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## 2013 MRF Material Composition Study

### Background

To assist Stewardship Ontario in setting blue box fees for stewards each year, MRF Material Composition Studies are undertaken at selected material recycling facilities (MRFs) on an annual basis. These studies provide comprehensive data that indicate the composition of blue box materials within material bales when they are being marketed to downstream processors and play an important role in informing the recovery rates for each material, which in turn are integral to calculating the fees for each material category. In order to build representativeness and to smooth out any data fluctuations, Stewardship Ontario uses the three year rolling average of the bale compositions as an input into the fee setting calculations.

The recovery rates for each blue box material are calculated as follows: material recovered for recycling in Ontario municipal recycling programs divided by material generated from Ontario households.

Estimates of each blue box material generated are informed by curbside waste composition studies (see accompanying summary report). The quantity of each material recovered for recycling is based on the data reported by municipalities. This is by far the most comprehensive data on the material recovered because municipalities that receive Stewardship Ontario funding are required to report this information and the data covers all material recovered throughout the year.

However, while some materials sorted and sold to markets correspond to material categories reported by stewards, e.g. steel and PET, many other recyclables are sorted and marketed as mixtures of recyclables, rather than the specific materials supplied into the market by stewards. For example, paper materials are marketed as various grades of newsprint and other mixtures of cardboard and printed paper. At any time, the composition of a bale will depend on the materials collected, the strength of markets for each material and the sorting approach of each MRF. In order to determine the amount of each blue box material recovered for recycling in a manner that is compatible with the categories of materials reported by stewards, it is necessary to measure the composition of the products sorted, sold and shipped to re-processors by Ontario MRFs.

Like the curbside composition studies, this is accomplished through studying a sample of products from a selection of MRFs across the province.

### What is a bale?

A bale is the end product of the MRF sorting process – it is typically composed of a specific material or mixture of materials and compacted together into a bale, ready for shipment to buyers.



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## Methodology

MRF Material Composition Studies are undertaken annually. Material is extracted before it is baled for market and examined to identify the typical mix of materials in any given bale. Stewardship Ontario engages a third party consultant to carry out the studies and supervises the studies to ensure quality control and accuracy.

The results of the composition studies are used to allocate the quantities of recovered blue box materials reported by municipalities to the various fee material categories.

### **2013 MRF Material Composition Study:**

The MRF Material Composition Studies carried out in spring and fall 2013, were conducted in both single-stream and multi-stream MRFs across Ontario. Samples from a wide variety of material bales were extracted and analysed for the composition of materials within. The study results were recorded into datasheets with a predefined set of material categories.

The MRFs where MRF Material Composition Studies were carried out included the following 11 municipal programs:

- Bluewater
- Durham
- Guelph
- Kingston
- London
- Norfolk
- Northumberland
- Peterborough
- Quinte
- Waterloo
- York

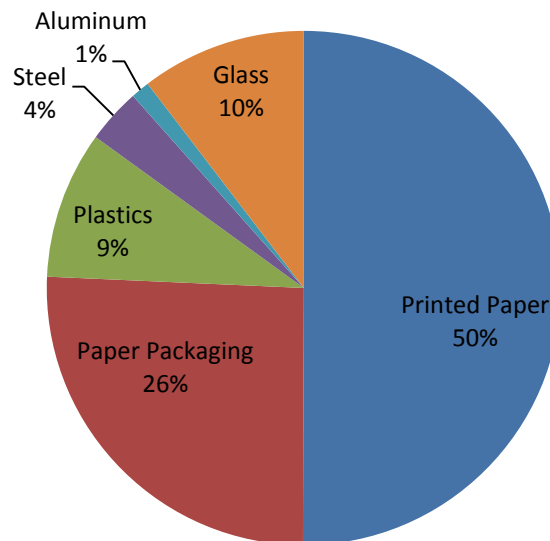
The data collected was also compared to prior year studies to identify year over year changes of the sample results for all types of materials.



## Key Findings

Total material recovered in 2013 is up slightly from 2012 from 892,924 tonnes to 900,135 tonnes. This represents a less than 1% percent increase in recovered tonnes. However, printed paper, while still the largest volume of recovered material is down slightly from 2012 from 53% to 50%. That reduction in printed paper volume is countered by an increase in plastics from 8% to 9% and an increase in steel from 3% to 4%. Tracking of “other” materials which are comprised of non-PPP, contamination and residue, began in 2013 and is identified in the bale specific graphs that follow.

### 2013 Blue Box Material Recovered: 900,135 tonnes



\* Other materials (non-PPP, contamination, residue) are captured in figures above

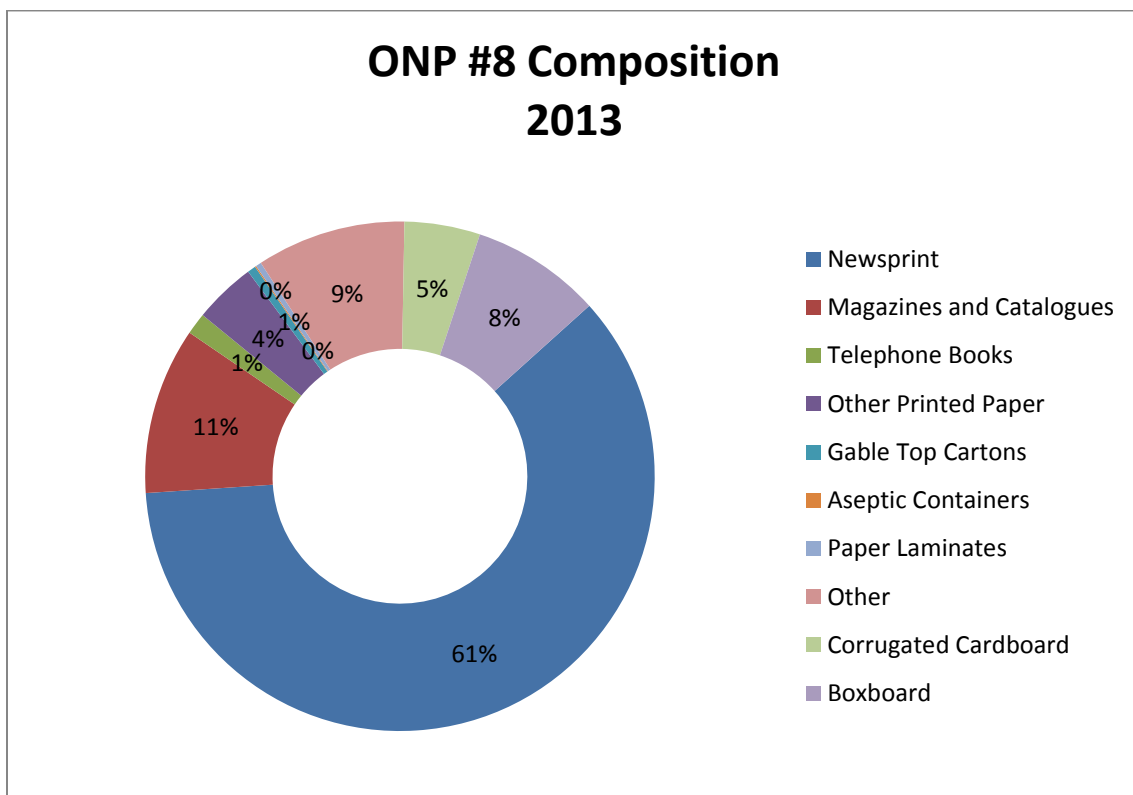
## Bale Compositions

In 2013, 900,135 tonnes of materials were recycled in the blue box system. In the subsections below, the composition of each type of bale is provided proportionately, as measured in the recent MRF composition studies.



