (waves 1-16) therefore denote beverage containers that are *currently* covered by CDL – not the items that *were* covered by the legislation prior to this time.

During the Wave 29 Monitor estimates of the volumes for each litter item category were defined. The assignments of volume estimates to each litter item category were based on actual measurements of containers/ items, the condition that these items were most commonly

found (which was based on the audits of at least three Waves), and the most common or average size of the items that were found within each category.

The auditors were an important part of the volume formulation process, and these persons were able to record the number, size and type of different items within each category over a number of waves. Volumes ascribed to each item represented the average size for that category across all site types.

The final volume attributed to each litter item category furthermore took into account the fact that some items were often found crushed and weathered. For example, some drink cans and cartons are often crushed and/ or weathered when they are identified by the auditors and counted. The same volume measurements have been used for all subsequent Waves.

Two noteworthy events that have taken place since the beginning of this longitudinal study include:

- The deposit on drink containers was increased from 5 cents to 10 cents in September 2008.
- The ban on thin plastic shopping bags came into affect in May 2009.

This document reports on Wave 46 of the longitudinal study. The litter count was conducted during August 2009. Section 2 of this report outlines the litter characteristics of the 151 sites, which include 11 revised sites (replacing 11 of the original 151). Appendix 1 contains charts tracking results back across all prior Monitors, and includes weighted results to facilitate meaningful comparison of results established at the 151 original sites with results derived from the 151 revised sites.

Section 2

Wave 46

Executive Summary

The following Executive Summary covers the findings of the August 2009 (Wave 46) KESAB Litter Monitor. Where possible, results have been tracked against those derived from any previous Waves which incorporated revised sites. All 151 sites were counted during the August 2009 count.

Items Counted

A total of 14,539 litter items were counted across the 151 South Australian sites during Wave 46. These figures were very similar to those from the previous two Monitors in May (14,433) and February (14,422) but slightly higher than the count conducted in August 2008 (13,882). The figures still represent a significant decrease in the litter count from previous monitors in May 2008 (17,400), February 2008 (18,281) and November 2007 (16,084).

Cigarette butts was the main contributor to the increase in the litter count, increasing by 30% or 1,417 butts from 4,764 in Wave 45 to 6,181 in Wave 46. The count of most other litter items decreased in August 2009.

The decrease in items from the May 2009 Monitor is demonstrated most strongly amongst the following litter items:

- PLASTIC - Snack bags & confectionery wrappers – 337 items, down from 584 items in Wave 45 (42% decrease)
- PAPER/ PAPERBOARD - Packages & boxes - 77 items, down from 287 items in Wave 45 (73% decrease)
- PLASTIC - Plastic bottle tops – 325 items, down from 459 items in Wave 45 (29% decrease)
- PLASTIC - Other plastic – 1208 items, down from 1306 in Wave 45 (8% decrease)
- METAL - Metal pieces – 192 items, down from 270 items in Wave 45 (29% decrease)
- MISCELLANEOUS - Rubber pieces (not tyres) -169 items, down from 240 items in Wave 45 (30% decrease)
- GLASS - Other glass – 227 items, down from 297 in Wave 45 (24% decrease)
- PAPER/ PAPERBOARD - Paper bags – 102 items, down from 170 items in Wave 45 (40% decrease)
- PLASTIC - Styrene foam boxes, sheets, etc. – 96 items, down from 158 items in Wave 45 (39% decrease)

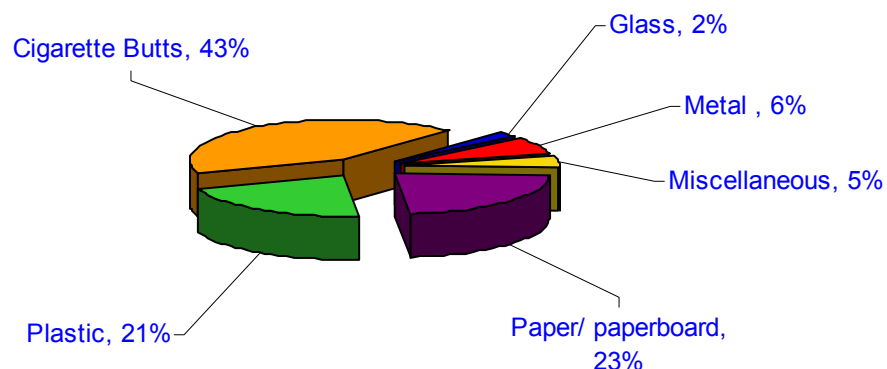
- PAPER/ PAPERBOARD - Cigarette packets – 191 items, down from 248 items (23% decrease)
- GLASS - Beer, all colours of glass, <750ml – 51 items, down from 101 items in Wave 45 (50% decrease)
- MISCELLANEOUS - Clothing & materials – 230 items, down from 280 items in Wave 45 (28% decrease)

Conversely, there was an increase in several litter items, these included:

- CIGARETTE BUTTS – 6,181 items, up from 4,764 in Wave 45 (30% increase)
- PAPER/ PAPERBOARD - Other paper (including tissues) – 2307 items, up from 2006 items in Wave 45 (15% increase)
- PLASTIC - Take away & cups - 258 items, up from 228 items (13% increase)
- MISCELLANEOUS - Construction materials – 165 items, up from 142 items (16% increase)
- PLASTIC - Bags - heavier glossy typically branded carry bags – 35 items, up from 16 items in Wave 45 (119% increase)

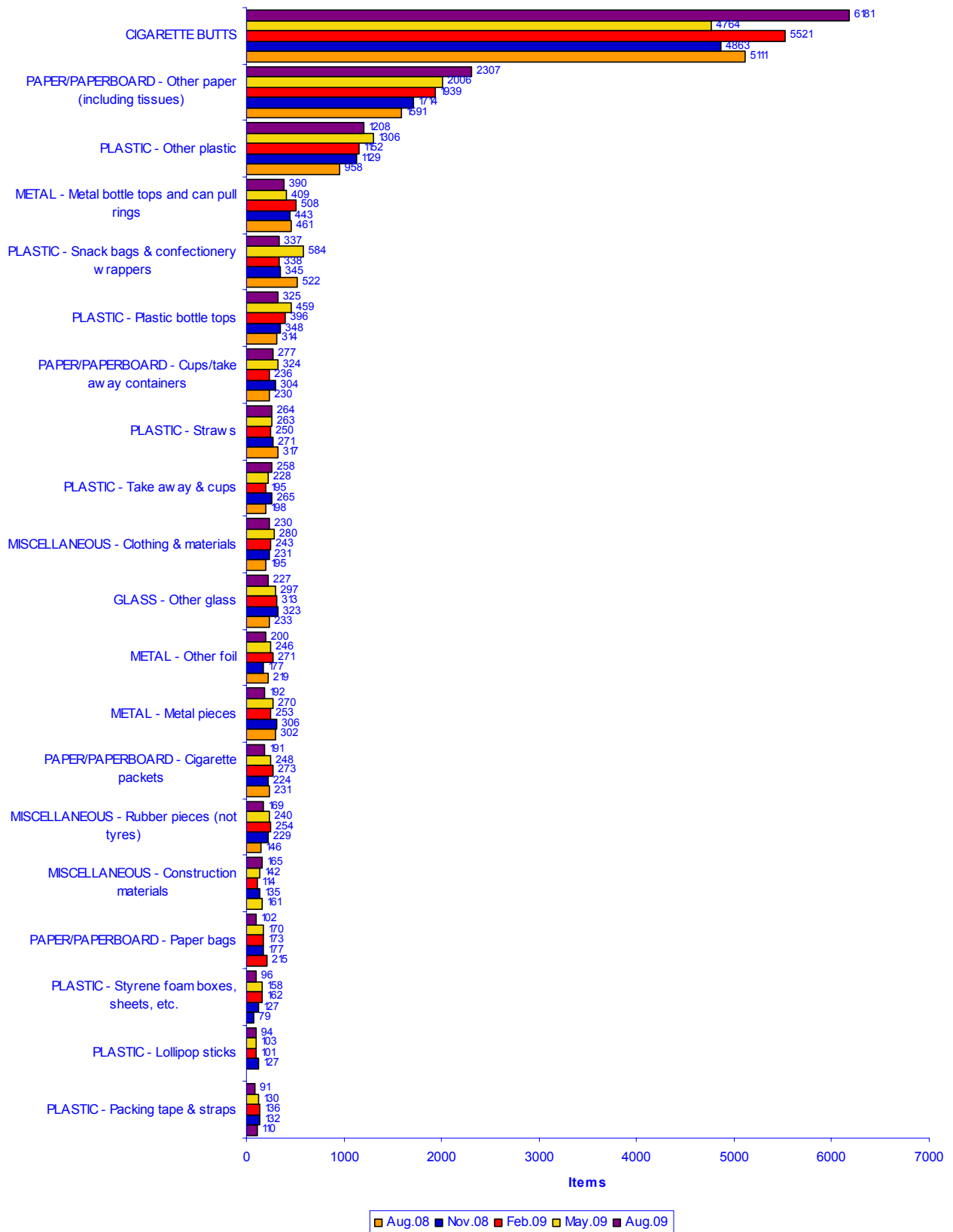
Cigarette butts accounted for the largest proportion of all litter items counted (43%, up from 33% in Wave 45, 38% in Wave 44 and 36% in Wave 43).

Items as Proportions of Total by Material Type



The top 20 ranking of litter items for August 2009 also included PASTIC – Lolly pop sticks, not present in the previously in Wave 45. The item that exited the top 20 as a result of the new entrant was PAPER/ PAPERBOARD –Paper bags.

TOP 20 CATEGORIES - HIGHEST COUNTS



Litter Volume

The total volume of litter counted in August 2009 amounted to 1.294 cubic metres, 37% lower than the estimated litter volume established during the August 2008 Monitor (2.048 m³) conducted at the same time in the previous year.

This total litter volume figure is also lower than the estimated litter volume figures established during the May 2009 (1.926m³), February 2009 (1.957 m³) and November 2008 (2.038m³) litter counts.

Miscellaneous items (30%, down from 31% in Wave 45) represented the largest proportion of litter volume for August 2009. Illegally dumped items formed the overwhelming majority (81%) of the miscellaneous litter volume and also represented the largest decrease in the volume of litter (0.312m³, down from 0.528m³ in Wave 45).

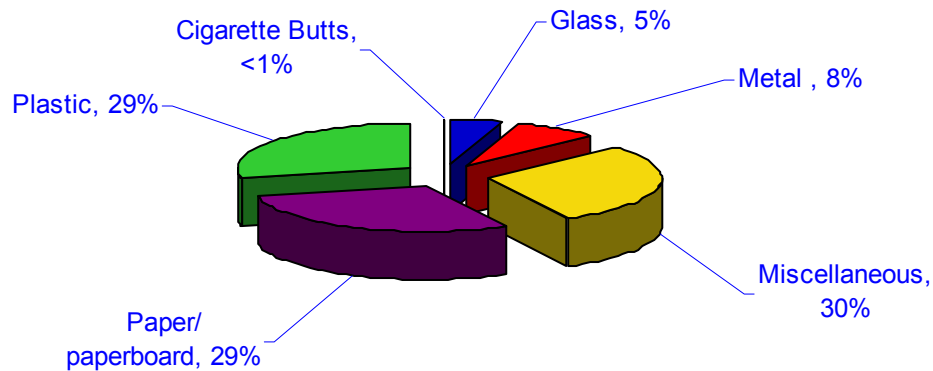
Paper/ paperboard items (29%, up from 24% in Wave 45) and plastic litter items (29%, down from 32% in Wave 45) accounted for the second and third largest proportions of litter volume in Wave 46.

The second largest decrease in volume was attributed to the reduction in plastic - industrial containers (0.157m³, down from 0.337m³ in Wave 45), these represented 43% of the plastic litter volume (down from 55% in Wave 45 and 72% in Wave 44).

Other material types represented the following proportions of the total volume of litter items counted:

- Metal (8%, unchanged from Wave 45)
- Glass (5%, down from 6% in Wave 45)
- Cigarette butts (<1%, unchanged from Wave 45)

Litter Volume as Proportion of Total Volume



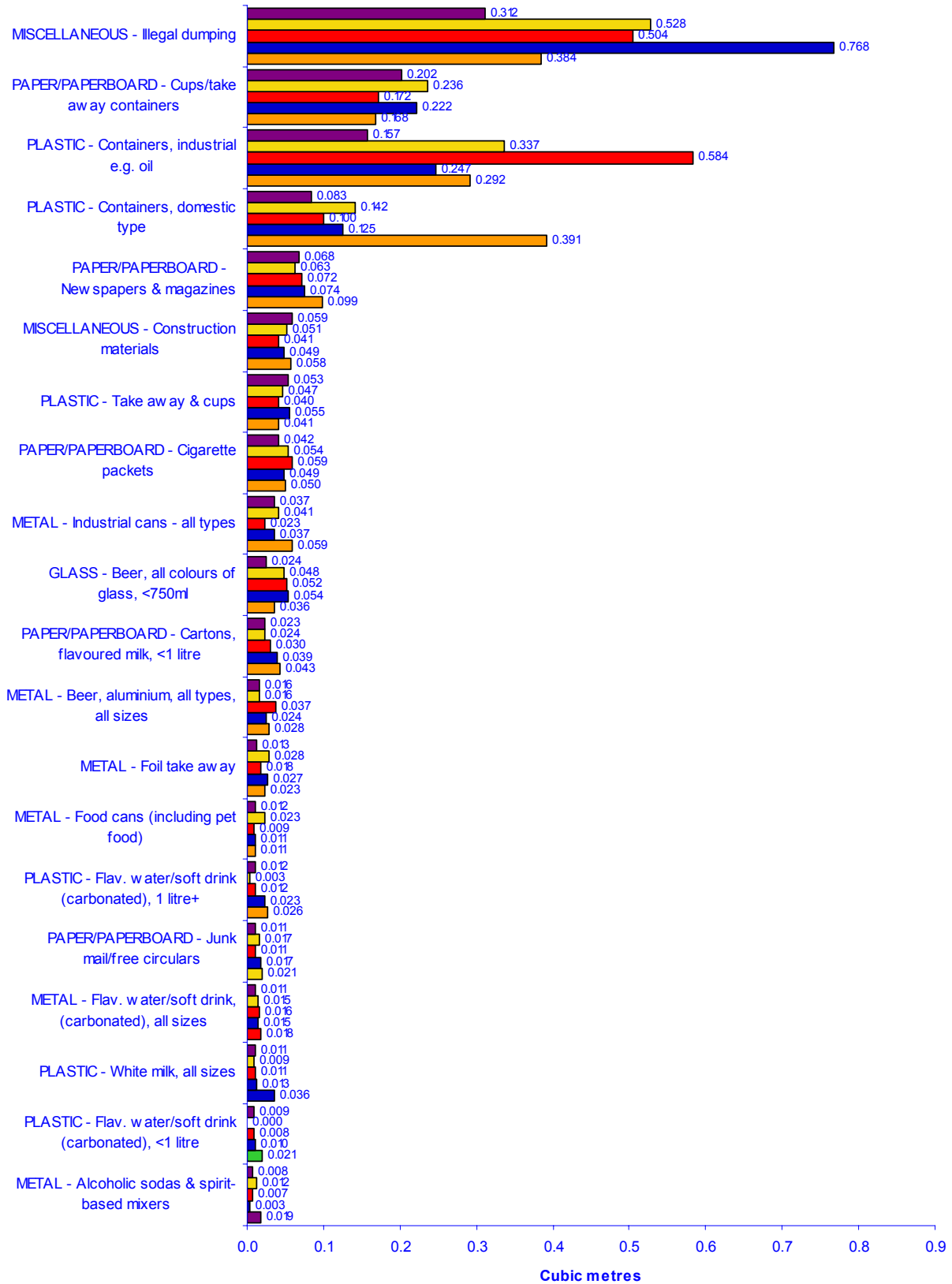
The items associated with the largest estimated litter volumes in Wave 46 included:

- Miscellaneous – illegal dumping (0.312m³, down from 0.528m³ in Wave 45)
- Paper/ paperboard - Cups/ take away containers (0.202m³, down from 0.236m³ in Wave 45)
- Plastic - industrial containers (0.157m³, down from 0.337m³ in Wave 45)
- Plastic – containers, domestic type (0.083m³, down from 0.142m³ from in Wave 45)
- Paper – newspapers and magazines (0.068m³, up from 0.063m³ from in Wave 45)
- Miscellaneous – construction material (0.059m³, up from 0.051³ from in Wave 45)
- Plastic – take away and cups (0.053m³, up from 0.047m³ from in Wave 45)

The top 20 ranking of litter items by volume was similar to the results for previous Waves, new items entering the top 20 however, were GLASS - Beer, all colours of glass, 750ml+, PAPER/ PAPERBOARD - Cartons, milk, plain (white), all sizes, PAPER/ PAPERBOARD - Packages & boxes and PLASTIC - Flavoured water/fruit juice drink/sports drink (non-carbonated), 1 litre+.

With new entrants there are always those items that exit from the top 20 volume list, in this Wave they were METAL - Alcoholic sodas & spirit-based mixers, PLASTIC - Flavoured water/soft drink (carbonated), <1 litre, PLASTIC - Flavoured water/soft drink (carbonated), 1 litre+ and PLASTIC - White milk, all sizes.

TOP 20 CATEGORIES - LARGEST VOLUMES



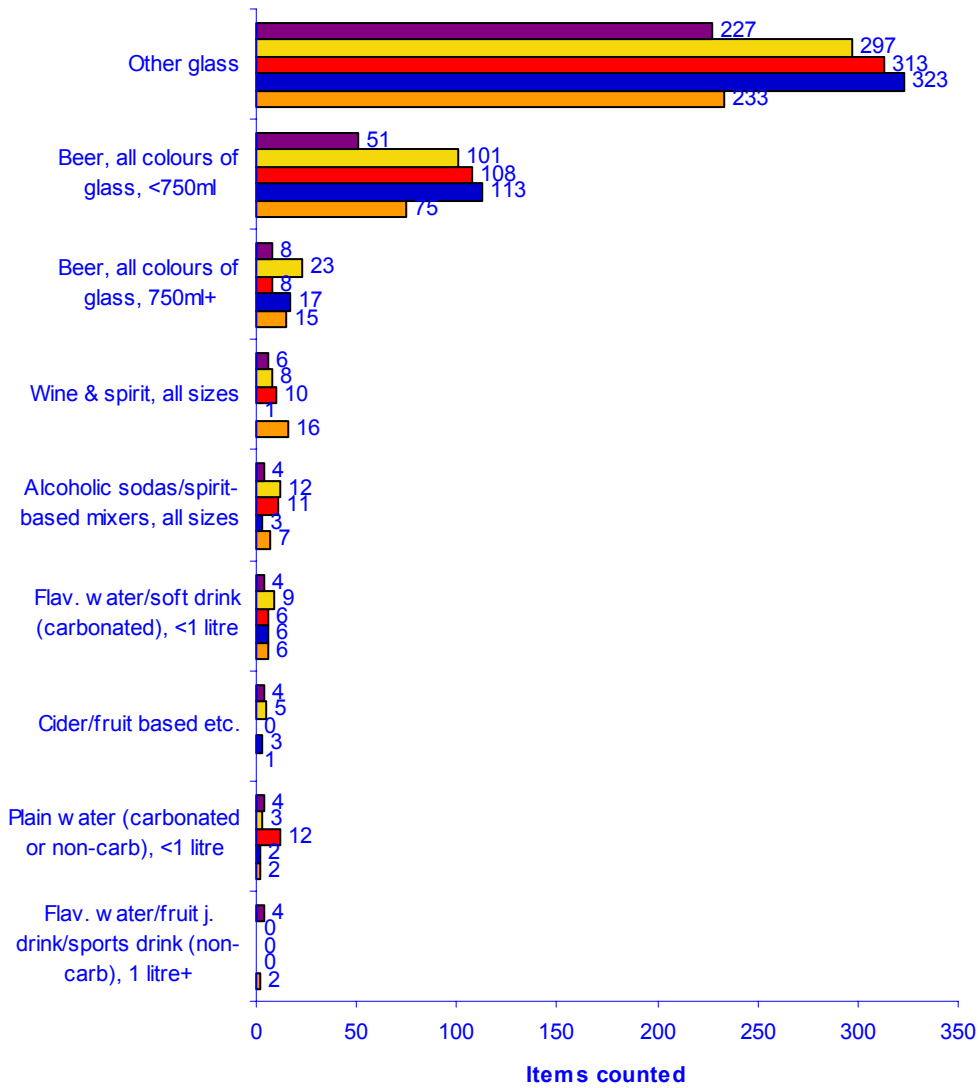
3.1 *Glass*

Items

A total of 320 (down from 477 in Wave 45) glass litter items were counted during Wave 46. The most frequently recorded glass items included:

- Other glass (227 items, down from 297 in Wave 45)
- Beer, all colours of glass <750ml (51 items, down from 101 in Wave 45)
- Beer, all colours of glass 750ml+ (8 items, down from 23 in Wave 45)
- Wine and spirits, all sizes (6 items, down from 8 in Wave 45)
- Alcoholic sodas/ spirit-based mixers , all sizes (4 items, down from 12 items in Wave 45)
- Flavoured water/ soft drink (carbonated) <1litre (4 items, down from 9 items in Wave 45)
- Cider/ fruit based etc. (4 items, down from 5 items in Wave 45)
- Plain water (carbonated or non carbonated), < 1 litre (4 items, up from 3 items in Wave 45)
- Flavoured water/ fruit juice drink/ sports drink (non-carbonated), 1 litre + (4 items, up from 0 items in Wave 45)

GLASS ITEMS - COUNTS
- top 5 -



Aug.08 Nov.08 Feb.09 May.09 Aug.09

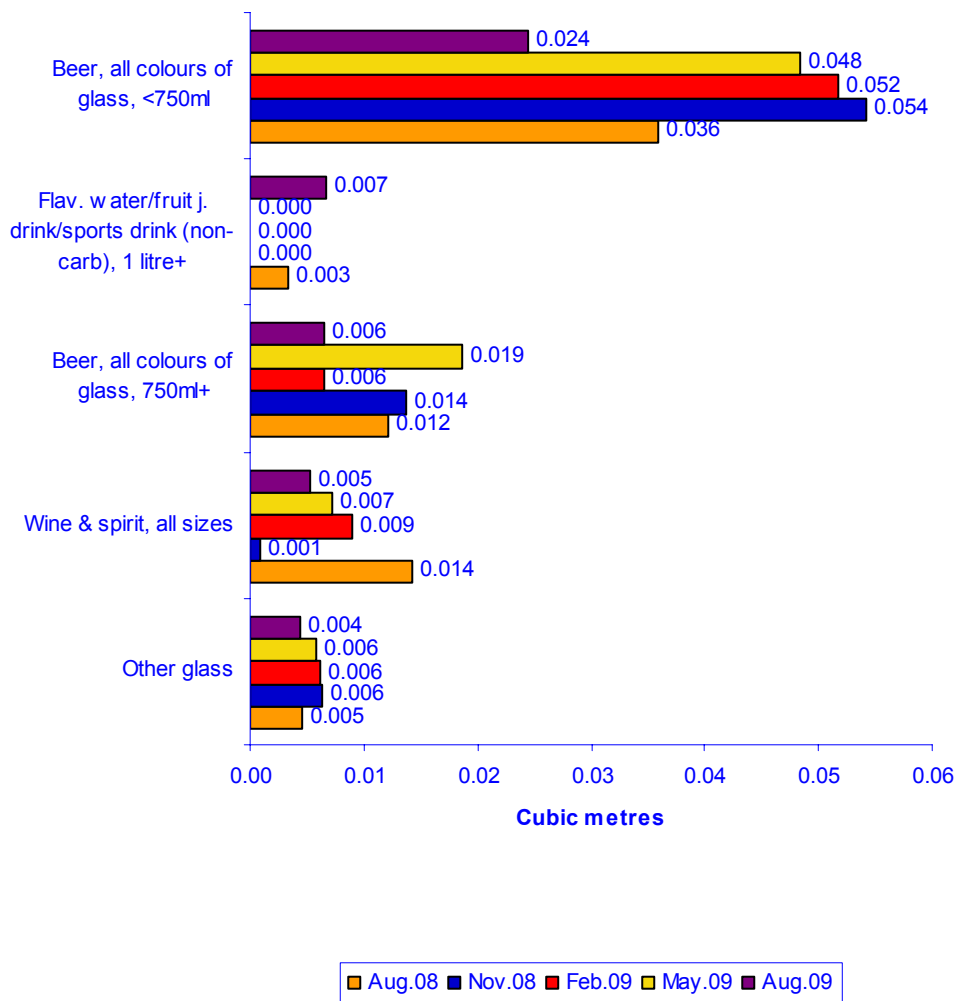
Volume

Glass litter items accounted for 0.059m³ (down from 0.108m³ in Wave 45) in estimated litter volume.

Glass items which contributed the largest volumes to the total included:

- Beer, all colours of glass, <750 ml (0.024m³, down from 0.048m³ in Wave 45)
- Flavoured water/ fruit juice drink/ sports drink (non-carbonated), 1 litre + (0.007m³, up from 0.000m³ in Wave 45)
- Beer, all colours of glass, 750+ ml (0.006m³, down from 0.019m³ in Wave 45)
- Wine and spirits, all sizes (0.005m³, down from 0.007m³ in Wave 45)
- Other glass (0.004m³, down from the 0.006m³ in Wave 45)

GLASS ITEMS - VOLUMES
- Top 5 -



3.2 Metal

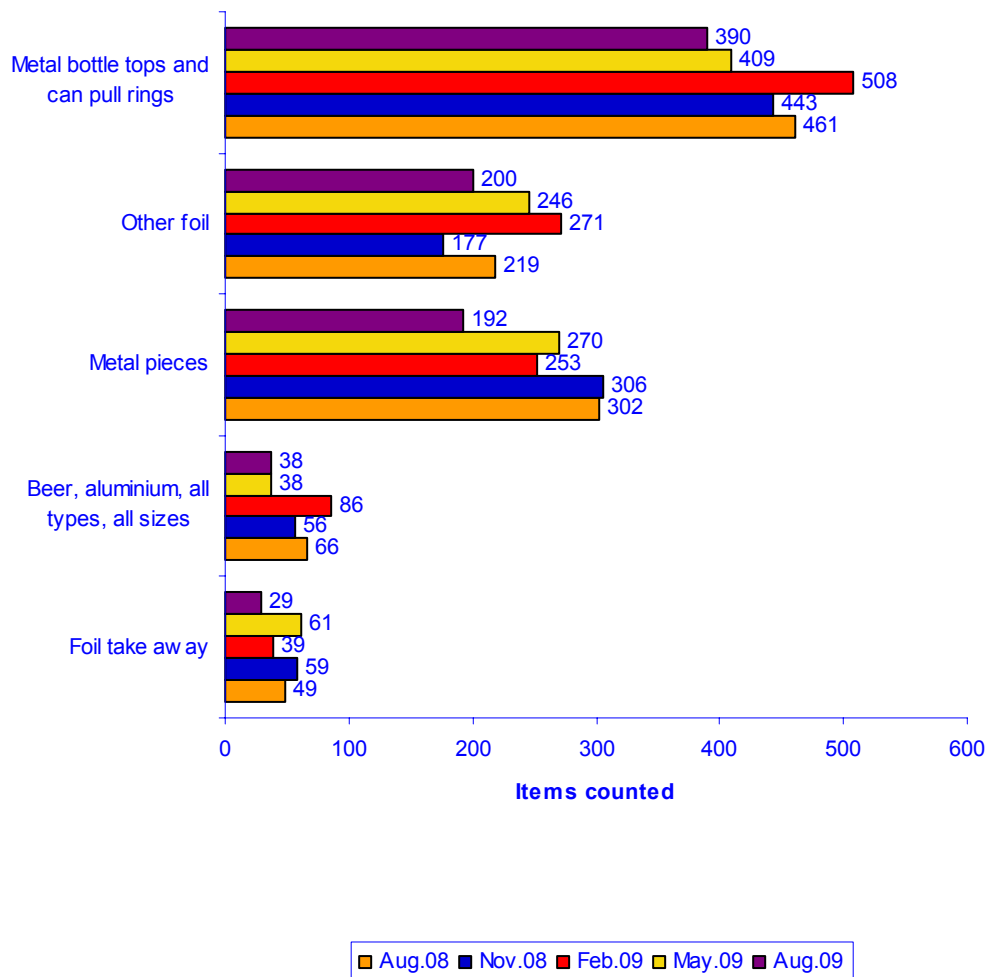
Items

A total of 926 (down from 1,149 in Wave 45) metal litter items were counted during May 2009.

The most frequently counted metal litter items included:

- Metal bottle tops and can pull rings (390 items, down from 409 in Wave 45)
- Other foil (200 items, down from 246 in Wave 45)
- Metal pieces (192 items, down from 270 in Wave 45)
- Beer, aluminium, all types, all sizes (38 items, the same as Wave 45)
- Foil Take away (29 items, down from 61 in Wave 45)

METAL ITEMS - COUNTS - Top 5



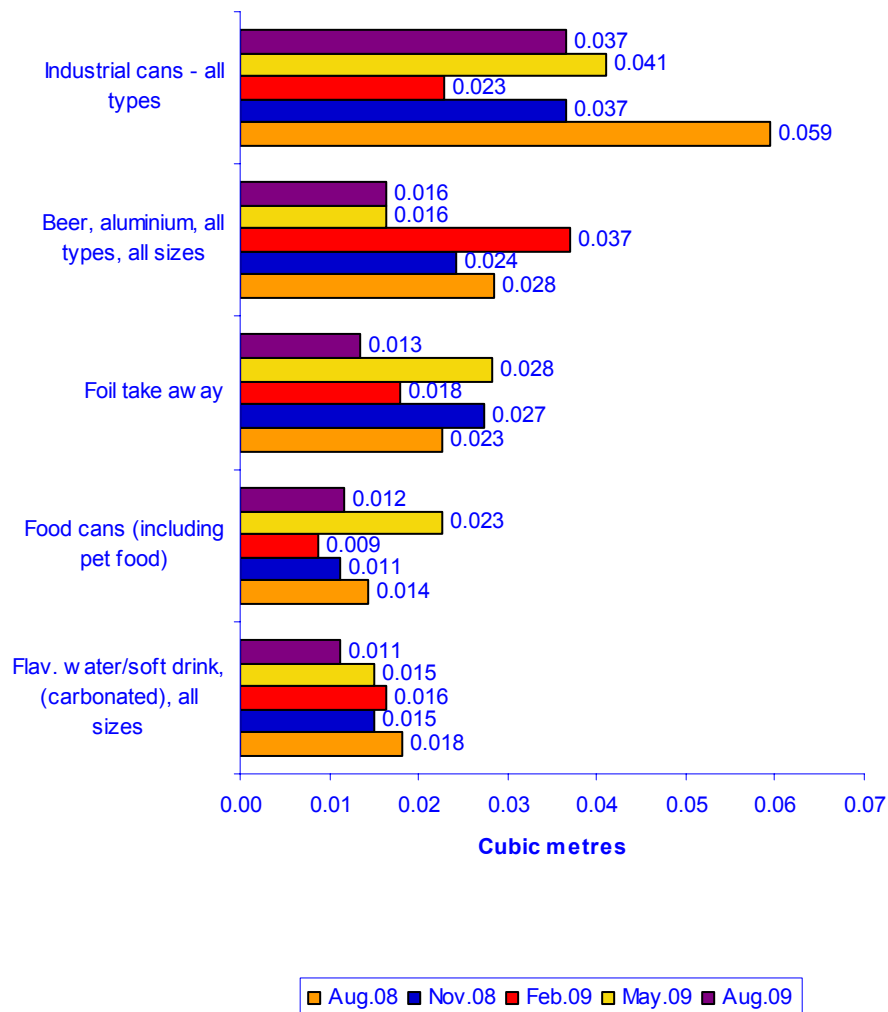
Volume

Metal litter items accounted for a total estimated litter volume of 0.104m³ (down from 0.147m³ in Wave 45).

