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ECOLOGY
State of Washington

# Beyond the Curb -

*Tracking the Commingled Residential Recyclables from Southwest WA*

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# Beyond the Curb

## Tracking the Commingled Residential Recyclables from Southwest WA

*by*
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Washington State Department of Ecology
Olympia, Washington

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# Acknowledgements

This report and its findings are made possible by the contribution of information and participation by members of the Southwest Region Workgroup and its guest speakers. Workgroup members met monthly for face-to-face meetings that lasted four hours, presented their data, and participated in frank discussions on the realities of our region's commingled recycling system from their perspective. *Thank you!*

## Southwest Region Workgroup Participants

| | | |
|---|---|---|
| Joan Nelson | City of Auburn | Government |
| Ursula Euler | City of Olympia | Government / Collector |
| Ron Jones | City of Olympia | Government / Collector |
| Jason Dose | City of Shelton | Government |
| Charlene Gallagher | City of Tacoma | Government / Collector |
| Jetta Antonakos | City of Tacoma | Government / Collector |
| Tanya Gray | City of Vancouver | Government |
| Rob Guttridge | Clark County | Government |
| Scott Campbell | Columbia Resource Company | MRF / Processor |
| Doug Swan | JMK Fibers | MRF / Processor |
| Bob Kovich | Jordan Trading | Broker |
| Bryan Tennant | LeMay – Thurston County | Collector |
| Charlie Maxwell | LeMay – Pierce County | Collector |
| Steve Skinner | Lewis County | Government |
| Melanie Case | Lewis County | Government |
| David Baker | Mason County | Government |
| Mike Rorvik | Murrey's Disposal | MRF / Processor |
| Ed Tolan | Nippon Paper | Manufacturer - Paper |
| Jay Simmons | North Pacific Paper Corp. (NORPAC) | Manufacturer - Paper |
| Amy Bottorff-Wines | North Pacific Paper Corp. (NORPAC) | Manufacturer - Paper |
| Steve Wamback | Pierce County | Government |
| Chris Thomas | SP Recycling Corp. | MRF / Processor |
| Joe Bushnell | Tacoma Recycling | MRF / Processor |
| Terri Thomas | Thurston County | Government |
| Josy Wright | Waste Connections | Collector |

## Guest Speakers* and Other Interested Stakeholders

| | | |
|---|---|---|
| Susan Choi* | America Chung Nam | Manufacturer - Paper |
| Denise Burrell | Anheuser Busch Companies, Inc | Manufacturer -Aluminum |
| Jason Wix* | Caraustar-Tacoma Paperboard | Manufacturer - Cardboard |
| Marc Daudon | Cascadia Consulting | Consultant - Plastics |
| Katie Kennedy* | Cascadia Consulting | Consultant - Plastics |
| George Sidles* | City of Seattle | Government |
| Bill Smith | City of Tacoma | Government / Collector |
| Diana Specht | Concrete Recyclers | Processor |
| John Specht* | Concrete Recyclers | Processor |
| Charlie Porta* | eCullet | Processor |
| Scott Johnson | Fibres International | Broker |
| Thomas Mabie | Glass Packaging Institute | Industry Association |
| Rick Hlvaka* | Green Solutions | Consultant - Glass |
| Danny Lloyd | Lloyd Enterprises | Processor - Glass |
| Jan Cleiland* | Longview Fibre | Manufacturer - Cardboard |
| Patty Moore* | Moore Associates | Consultant - Plastics |
| Kelly George* | Nucor Steel Seattle | Manufacturer - Steel |
| Jeromy Adams* | Nucor Steel Seattle | Manufacturer - Steel |
| Peter Spendelow* | Oregon Dept. of Environmental Quality | Government |
| John Hutchinson* | Owens-Corning Insulation Systems | Manufacturer - Glass |
| John Caputo | Republic Services | Processor |
| Matt Englesby | The Trex Company | Manufacturer - Plastics |
| Chris Freas | TriVitro | Manufactuer - Glass |
| Don Freas | TriVitro | Manufactuer - Glass |
| Jay Shepard | WA Department of Ecology | Government |
| Penny Ingram | WA Utilities and Transportation Commission | Government |
| Brad Lovaas | WA Refuse and Recycling Association | Industry Association |
| Steve McGonigal | WA State Recycling Association | Industry Association |

# Executive Summary

In March 2009, the Washington Department of Ecology followed up on the previous effort of EPA's Region 10 Initiative, Contamination in Commingled Recycling Systems Standards & Guidelines, by holding a statewide kickoff meeting for the WA Commingled Recycling Improvements Project. The kickoff meeting resulted in local government agreement to collaborate regionally to address reducing contamination in commingled recycling systems in Washington State. Each regional workgroup (Southwest, Northwest, and Eastern/Central – see Appendix A) agreed to involve all stakeholders—local governments, material recovery facilities, haulers, and end-users—and decide regionally on their approach and objectives. This report represents the work accomplished by the Southwest Region Workgroup over the course of approximately one year.