### **Old Newspaper (ONP) #8 – Paper**

An ONP #8 bale typically has the highest newsprint content. However, in Ontario MRFs it also includes significant quantities of other paper materials. The actual composition from the 2013 study showed that newsprint along with magazines & catalogues and boxboard made up 80 per cent of the bale. Other\* materials comprised 9 percent of the bales. Because the composition of the bales may fluctuate one year to the next, the three year rolling average (second graph below) shows composition of these bales averaged over a three year period.



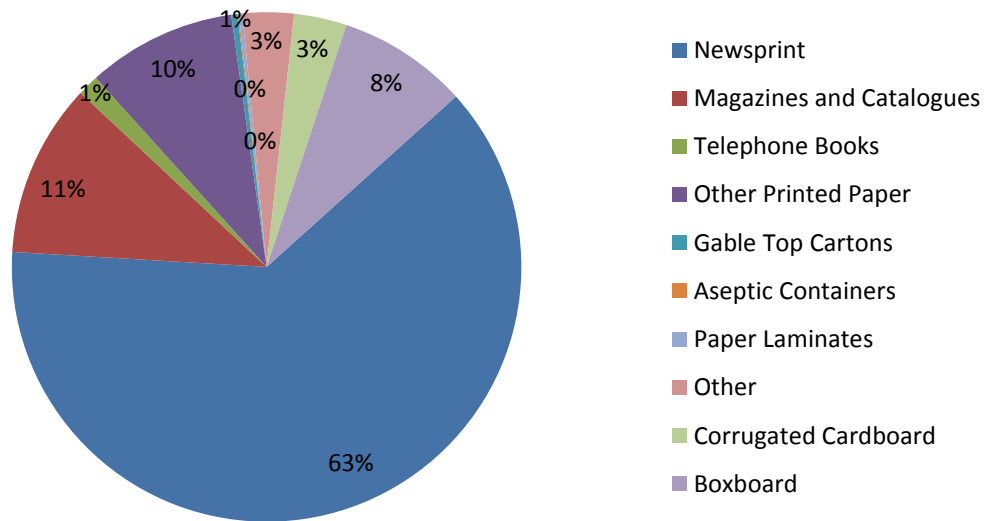
\*Other materials include non-obligated materials such as non-PPP, contamination and residue.



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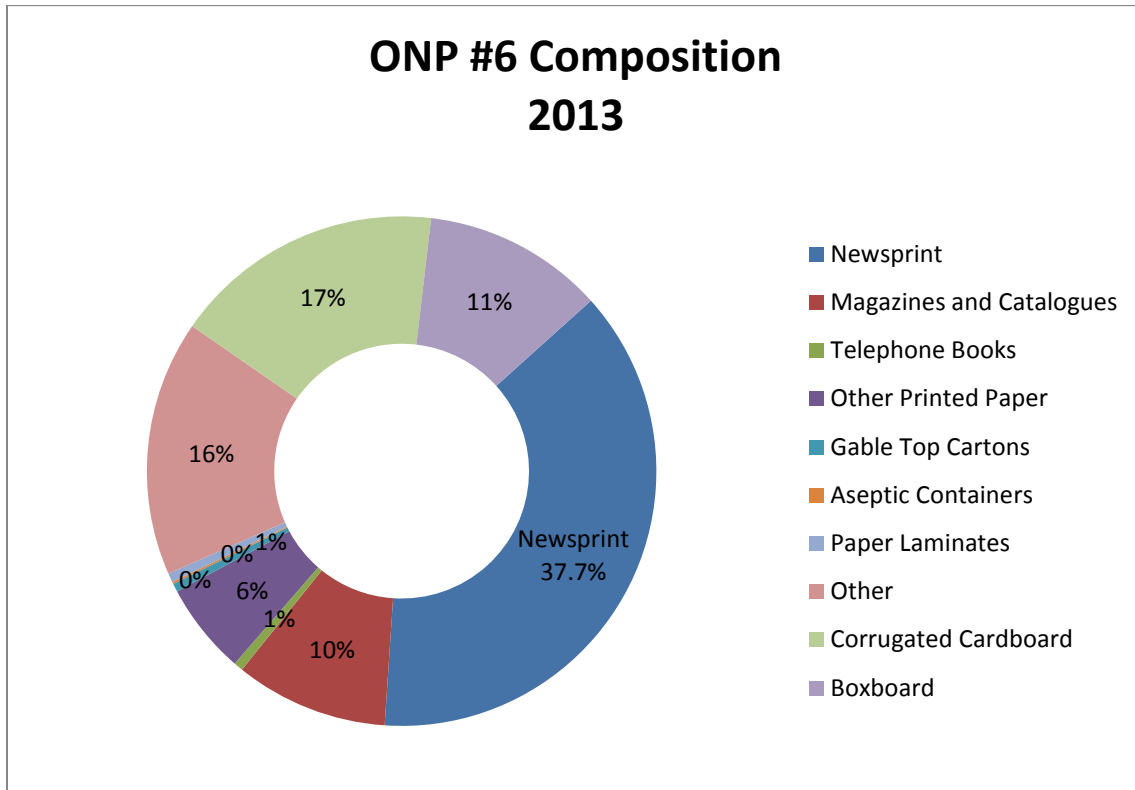
### ONP #8 Composition 2011-2013 - Three Year Rolling Average



\*Other materials include non-obligated materials such as non-PPP, contamination and residue. Data tracking of this material category commenced in 2013.



ONP #6 bales are typically comprised of a mix of newsprint, corrugated cardboard and boxboard, but are less rich in newsprint content than ONP#8. The bales from the 2013 study showed that newsprint made up just over one third of the bale at 38 per cent. Corrugated cardboard makes up the next largest component at 17 per cent, followed by other\* materials at 16 per cent. This shows a shift from the 2012 study where newsprint represented over 50 per cent of the ONP #6 bale with corrugated cardboard as the second largest component at 21 per cent and boxboard at 13 per cent. Because the composition of the bales may fluctuate one year to the next, the three year rolling average (second graph below) shows composition of these bales averaged over a three year period.