Metal items associated with the largest estimated volumes of litter during Wave 45 included:

- Industrial cans – all types (0.037m³, down from 0.041m³ in Wave 45)
- Beer, aluminium, all types, all sizes (0.016m³, the same as Wave 45)
- Foil/ take away (0.013m³, up from 0.028m³ in Wave 45)
- Food cans, including pet food (0.012m³, down from 0.023m³ in Wave 45)
- Flavoured water/ soft drink (carbonated), all sizes (0.011m³, down from 0.015m³ in Wave 45)

METAL ITEMS - VOLUMES - Top 5



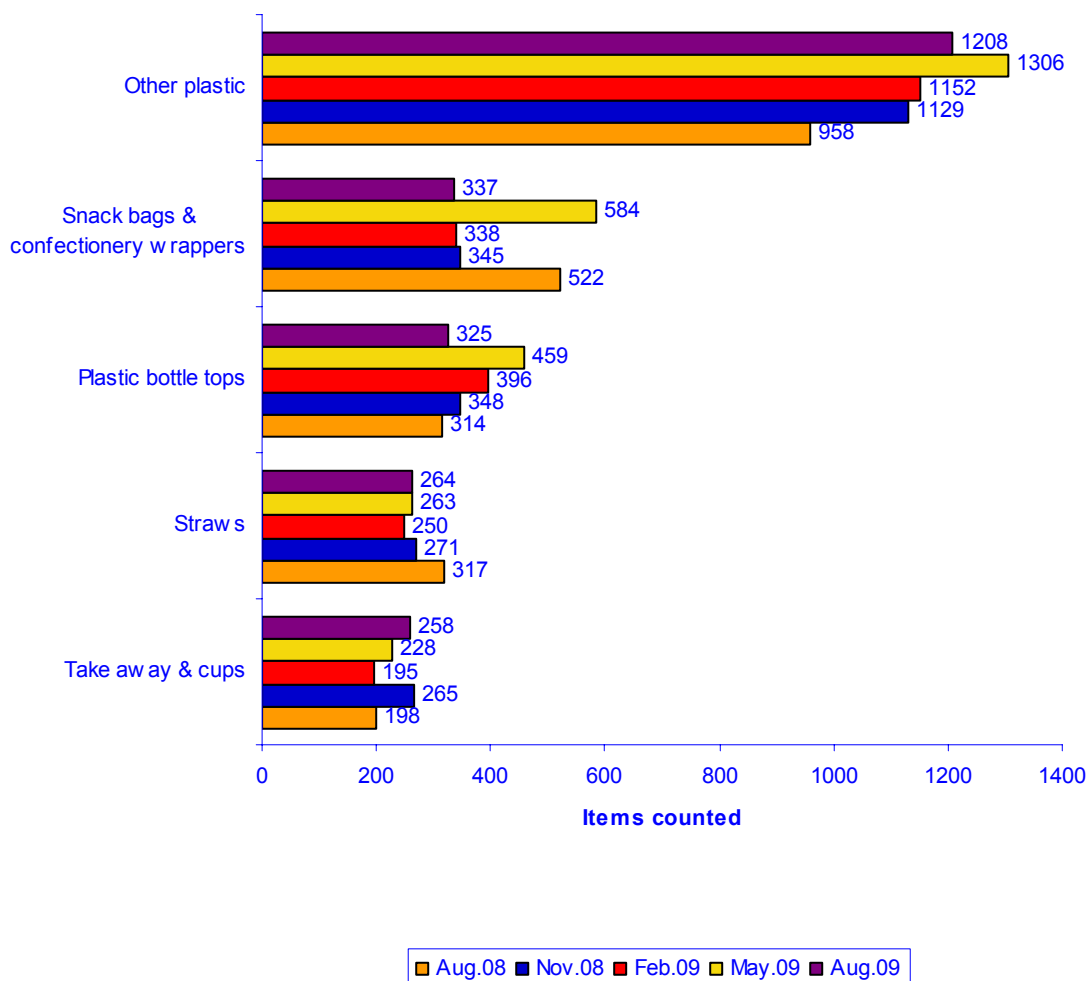
3.3 Plastic

Items

A total of 3,055 (down from 3,710 in Wave 45) plastic litter items were counted during Wave 46. The most frequently counted plastic litter items included:

- Other plastic (1,208 items, down from 1,306 in Wave 45)
- Snack bags & confectionery wrappers (337 items, down from 584 in Wave 45)
- Plastic bottle tops (325 items, down from 459 in Wave 45)
- Straws (264 items, up from 263 in Wave 45)
- Take away & cups (258 items, up from 228 in Wave 45)

PLASTIC ITEMS - COUNTS - Top 5

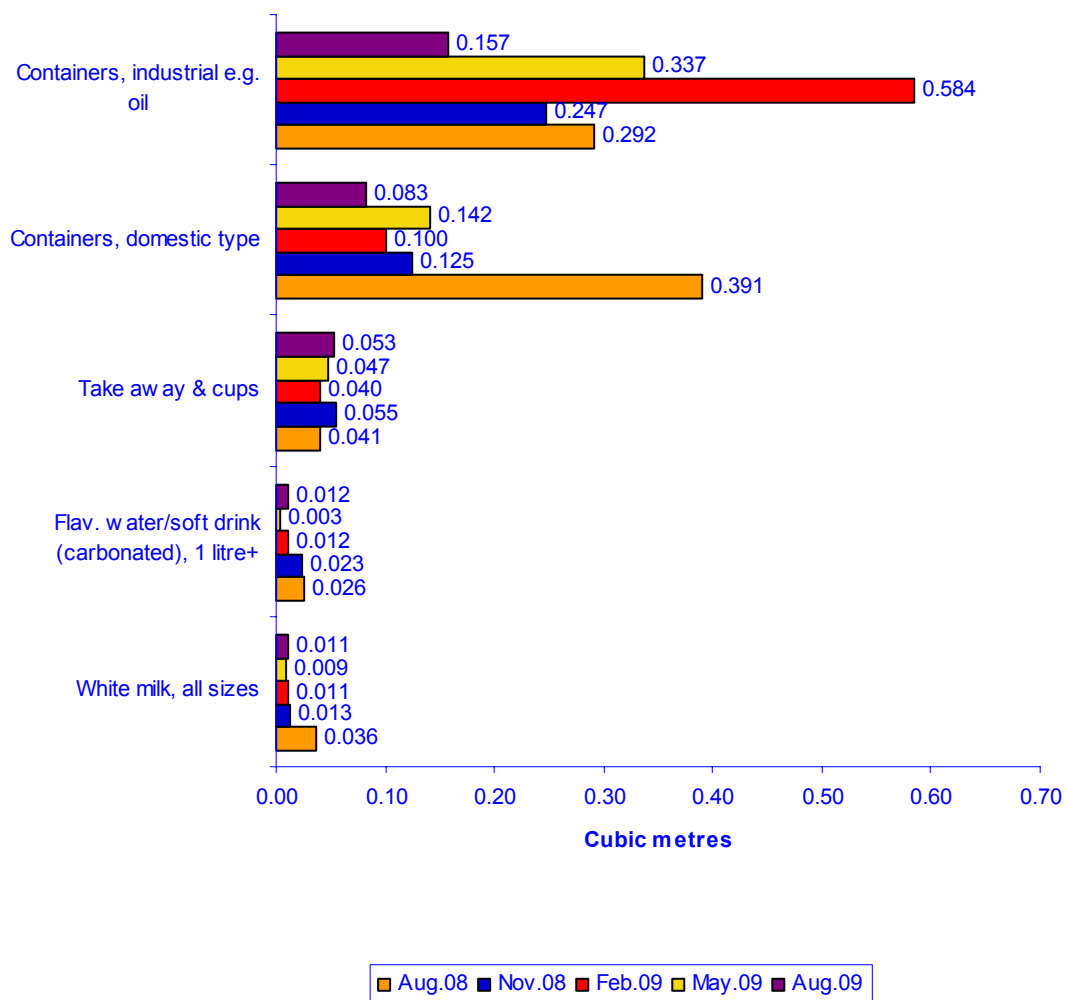


Volume

Plastic items were associated with an estimated litter volume of 0.369m³ (down from 0.618m³ in Wave 45). Items which represented the largest volumes within the Wave 46 litter count included:

- Containers, industrial e.g. oil (0.157m³, down from 0.337m³ in Wave 45)
- Containers, domestic type (0.083m³, down from 0.142m³ in Wave 45)
- Take away & cups (0.053m³, up from 0.047m³ in Wave 45)
- Flavoured water/ fruit juice drink/ sports drink (non-carbonated), 1 litre+ (0.012m³, up from 0.003m³ in Wave 45)
- White milk, all sizes (0.011m³, up from 0.009m³ in Wave 45)

PLASTIC ITEMS - VOLUMES - Top 5



3.4 Paper/ Paperboard

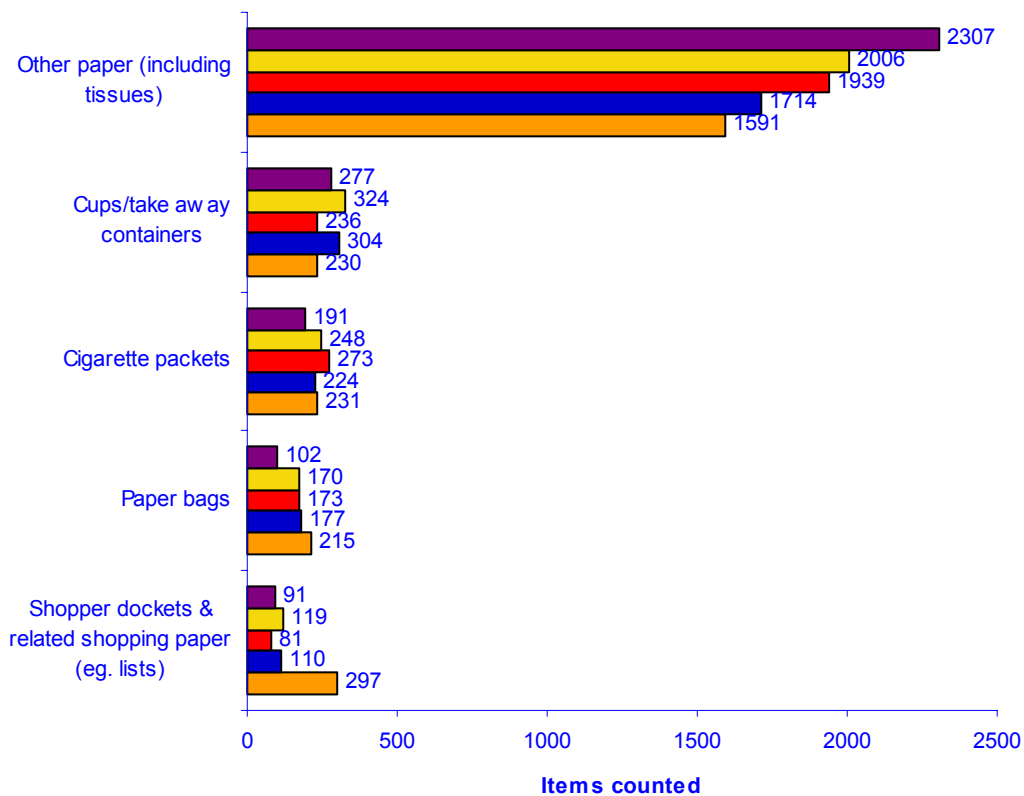
Items

A total of 3,298 (down from 3,465 in Wave 45) paper/ paperboard litter items were recorded during Wave 46.

The most frequently identified items within this material type were:

- Other paper – including tissues (2,307 items, up from 2,006 in Wave 45)
- Cups/ take away containers (277 items, down from 324 in Wave 45)
- Cigarette packets (191, down from 248 in Wave 45)
- Paper bags (102 items, down from 170 in Wave 45)
- Shopper docket & related shopping paper (eg. lists) (91 items, down from 119 in Wave 45)

PAPER/ PAPERBOARD ITEMS - COUNTS - Top 5



Aug.08 Nov.08 Feb.09 May.09 Aug.09

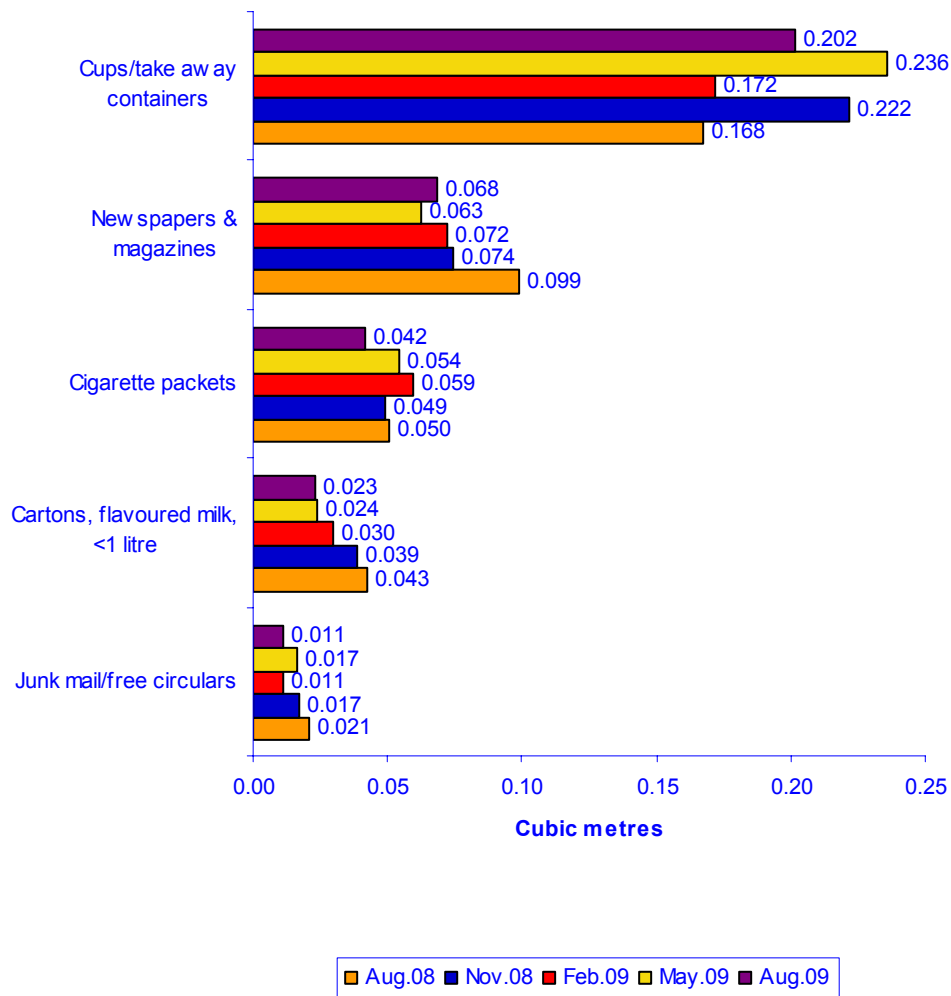
Volume

Paper/ Paperboard items accounted for 0.375m³ in estimated litter volume (down from 0.454m³ in Wave 45).

Paper/ paperboard items which contributed the largest volumes to the total included:

- Cups/take away containers (0.202m³, down from 0.236m³ in Wave 45)
- Newspapers & magazines (0.068m³, up from 0.063m³ in Wave 45)
- Cigarette packets (0.042m³, down from 0.054m³ in Wave 45)
- Cartons, flavoured milk, <1 litre (0.023m³, down from 0.024m³ in Wave 45)
- Junk mail/free circulars (0.011m³, down from 0.017m³ in Wave 45)

PAPER/ PAPERBOARD ITEMS - VOLUMES - Top 5



3.5 *Miscellaneous*

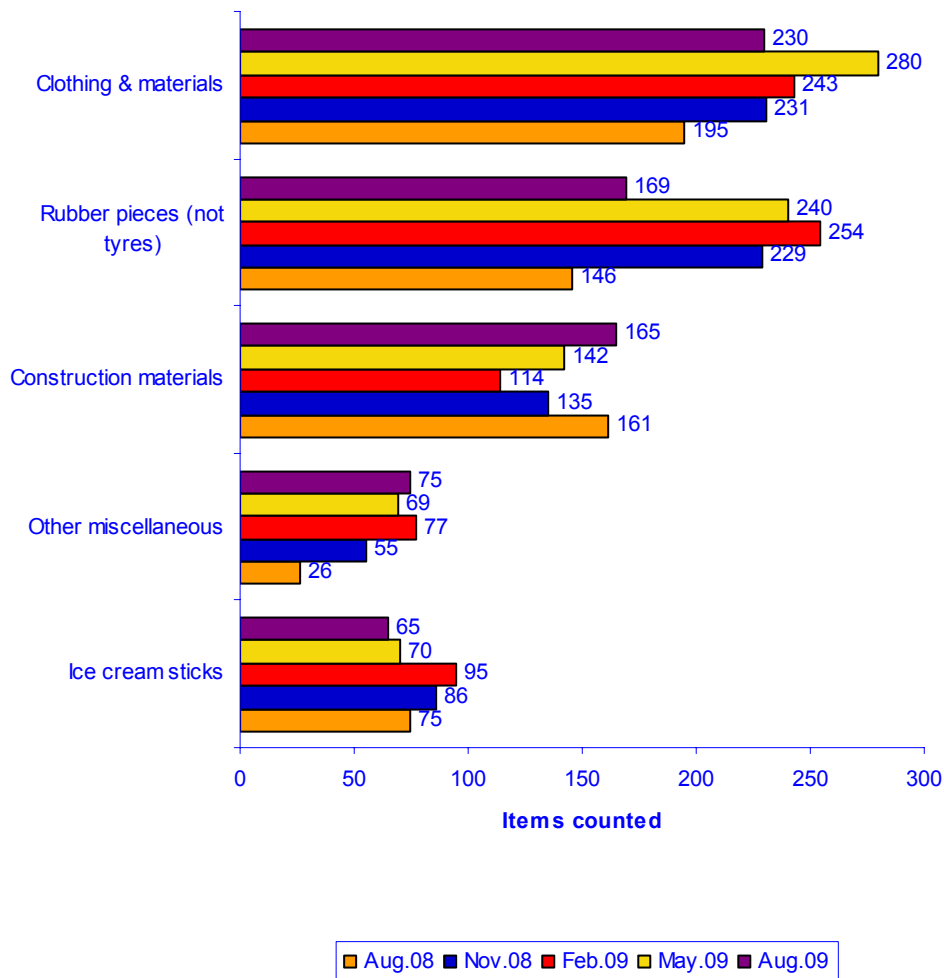
Items

A total of 759 (down from 868 in Wave 45) miscellaneous litter items were counted during Wave 46 in August 2009.

The most frequently recorded items included:

- Clothing & materials (230 items, down from 280 in Wave 45)
- Rubber pieces – not tyres (169 items, down from 240 in Wave 45).
Rubber pieces in this category include vehicle rubber mouldings, hose pipes and tubing, bicycle handle bar grips and casings, pram mouldings and strips.
- Construction materials (165 items, up from 142 in Wave 45)
- Other miscellaneous (75 items, up from 69 in Wave 45)
- Ice cream sticks (65 items, down from 70 in Wave 45)

MISCELLANEOUS ITEMS - COUNTS - Top 5



Volume

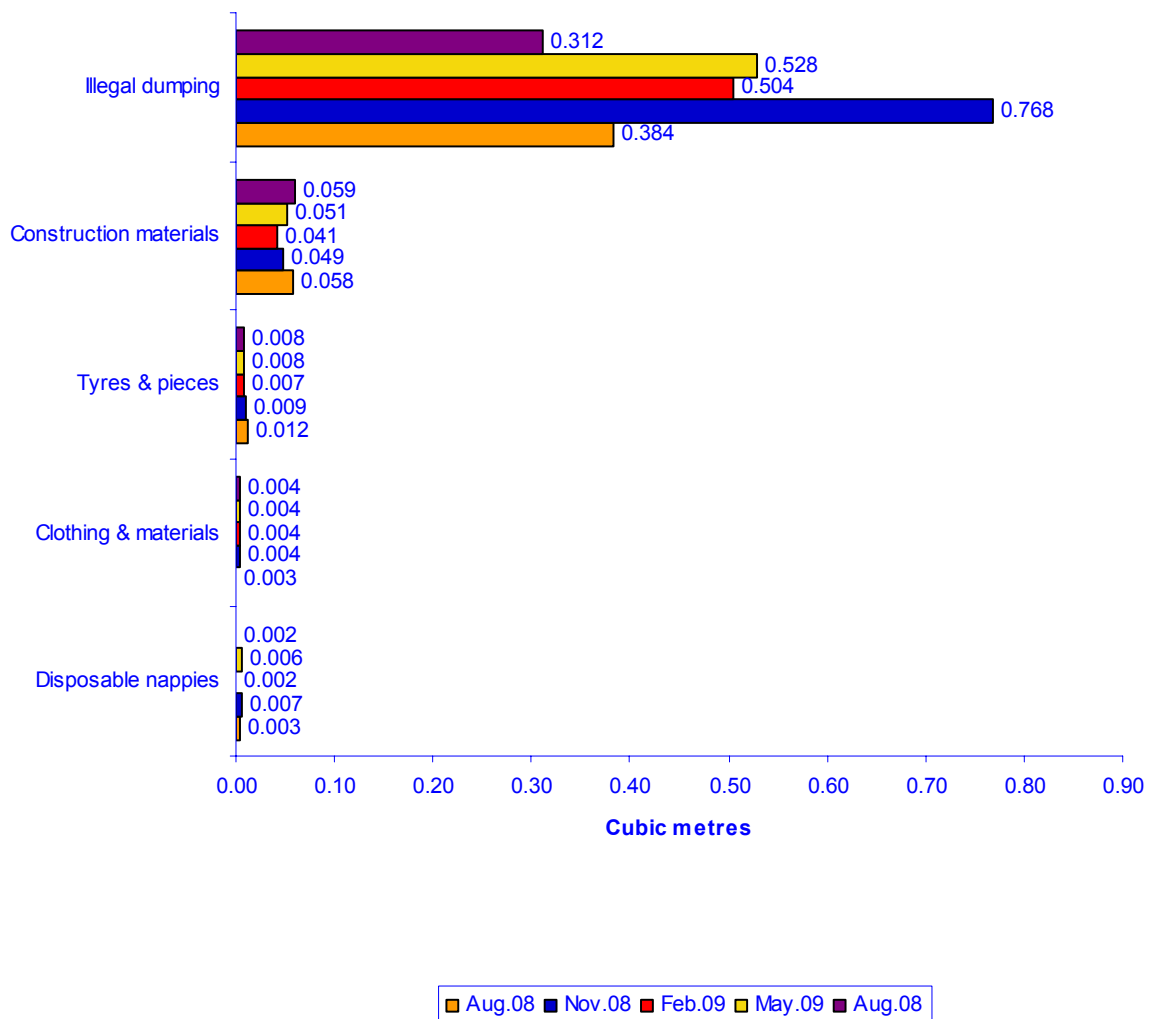
Miscellaneous litter was associated with an estimated litter volume of 0.386m³ (down from 0.598m³ in Wave 45).

Illegal dumping remained the major contributor to the total volume of miscellaneous items, with an estimated total volume of 0.312m³ (up from 0.528m³ in Wave 45).

Other miscellaneous items which contributed to the litter stream volume included:

- Construction materials (0.059m³, up from 0.051m³ in Wave 45)
- Tyres & pieces (0.008m³, the same as Wave 45)
- Clothing and materials (0.004m³, the same as Wave 45)
- Disposable nappies (0.002 m³, down from 0.006 m³, in Wave 45)

MISCELLANEOUS ITEMS - VOLUMES - Top 5



3.6 *Cigarette Butts*

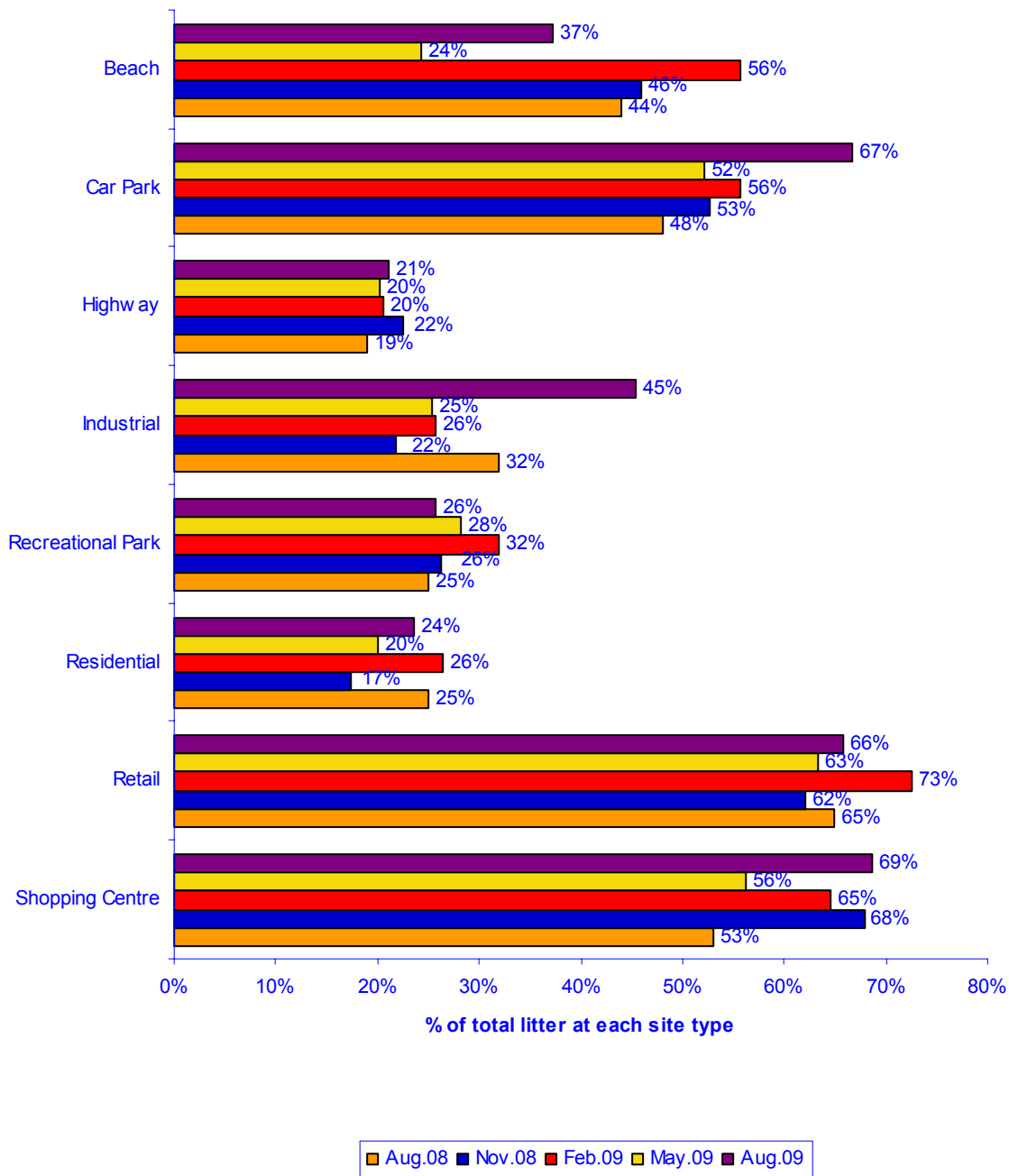
Items

The total number of butts recorded during Wave 46 amounted to 6,181 (up from 4,764 in Wave 45).

More than two thirds (69%, up from 56% in Wave 45) of the litter items counted at shopping centre sites were cigarette butts, they also contributed to two thirds of the items counted at car park sites (67%, up from 52% in Wave 45) and retail sites (66%, up from 63% in Wave 45).

The proportion of cigarette butts as a proportion of the total litter items counted also increased at industrial sites (45%, up from 25% in Wave 45), beaches (37%, up from 24% in Wave 45), residential sites (24%, up from 20% in Wave 45) and highway sites (21%, up marginally from 20% Wave 45). The proportion of cigarette butts counted at recreational parks sites in Wave 46 however, decreased (26%, down from 28% in Wave 45).

CIGARETTE BUTT COUNTS AS PROPORTIONS OF TOTAL LITTER COUNT AT EACH SITE TYPE



Volume

Despite cigarette butts being the most numerous litter item, they accounted for less than 1% of the total volume of litter recorded during the current Wave.

3.7 Dispersion of Litter by Site Type

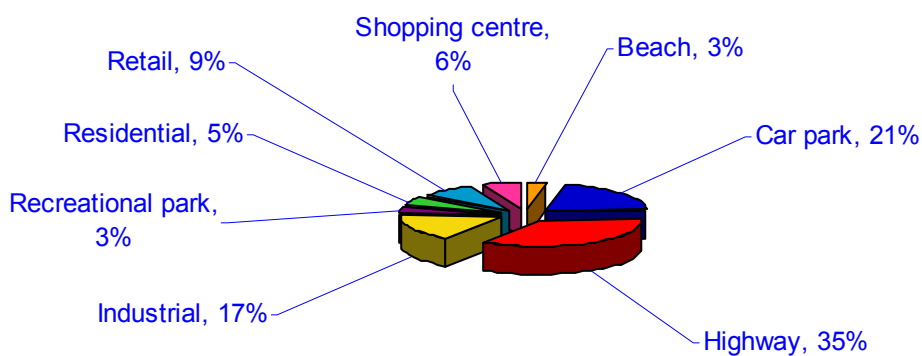
Items

Highways remained the most significant contributor to the total number of items counted during Wave 46 with more than one third (35%, down from 36% in Wave 45) of the total litter items counted at highway locations.