The Southwest Region Workgroup (Workgroup) convened in April 2009 and began the process with a shared understanding of the similarities and differences of the commingled collection programs in the region (Appendix B), identified which processors were receiving material flow from each jurisdiction (Appendix B), and determined their overall objective was to address contamination and material loss in single-family residential commingled curbside recycling programs in the counties of Clark, Grays Harbor, Lewis, Mason, Pierce, and Thurston, and the cities of Longview and Port Angeles. A fact-finding mission was the first step for the Workgroup in order to meet their agreed upon goals:

1. Obtain the knowledge necessary to make informed decisions on programs
2. Provide data and context to elected officials
3. Provide consistency in public education messages (including dangerous items like sharps)
4. Reduce problems in sorting at material recovery facilities (MRFs)
5. Create feedback loops, both positive and negative, for the system as a whole
6. Identify possible funding mechanisms for increased public education

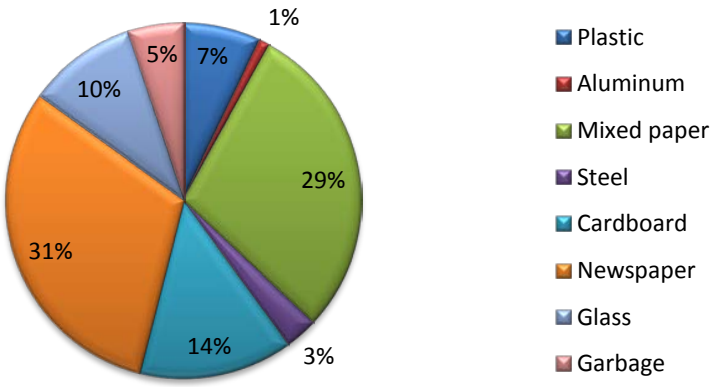
The Workgroup met monthly and at each half-day meeting all stakeholders shared their perspective on the issues they face with each material. Guest presenters representing end-users were invited to obtain data on the final use of each material (only local paper mills were consistent end-user members of the workgroup). By using an identical set of questions for each material (Appendix C), we were able to track materials and obtain data in a consistent and fair manner, giving each material focused attention.

Due to the scope of the project, the workgroup agreed to rely on existing data when available and on anecdotal information to understand the 'story' of each material as it made its way from the curb, to the MRF(s), to eventually its final end-use.

Letters of endorsement by 14 Workgroup participants—representing city and county local governments, processors, and end-users— regarding the process and the findings in this report can be found in Appendix D.

## Summary Findings of Materials in the Commingled Residential Recycling System

### What is in the Commingled Cart (by weight)?




### What is collected in the commingled single stream programs in the region?

| Collected in All Programs | Collected in Some Programs | Not Collected |
|---|---|---|
| Corrugated cardboard | Glass bottles & jars | Waxed boxes |
| Aluminum & Steel cans | Aluminum foil & pans | Non-bottle/jar glass |
| Phone books | Pots & pans | Large scrap metal |
| Mail | Aerosol cans | Hangers |
| Magazines | Scrap metal (< 2ft & 35 lbs) | Juice pouches |
| Catalogs | Frozen food boxes | Batteries |
| Boxboard (shoe & cereal boxes) | Shredded paper | Ammo |
| Paper bags | Milk cartons/Juice boxes | Paper towels |
| Newspaper & inserts | Egg cartons | Plates & cups |
| PET/HDPE bottles & jugs | Soda/Beer cartons | Napkins |
| | Aseptic cartons | Tissues |
| | Ice cream cartons | Food soiled paper |
| | Paper cores/rolls | Metallic giftwrap |
| | Paper giftwrap | Styrofoam |
| | Paperback books | Chip bags |
| | Plastic bags | Trays & Clamshells |
| | Buckets | Frozen food bags |
| | Dairy tubs & cups | Lids & Caps |
| | Pill bottles | Toys |
| | Nursery pots | HazWaste containers |

## Collection

| Material Category | % of Tonnage[1] | Consistent Collection | Consistent Messages |
|---|---|---|---|
| Cardboard | **14%** | 🟡 | 🟢 |
| Glass | **5% - 10%** | 🔴 | 🟢 |
| Metal | **4%** | 🟡 | 🟢 |
| Newspaper | **31%** | 🟢 | 🟢 |
| Plastics | **7%** | 🔴 | 🟢 |
| Mixed Paper | **29%** | 🔴 | 🔴 |

## Processing

| Material Category | % of MRF Revenue | Significant Processing Issues | Source of Cross-Contamination |
|---|---|---|---|
| Cardboard | **10%** | 🟢 | 🟡 |
| Glass | **(- $)** | 🔴 | 🔴 |
| Metal | **14%** | 🟡 | 🟡 |
| Newspaper | **3%** | 🟢 | 🟢 |
| Plastics | **6%** | 🔴 | 🔴 |
| Mixed Paper | **59%** | 🟡 | 🟡 |