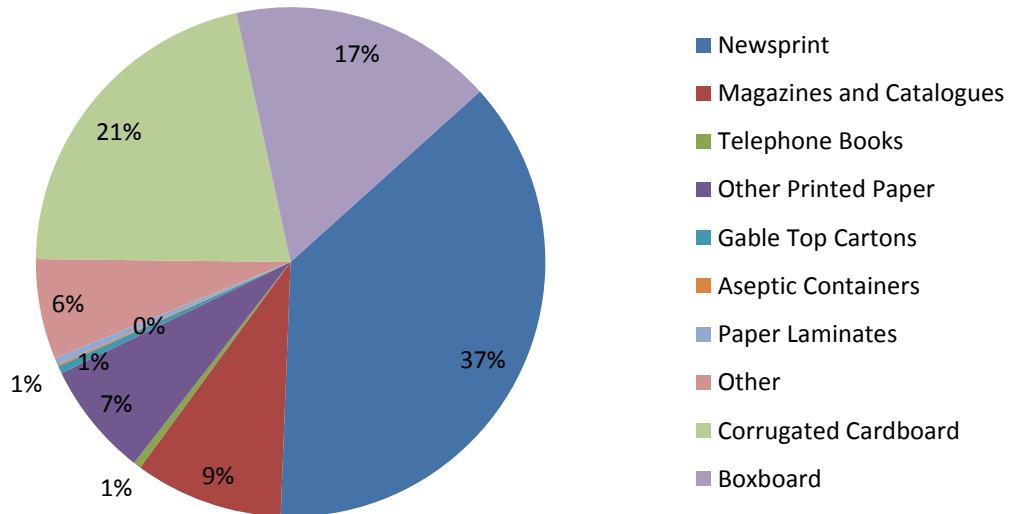
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## ONP #6 Composition 2011-2013 - Three Year Rolling Average

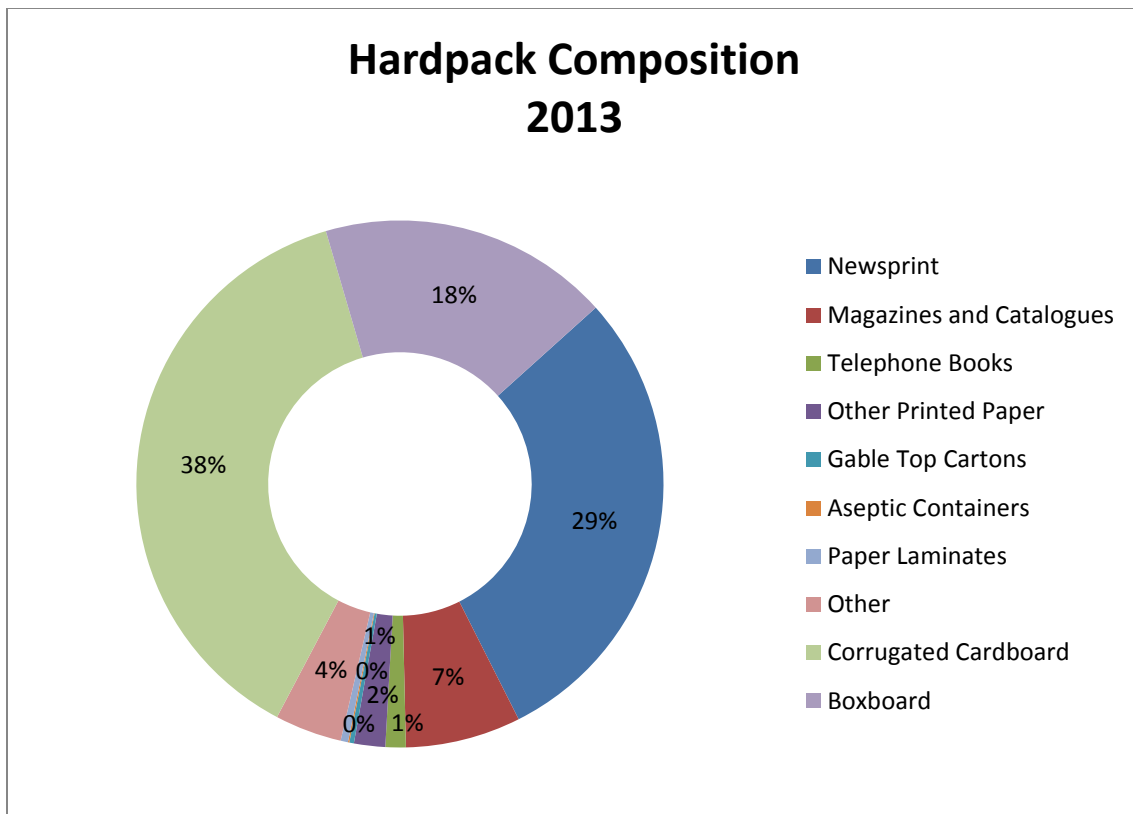


\*Other materials include non-obligated materials such as non-PPP, contamination and residue. Data tracking of this material category commenced in 2013.



### **Hard Pack**

Hard pack bales are typically composed largely of a mix of corrugated cardboard and boxboard. Again in 2013, corrugated cardboard made up the largest portion of these bales at 38 percent – this is slightly up from the 2012 study which showed that corrugated cardboard made up 34 percent of the hard pack bales. There was a fairly dramatic shift in the amount of newsprint in the hard pack bales in 2013, up from 15 percent in 2012 to 29 percent. At the same time, the proportion of boxboard declined in 2013 to 18 percent from 32 percent in 2012. Because the composition of the bales may fluctuate one year to the next, the three year rolling average (second graph below) shows composition of these bales averaged over a three year period.



\*Other materials include non-obligated materials such as non-PPP, contamination and residue.

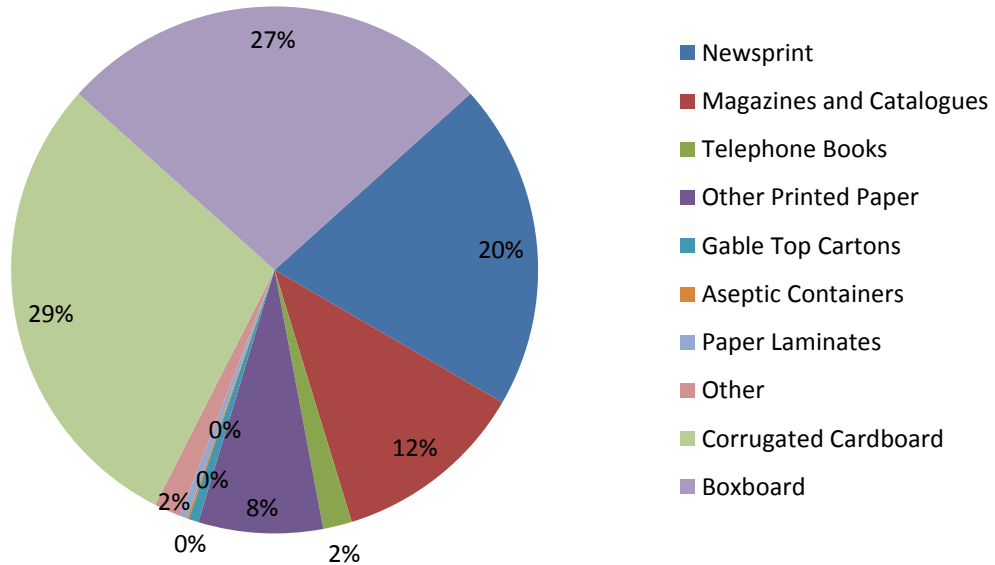




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## Hardpack Composition 2011-2013- Three Year Rolling Average