Other sites contributed the following proportions of the total number of litter items counted during August 2009:

- Car Park (21%, up from 15% in Wave 45)
- Industrial (17%, up from 16% in Wave 45)
- Retail (9%, down from 11% in Wave 45)
- Shopping Centre (6%, the same as Wave 45)
- Residential (5%, down from 7% in Wave 45)
- Recreational Park (3%, down from 4% in Wave 45)
- Beach (3%, down from 6% in Wave 45)

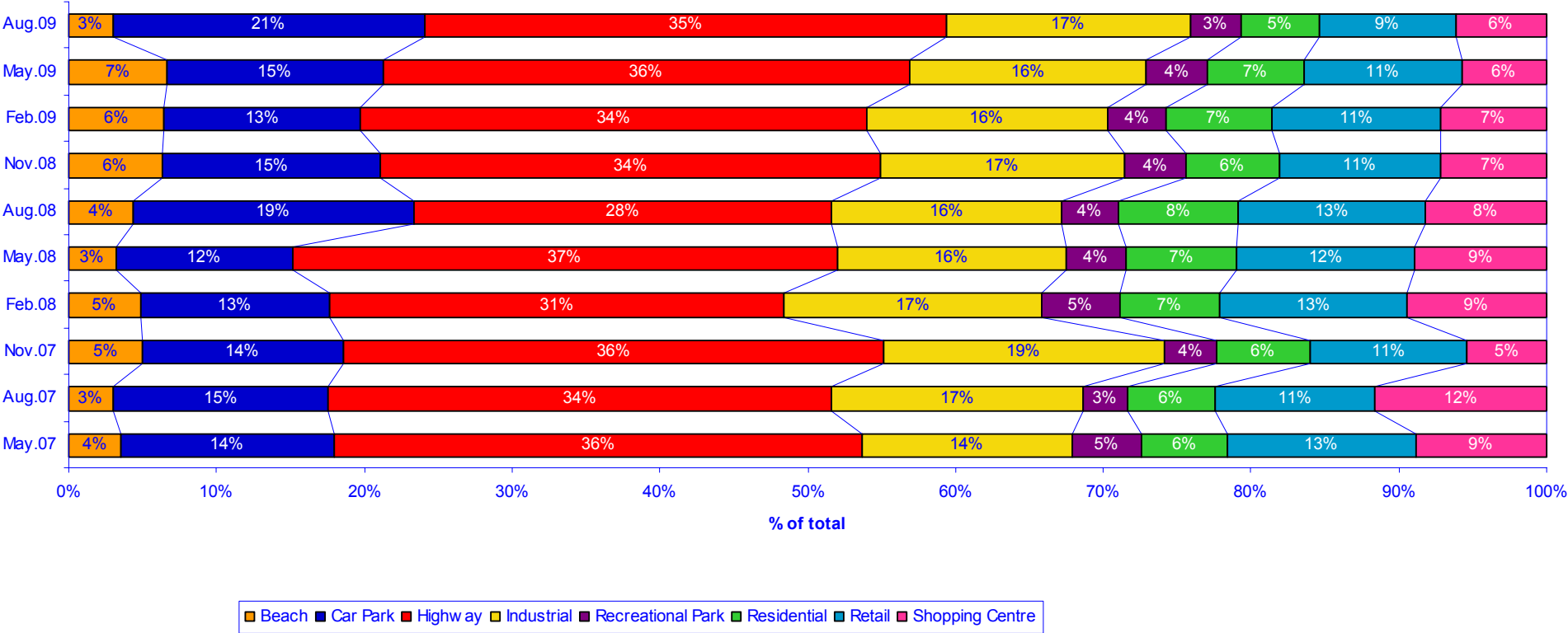
PROPORTION OF TOTAL LITTER ITEMS COUNTED WITHIN SITE TYPE



A comparison of the proportions of litter items found at each site type with the proportions of sites represented within each site type category clearly indicates that highway locations contributed large amounts to the total number of litter items counted in the August 2009 study. Specifically, although highway sites represented only 18% of the total number of sites surveyed, such sites contributed 35% (down from 36% in Wave 45) of the total litter items counted during Wave 46.

Conversely, residential locations, beaches, shopping centres and recreational parks contributed smaller proportions of litter items to the total litter count than would be anticipated based upon the representation of such sites within the overall sample of locations. Specifically, residential areas (which incorporated 17% of the sites surveyed) contributed only 5% (down from 7% in Wave 45) of the total litter items counted in South Australia during August 2009, while beaches (11% of sites surveyed) only contributed 3% (down from 7% in Wave 45) of the total litter counted. Shopping centres (9% of sites surveyed) contributed 6% (the same as Wave 45), and recreational parks (9% of sites surveyed) only contributed 3% (down from 4% in Wave 45) towards the overall figure.

PROPORTION OF TOTAL LITTER ITEMS COUNTED WITHIN SITE TYPE
 - tracking -



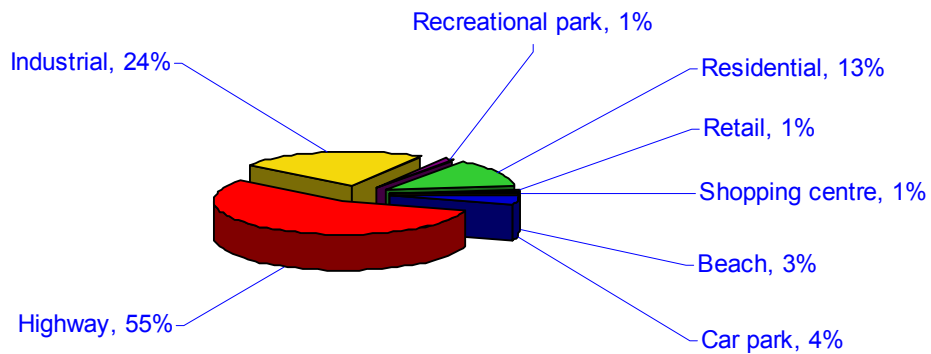
Volume

More than half (55%, down from 62% in Wave 45) of the total volume of litter estimated during Wave 46 was associated with litter items which were recorded at highway locations.

Industrial sites (24%, up from 17% in Wave 45) and residential sites (13%, up from 8% in Wave 45) together contributed more than one third (37%) of the total litter volume.

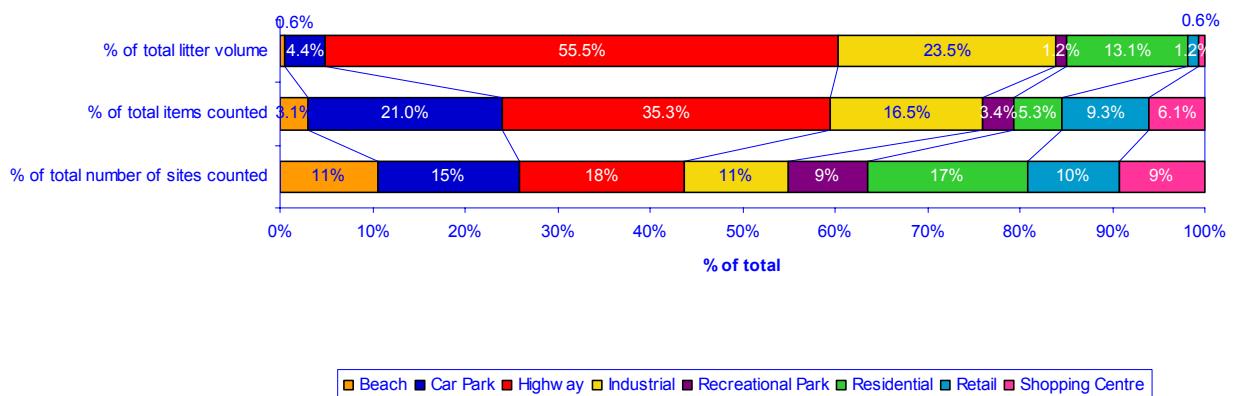
Car Parks (4%, down from 6% in Wave 45) and beaches (3%, the same as Wave 45) contributed lower litter volume levels, while other sites contributed only relatively negligible amounts to the total volume of litter recorded during August 2009.

PROPORTION OF TOTAL LITTER VOLUME BY SITE TYPE



A comparison of the litter volume, number of litter items and proportion of sites represented within location types shows that highways and industrial locations contributed a larger number and volume of litter items than would be expected given their representations within the sample.

NUMBER AND VOLUME OF LITTER BY SITE TYPE AS PROPORTIONS OF TOTALS



3.8 *CDL Beverage Containers*

The overwhelming majority (98%, up from 97% in Wave 45) of litter items counted in August 2009 were non-beverage items.

The total number of CDL beverage containers counted decreased by more than one quarter (28%) to 263 (down from 364 in Wave 45).

CDL beverage containers accounted for 92% (up from 90% in Wave 45) of all beverage containers counted during Wave 46.

Data Summary - Items

KESAB - Litter Strategy Monitoring - Wave 46 - August 2009 -			Items										
			BEACH	CAR PARK	HIGHWAY	INDUSTRIAL	RECREATIONAL PARK	RESIDENTIAL	RETAIL	SHOPPING CENTRE	METROPOLITAN	REGIONAL	TOTAL ITEMS
CIGARETTE BUTTS		NBEV	165	2038	1082	1090	128	180	889	609	4806	1375	6181
GLASS	Alcoholic sodas/spirit-based mixers, all sizes	CDL		1	2			1			2	2	4
	Beer, all colours of glass, <750ml	CDL	1	6	29	8		7			27	24	51
	Beer, all colours of glass, 750ml+	CDL			7	1					1	7	8
	Cider/fruit based etc.	CDL			4						4		4
	Flav. water/fruit j. drink/sports drink (non-carb), <1 litre	CDL			2						2		2
	Flav. water/fruit j. drink/sports drink (non-carb), 1 litre+	CDL			4							4	4
	Flav. water/soft drink (carbonated), <1 litre	CDL			3	1					3	1	4
	Flav. water/soft drink (carbonated), 1 litre+	CDL											0
	Fruit juice, <1 litre	CDL					1					1	1
	Fruit juice, 1 litre+	BEV											0
	Other glass	NBEV	6	35	89	67	5	11	13	1	161	66	227
	Plain water (carbonated or non-carb), <1 litre	CDL			2		2				2	2	4
	Plain water (carbonated or non-carb), 1 litre+	CDL		3							3		3
	Wine & spirit, all sizes	BEV		1	4	1					4	2	6
Wine cooler, all sizes	CDL			2							2	2	
TOTAL			7	46	148	78	8	19	13	1	209	111	320
METAL	Aerosols - pressure packs	NBEV			4						1	3	4
	Alcoholic sodas & spirit-based mixers	CDL			13	1					9	5	14
	Beer, aluminium, all types, all sizes	CDL		2	33	3					10	28	38
	Cider/fruit based etc.	CDL											0
	Flav. water/soft drink, (carbonated), all sizes	CDL		1	17	5	1	2			23	3	26
	Flav. water/soft drink, (non-carb), all sizes	CDL											0
	Foil take away	NBEV		1	20	1	3	2		2	6	23	29
	Food cans (including pet food)	NBEV			11	10		4			15	10	25
	Industrial cans - all types	NBEV			6	2					1	7	8
	Metal bottle tops and can pull rings	NBEV	16	93	130	65	10	19	45	12	207	183	390
	Metal pieces	NBEV		13	115	38	3	11	10	2	114	78	192
Other foil	NBEV	5	30	70	27	15	21	25	7	126	74	200	
TOTAL			21	140	419	152	32	59	80	23	512	414	926

KESAB - Litter Strategy Monitoring - Wave 46 - August 2009 -			Items										
			BEACH	CAR PARK	HIGHWAY	INDUSTRIAL	RECREATIONAL PARK	RESIDENTIAL	RETAIL	SHOPPING CENTRE	METROPOLITAN	REGIONAL	TOTAL ITEMS
MISCELLANEOUS	Clothing & materials	NBEV	14	13	155	25	8	9	4	2	144	86	230
	Condoms	NBEV		1			1				1	1	2
	Construction materials	NBEV	6	6	49	81	1	22			157	8	165
	Disposable nappies	NBEV			1			1			1	1	2
	Ice cream sticks	NBEV	2	17	15	4	2	5	6	14	39	26	65
	Illegal dumping	NBEV			2	7		4			13		13
	Other miscellaneous	NBEV		34	12	10		4	5	10	63	12	75
	Rubber pieces (not tyres)	NBEV	3	5	138	13	2	3	3	2	101	68	169
	Syringes	NBEV				4					4		4
	Tyres & pieces	NBEV		1	30	3					7	27	34
TOTAL		25	77	402	147	14	48	18	28	530	229	759	
PAPER/PAPERBOARD	Cartons, flavoured milk, <1 litre	CDL		1	23	4		2		1	20	11	31
	Cartons, flavoured milk, 1 litre+	BEV			1			1			1	1	2
	Cartons, fruit juice, <1 litre	CDL			2		1				3		3
	Cartons, fruit juice, 1 litre+	BEV									3	3	0
	Cartons, milk, plain (white), all sizes	BEV			5	1							6
	Cigarette packets	NBEV	5	24	116	25	3	9	5	4	107	84	191
	Cups/take away containers	NBEV	1	29	176	36	5	15	12	3	172	105	277
	Flav. water/fruit j. drink/sports drink (non-carb), <1 litre	CDL		1	1	1		1			4		4
	Flav. water/fruit j. drink/sports drink (non-carb), 1 litre+	CDL		1							1		1
	Ice cream wrappers	NBEV			13	3	4	3	3	3	10	19	29
	Junk mail/free circulars	NBEV		7	21	4	3	24	4	3	48	18	66
	Newspapers & magazines	NBEV	1	2	27	14		12	1	1	37	21	58
	Other paper (including tissues)	NBEV	27	321	1052	409	84	176	159	79	1906	401	2307
	Packages & boxes	NBEV	2	6	45	17		4	2	1	66	11	77
	Paper bags	NBEV	4	9	56	14	2	6	6	5	53	49	102
Shopper dockets & related shopping paper (eg. lists)	NBEV	3	24	11	5	4	8	5	31	69	22	91	
Tickets, e.g. bus, ATM, vending machine etc.	NBEV		9	21	7		2	10	4	41	12	53	
TOTAL		43	434	1570	540	106	263	207	135	2541	757	3298	

KESAB - Litter Strategy Monitoring - Wave 46 - August 2009 -			Items										
			BEACH	CAR PARK	HIGHWAY	INDUSTRIAL	RECREATIONAL PARK	RESIDENTIAL	RETAIL	SHOPPING CENTRE	METROPOLITAN	REGIONAL	TOTAL ITEMS
PLASTIC	6 ring can holders	NBEV			5	1					2	4	6
	Bags - heavier glossy typically branded carry bags	NBEV		1	29			4	1		27	8	35
	Bags - supermarket type light weight carry bags	NBEV	5	10	34	8	3	5	4		43	26	69
	Bread bag tags	NBEV	4	8	10	3	7	4		1	15	22	37
	Containers, domestic type	NBEV			7	1		2			7	3	10
	Containers, industrial e.g. oil	NBEV			7							7	7
	Drink pouches	CDL			10				1		1	10	11
	Flav. water/fruit j. drink/sports drink (non-carb), <1 litre	CDL			4		1				5		5
	Flav. water/fruit j. drink/sports drink (non-carb), 1 litre+	CDL			1						1		1
	Flav. water/soft drink (carbonated), <1 litre	CDL		1	12	1					7	7	14
	Flav. water/soft drink (carbonated), 1 litre+	CDL			5	2					7		7
	Flavoured milk, <1 litre	CDL		1	6						2	5	7
	Flavoured milk, 1 litre+	BEV			1						1		1
	Fruit juice, <1 litre	CDL			4							4	4
	Fruit juice, 1 litre+	BEV											0
	Lollipop sticks	NBEV	5	27	20	4	20	3	9	6	51	43	94
	Other plastic	NBEV	99	99	615	174	46	89	47	39	900	308	1208
	Packing tape & straps	NBEV		2	76	6	1	3	2	1	69	22	91
	Plain water (carbonated or non-carb), <1 litre	CDL		1	4						5		5
	Plain water (carbonated or non-carb), 1 litre+	CDL			4	1					5		5
	Plastic bottle tops	NBEV	38	39	120	51	25	22	17	13	230	95	325
	Sacks - sheeting - other bags	NBEV		1	30	15	4	4	5		17	42	59
	Snack bags & confectionery wrappers	NBEV	11	53	145	38	26	25	27	12	193	144	337
	Spoons/cutlery	NBEV	4	11	41	4	18	7	4	2	48	43	91
	Straws	NBEV	13	45	100	24	38	10	22	12	147	117	264
	Styrene foam boxes, sheets, etc.	NBEV	3	4	65	21		2	1		83	13	96
	Take away & cups	NBEV	1	21	152	39	21	16	4	4	136	122	258
White milk, all sizes	BEV			5						1	4	5	
Wine cask bladders	BEV			3						1	2	3	
TOTAL		183	324	1515	393	210	196	144	90	2004	1051	3055	
GRAND TOTAL		444	3059	5136	2400	498	765	1351	886	10602	3937	14539	

Data Summary - Volumes

KESAB - Litter Strategy Monitoring - Wave 46 - August 2009 -			Volume - Cubic Metres										
			BEACH	CAR PARK	HIGHWAY	INDUSTRIAL	RECREATIONAL PARK	RESIDENTIAL	RETAIL	SHOPPING CENTRE	METROPOLITAN	REGIONAL	TOTAL VOLUME
CIGARETTE BUTTS		NBEV	0.000019	0.000234	0.000124	0.000125	0.000015	0.000021	0.000102	0.000070	0.000553	0.000158	0.000711
GLASS	Alcoholic sodas/spirit-based mixers, all sizes	CDL		0.000374	0.000749			0.000374			0.000749	0.000749	0.001497
	Beer, all colours of glass, <750ml	CDL	0.000480	0.002877	0.013906	0.003836		0.003357			0.012947	0.011508	0.024455
	Beer, all colours of glass, 750ml+	CDL			0.005672	0.000810					0.000810	0.005672	0.006482
	Cider/fruit based etc.	CDL			0.001817						0.001817		0.001817
	Flav. water/fruit j. drink/sports drink (non-carb), <1 litre	CDL			0.001621						0.001621		0.001621
	Flav. water/fruit j. drink/sports drink (non-carb), 1 litre+	CDL			0.006616							0.006616	0.006616
	Flav. water/soft drink (carbonated), <1 litre	CDL			0.000903	0.000301					0.000903	0.000301	0.001204
	Flav. water/soft drink (carbonated), 1 litre+	CDL											0.000000
	Fruit juice, <1 litre	CDL					0.000284					0.000284	0.000284
	Fruit juice, 1 litre+	BEV											0.000000
	Other glass	NBEV	0.000118	0.000687	0.001748	0.001316	0.000098	0.000216	0.000255	0.000020	0.003162	0.001296	0.004458
	Plain water (carbonated or non-carb), <1 litre	CDL			0.000830		0.000830				0.000830	0.000830	0.001659
	Plain water (carbonated or non-carb), 1 litre+	CDL		0.003178							0.003178		0.003178
	Wine & spirit, all sizes	BEV		0.000891	0.003566	0.000891					0.003566	0.001783	0.005348
Wine cooler, all sizes	CDL			0.000749							0.000749	0.000749	
TOTAL		0.000597	0.008008	0.038175	0.007155	0.001211	0.003947	0.000255	0.000020	0.029581	0.029787	0.059368	
METAL	Aerosols - pressure packs	NBEV			0.002737						0.000684	0.002053	0.002737
	Alcoholic sodas & spirit-based mixers	CDL			0.007305	0.000562					0.005057	0.002810	0.007867
	Beer, aluminium, all types, all sizes	CDL		0.000863	0.014236	0.001294					0.004314	0.012079	0.016393
	Cider/fruit based etc.	CDL											0.000000
	Flav. water/soft drink, (carbonated), all sizes	CDL		0.000431	0.007334	0.002157	0.000431	0.000863			0.009922	0.001294	0.011216
	Flav. water/soft drink, (non-carb), all sizes	CDL											0.000000
	Foil take away	NBEV		0.000462	0.009248	0.000462	0.001387	0.000925		0.000925	0.002774	0.010635	0.013409
	Food cans (including pet food)	NBEV			0.005102	0.004638		0.001855			0.006957	0.004638	0.011595
	Industrial cans - all types	NBEV			0.027420	0.009140					0.004570	0.031990	0.036560
	Metal bottle tops and can pull rings	NBEV	0.000064	0.000372	0.000520	0.000260	0.000040	0.000076	0.000180	0.000048	0.000828	0.000732	0.001560
	Metal pieces	NBEV		0.000138	0.001219	0.000403	0.000032	0.000117	0.000106	0.000021	0.001208	0.000827	0.002035
	Other foil	NBEV	0.000008	0.000047	0.000109	0.000042	0.000023	0.000033	0.000039	0.000011	0.000197	0.000115	0.000312
TOTAL		0.000072	0.002313	0.075230	0.018958	0.001914	0.003868	0.000325	0.001005	0.036512	0.067173	0.103685	

KESAB - Litter Strategy Monitoring - Wave 46 - August 2009 -			Volume - Cubic Metres										
			BEACH	CAR PARK	HIGHWAY	INDUSTRIAL	RECREATIONAL PARK	RESIDENTIAL	RETAIL	SHOPPING CENTRE	METROPOLITAN	REGIONAL	TOTAL VOLUME
MISCELLANEOUS	Clothing & materials	NBEV	0.000214	0.000199	0.002372	0.000383	0.000122	0.000138	0.000061	0.000031	0.002203	0.001316	0.003519
	Condoms	NBEV		0.000000			0.000000				0.000000	0.000000	0.000000
	Construction materials	NBEV	0.002160	0.002160	0.017640	0.029160	0.000360	0.007920			0.056520	0.002880	0.059400
	Disposable nappies	NBEV			0.001125			0.001125			0.001125	0.001125	0.002250
	Ice cream sticks	NBEV	0.000002	0.000016	0.000014	0.000004	0.000002	0.000005	0.000006	0.000013	0.000036	0.000024	0.000060
	Illegal dumping	NBEV			0.048000	0.168000		0.096000			0.312000		0.312000
	Other miscellaneous	NBEV		0.000459	0.000162	0.000135		0.000054	0.000068	0.000135	0.000851	0.000162	0.001013
	Rubber pieces (not tyres)	NBEV	0.000000	0.000001	0.000023	0.000002	0.000000	0.000000	0.000000	0.000000	0.000017	0.000011	0.000028
	Syringes	NBEV				0.000009					0.000009		0.000009
	Tyres & pieces	NBEV		0.000225	0.006750	0.000675					0.001575	0.006075	0.007650
TOTAL			0.002377	0.003060	0.076085	0.198367	0.000485	0.105242	0.000135	0.000179	0.374336	0.011593	0.385929
PAPER/PAPERBOARD	Cartons, flavoured milk, <1 litre	CDL		0.000750	0.017243	0.002999		0.001499		0.000750	0.014994	0.008247	0.023241
	Cartons, flavoured milk, 1 litre+	BEV			0.001013			0.001013			0.001013	0.001013	0.002025
	Cartons, fruit juice, <1 litre	CDL			0.001250		0.000625				0.001874		0.001874
	Cartons, fruit juice, 1 litre+	BEV											0.000000
	Cartons, milk, plain (white), all sizes	BEV			0.005063	0.001013					0.003038	0.003038	0.006076
	Cigarette packets	NBEV	0.001089	0.005229	0.025273	0.005447	0.000654	0.001961	0.001089	0.000871	0.023312	0.018301	0.041613
	Cups/take away containers	NBEV	0.000729	0.021140	0.128295	0.026242	0.003645	0.010934	0.008747	0.002187	0.125379	0.076540	0.201919
	Flav. water/fruit j. drink/sports drink (non-carb), <1 litre	CDL		0.000262	0.000262	0.000262		0.000262			0.001048		0.001048
	Flav. water/fruit j. drink/sports drink (non-carb), 1 litre+	CDL		0.002070							0.002070		0.002070
	Ice cream wrappers	NBEV			0.000031	0.000007	0.000010	0.000007	0.000007	0.000007	0.000024	0.000046	0.000070
	Junk mail/free circulars	NBEV		0.001218	0.003654	0.000696	0.000522	0.004176	0.000696	0.000522	0.008352	0.003132	0.011484
	Newspapers & magazines	NBEV	0.001180	0.002360	0.031860	0.016520		0.014160	0.001180	0.001180	0.043660	0.024780	0.068440
	Other paper (including tissues)	NBEV	0.000091	0.001085	0.003556	0.001382	0.000284	0.000595	0.000537	0.000267	0.006442	0.001355	0.007798
	Packages & boxes	NBEV	0.000160	0.000480	0.003600	0.001360		0.000320	0.000160	0.000080	0.005280	0.000880	0.006160
	Paper bags	NBEV	0.000042	0.000095	0.000592	0.000148	0.000021	0.000063	0.000063	0.000053	0.000561	0.000518	0.001079
	Shopper docketts & related shopping paper (eg. lists)	NBEV	0.000006	0.000049	0.000022	0.000010	0.000008	0.000016	0.000010	0.000063	0.000140	0.000045	0.000185
	Tickets, e.g. bus, ATM, vending machine etc.	NBEV		0.000008	0.000018	0.000006		0.000002	0.000009	0.000004	0.000036	0.000011	0.000047
TOTAL			0.003298	0.034745	0.221733	0.056093	0.005768	0.035009	0.012500	0.005984	0.237224	0.137905	0.375129

KESAB - Litter Strategy Monitoring - Wave 46 - August 2009 -			Volume - Cubic Metres											
			BEACH	CAR PARK	HIGHWAY	INDUSTRIAL	RECREATIONAL PARK	RESIDENTIAL	RETAIL	SHOPPING CENTRE	METROPOLITAN	REGIONAL	TOTAL VOLUME	
PLASTIC	6 ring can holders	NBEV			0.000008	0.000002						0.000003	0.000006	0.000009
	Bags - heavier glossy typically branded carry bags	NBEV		0.000088	0.002540			0.000350	0.000088			0.002365	0.000701	0.003066
	Bags - supermarket type light weight carry bags	NBEV	0.000170	0.000339	0.001154	0.000272	0.000102	0.000170	0.000136			0.001459	0.000882	0.002342
	Bread bag tags	NBEV	0.000001	0.000002	0.000002	0.000001	0.000002	0.000001		0.000000		0.000003	0.000005	0.000009
	Containers, domestic type	NBEV			0.058268	0.008324		0.016648				0.058268	0.024972	0.083240
	Containers, industrial e.g. oil	NBEV			0.157206								0.157206	0.157206
	Drink pouches	CDL			0.000863				0.000086			0.000086	0.000863	0.000949
	Flav. water/fruit j. drink/sports drink (non-carb), <1 litre	CDL			0.002224		0.000556					0.002781		0.002781
	Flav. water/fruit j. drink/sports drink (non-carb), 1 litre+	CDL			0.001654							0.001654		0.001654
	Flav. water/soft drink (carbonated), <1 litre	CDL		0.000622	0.007465	0.000622						0.004355	0.004355	0.008710
	Flav. water/soft drink (carbonated), 1 litre+	CDL			0.008270	0.003308						0.011578		0.011578
	Flavoured milk, <1 litre	CDL		0.000533	0.003196							0.001065	0.002664	0.003729
	Flavoured milk, 1 litre+	BEV			0.002137							0.002137		0.002137
	Fruit juice, <1 litre	CDL			0.002131								0.002131	0.002131
	Fruit juice, 1 litre+	BEV												0.000000
	Lollipop sticks	NBEV	0.000003	0.000014	0.000011	0.000002	0.000011	0.000002	0.000005	0.000003		0.000027	0.000023	0.000050
	Other plastic	NBEV	0.000124	0.000124	0.000769	0.000218	0.000058	0.000111	0.000059	0.000049		0.001125	0.000385	0.001510
	Packing tape & straps	NBEV		0.000001	0.000021	0.000002	0.000000	0.000001	0.000001	0.000000		0.000019	0.000006	0.000025
	Plain water (carbonated or non-carb), <1 litre	CDL		0.000788	0.003152							0.003940		0.003940
	Plain water (carbonated or non-carb), 1 litre+	CDL			0.006166	0.001542						0.007708		0.007708
	Plastic bottle tops	NBEV	0.000304	0.000312	0.000961	0.000408	0.000200	0.000176	0.000136	0.000104		0.001841	0.000760	0.002602
	Sacks - sheeting - other bags	NBEV		0.000000	0.000009	0.000005	0.000001	0.000001	0.000002			0.000005	0.000013	0.000019
	Snack bags & confectionery wrappers	NBEV	0.000086	0.000415	0.001135	0.000298	0.000204	0.000196	0.000211	0.000094		0.001511	0.001128	0.002639
	Spoons/cutlery	NBEV	0.000038	0.000106	0.000394	0.000038	0.000173	0.000067	0.000038	0.000019		0.000461	0.000413	0.000874
	Straws	NBEV	0.000054	0.000186	0.000413	0.000099	0.000157	0.000041	0.000091	0.000050		0.000606	0.000483	0.001089
	Styrene foam boxes, sheets, etc.	NBEV	0.000113	0.000150	0.002438	0.000788		0.000075	0.000038			0.003113	0.000488	0.003601
	Take away & cups	NBEV	0.000207	0.004347	0.031467	0.008074	0.004347	0.003312	0.000828	0.000828		0.028155	0.025256	0.053411
	White milk, all sizes	BEV			0.010683							0.002137	0.008547	0.010683
	Wine cask bladders	BEV			0.001380							0.000460	0.000920	0.001380
	TOTAL		0.001099	0.008026	0.306115	0.024000	0.005810	0.021152	0.001717	0.001147		0.136862	0.232205	0.369066
GRAND TOTAL		0.007462	0.056386	0.717462	0.304698	0.015203	0.169238	0.015035	0.008404		0.815067	0.478821	1.293888	

Appendix 1: Tracking Graphs

Weighting of Previous Results

Since February 2006 (Wave 32), 11 revised sites have been surveyed concurrently with the 151 original sites included within the litter monitor program since its inception in February 1998. The new and old sites were surveyed simultaneously across four Waves of the monitor.

These 11 revised sites have previously been surveyed concurrently with the 151 original sites to replace 11 of the original sites that were found to be unusual in nature, and analyses have typically focused on results for the 151 sites including the 11 *new* sites and the 151 sites including the 11 *old* sites separately.

However, in counts since the February 2007 Monitor only the 151 revised sites (incorporating the 11 new locations) have been surveyed. In order to facilitate tracking comparisons, figures prior to February 2007 have been weighted based upon the variations between results corresponding to the 151 sites including the 11 new sites and the 151 sites including the 11 old sites.

Weighting techniques were based upon comparisons of figures for items and volumes recorded during Waves 32, 33, 34 and 35 across all sites incorporating either the 11 original or 11 revised sites. Differences between such figures provided indices of the degree of consistent variation between original and revised site litter data, and reliable weightings were thereby established.

Figures which have been weighted included:

- **Absolute values (counts and volumes) within material categories and site types**, since the inclusion of the revised sites resulted in differences in nearly all absolute values of counted litter.
- **Comparisons between proportional representation of litter across site types**, due to the fact that site revision altered the proportions of litter contributed to the total litter stream within certain site categories whilst others remained unchanged.

However, preliminary investigations demonstrated that proportional contribution to the total litter stream within material types was consistently similar between the original and revised site sets. This finding supports the assumption that whilst the quantities of litter recorded differed between old and new sites, the types of materials present within such litter were relatively consistent. For this reason, proportional figures within material types did not require weighting.

Items within material categories across all 151 sites including either 11 original or 11 revised sites	Wave 32				Wave 33				Wave 34				Wave 35			
	Old	New	Diff	New as % of Old	Old	New	Diff	New as % of Old	Old	New	Diff	New as % of Old	Old	New	Diff	New as % of Old
Glass	419	311	108	0.74224344	349	293	56	0.83954155	321	281	40	0.87538941	305	249	56	0.81639344
Metal	1505	1218	287	0.80930233	1450	1099	351	0.75793103	1440	1086	354	0.75416667	1517	1183	334	0.77982861
Plastic	5447	3819	1628	0.70111988	5261	3866	1395	0.73484128	5057	3575	1482	0.70694087	5332	3827	1505	0.71774194
Paper/ paperboard	4299	2969	1330	0.69062573	3820	3003	817	0.78612565	4017	2961	1056	0.73711725	3616	2752	864	0.76106195
Miscellaneous	1286	975	311	0.75816485	1057	814	243	0.77010407	1025	815	210	0.79512195	1150	944	206	0.82086957
Cigarette Butts	7600	5744	1856	0.75578947	9606	6814	2792	0.70934832	10950	6959	3991	0.63552511	10875	6474	4401	0.59531034
TOTAL	20556	15036	5520	0.73146527	21543	15889	5654	0.73754816	22810	15677	7133	0.68728628	22795	15429	7366	0.67685896
AVERAGE New as % of Old				0.74124442				0.76220572				0.74164965				0.73829497
OVERALL Mean New as % of Old	0.7458															

Items within site type across all 151 sites including either 11 original or 11 revised sites		Residential	Beach	Industrial	Car Park	Shopping Centre	Retail	Recreational Park	Highway	Metropolitan	Regional	TOTAL
		Old	New	Diff	New as % of Old	Old	New	Diff	New as % of Old	Old	New	Diff
Wave 32	Old	1187	1016	2395	2194	1261	1517	617	10369	17020	3536	20556
	New	1187	1016	2196	2064	1292	1517	617	5147	11500	3536	15036
	Diff	0	0	199	130	-31	0	0	5222	5520	0	5520
	New as % of Old	1	1	0.92	0.94	1.02	1	1	0.50	0.68	1	7.3786248
Wave 33	Old	1227	737	2573	3142	2323	1659	590	9292	17788	3755	21543
	New	1227	737	2428	2722	1919	1659	590	4607	12134	3755	15889
	Diff	0	0	145	420	404	0	0	4685	5654	0	5654
	New as % of Old	1	1	0.94	0.87	0.83	1	1	0.50	0.68	1	7.1318625
Wave 34	Old	1185	721	2498	3365	1853	1670	479	11039	18749	4061	22810
	New	1185	721	2077	2724	1155	1670	479	5666	11616	4061	15677
	Diff	0	0	421	641	698	0	0	5373	7133	0	7133
	New as % of Old	1	1	0.83	0.81	0.62	1	1	0.51	0.62	1	6.7775595
Wave 35	Old	1134	728	2705	2601	2232	1801	729	10865	18640	4155	22795
	New	1134	728	2399	2156	1157	1801	729	5325	11274	4155	15429
	Diff	0	0	306	445	1075	0	0	5540	7366	0	7366
	New as % of Old	1	1	0.89	0.83	0.52	1	1	0.49	0.60	1	6.7242631
Average New as % of Old		1	1	0.89	0.86	0.75	1	1	0.50	0.65	1	7.0030775

Proportions of total items within site type across all 151 sites including either 11 original or 11 revised sites		Residential	Beach	Industrial	Car Park	Shopping Centre	Retail	Recreational Park	Highway	Metropolitan	Regional	TOTAL
Wave 32	Old	1187	1016	2395	2194	1261	1517	617	10369	17020	3536	20556
	New	1187	1016	2196	2064	1292	1517	617	5147	11500	3536	15036
	Old % of total items	5.8%	4.9%	11.7%	10.7%	6.1%	7.4%	3.0%	50.4%	82.8%	17.2%	
	New % of total items	7.9%	6.8%	14.6%	13.7%	8.6%	10.1%	4.1%	34.2%	76.5%	23.5%	
	% change from Old to New	2.1%	1.8%	3.0%	3.1%	2.5%	2.7%	1.1%	-16.2%	-6.3%	6.3%	
Wave 33	Old	1227	737	2573	3142	2323	1659	590	9292	17788	3755	21543
	New	1227	737	2428	2722	1919	1659	590	4607	12134	3755	15889
	Old % of total items	5.7%	3.4%	11.9%	14.6%	10.8%	7.7%	2.7%	43.1%	82.6%	17.4%	
	New % of total items	7.7%	4.6%	15.3%	17.1%	12.1%	10.4%	3.7%	29.0%	76.4%	23.6%	
	% change from Old to New	2.0%	1.2%	3.3%	2.5%	1.3%	2.7%	1.0%	-14.1%	-6.2%	6.2%	
Wave 34	Old	1185	721	2498	3365	1853	1670	479	11039	18749	4061	22810
	New	1185	721	2077	2724	1155	1670	479	5666	11616	4061	15677
	Old % of total items	5.2%	3.2%	11.0%	14.8%	8.1%	7.3%	2.1%	48.4%	82.2%	17.8%	
	New % of total items	7.6%	4.6%	13.2%	17.4%	7.4%	10.7%	3.1%	36.1%	74.1%	25.9%	
	% change from Old to New	2.4%	1.4%	2.3%	2.6%	-0.8%	3.3%	1.0%	-12.3%	-8.1%	8.1%	
Wave 35	Old	1134	728	2705	2601	2232	1801	729	10865	18640	4155	22795
	New	1134	728	2399	2156	1157	1801	729	5325	11274	4155	15429
	Old % of total items	5.0%	3.2%	11.9%	11.4%	9.8%	7.9%	3.2%	47.7%	81.8%	18.2%	
	New % of total items	7.3%	4.7%	15.5%	14.0%	7.5%	11.7%	4.7%	34.5%	73.1%	26.9%	
	% change from Old to New	2.4%	1.5%	3.7%	2.6%	-2.3%	3.8%	1.5%	-13.2%	-8.7%	8.7%	
Average % difference from Old to New		2%	1%	3%	3%	0%	3%	1%	-14%	-7%	7%	

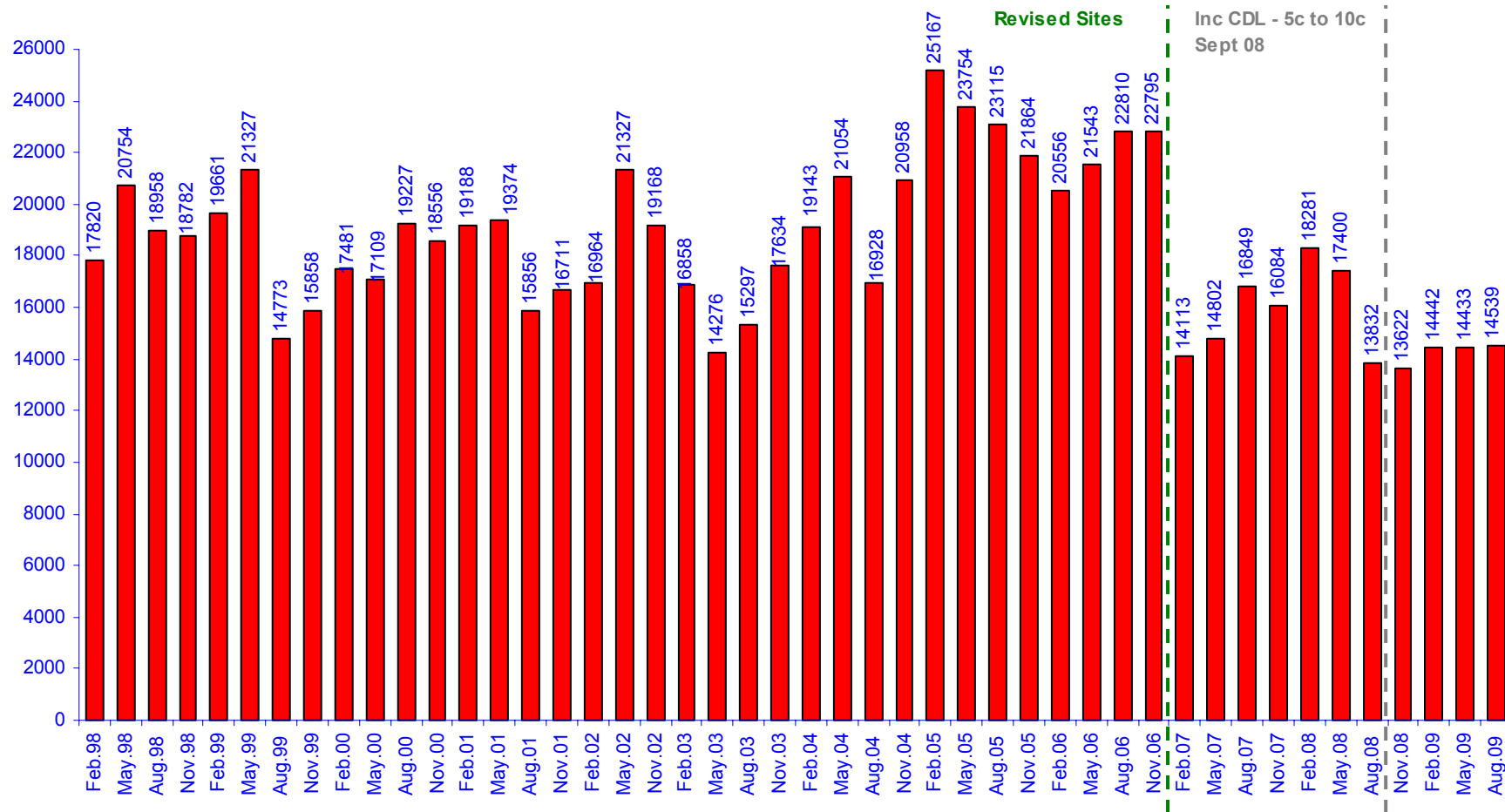
Volumes within material categories across all 151 sites including either 11 original or 11 revised sites	Wave 32				Wave 33				Wave 34				Wave 35			
	Old	New	Diff	New as % of Old	Old	New	Diff	New as % of Old	Old	New	Diff	New as % of Old	Old	New	Diff	New as % of Old
Glass	0.11965	0.09027	0.02939	0.75438	0.08663	0.06859	0.01804	0.79173	0.08559	0.07086	0.01473	0.82789	0.06907	0.05316	0.01591	0.76962
Metal	0.22261	0.19846	0.02415	0.8915	0.15196	0.13181	0.02015	0.86741	0.15085	0.10952	0.04132	0.72605	0.17499	0.15130	0.02369	0.86463
Plastic	1.16278	0.72042	0.44235	0.61957	0.90407	0.71848	0.18559	0.79472	0.93411	0.63312	0.30099	0.67778	0.88814	0.67589	0.21225	0.76102
Paper/ paperboard	0.71375	0.41932	0.29443	0.58749	0.47904	0.36017	0.11888	0.75184	0.54568	0.35535	0.19033	0.6512	0.50410	0.35413	0.14998	0.70249
Miscellaneous	1.11014	0.83415	0.27599	0.75139	0.84900	0.61172	0.23727	0.72052	0.78143	0.71261	0.06882	0.91194	2.14021	1.97182	0.16839	0.92132
Cigarette Butts	0.00009	0.00007	0.00002	0.75515	0.00011	0.00008	0.00003	0.70935	0.00013	0.00008	0.00005	0.63553	0.00013	0.00007	0.00005	0.59531
TOTAL	3.32902	2.26269	1.06633	0.67969	2.47082	1.89085	0.57996	0.76528	2.49778	1.88155	0.61624	0.75329	3.77664	3.20638	0.57026	0.849
AVERAGE New as % of Old				0.71988				0.77155				0.74052				0.78049
OVERALL MEAN DIFFERENCE	0.7531															

Volumes within site type across all 151 sites including either 11 original or 11 revised sites		Residential	Beach	Industrial	Car Park	Shopping Centre	Retail	Recreational Park	Highway	Metropolitan	Regional	TOTAL
Wave 32	Old	0.05441	0.02998	0.57970	0.13090	0.01177	0.01877	0.02922	2.47428	2.54585	0.78318	3.32902
	New	0.05441	0.02998	0.57922	0.17275	0.00965	0.01877	0.02922	1.36868	1.47951	0.78318	2.26269
	Diff			0.00048	-0.04186	0.00212			1.10559	1.06633		
	New as % of Old	1	1	0.99917	1.31979	0.82005	1	1	0.55317	0.58115	1	
Wave 33	Old	0.06600	0.03600	0.54200	0.07100	0.03000	0.02100	0.04100	1.66400	1.85500	0.61500	2.47100
	New	0.06600	0.03600	0.53900	0.07000	0.01000	0.02100	0.04100	1.10700	1.27500	0.61500	1.89000
	Diff			0.00300	0.00100	0.02000			0.55700	0.58000		
	New as % of Old	1	1	0.99446	0.98592	0.33333	1	1	0.66526	0.68733	1	
Wave 34	Old	0.07800	0.06500	0.41100	0.14100	0.05000	0.01200	0.00600	1.73400	1.87300	0.62500	2.49700
	New	0.07800	0.06500	0.40000	0.14000	0.00900	0.01200	0.00600	1.17100	1.25700	0.62500	1.88100
	Diff			0.01100	0.00100	0.04100			0.56300	0.61600		
	New as % of Old	1	1	0.97324	0.99291	0.18000	1	1	0.67532	0.67112	1	
Wave 35	Old	0.17400	0.01700	0.58800	0.13000	0.05300	0.05900	0.01700	2.73700	2.12500	1.65200	3.77500
	New	0.17400	0.01700	0.58600	0.14600	0.03700	0.05900	0.01700	2.16900	1.55500	1.65200	3.20500
	Diff			0.00200	-0.01600	0.01600			0.56800	0.57000		
	New as % of Old	1	1	1.00	1.12	0.70	1	1	0.79	0.73	1	
Average New as % of Old		1	1	0.99	1.11	0.51	1	1	0.67	0.67	1	

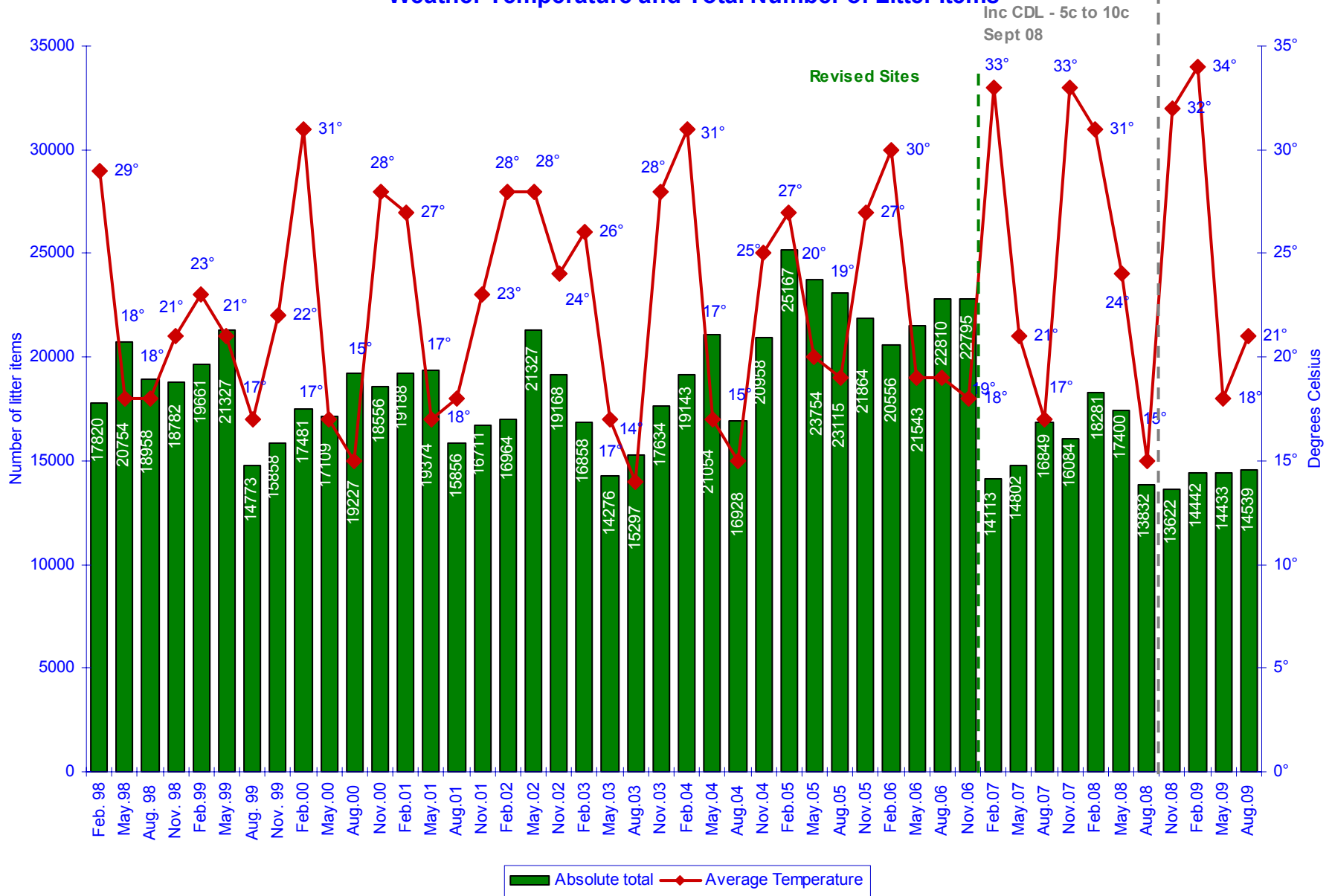
Proportions of total volume within site type across all 151 sites including either 11 original or 11 revised sites		Residential	Beach	Industrial	Car Park	Shopping Centre	Retail	Recreational Park	Highway	Metropolitan	Regional	TOTAL
Wave 32	Old	0.05441	0.02998	0.57970	0.13090	0.01177	0.01877	0.02922	2.47428	2.54585	0.78318	3.32902
	New	0.05441	0.02998	0.57922	0.17275	0.00965	0.01877	0.02922	1.36868	1.47951	0.78318	2.26269
	Old % of total volume	1.6%	0.9%	17.4%	3.9%	0.4%	0.6%	0.9%	74.3%	76.5%	23.5%	
	New % of total volume	2.4%	1.3%	25.6%	7.6%	0.4%	0.8%	1.3%	60.5%	65.4%	34.6%	
	% change from Old to New	0.8%	0.4%	8.2%	3.7%	0.1%	0.3%	0.4%	-13.8%	-11.1%	11.1%	
Wave 33	Old	0.06600	0.03600	0.54200	0.07100	0.03000	0.02100	0.04100	1.66400	1.85500	0.61500	2.47100
	New	0.06600	0.03600	0.53900	0.07000	0.01000	0.02100	0.04100	1.10700	1.27500	0.61500	1.89000
	Old % of total volume	2.7%	1.5%	21.9%	2.9%	1.2%	0.8%	1.7%	67.3%	75.1%	24.9%	
	New % of total volume	3.5%	1.9%	28.5%	3.7%	0.5%	1.1%	2.2%	58.6%	67.5%	32.5%	
	% change from Old to New	0.8%	0.4%	6.6%	0.8%	-0.7%	0.3%	0.5%	-8.8%	-7.6%	7.7%	
Wave 34	Old	0.07800	0.06500	0.41100	0.14100	0.05000	0.01200	0.00600	1.73400	1.87300	0.62500	2.49700
	New	0.07800	0.06500	0.40000	0.14000	0.00900	0.01200	0.00600	1.17100	1.25700	0.62500	1.88100
	Old % of total volume	3.1%	2.6%	16.5%	5.6%	2.0%	0.5%	0.2%	69.4%	75.0%	25.0%	
	New % of total volume	4.1%	3.5%	21.3%	7.4%	0.5%	0.6%	0.3%	62.3%	66.8%	33.2%	
	% change from Old to New	1.0%	0.9%	4.8%	1.8%	-1.5%	0.2%	0.1%	-7.2%	-8.2%	8.2%	
Wave 35	Old	0.17400	0.01700	0.58800	0.13000	0.05300	0.05900	0.01700	2.73700	2.12500	1.65200	3.77500
	New	0.17400	0.01700	0.58600	0.14600	0.03700	0.05900	0.01700	2.16900	1.55500	1.65200	3.20500
	Old % of total volume	4.6%	0.5%	15.6%	3.4%	1.4%	1.6%	0.5%	72.5%	56.3%	43.8%	
	New % of total volume	5.4%	0.5%	18.3%	4.6%	1.2%	1.8%	0.5%	67.7%	48.5%	51.5%	
	% change from Old to New	0.8%	0.1%	2.7%	1.1%	-0.2%	0.3%	0.1%	-4.8%	-7.8%	7.8%	
Average % difference from Old to New		1%	0%	6%	2%	-1%	0%	0%	-9%	-9%	9%	

Unweighted Tracking Graphs *- Items*

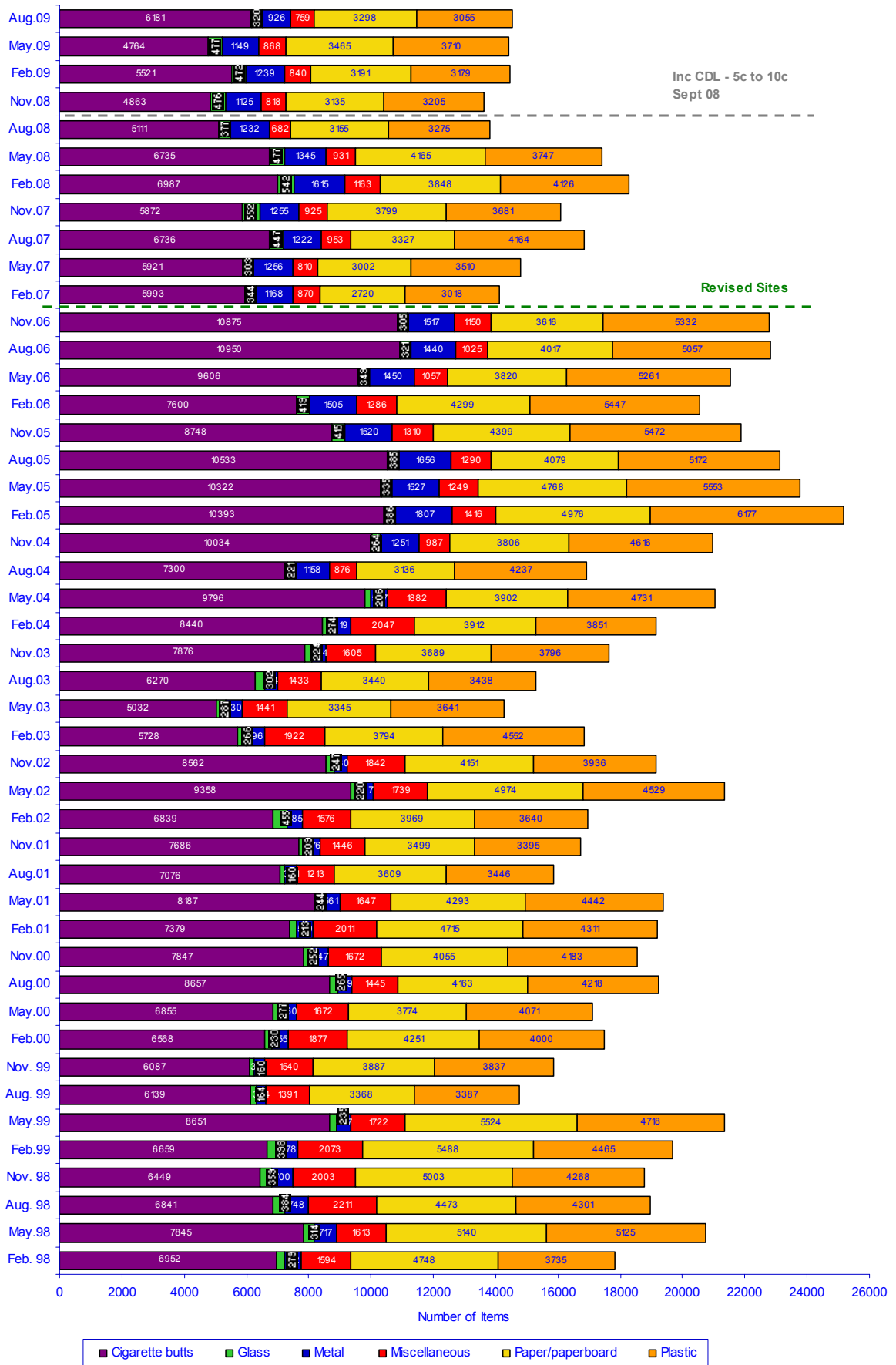
Total Litter - Number of Items



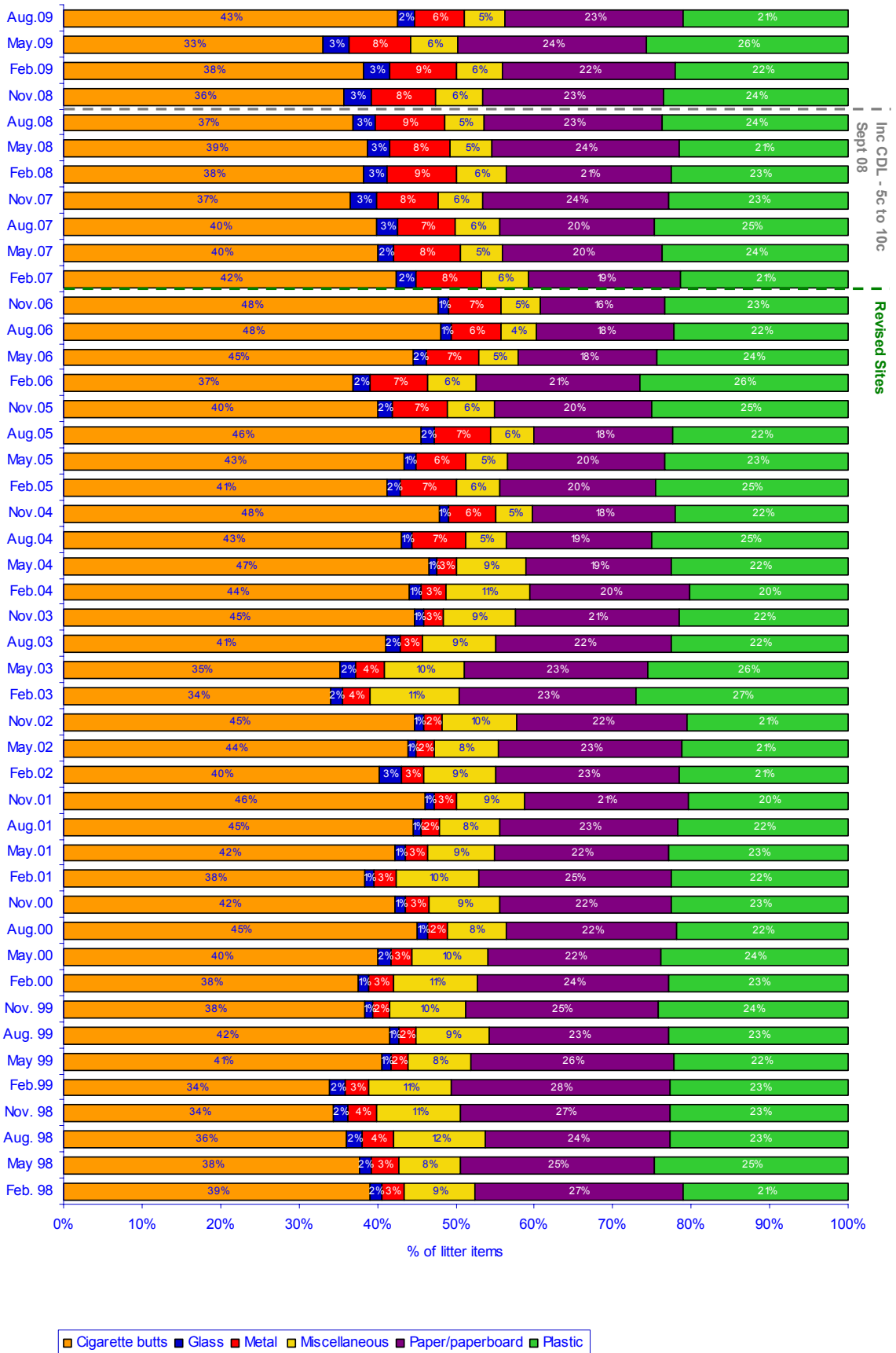
Weather Temperature and Total Number of Litter Items