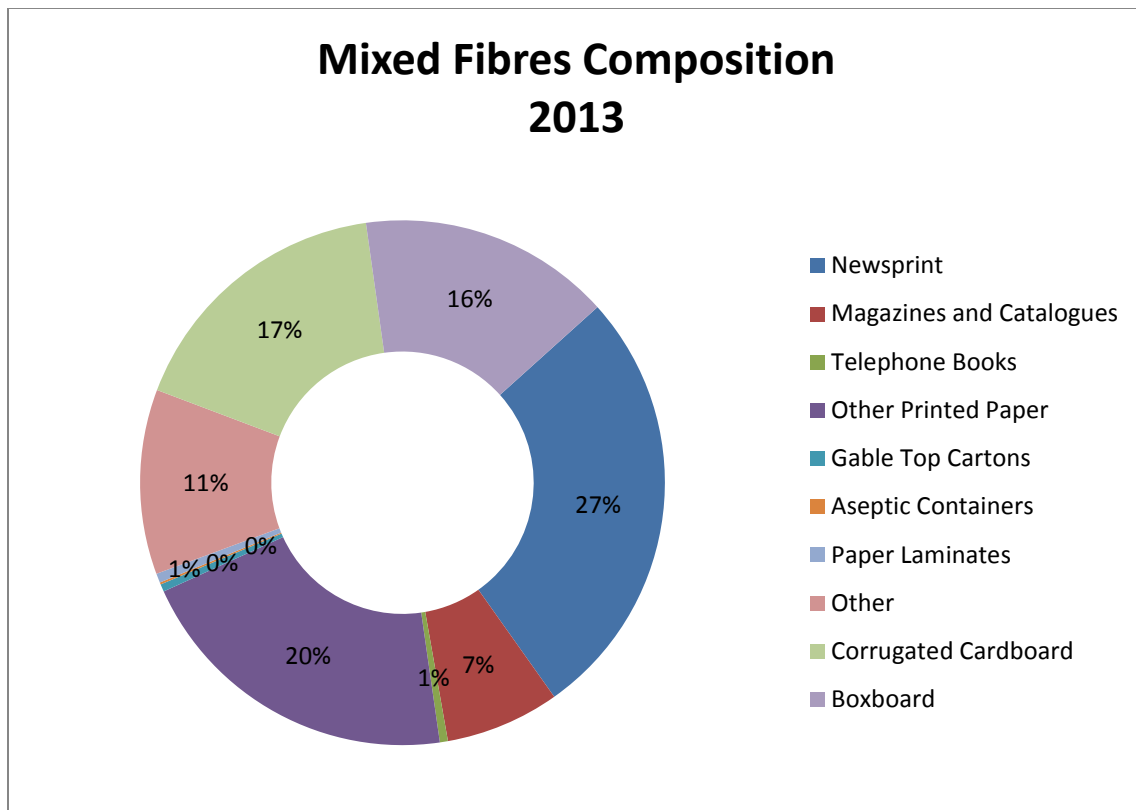


\*Other materials include non-obligated materials such as non-PPP, contamination and residue. Data tracking of this material category commenced in 2013.



### **Mixed Fibres**

This category can include all possible fibre materials and the actual composition of the bale depends on the sorting done at each MRF. In the 2013 study, mixed fibre bales contained newsprint as the largest component, followed by other printed paper, corrugated cardboard and boxboard. Other\* materials made up 11 per cent of the bales. In general, single-stream MRFs had a higher proportion of newsprint in mixed fibre bales, whereas in the multi-stream MRFs the different fibre types were more evenly represented. Because the composition of the bales may fluctuate one year to the next, the three year rolling average (second graph below) shows composition of these bales averaged over a three year period.



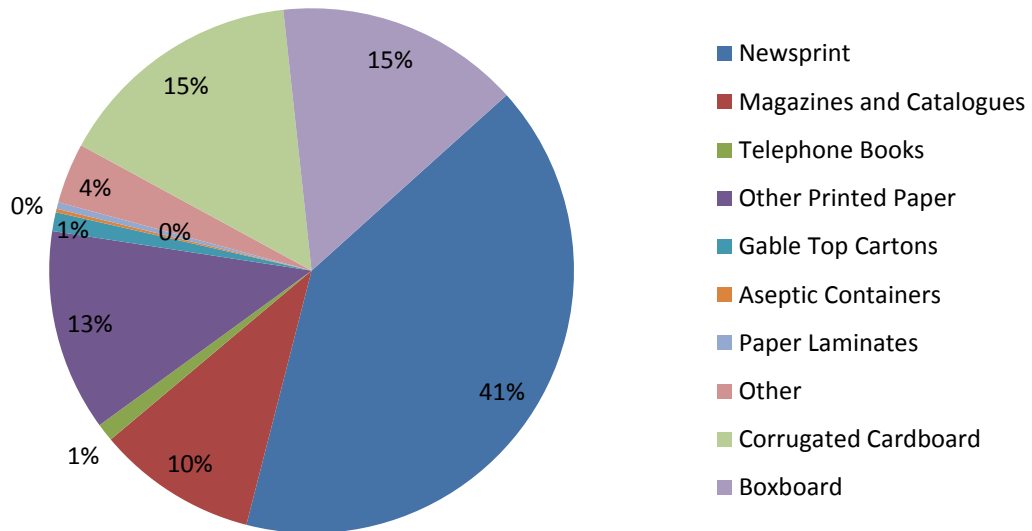
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## Mixed Fibres Composition 2011-2013 - Three Year Rolling Average