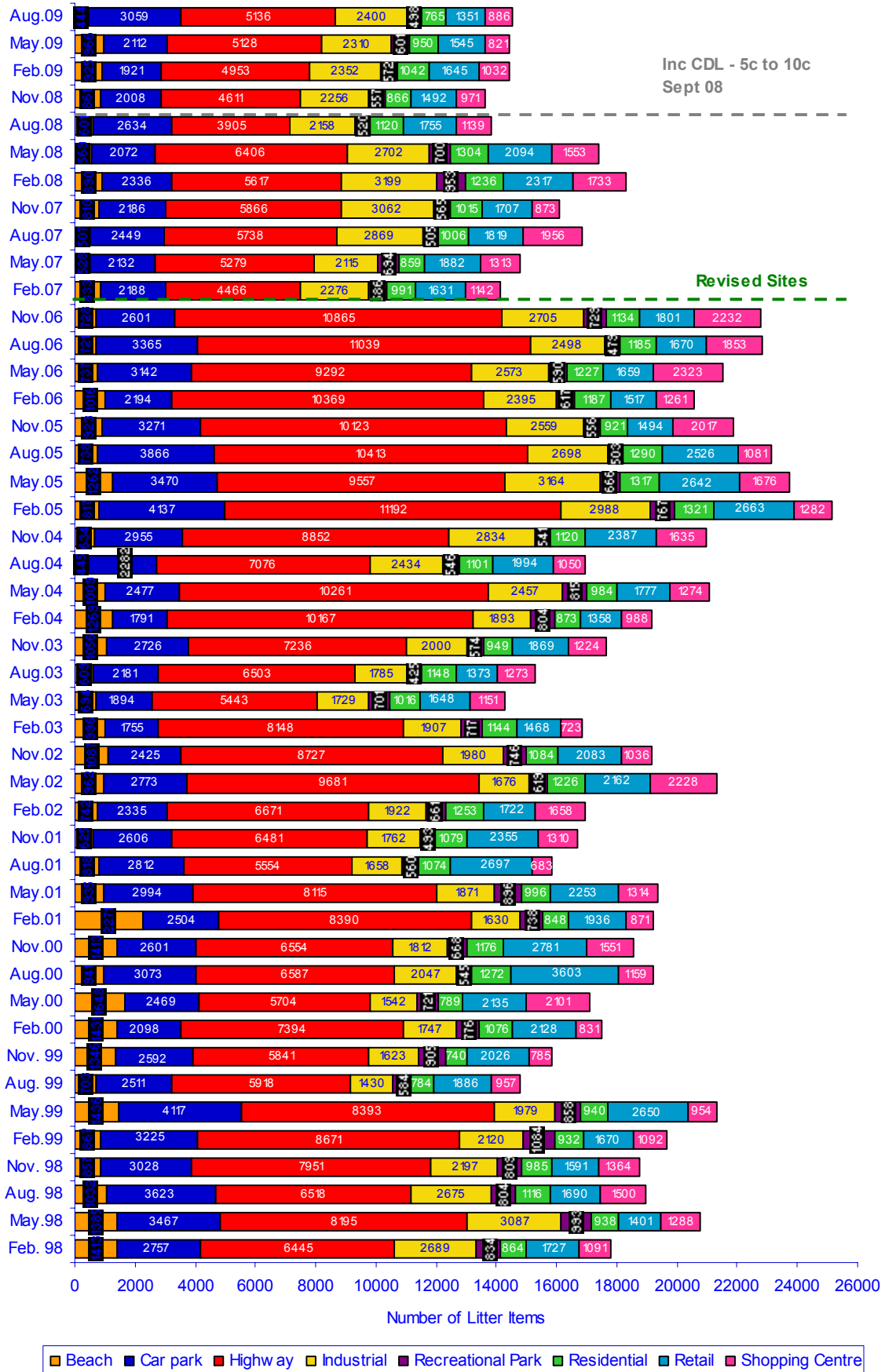
Number of Litter Items by Material Type



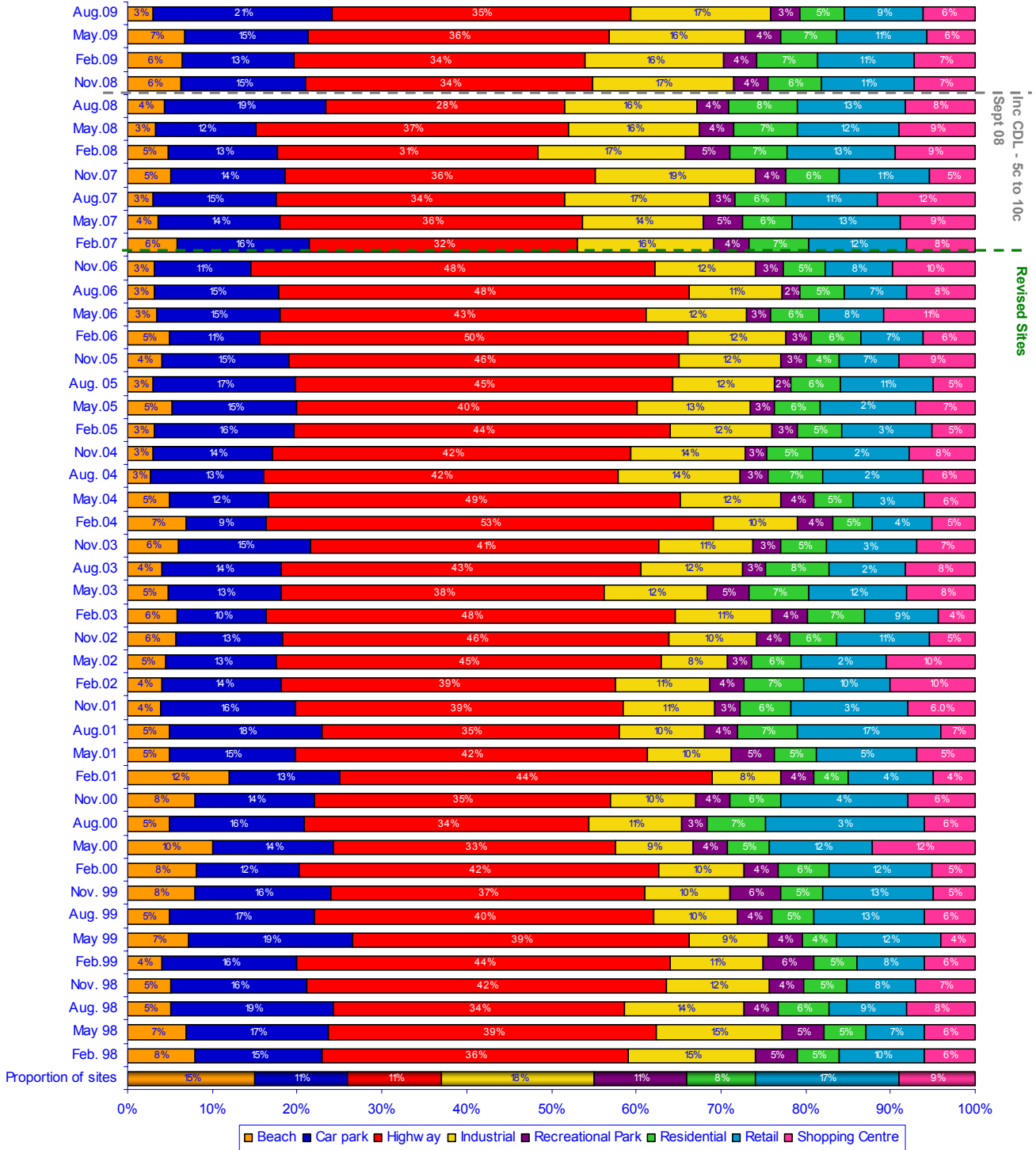
Proportion of Total Litter Stream by Material Type



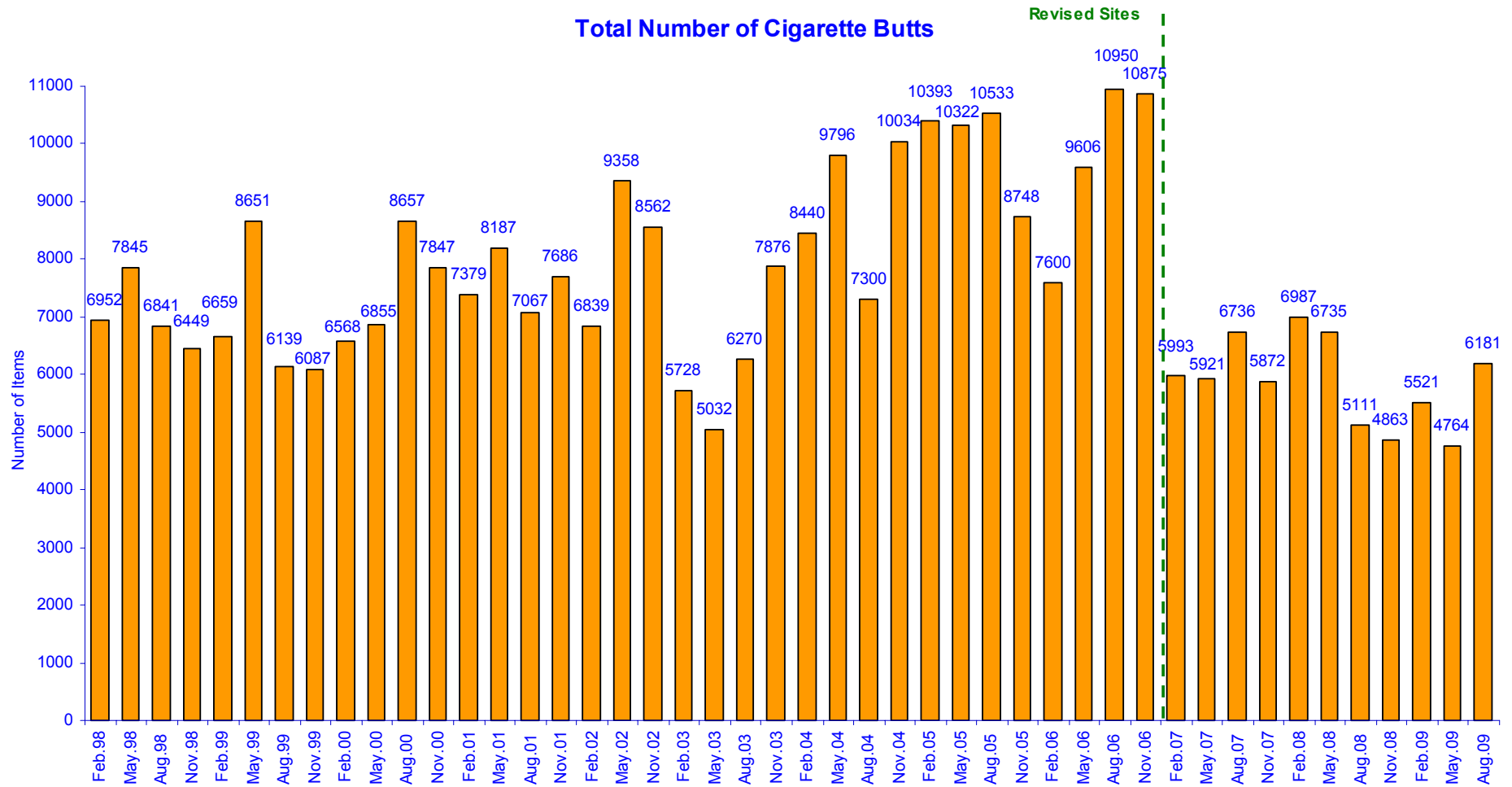
Number of Litter Items by Site Type



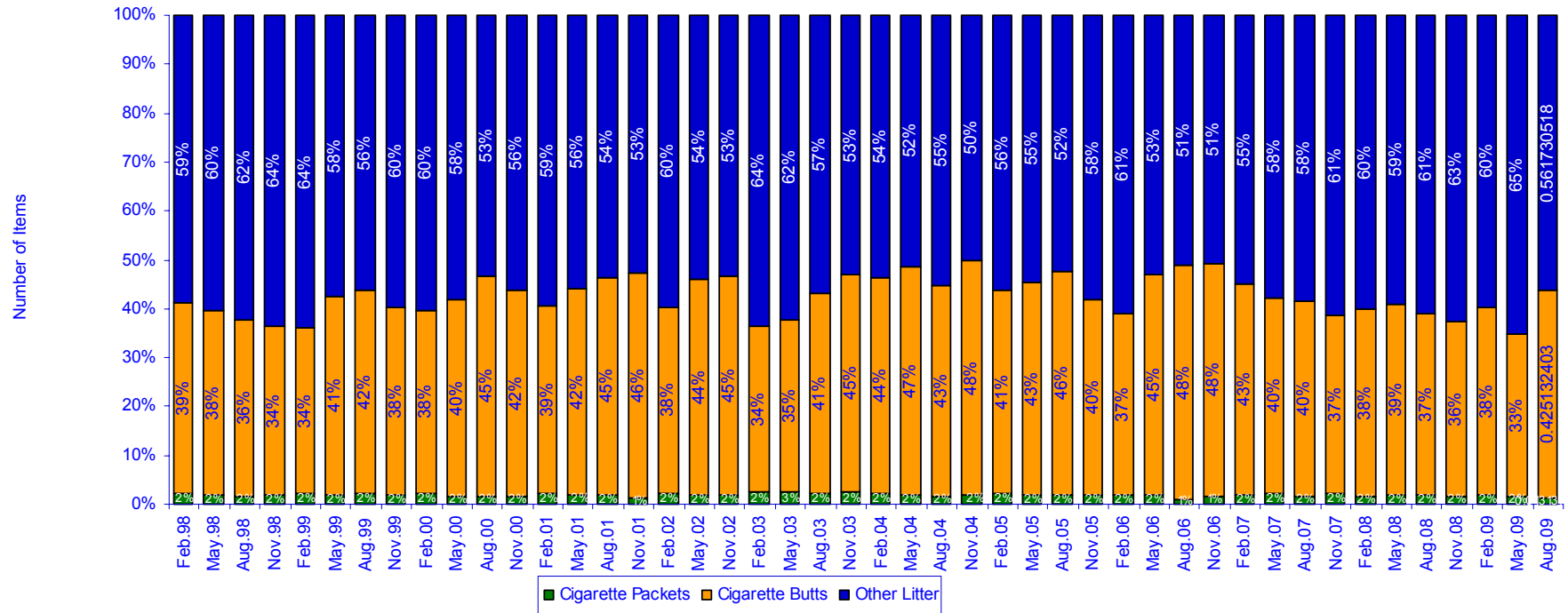
Proportion of Total Litter by Site Type



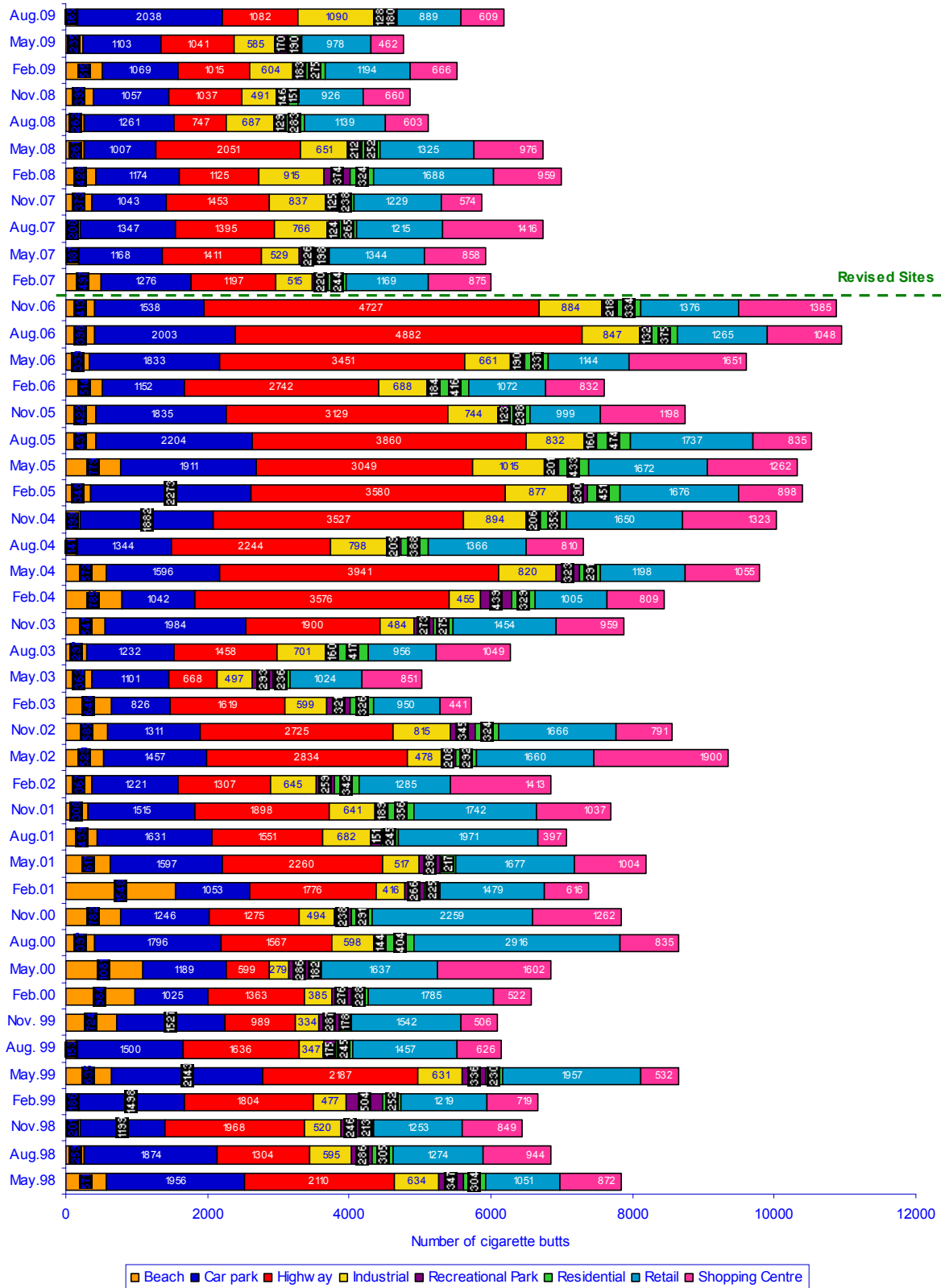
Total Number of Cigarette Butts



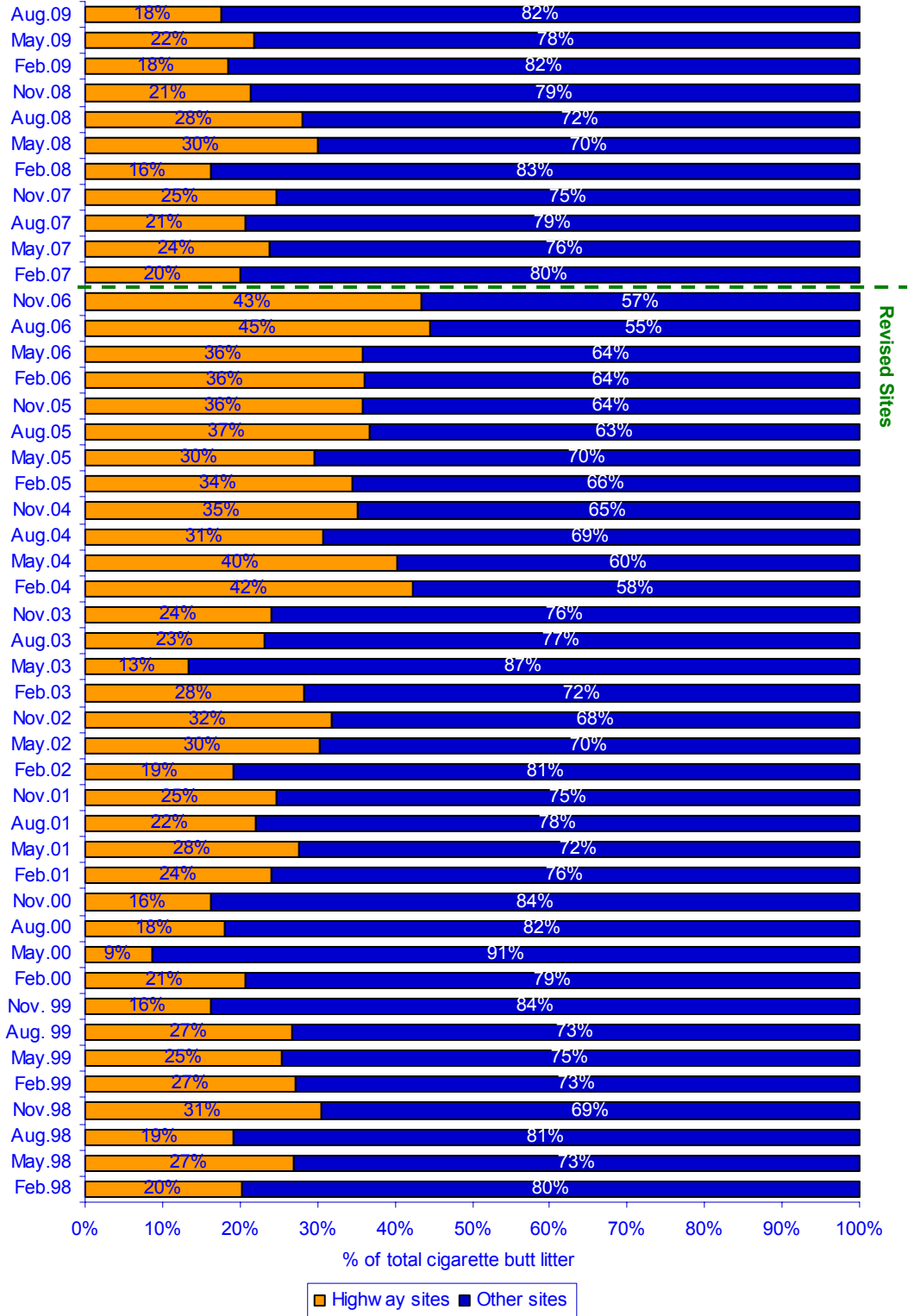
Proportion of Cigarette Related Litter Items in Total Litter Stream



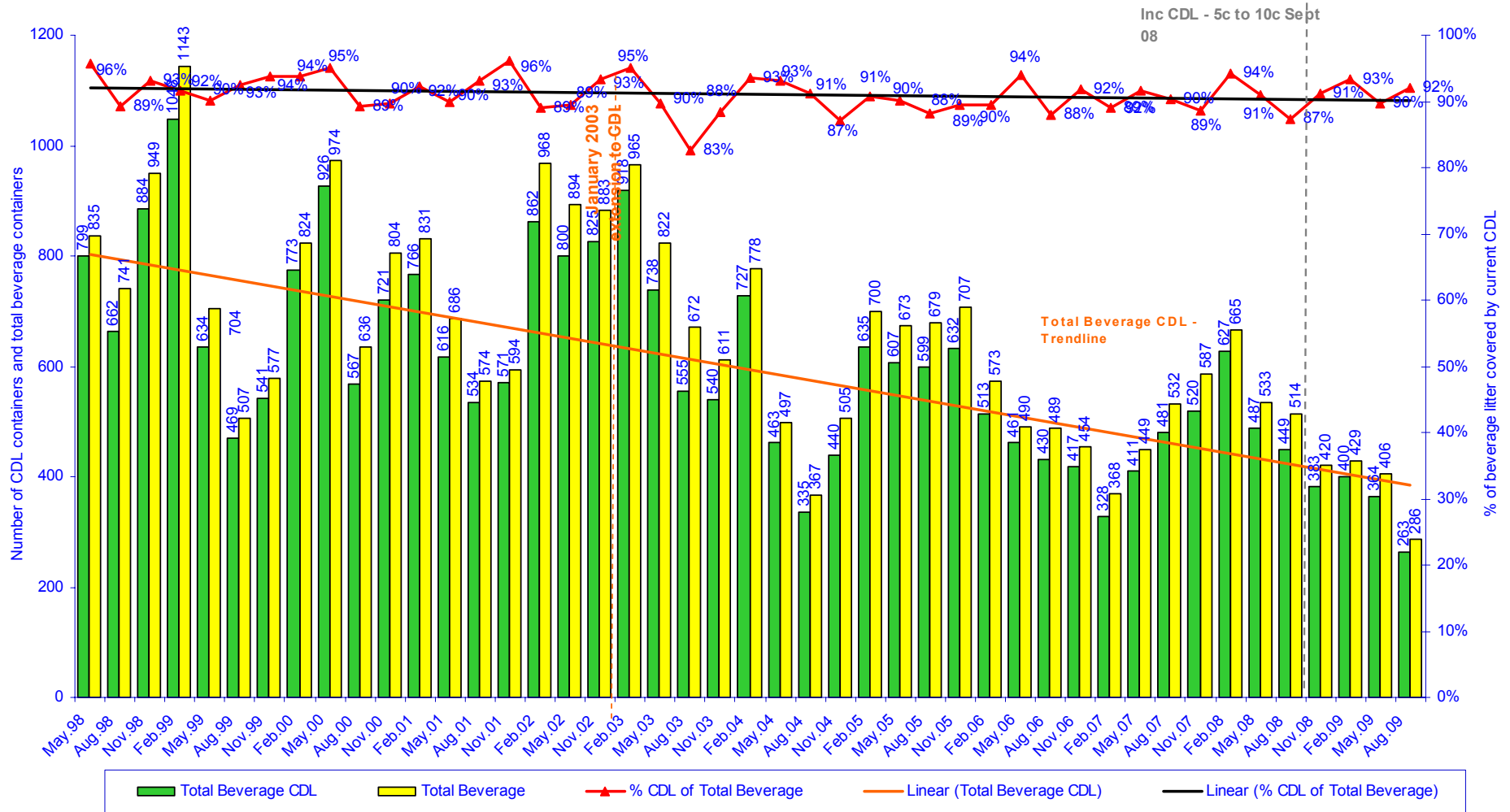
Number of Cigarette Butts by Site Type



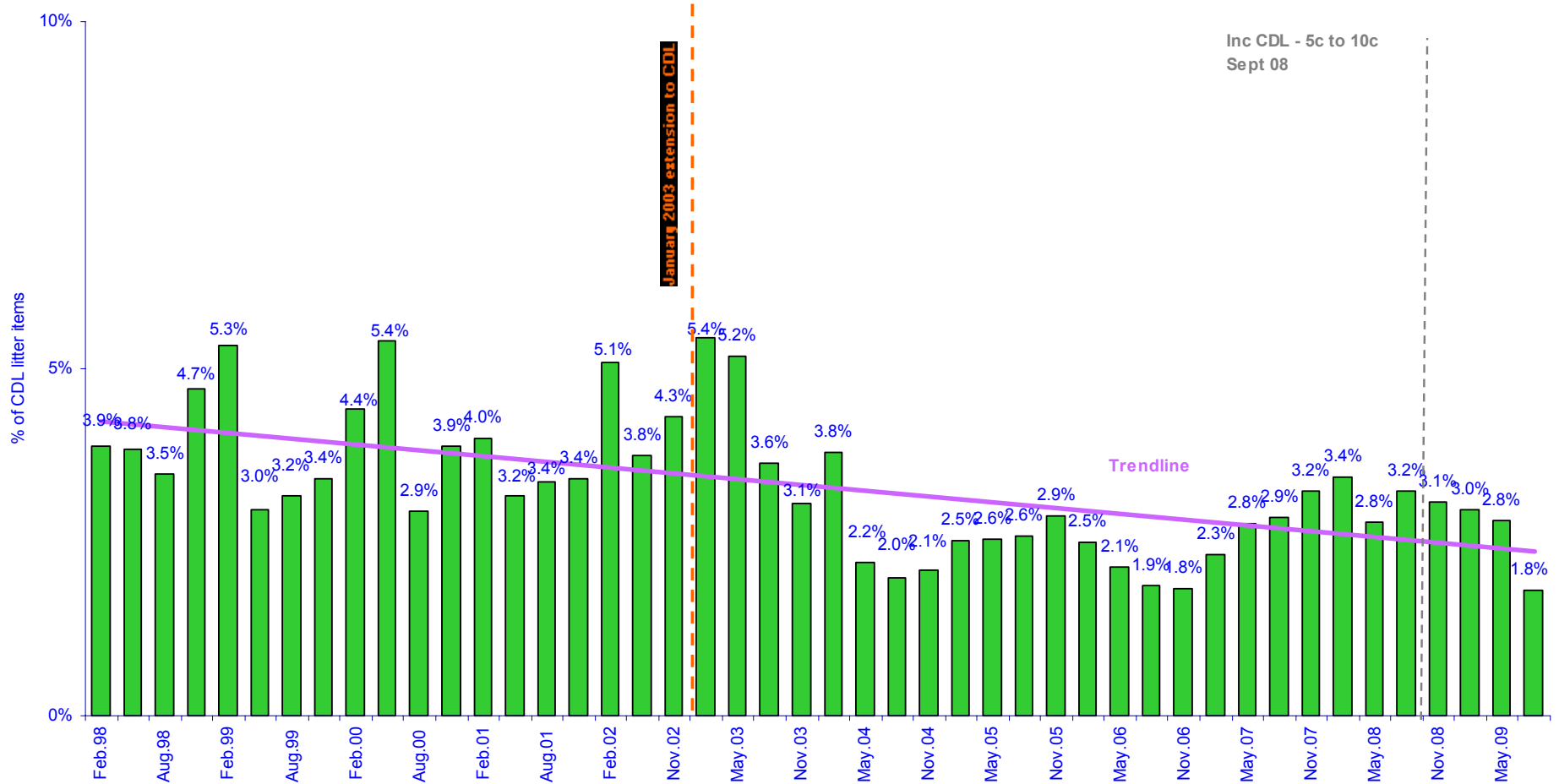
Proportion of Total Cigarette Butt Litter at Highway sites & Other sites



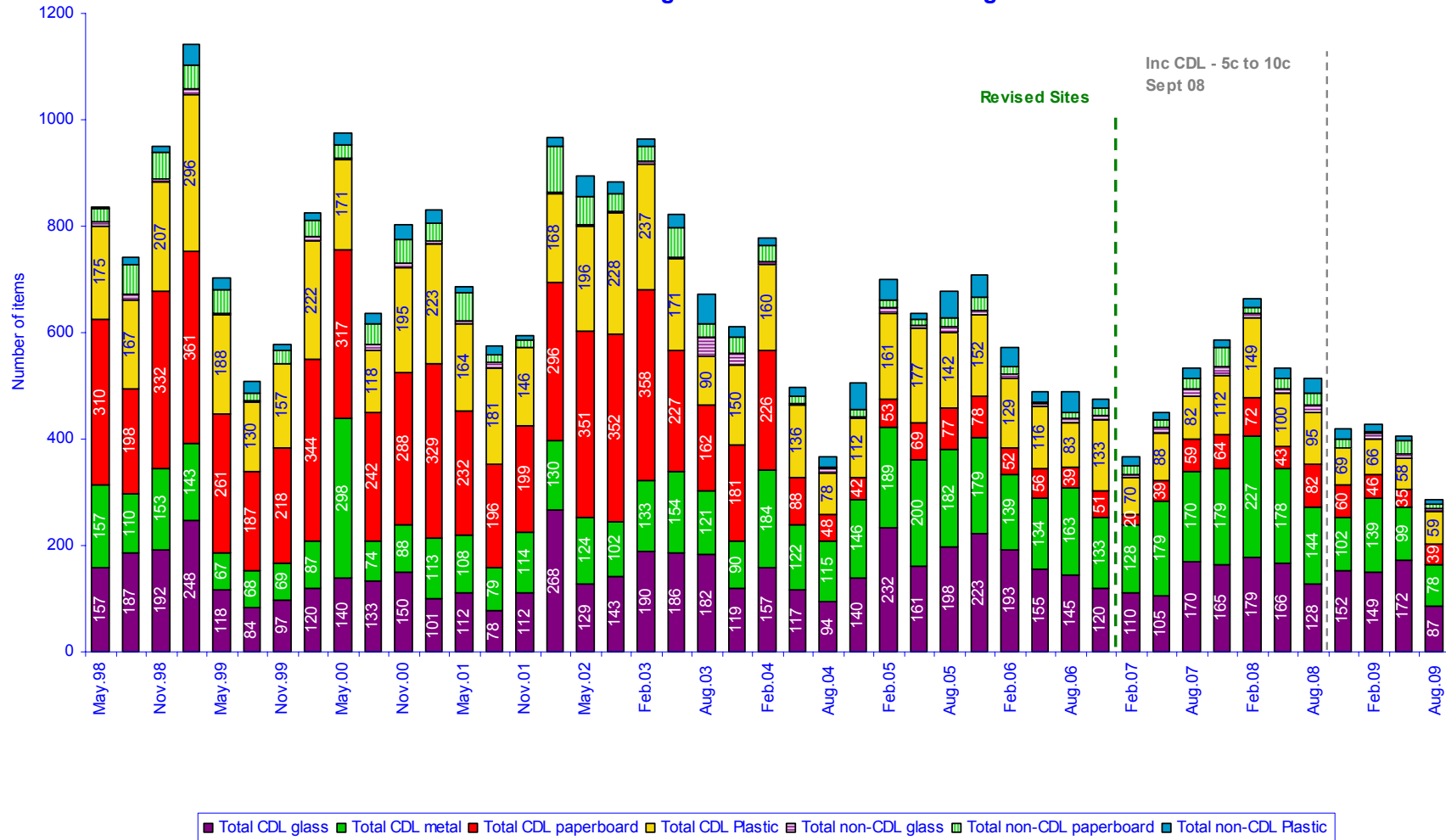
Proportion of Beverage Litter Covered By Current CDL & Total Number of Beverage Litter Items & Containers Covered By Current CDL