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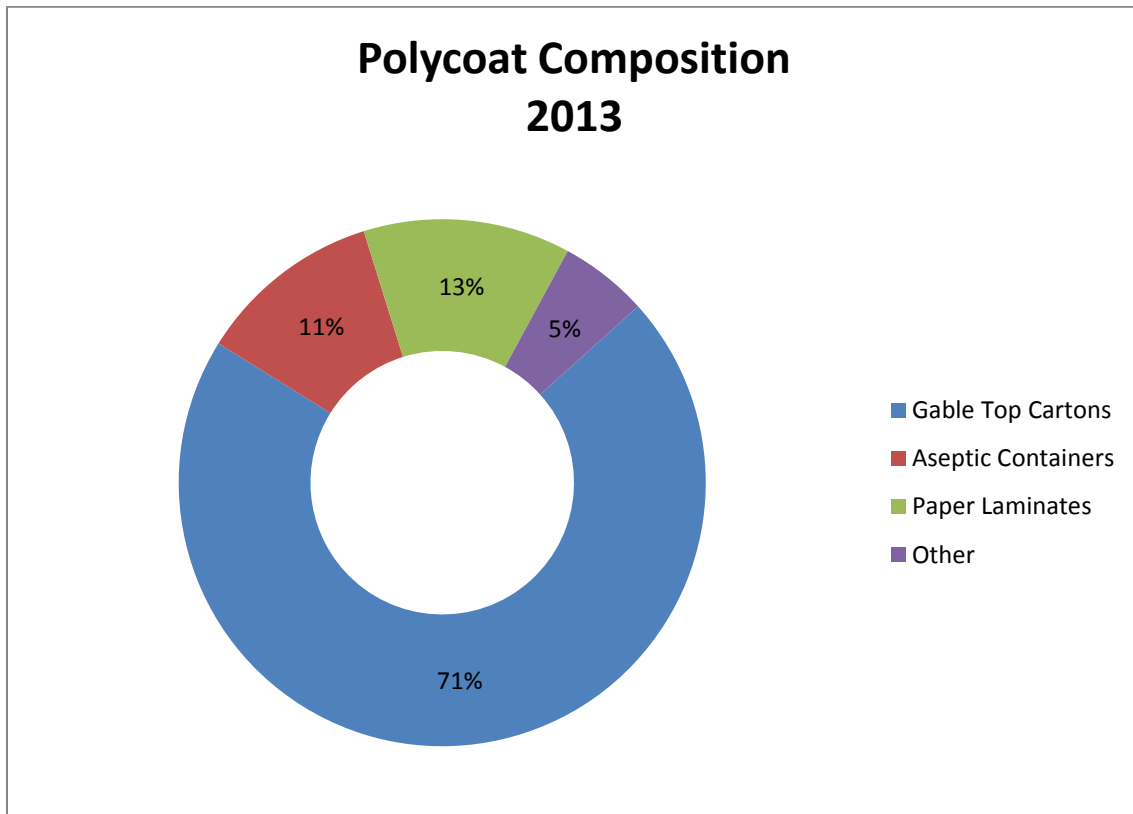


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### **Polycoat**

Polycoat bales consist primarily of gable top cartons for milk and milk substitutes and other beverage containers such as fruit juice. The bales studied this year, again reflected this, with gable top cartons making up 71 per cent of the bales - this is a decrease from over 80% in 2012. Other materials found in the bale included paper laminate materials such as hot beverage cups at 13 per cent and 11 per cent of the bales were made up of aseptic containers. Because the composition of the bales may fluctuate one year to the next, the three year rolling average (second graph below) shows composition of these bales averaged over a three year period.



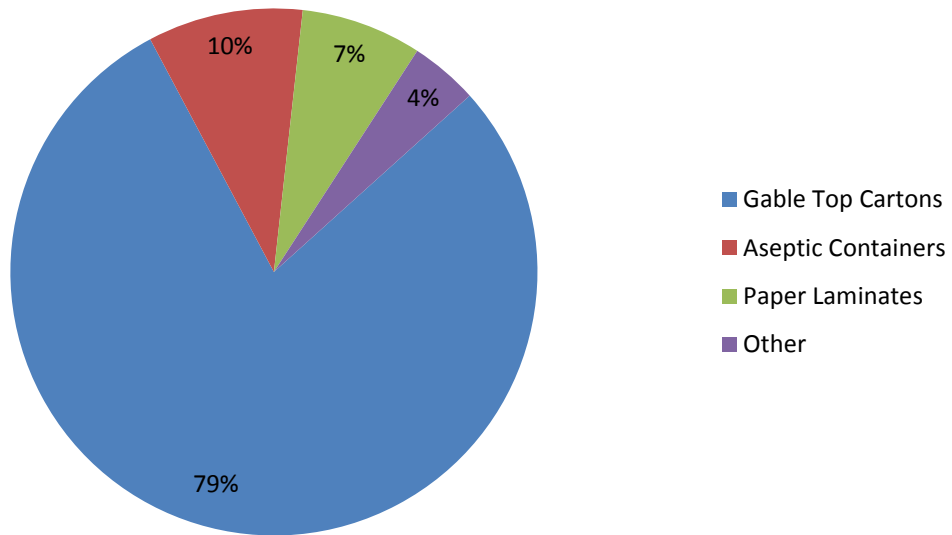
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## Polycoat Composition 2011-2013 - Three Year Rolling Average



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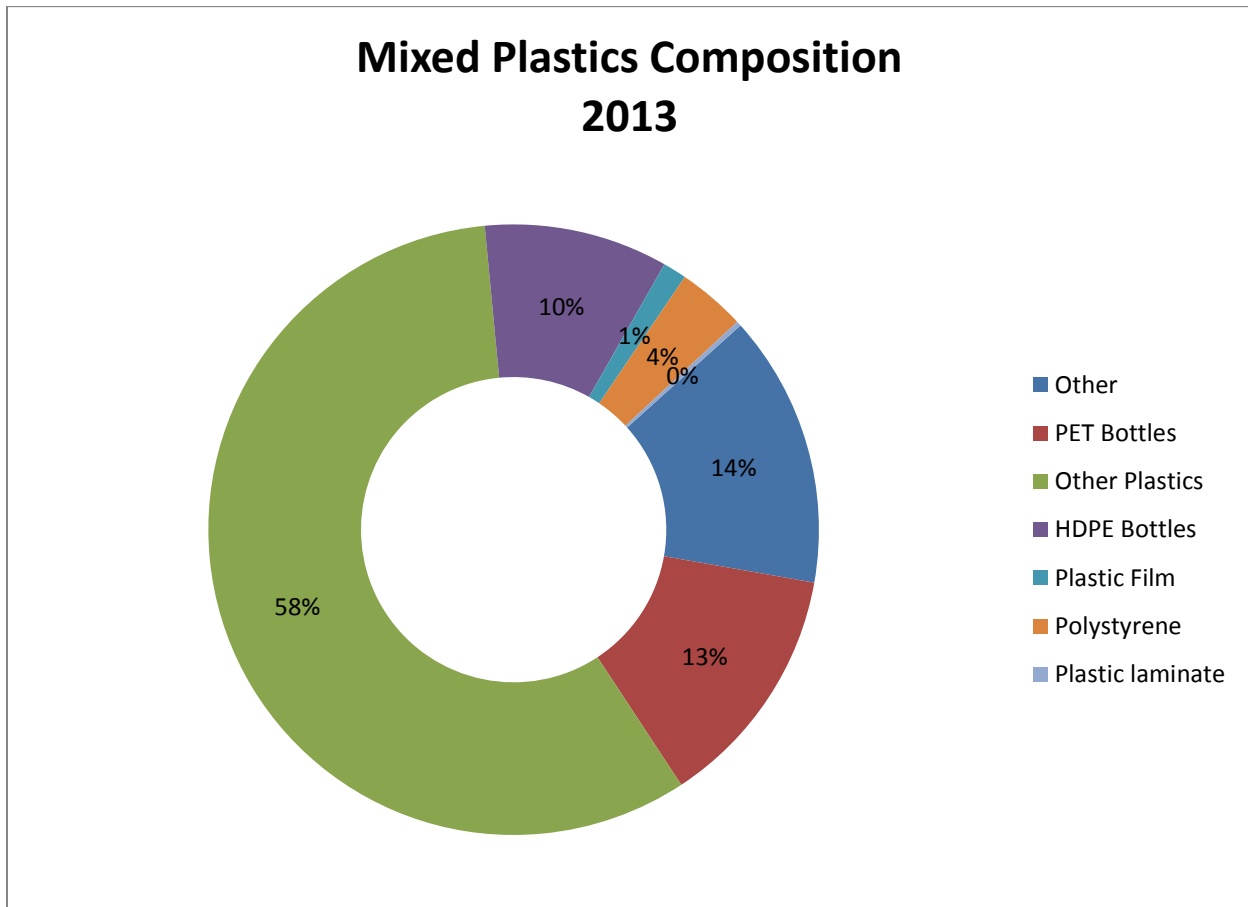


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### **Mixed Plastics**

Mixed plastics bales generally include all types of plastics, including those that are typically sorted into single material bales e.g. PET bottles, HDPE and film. The relative quantities of the different types of plastics captured depends upon the materials targeted for collection and the relative quantities generated by residents. Again, this year's study shows that most (58 percent) of the mixed plastics bales were made up of other plastics which are composed of a variety of tubs and lids, rigid plastics and PET thermoform. The second largest component of these bales in 2013 was other\* materials at 14 per cent followed by PET bottles at 13 per cent. Because the composition of the bales may fluctuate one year to the next, the three year rolling average (second graph below) shows composition of these bales averaged over a three year period.



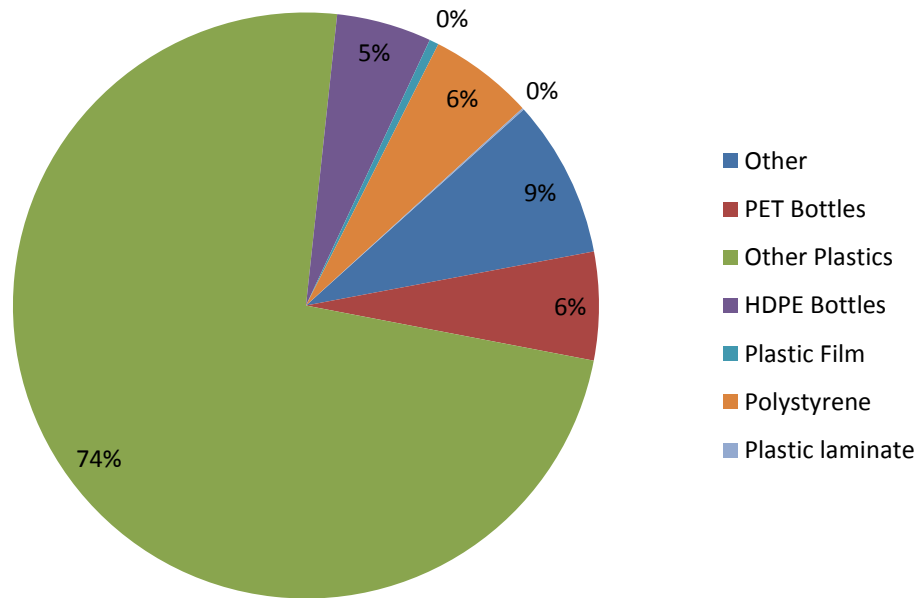
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### Mixed Plastics Composition 2011-2013 - Three Year Rolling Average

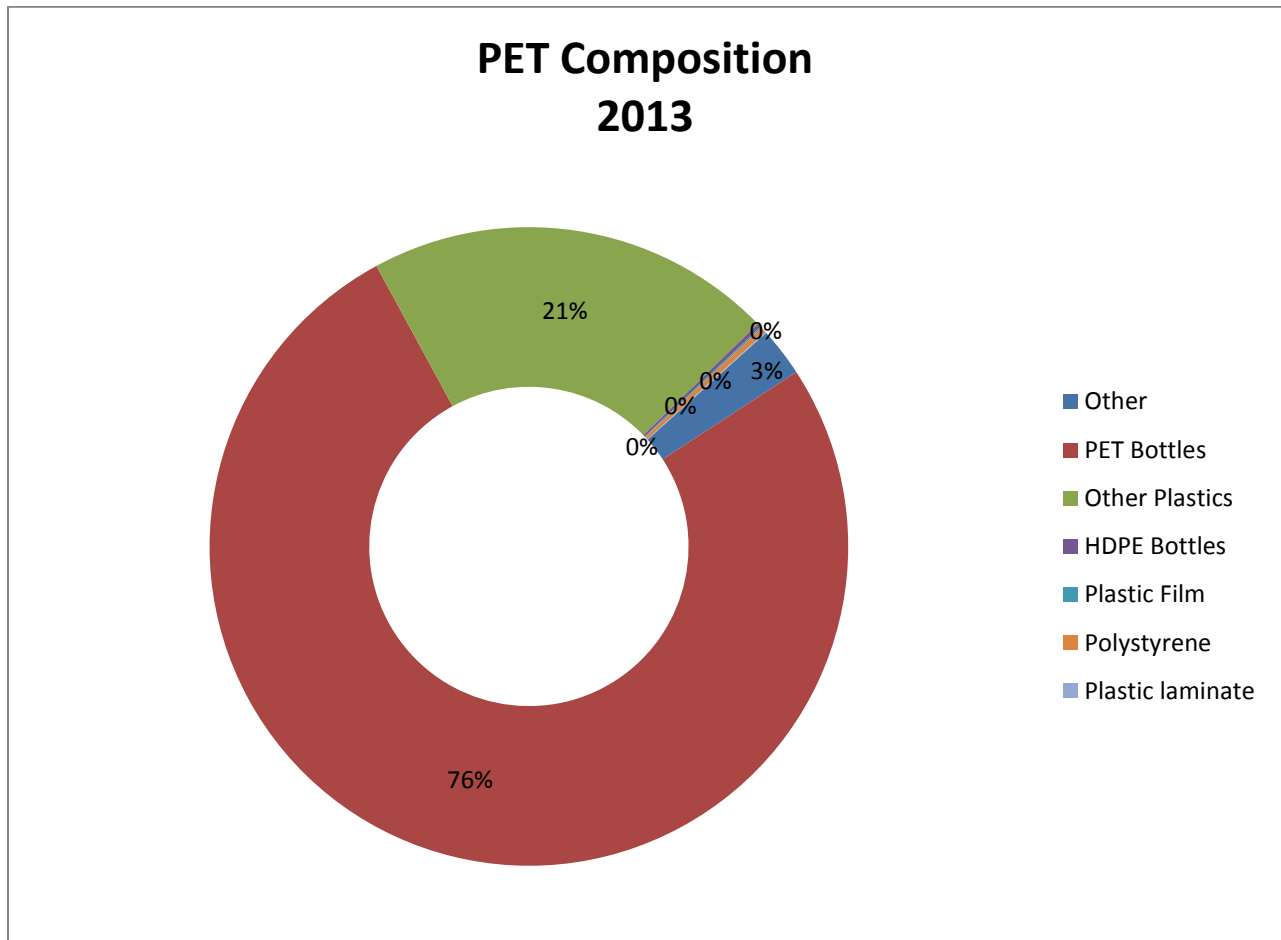


\*Other materials include non-obligated materials such as non-PPP, contamination and residue. Data tracking of this material category commenced in 2013.