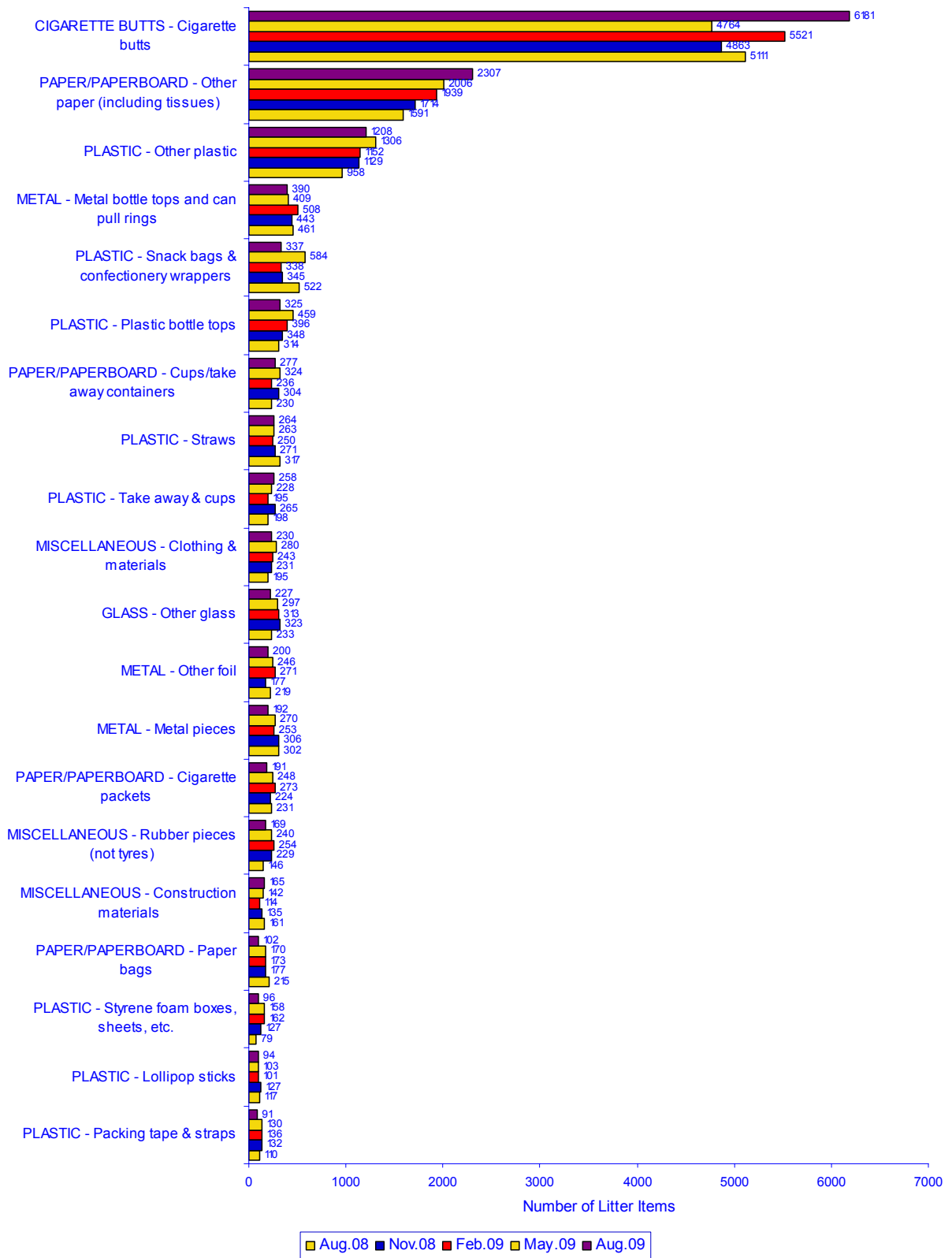
Proportion of Current CDL Litter Items in Total Litter Stream



CDL and Non-CDL Beverage Items Within Material Categories

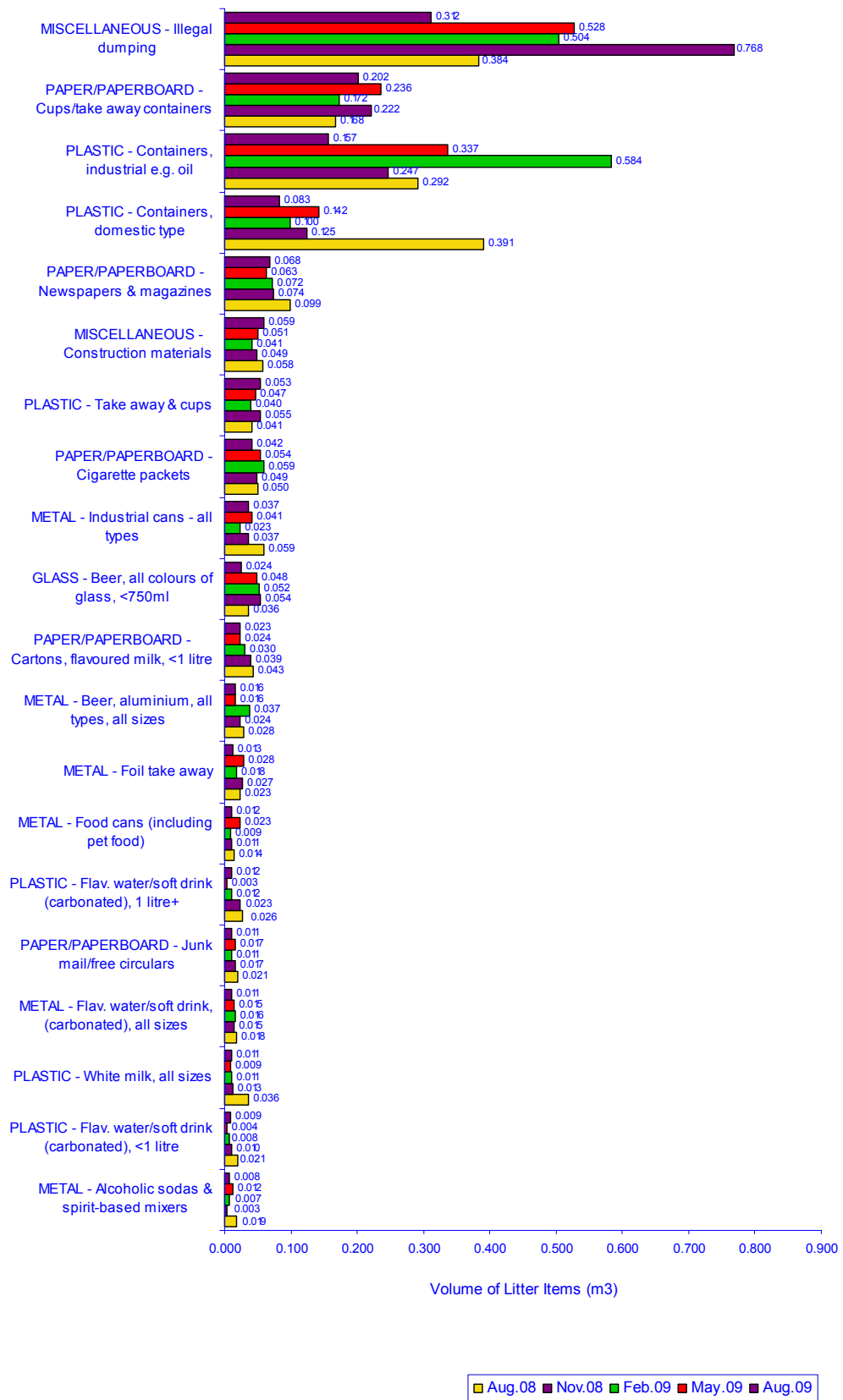


Top 20 Litter Items - Highest Counts

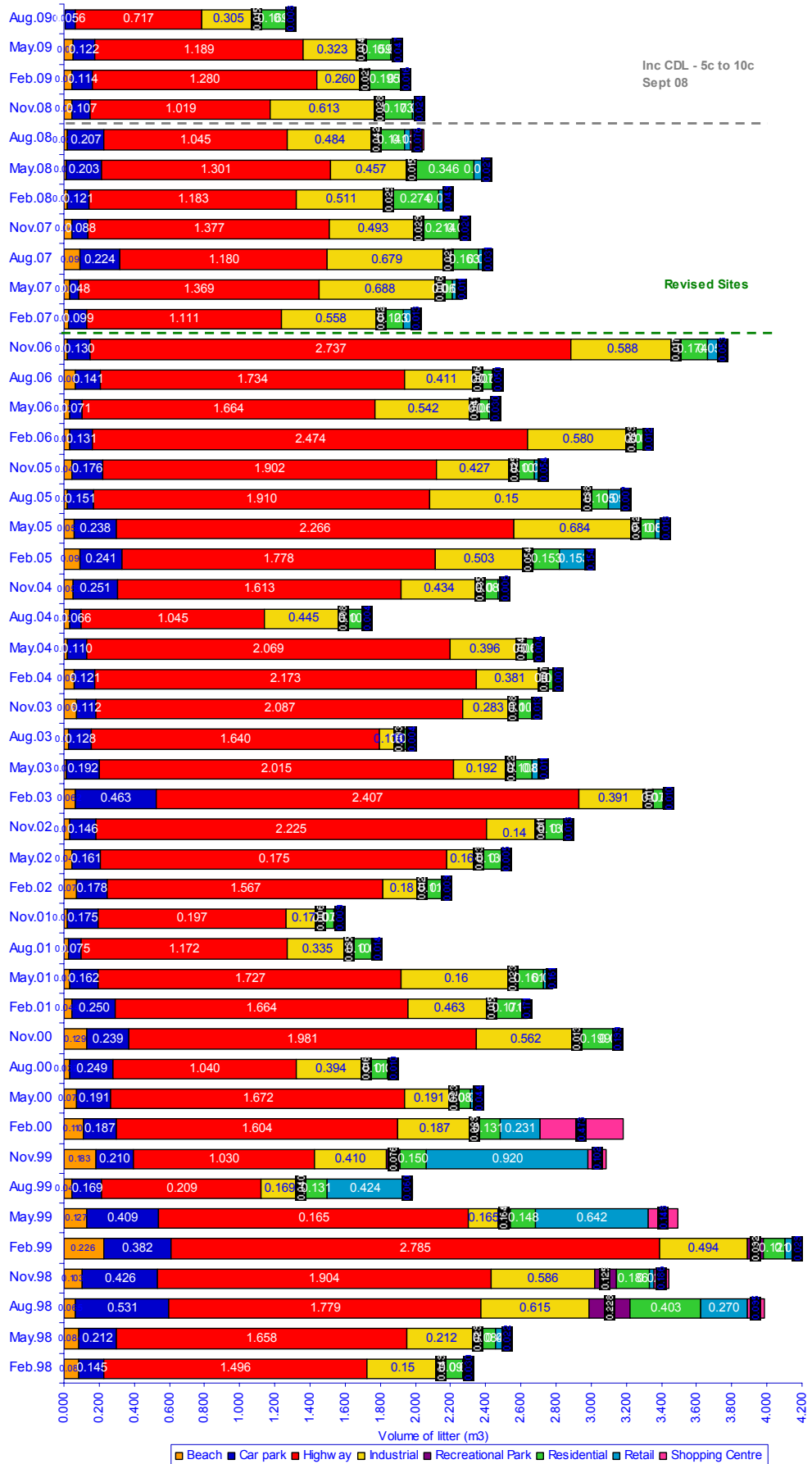


***Unweighted Tracking Graphs
- Volume***

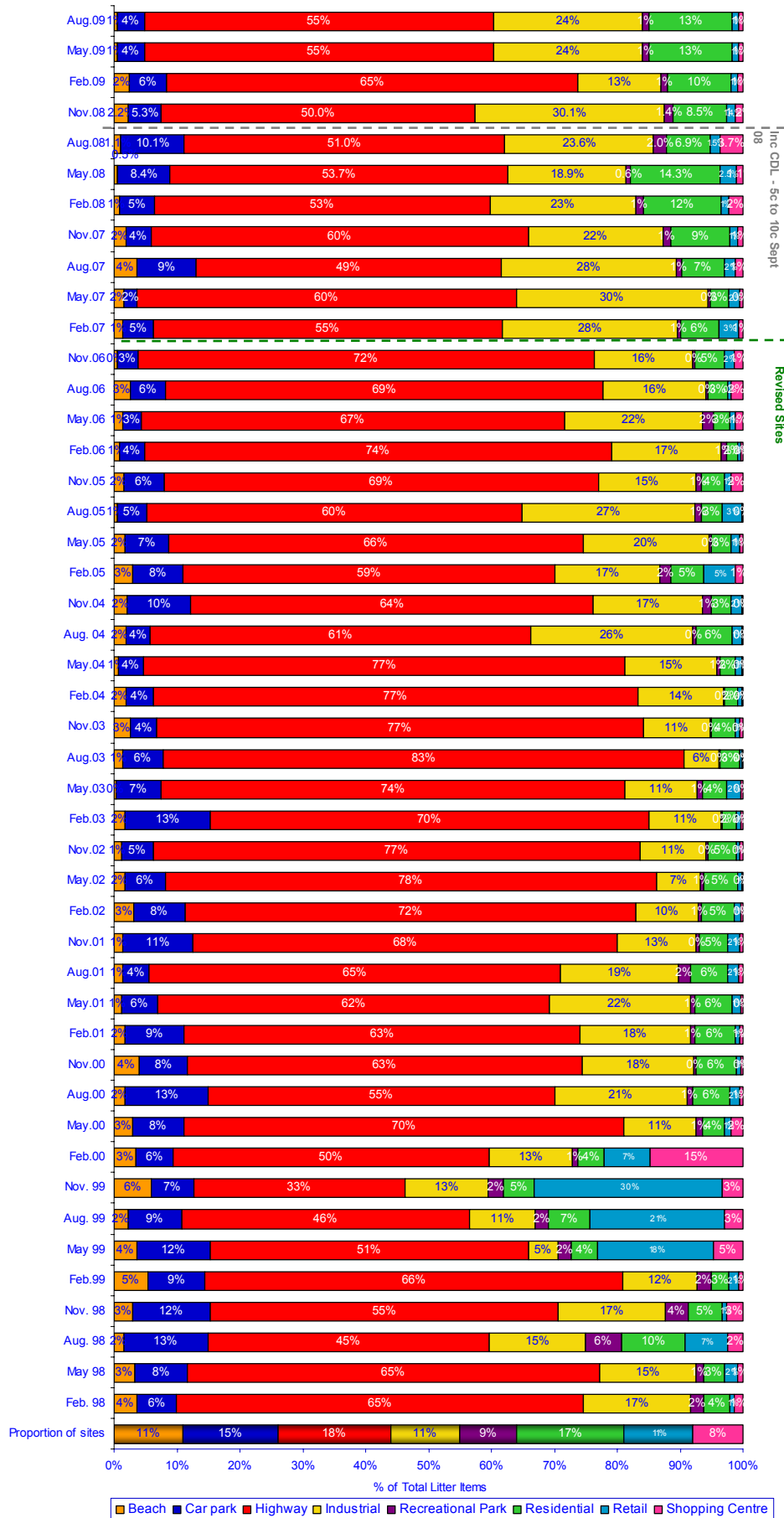
Top 20 Litter Items by Volume



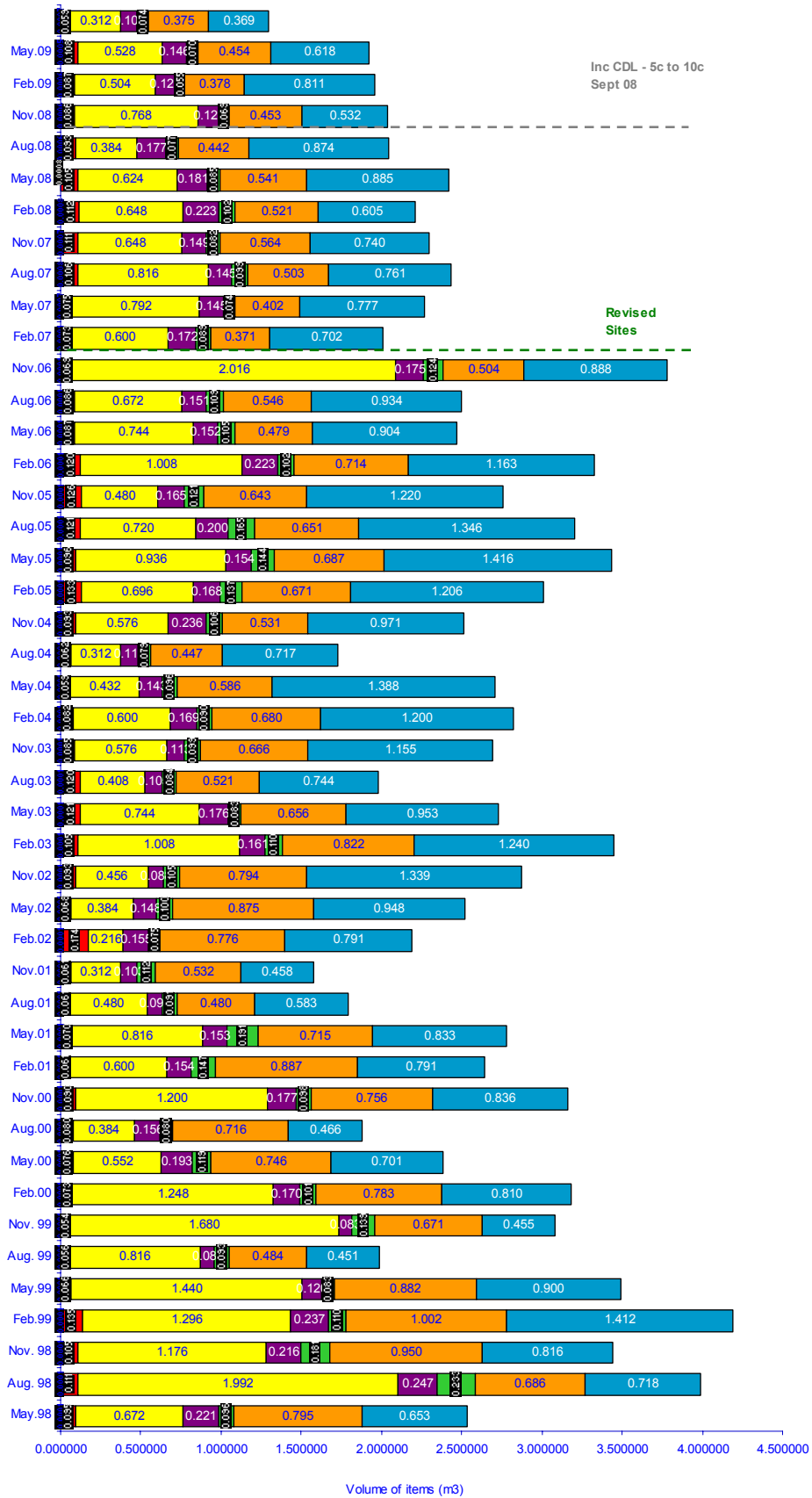
Volume of Litter by Site Type



Proportion of Litter Volume in Total Litter Stream by Site Type



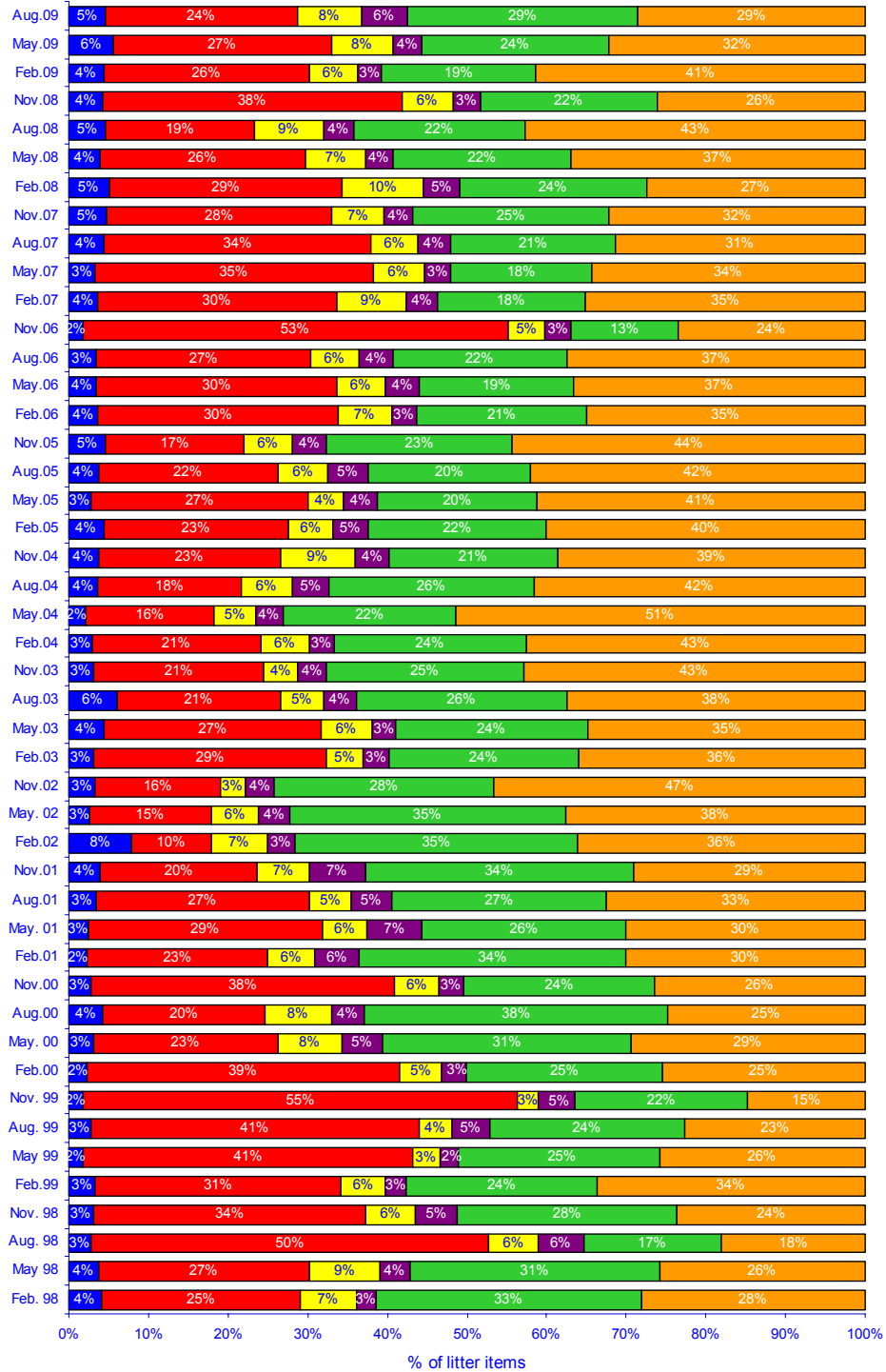
Volume of Litter Items by Material Type



■ Cigarette butts ■ Glass ■ Illegal dumping ■ Metal ■ Miscellaneous (excluding illegal dumping) ■ Paper/paperboard ■ Plastic

Proportion of Total Litter Volume by Material Type

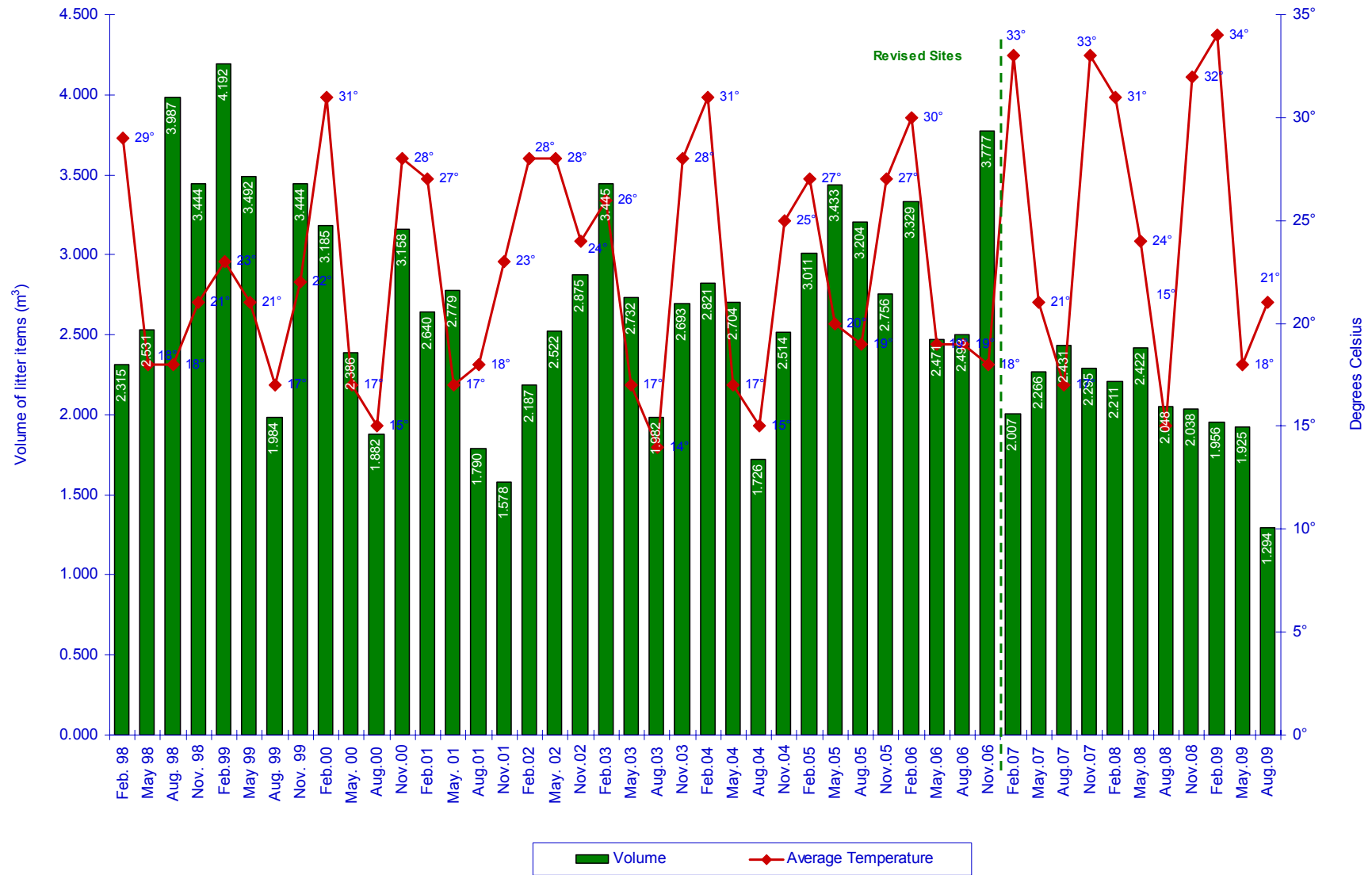
- Please note that cigarette butts are not included as the volumes of such are consistently negligible -



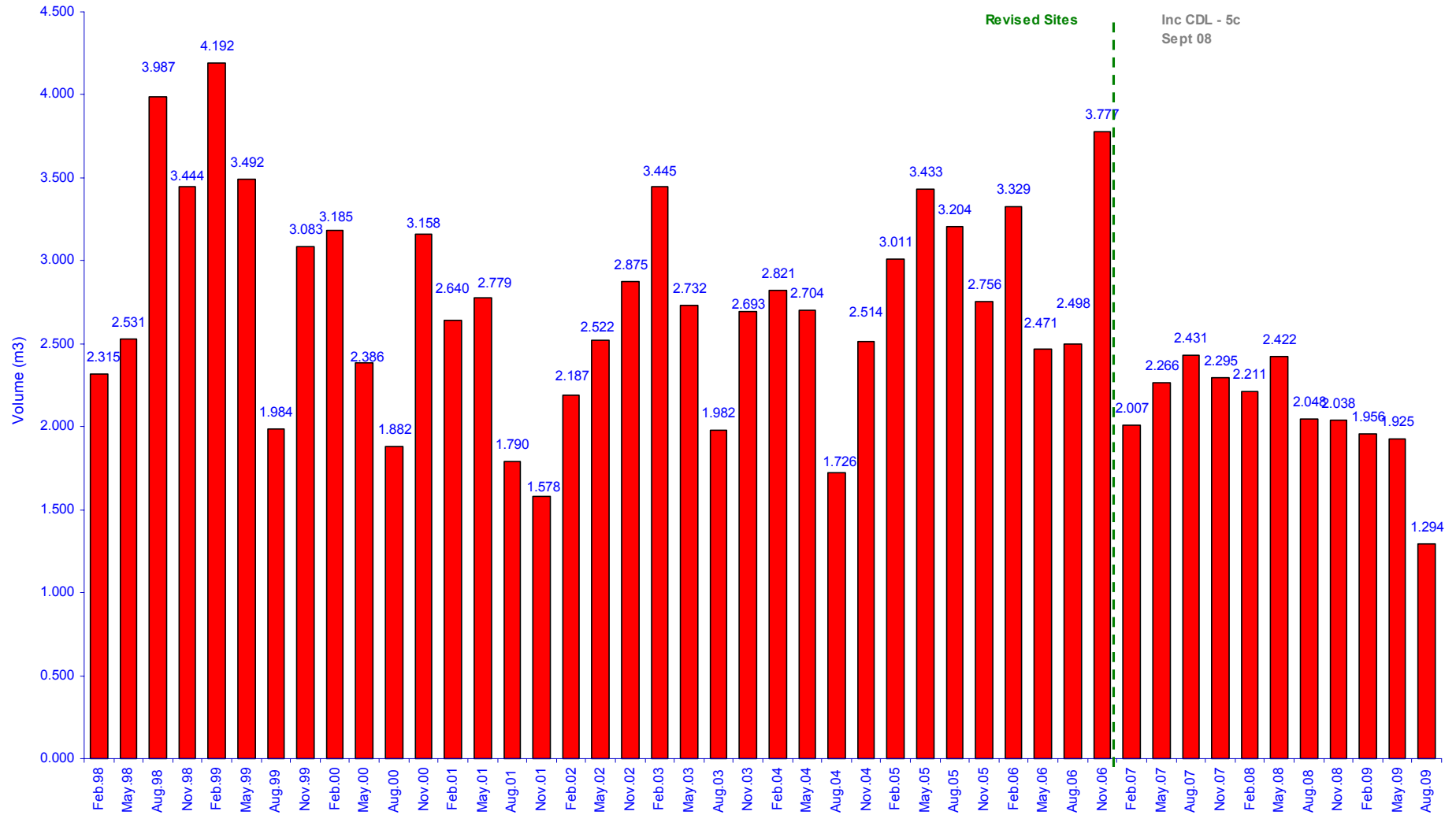
■ Glass ■ Illegal dumping ■ Metal ■ Miscellaneous (excluding illegal dumping) ■ Paper/paperboard ■ Plastic