**PET**

PET bales typically contain primarily PET bottles however, other PET products may also be included in these bales depending on a variety of factors including, the mix of materials collected and how the materials are sorted at the MRF according to end market requirements. PET bottles and jars made up 76 per cent of the bales in 2013 and 21 per cent of these bales were comprised of other accepted plastic recyclables, primarily PET thermoform (identified in chart below as Other Plastics). Because the composition of the bales may fluctuate one year to the next, the three year rolling average (second graph below) shows composition of these bales averaged over a three year period.



\*Other materials include non-obligated materials such as non-PPP, contamination and residue.

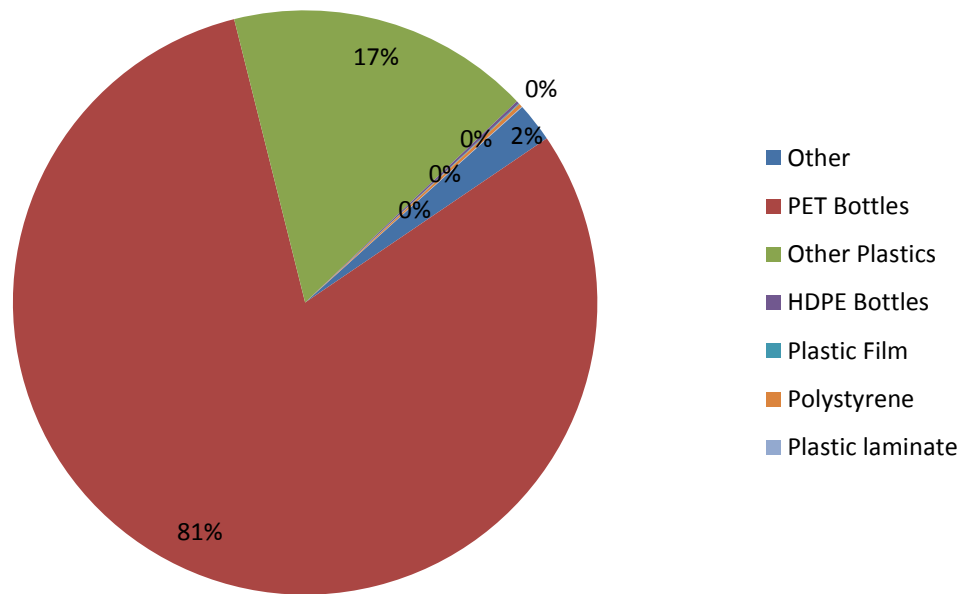




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### PET Composition 2011-2013 - Three Year Rolling Average



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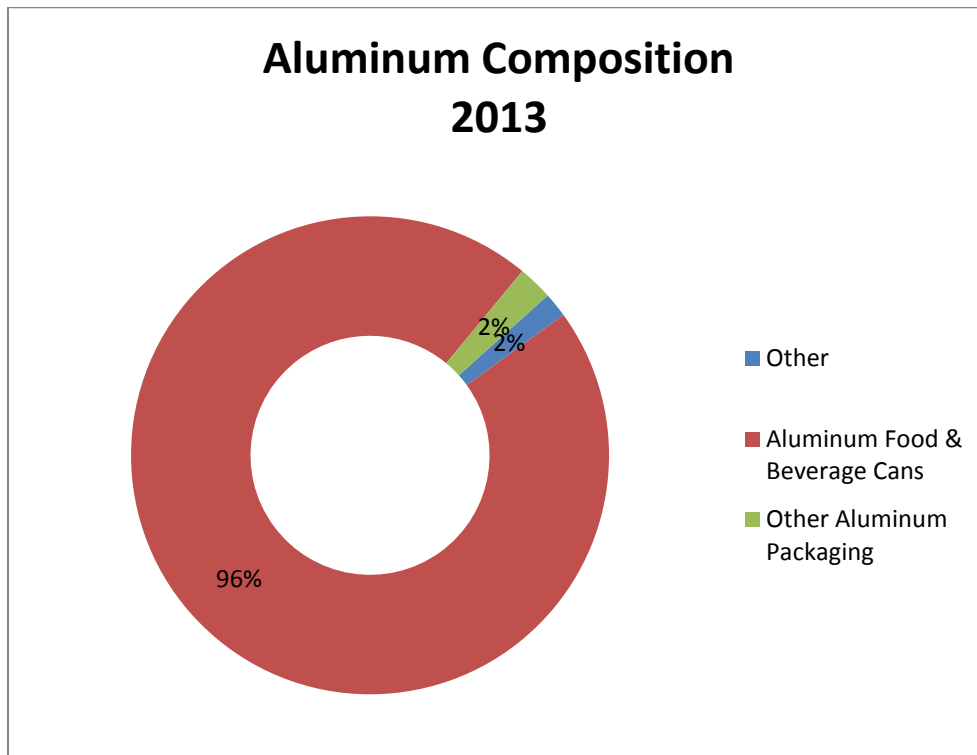


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## Aluminum

Aluminum bales typically contain aluminum packaging. Again in 2013, aluminum food and beverage cans made up by far the largest proportion of these bales at 96%. Because the composition of the bales may fluctuate one year to the next, the three year rolling average (second graph below) shows composition of these bales averaged over a three year period.



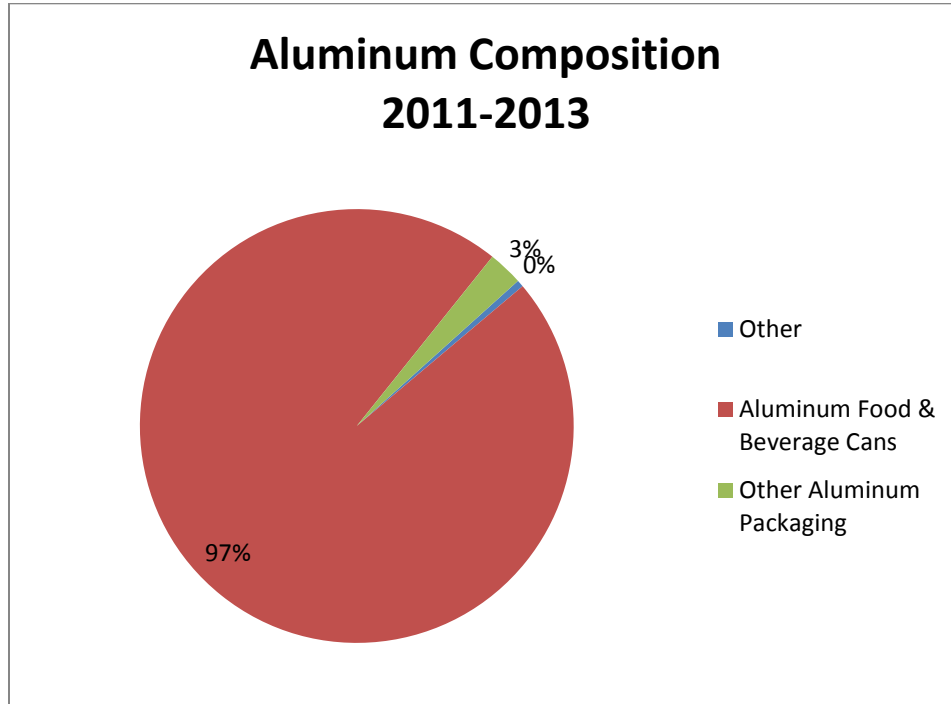
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## Aluminum Composition 2011-2013



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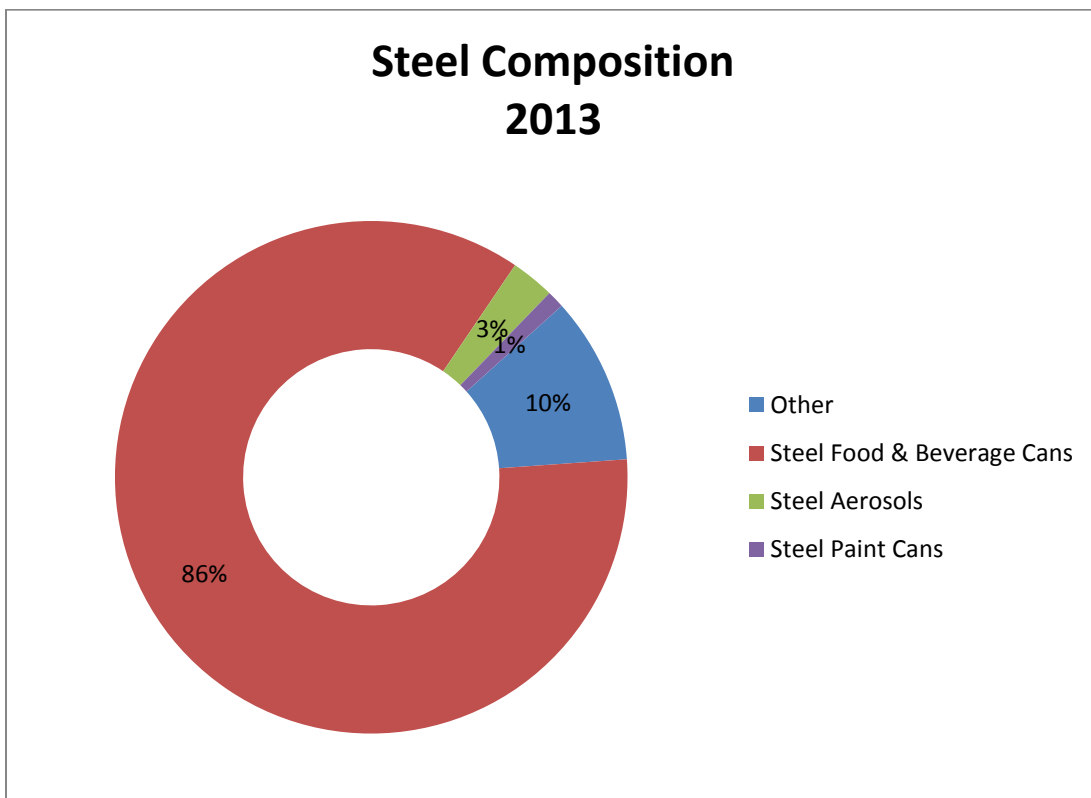


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## **Steel**

Steel bales typically contain steel food and beverage cans, steel aerosol cans and in some cases empty steel paint cans. As in previous years, the 2013 study showed steel food and beverage cans were the largest component of these bales at 86%, down however from 2012 when steel food and beverage cans comprised 96 per cent of the bales. Ten per cent of these bales were made up of other\* materials followed by steel aerosol at 3%. Because the composition of the bales may fluctuate one year to the next, the three year rolling average (second graph below) shows composition of these bales averaged over a three year period.



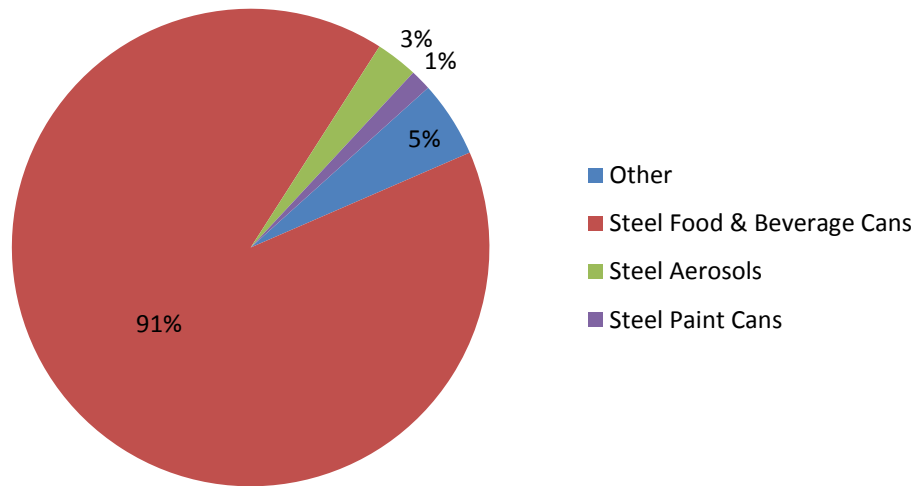
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## Steel Composition 2011-2013 - Three Year Rolling Average



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## Summary YOY Comparison to 2012 MRF Material Composition Studies

There were some differences in the 2013 study results compared to past studies carried out in 2010 through 2012.

**ONP #8 Bale:** Newsprint volumes decreased by 9 per cent while boxboard volumes increased by about 6 per cent in this bale.

**Mixed Fibre Bale:** For mixed fibre bales, more newsprint was found at single-stream MRFs while less of it was found in mixed fibre bales at multi-stream MRFs. At multi-stream MRFs, boxboard volumes decreased 4.4 per cent in this bale.

**Mixed Plastic Bale:** For mixed plastic bales, other plastics make up over 66.3 per cent of the composition in multi-stream MRFs. There was noticeably more HPDE bottles found in these bales as well at 13.8 per cent compared to the previous studies with an average proportion of this material at 3.8 per cent

**PET Bottle Bale:** For PET bottle bales found in multi-stream MRFs, the quantity of PET bottles decreased 31.5 per cent, from 93.6 per cent in 2012 to 73.5 per cent in 2013. In contrast, the quantities of other plastics increased from 6.2 per cent in the previous samples to 25.6 per cent.