Weather Temperature and Total Volume of Litter Items

Inc CDL - 5c to 10c
Sept 08



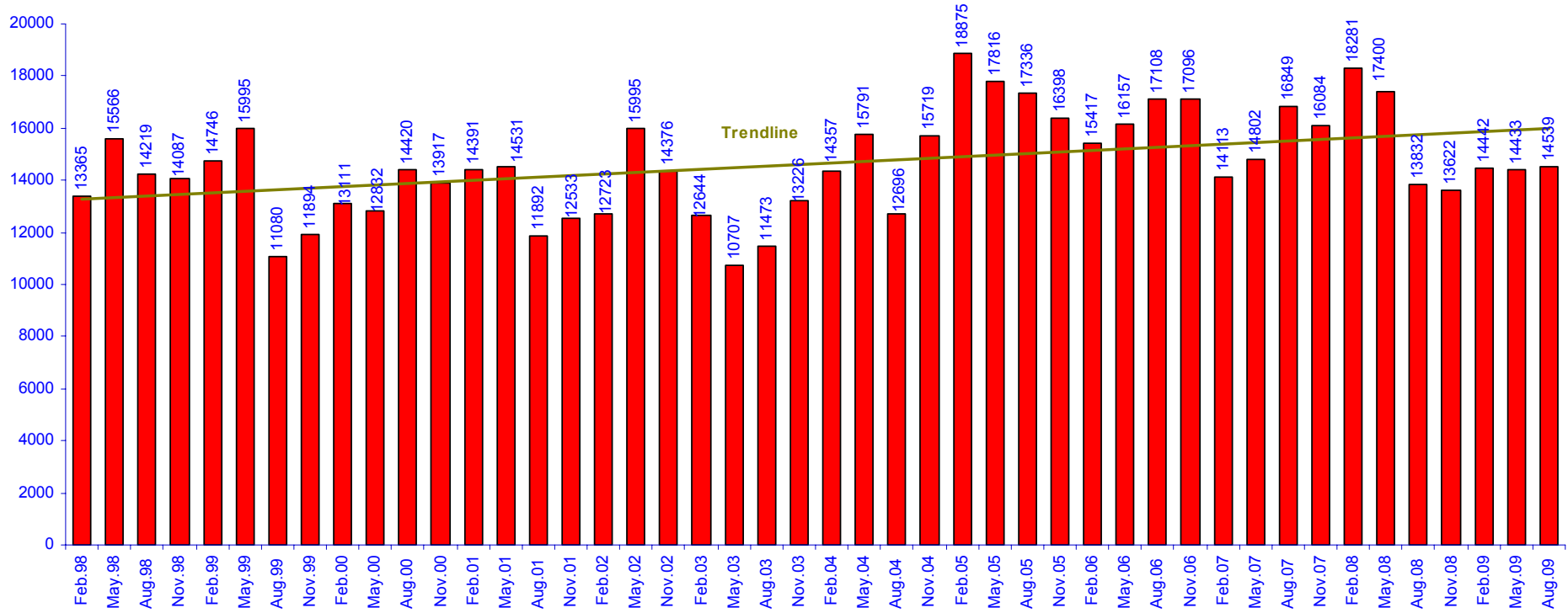
Total Volume (Cubic Metres) of Litter



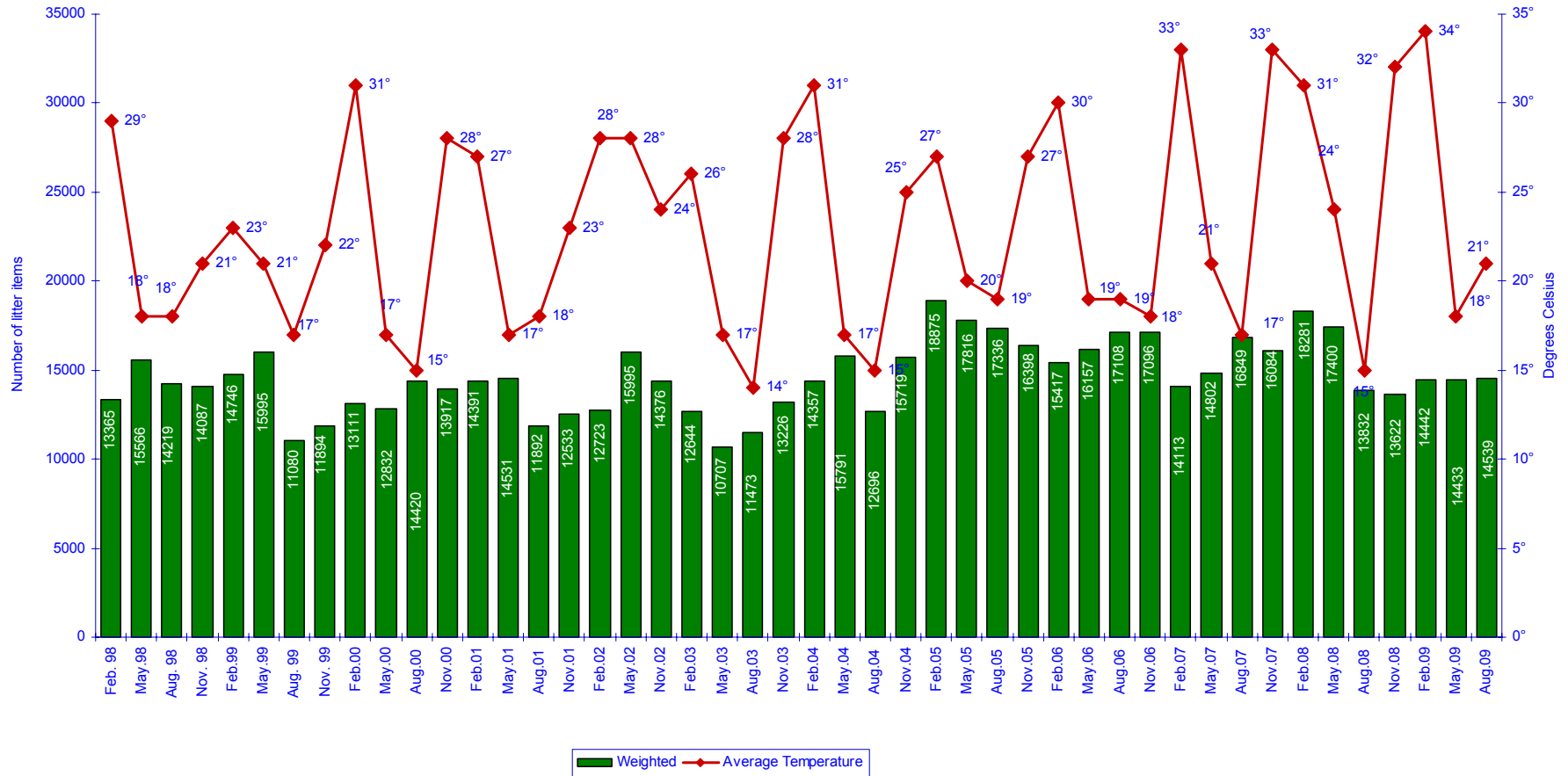
Weighted Tracking Graphs

- Items

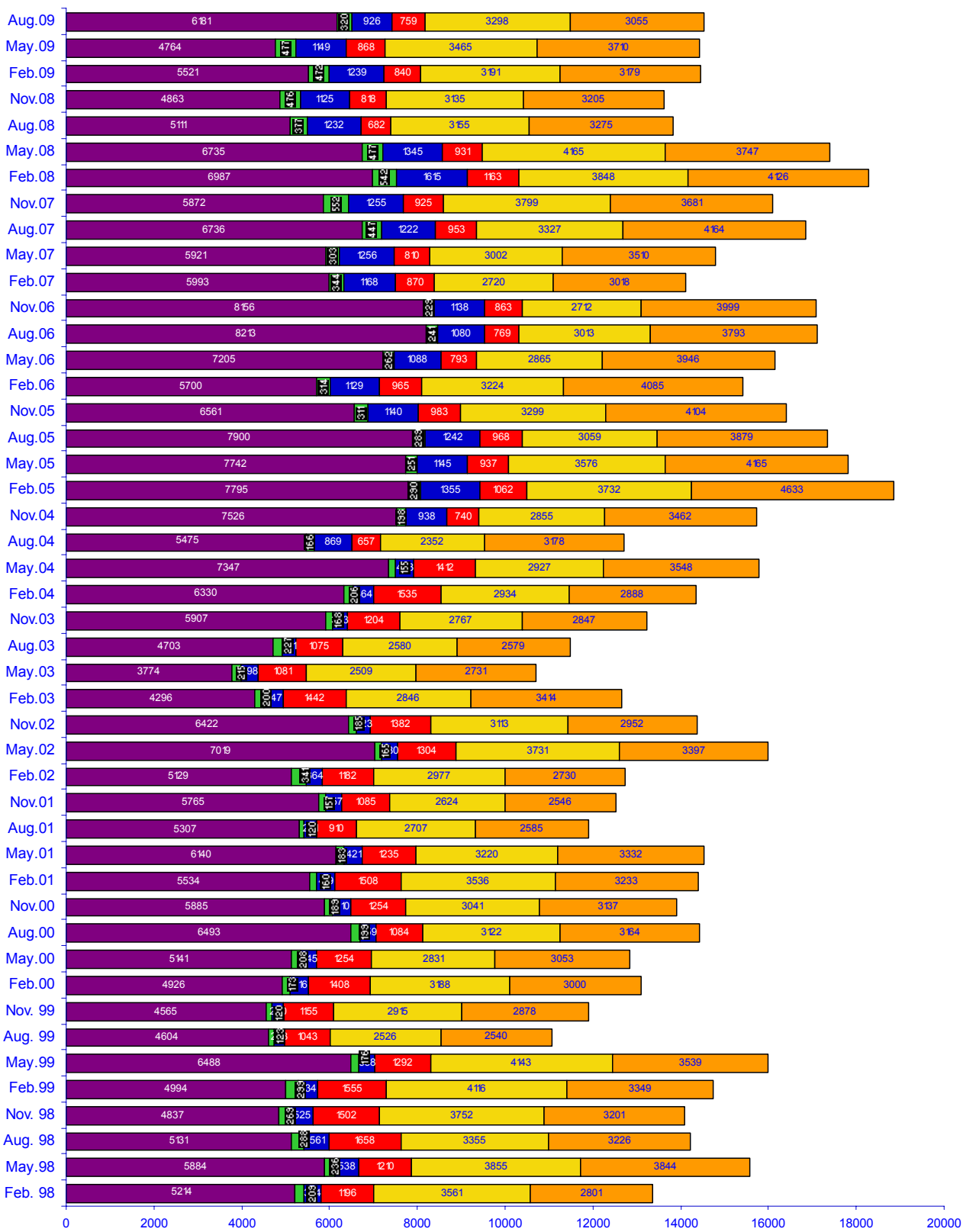
Total Litter - Number of Items - Weighted



Weather Temperature and Total Number of Litter Items - Weighted



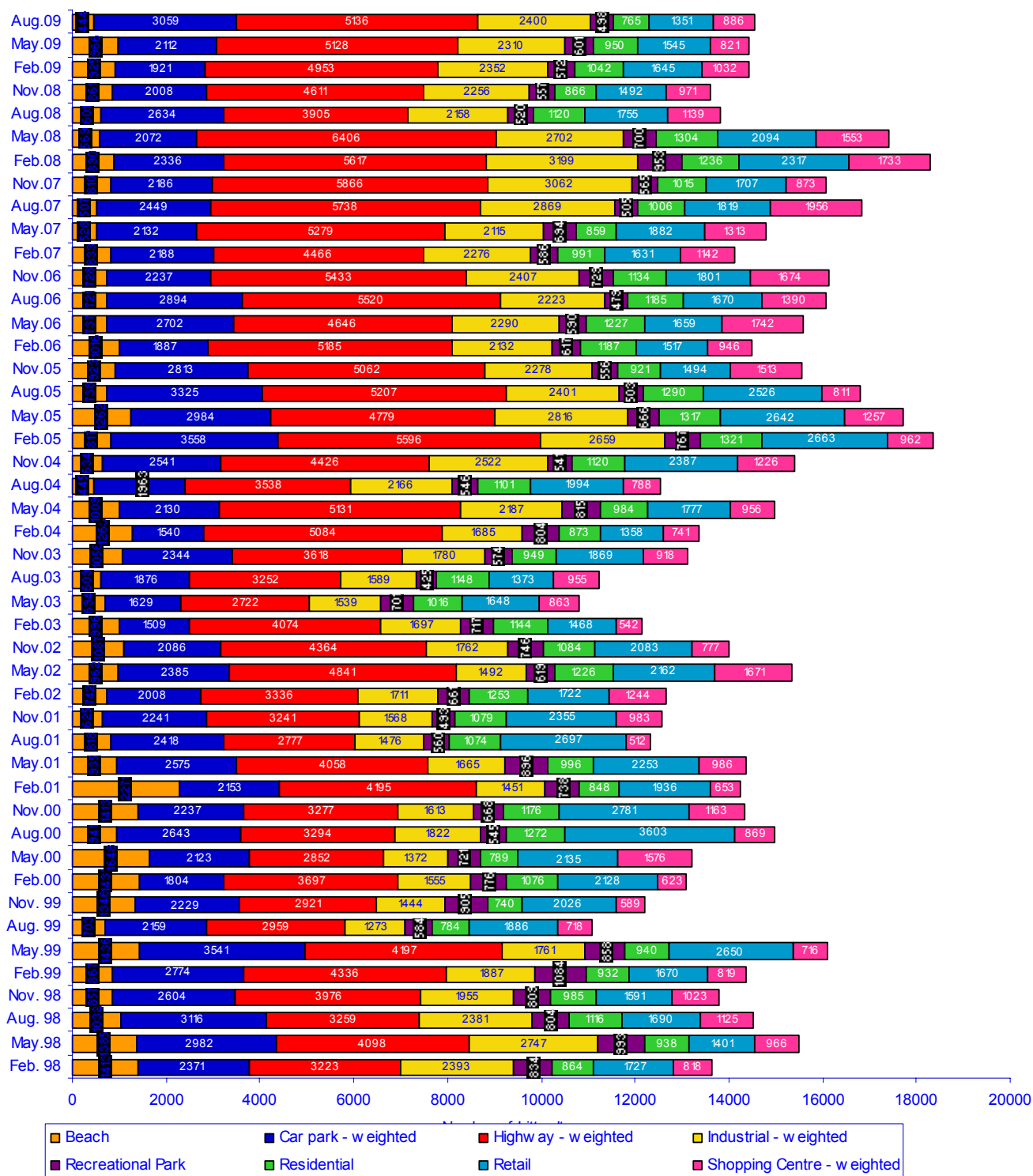
Number of Litter Items by Material Type - Weighted



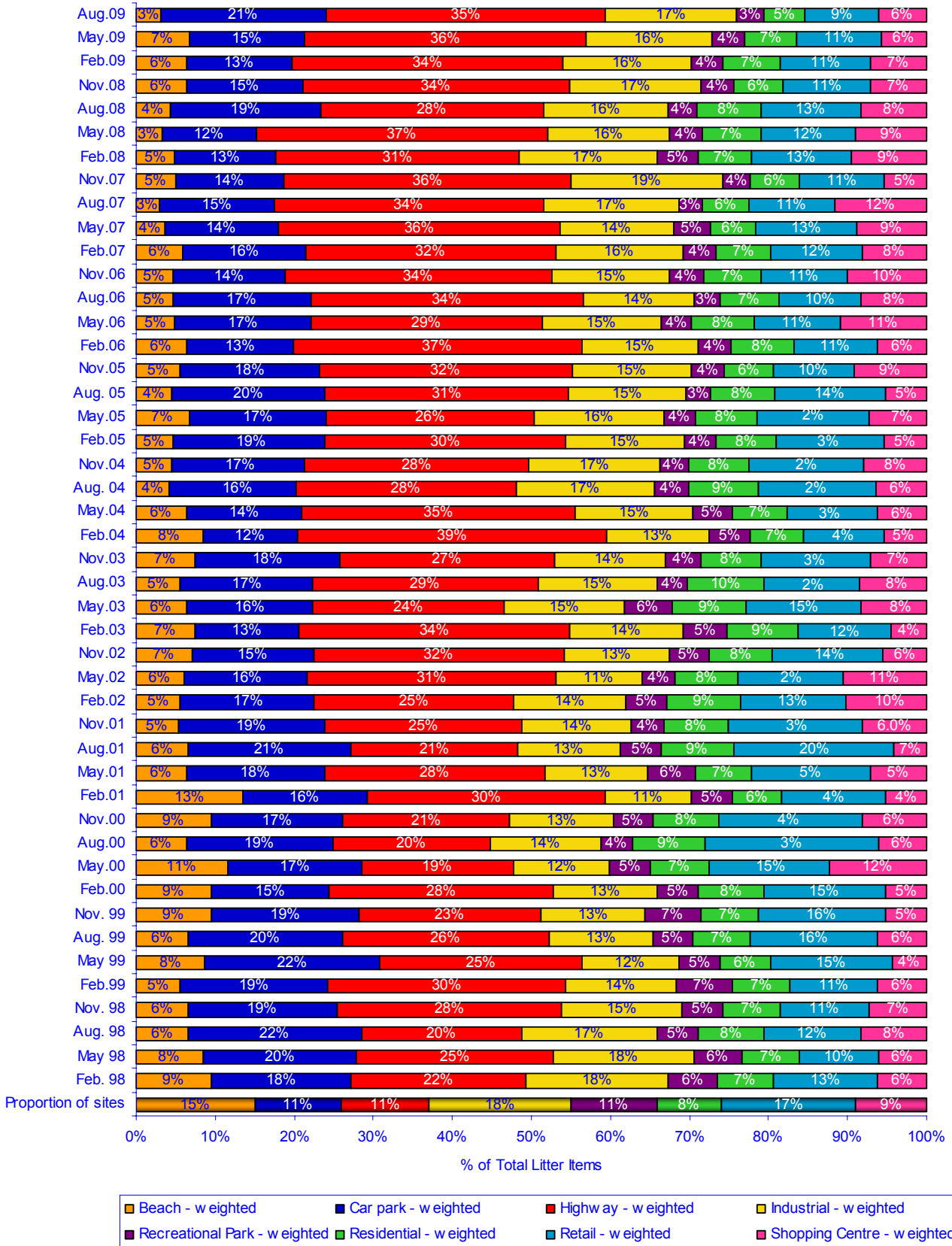
■ Cigarette butts - weighted ■ Glass - weighted ■ Metal - weighted ■ Miscellaneous - weighted ■ Paper/paperboard - weighted ■ Plastic - weighted

Number of Items

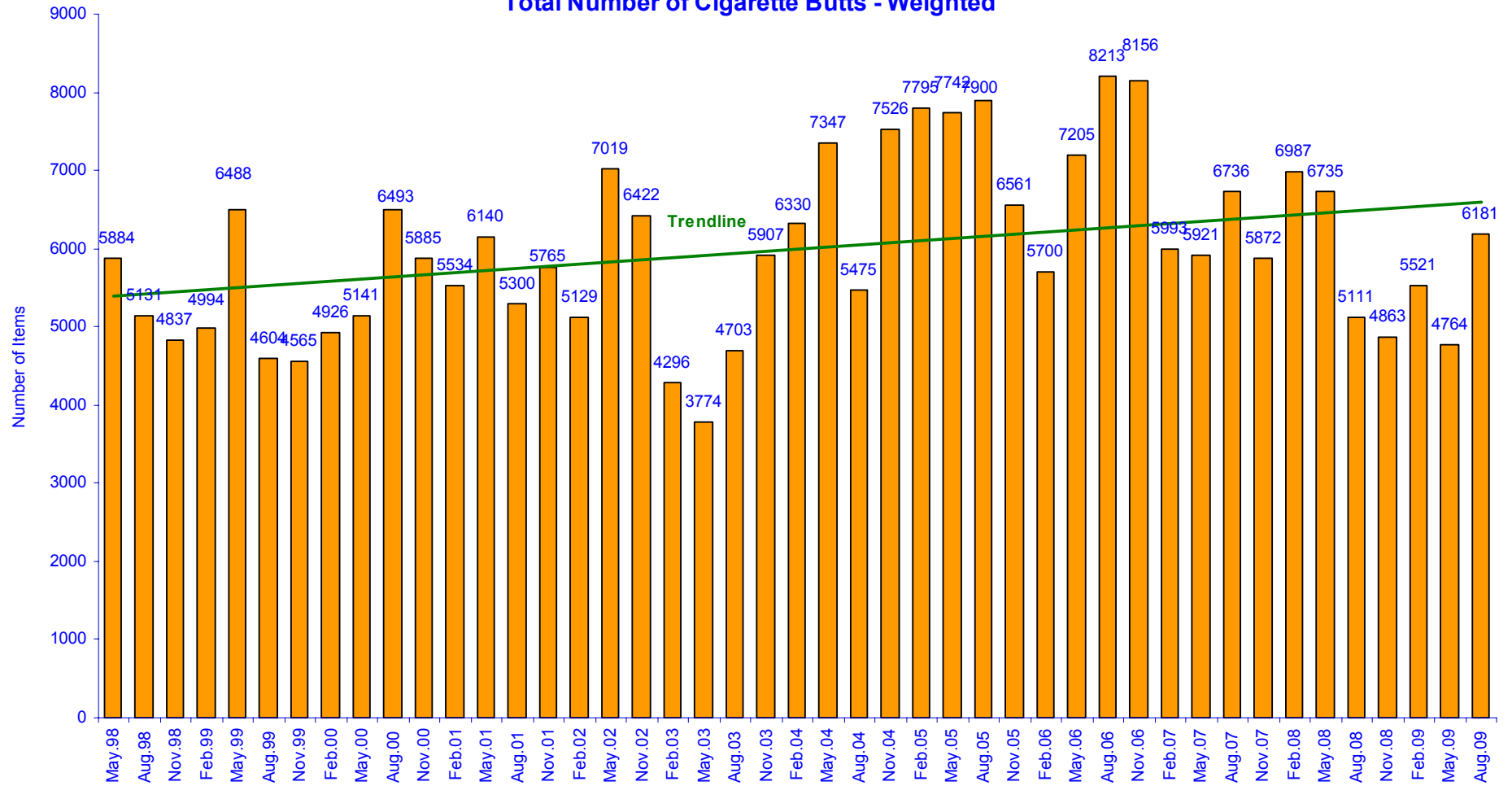
Number of Litter Items by Site Type - Weighted



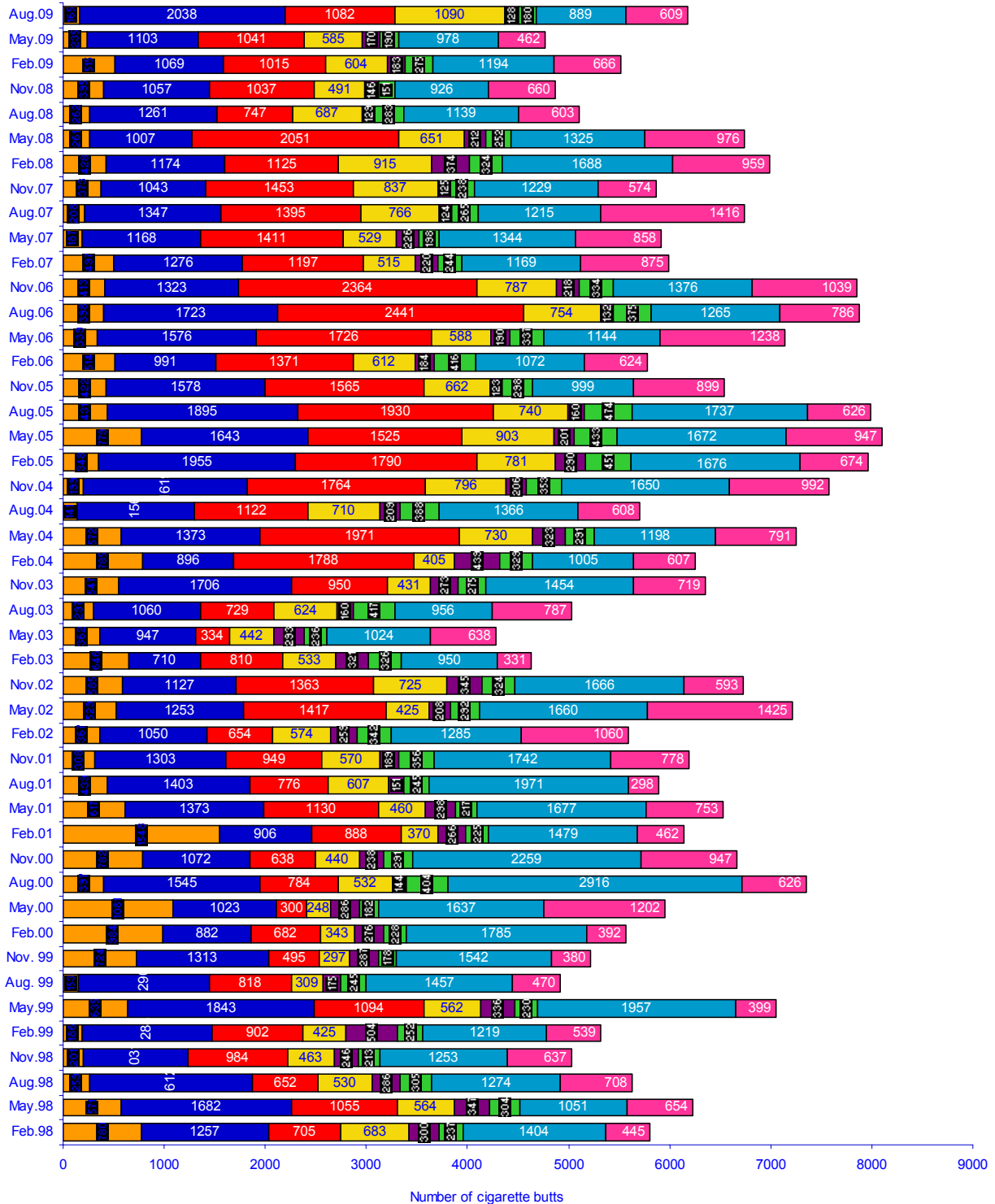
Proportion of Total Litter by Site Type - Weighted



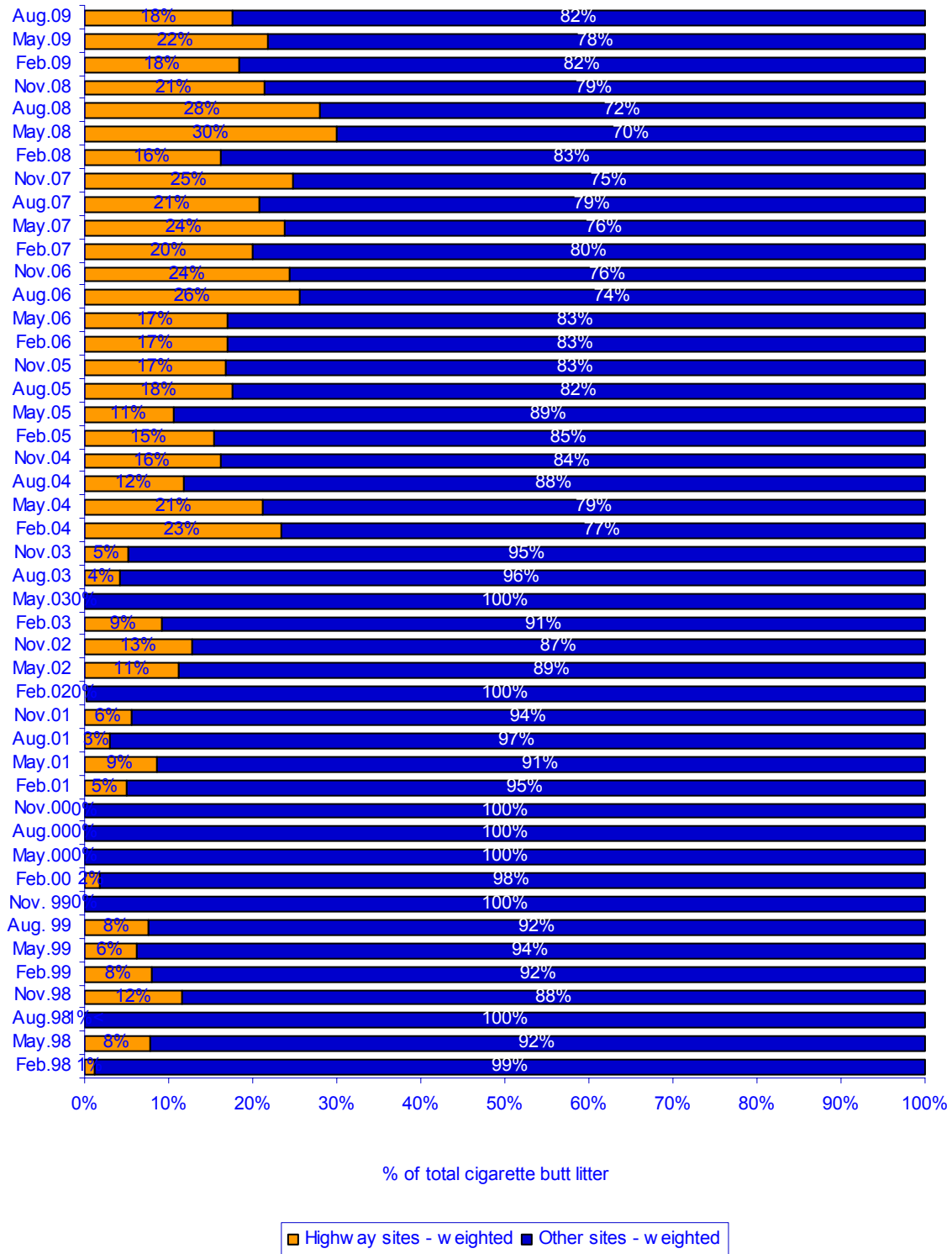
Total Number of Cigarette Butts - Weighted



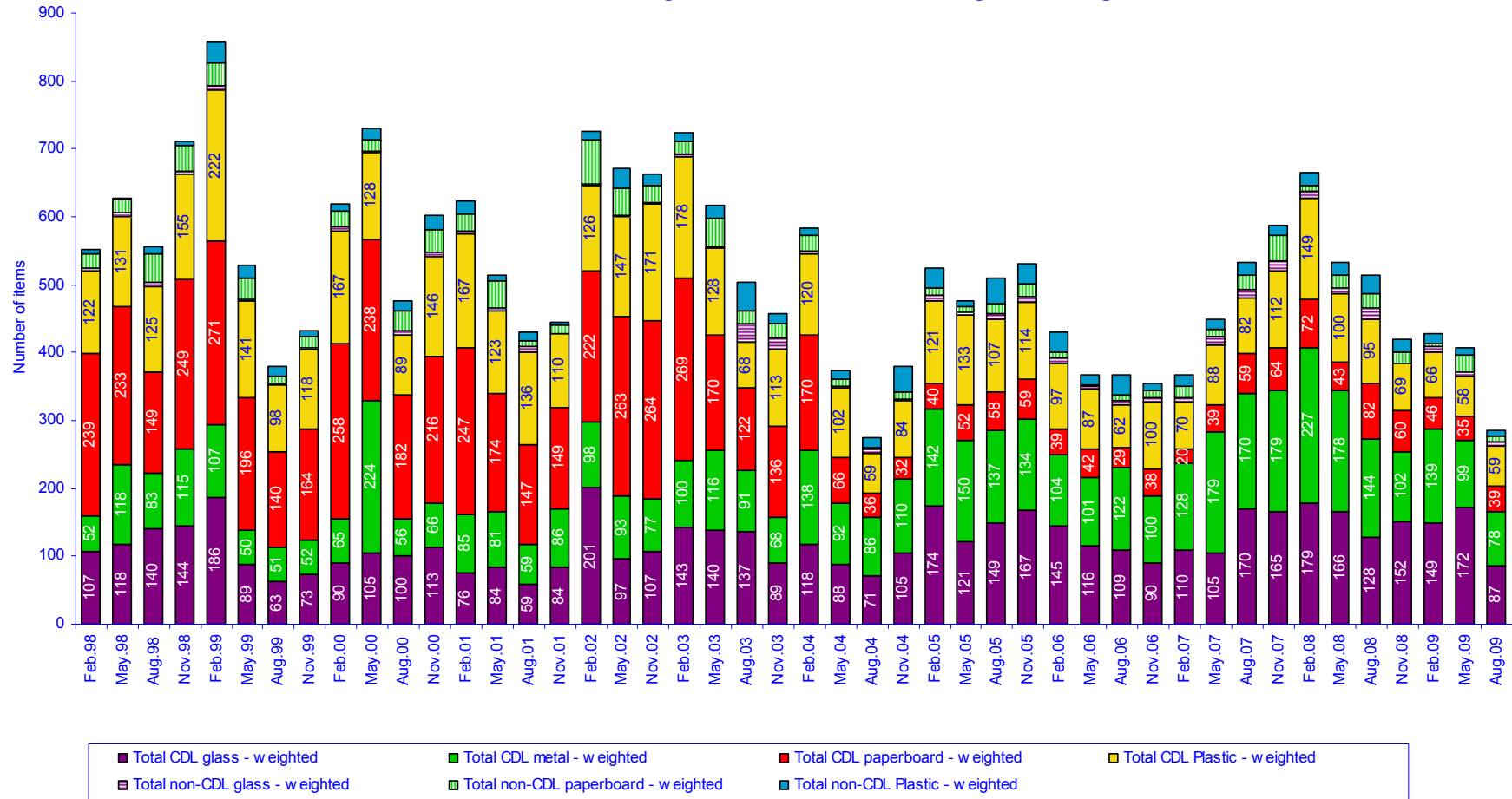
Number of Cigarette Butts by Site Type - Weighted



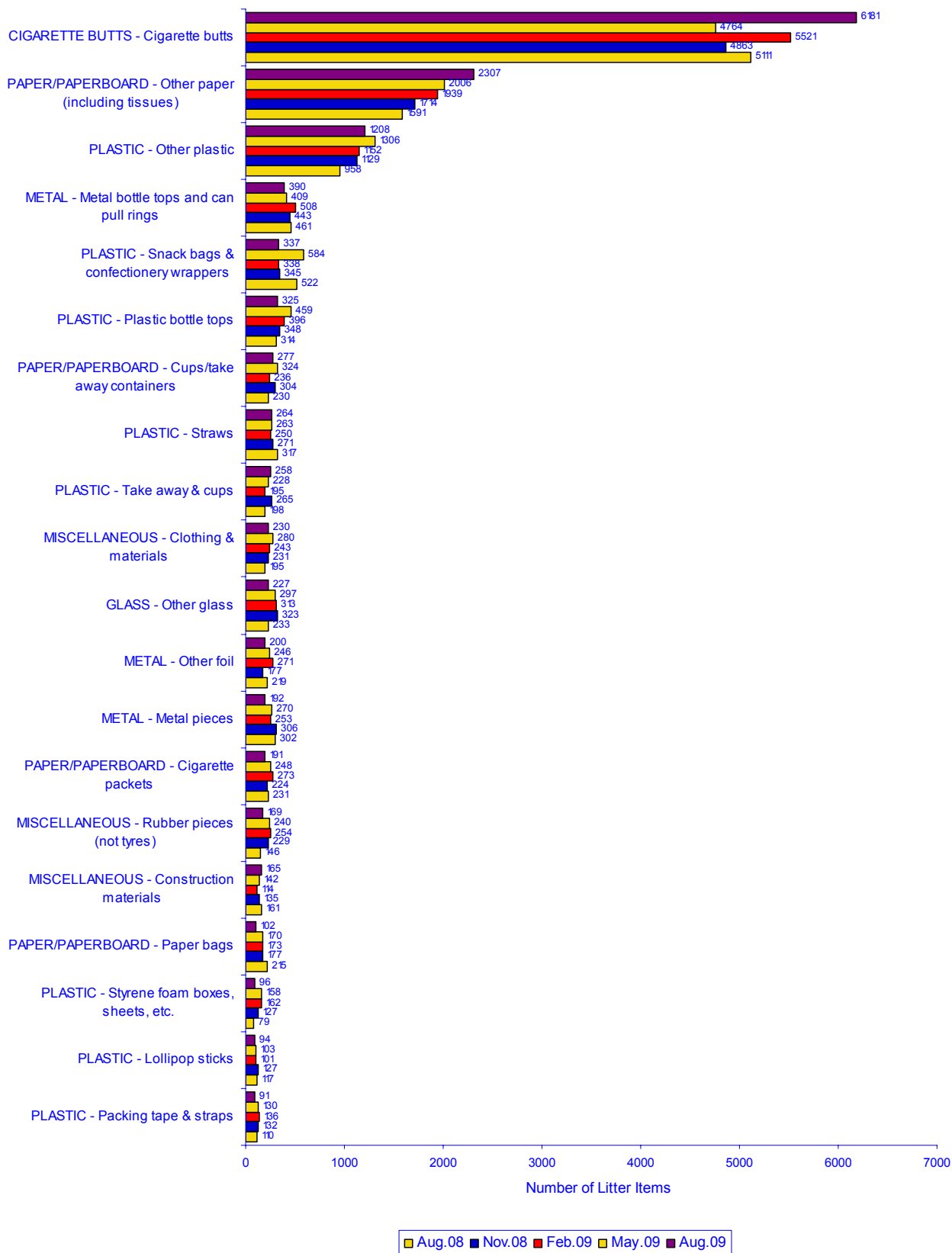
Proportion of Total Cigarette Butt Litter at Highway sites & Other sites - Weighted



CDL and Non-CDL Beverage Items Within Material Categories - Weighted

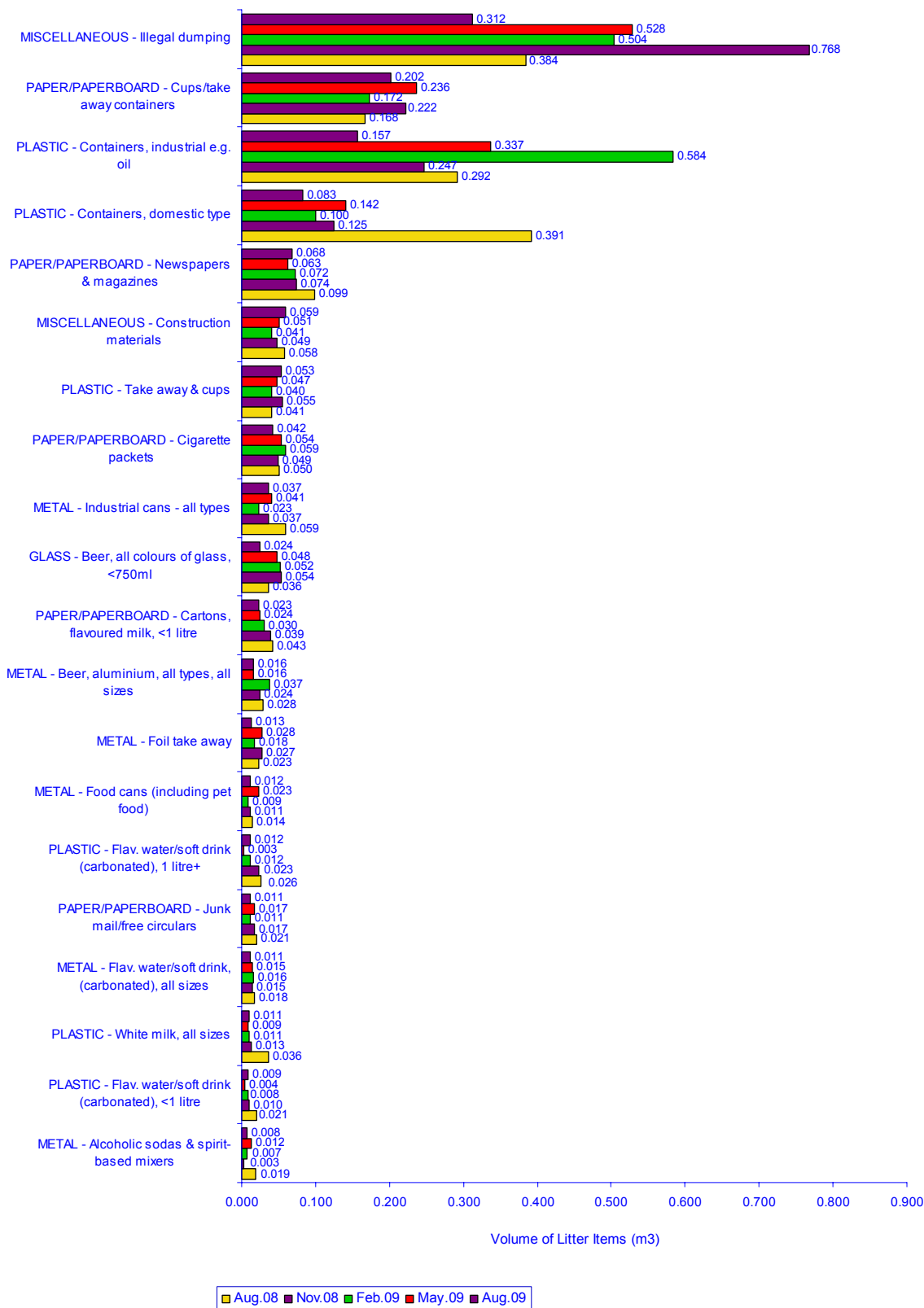


Top 20 Litter Items - Highest Counts - Weighted

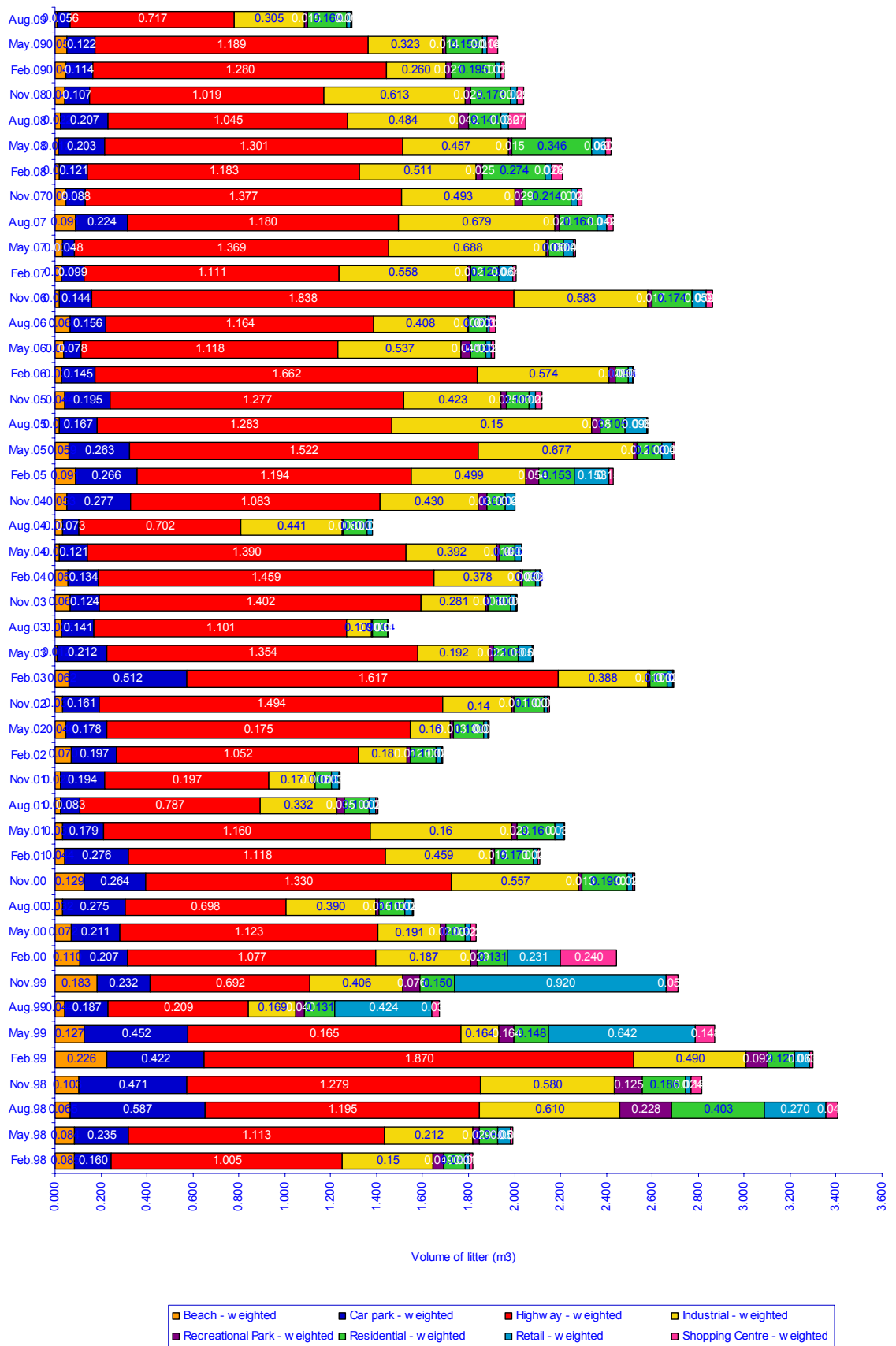


Weighted Tracking Graphs - Volumes

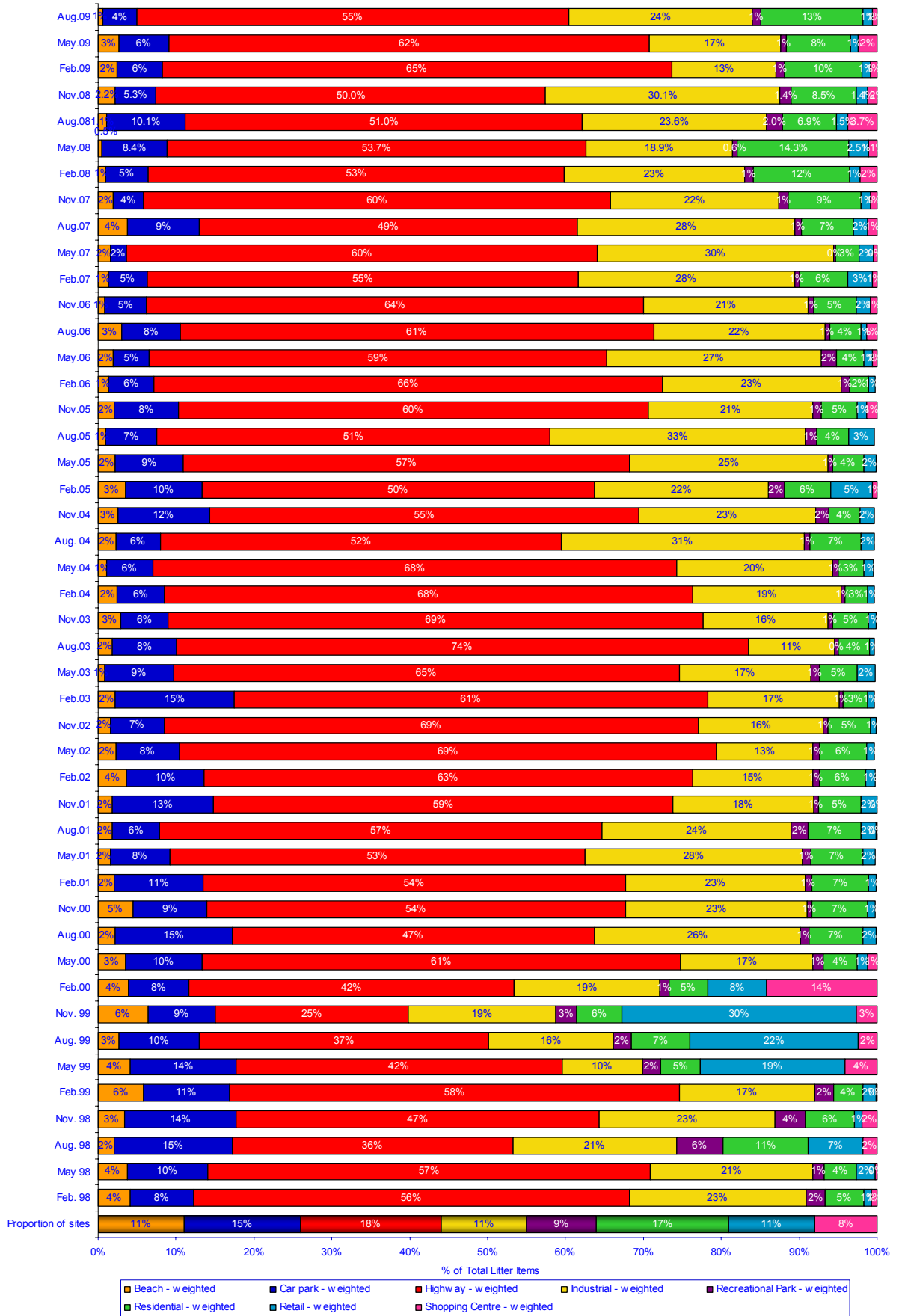
Top 20 Litter Items by Volume - Weighted



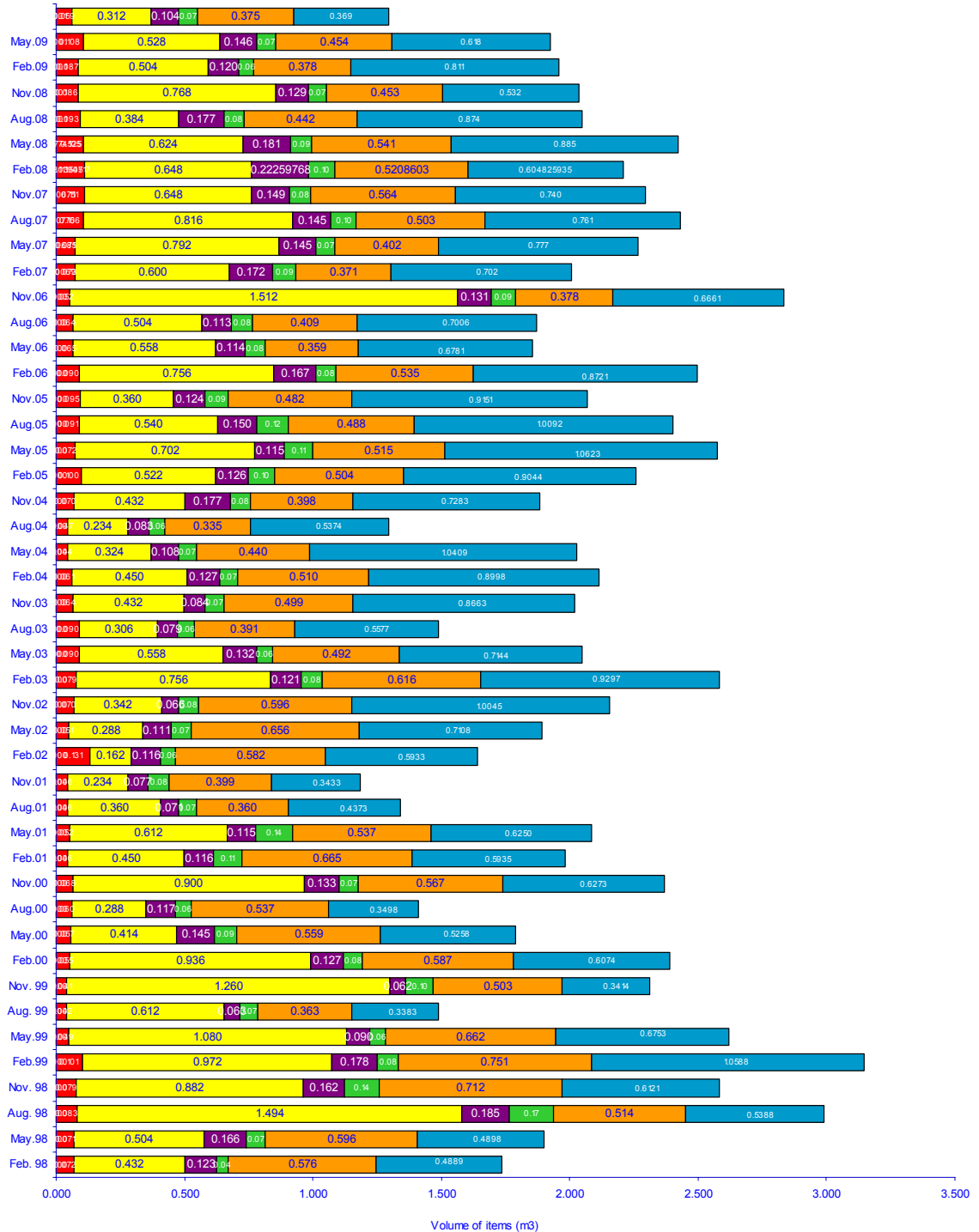
Volume of Litter by Site Type - Weighted



Proportion of Litter Volume in Total Litter Stream by Site Type - Weighted

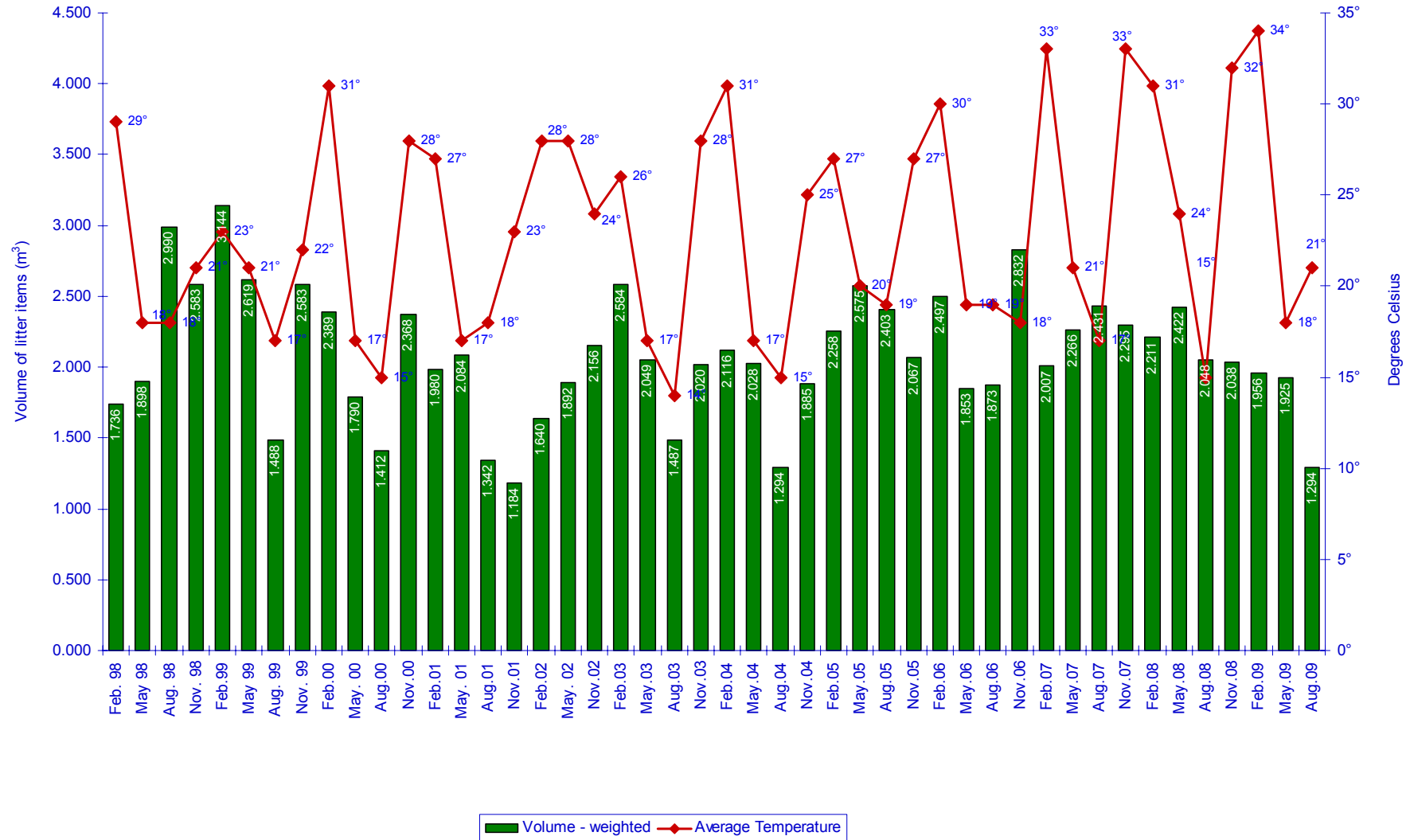


Volume of Litter Items by Material Type - Weighted

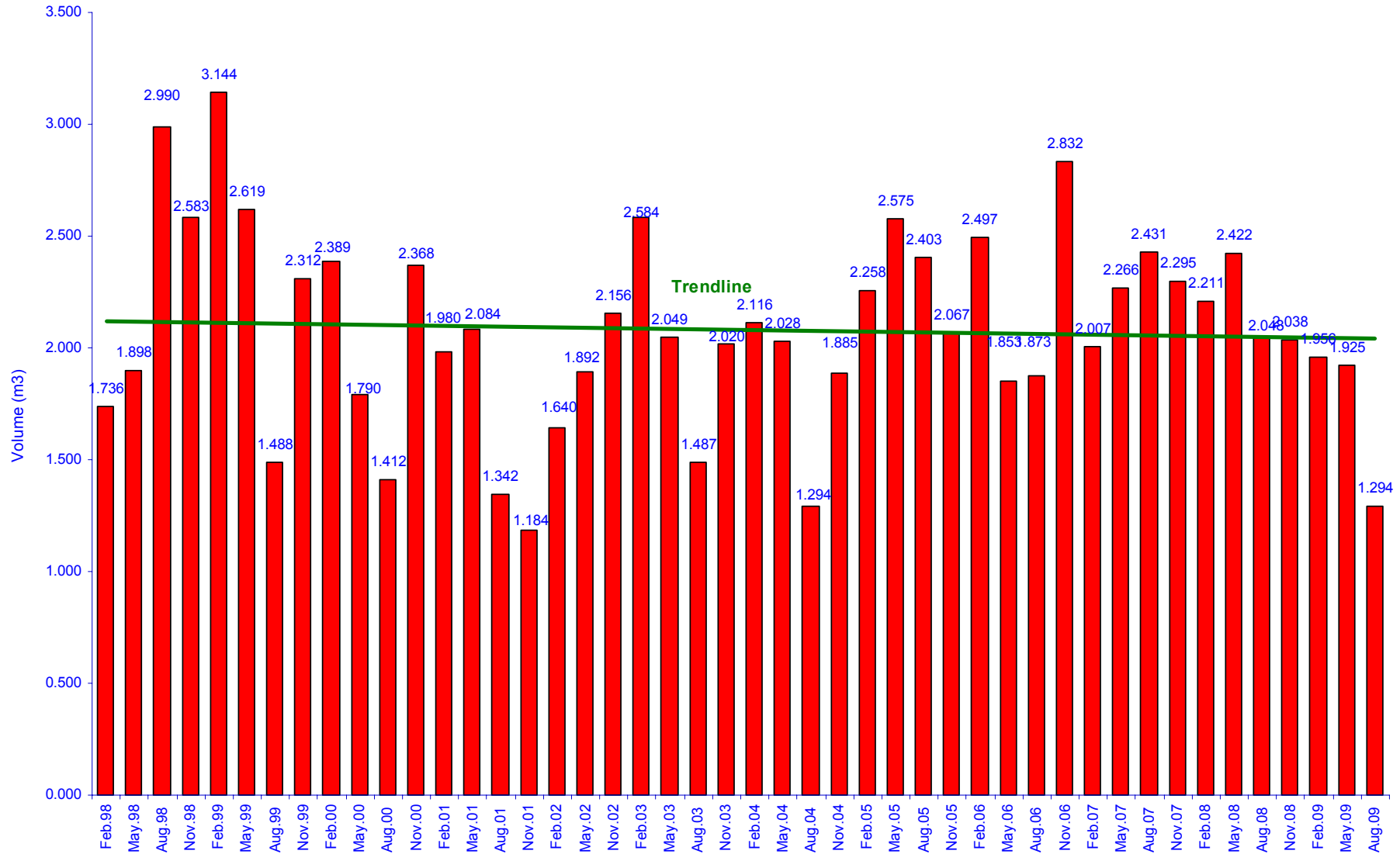


- Cigarette butts - w eighted
- Glass - w eighted
- Illegal dumping - w eighted
- Metal - w eighted
- Miscellaneous (excluding illegal dumping) - w eighted
- Paper/paperboard - w eighted
- Plastic - w eighted

Weather Temperature and Total Volume of Litter Items - Weighted



Total Volume (Cubic Metres) of Litter - Weighted



***Appendix 2:
Data Collection Form***

KESAB - LITTER COUNT COVER SHEET

(REF: 7239)

SITE CODE:

PLEASE ENSURE THAT A COPY OF THIS COVER SHEET IS FILLED OUT AND ATTACHED TO THE COMPLETED LITTER COUNT FORM FOR EVERY SITE.

Date of count: ___ / ___ / ___

Site description: _____

Site responsible person: _____

Wet? (Y/N)

Windy? (Y/N)

Temp? °C

Conditions: (Circle appropriate numbers)

1. Area appeared to be cleaned before count
2. Deliberate dumping of rubbish
3. Area was mowed before count causing proliferation
4. Very recent storm/flood damage litter build-up
5. Very recent or current high winds causing build-up
6. Recent public event held in area – **specify:**
7. Uncovered load spilled in area causing litter

Please record number and type of bins in site area

No. of litter bins:

No. of butt bins:

No. and type of other bins: _____

PAPER / PAPERBOARD					PLASTIC				
Item Type	Brand	Work Area	Total	Item Type	Brand	Work Area	Total		
Ka Packages & boxes	NONE			Pf Plain water (carbonated or non-carb) 1 litre+	NONE				
Kb Cigarette packets	NONE			Pg Plain water (carbonated or non-carb) <1 litre	NONE				
Kc Cartons, milk, plain (white), all sizes	NONE			Ph Flavoured water/soft drink (carbonated) 1 litre+	NONE				
Kd Cartons, flavoured milk 1 litre or more	NONE			Pi Flavoured water/soft drink (carbonated) <1 litre	NONE				
Ke Cartons, flavoured milk < 1 litre	NONE			Pj Flavoured water/fruit juice drinks, sports drinks etc. (non-carb) 1 litre+	NONE				
Kf Cartons, flav. water / fruit juice drink/ sports drink, (non carb), 1 litre+	NONE			Pk Flavoured water/fruit juice drinks, sports drinks etc. (non-carb) <1 litre	NONE				
Kg Cartons, flav. water / fruit juice drink/ sports drink, (non carb), <1 litre	NONE			Pm Containers, industrial e.g. oil	NONE				
Kh Cartons, fruit juice, 1 litre or more	NONE			Pn Containers, domestic type	NONE				
Ki Cartons, fruit juice, < 1 litre	NONE			Po Bags - light weight plastic shopping type carry bags	NONE				
Kj Newspapers & magazines	NONE			Pp Bags - heavier glossy typically branded carry bags	NONE				
Kk Junk mail / free circulars	NONE			Pq Sacks - sheeting - other bags	NONE				
Kl Cup/take away containers	NONE			Pr Wine cask bladders	NONE				
Km Tickets, e.g. bus, ATM, vending machine etc.	NONE			Ps Straws	NONE				
Kn Ice cream wrappers	NONE			Pt 6 ring can holders	NONE				
Ko Paper bags	NONE			Pt Snack bags and confectionery wrappers	NONE				
Kp Shopper dockets & related shopping paper (eg, lists)	NONE			Pu Styrene foam boxes, sheets, etc	NONE				
Kq Other paper (including tissues)	NONE			Pv Packing tape & straps	NONE				
Pa White milk, all sizes	NONE			Pw Take away & cups	NONE				
Pb Flavoured milk, 1 litre or more	NONE			Px Plastic bottle tops	NONE				
Pc Flavoured milk, < 1 litre	NONE			Pz Bread bag tags	NONE				
Pd Fruit juice, 1 litre or more	NONE			P1 Lollipop sticks	NONE				
Pe Fruit juice < 1 litre	NONE			P2 Spoons/ cutlery	NONE				
	NONE			P2 Drink pouches	NONE				
	NONE			P3 All other plastic	NONE				