## Manufacturing

| Material Category | Export/ Local | Yield Loss | Prohibitives (*see Glossary*) | Outthrows (*see Glossary*) | Final Product (if collected commingled) |
|---|---|---|---|---|---|
| Cardboard | 🟢 | **15%** | 🔴 | 🟡 | *Corrugated boxes, bags, boxboard* |
| Glass[2] | 🔴 | | 🔴 | 🟢 | *Aggregate (road base, etc)* |
| Metal | 🟢 | | 🟡 | 🟢 | *Aluminum cans & steel rebar* |
| Newspaper | 🟢 | **16%** | 🔴 | 🔴 | *Phone books, bags, newspaper* |
| Plastics | 🟢 | **16%** | **?** | **?** | *Carpet, clothing, fiber fill, & thick-walled plastic products* |
| Mixed Paper[2] | 🔴 | **?** | 🟡 | 🟢 | *Boxboard and box dividers* |

1. *Incoming tonnage total includes 5% - 10% of garbage*
2. *Considered a major issue for Export/Local due to limited market options*

*Note: This is a summary of a larger chart. For the full chart, please see Appendix E*

**KEY** 🟢 Not An Issue 🟡 Minor Issue 🔴 Major Issue

## What are the energy savings for recycling each material?

**Energy Savings for Recycling[1]**
**(Million Btu/Ton of Material Recycled)**

| Materials | Net Energy Savings[2] (Postconsumer) |
|---|---|
| Aluminum cans | 206.42 |
| Cardboard | 15.42 |
| Glass | 2.13 |
| Mixed paper | 22.94 |
| Newspaper | 16.49 |
| Plastic - HDPE | 50.90 |
| Plastic - PET | 52.83 |
| Steel cans | 19.97 |

1. When compared to landfilling
2. Includes process and transportation energy inputs

*Source: U.S. EPA 2006*

## Is it 'worth it' to collect this material in the commingled singlestream system?

**Cardboard (OCC) -** Yes. Old cardboard is effectively sorted, has local and export markets, has a high market value, and is recycled into products that would otherwise use wood chips to manufacture. Of all the materials in the commingled cart, it's the quickest, easiest, and least expensive to remove from the commingled mix.

**Glass Containers -** No. Because glass breaks—unlike the other commodities—it poses significant problems and hazards for the processing and end-use parts of the commingled system. Not only does it contaminate the paper, but because it has been commingled, its potential end-uses are dramatically reduced from an environmental and economic standpoint. When glass is commingled in singlestream collection programs in Southwest Washington, it eliminates the ability for the glass to be recycled into another glass container or for use in fiberglass.

**Aluminum -** Yes for aluminum cans, but no for aluminum foil and foil containers.
While smashed aluminum cans do have the potential to get missorted with paper or fall through the processing equipment and end up as a residual, they cause few problems in the system as a whole. They have a very high value in proportion to percentage of their volume in the commingled mix, there are local end-markets that complete the closed-loop system by manufacturing them back into cans, and recycling aluminum cans has significant environmental benefits in energy use reductions. All other aluminum products such as foil, foil sheet pans, and cat food cans are collected in such small amounts that they cannot be reasonably separated at MRF's and end up as a contaminant. Foil products move through the processing system like paper, contaminating paper bales and are ultimately disposed of by paper mills.

**Steel -** Yes. While the contribution to overall steel production is minimal, steel cans do have value to steel manufacturers as well as processors. Steel cans are easy to separate from the other

commodities and cause minimal problems throughout the system. Loose steel lids are not recovered due to size and shape.

**Mixed Waste Paper (MWP)** - Yes. As an overall category, mixed waste paper makes up a large percentage by weight and volume of the residential wastestream, has a strong export market, and has environmental benefits when used as a feedstock for making fiber products. However, it is important to remember that the category of mixed waste paper is a specific commodity, and that not all types of residential waste paper can be recycled with mixed paper. Because Chinese paper mills are purchasing the vast majority of the mixed paper produced in this region, the following types of paper products that are going to those mills are not recycled and should be avoided in commingled collection programs (these are also problematic at domestic paper mills): poly-coated containers (milk, juice, frozen food boxes), aluminum coated containers (aseptic boxes), cores (tissue and paper towel rolls), book bindings, wet strength paper (beer and soda carriers), window envelopes, and finely shredded paper (also problematic for processors).

**Newspaper (ONP)** - Yes. Although it is declining in volume as part of the residential mix, newspaper has value to domestic and Chinese paper mills. It is a material that is easily understood by the public, is universally collected in all programs, and does not cause cross-contamination for most materials, but can cause yield loss (*see Glossary*) at cardboard mills.

**Plastic Containers (PET & HDPE)** - Yes. PET, HDPE bottles and jugs have value, sustainable markets, and the public understands descriptions of these plastics. However, flattened bottles and jugs do cross-contaminate paper and cardboard and end up disposed by paper mills. Other than bottles and jugs, as more plastics are included in the collection program, the public becomes confused. The result is a 30% increase of non-program plastics included in the cart. The non-program plastics, once mixed, have limited markets due to the lower grade.

## Key Issues and Recommendations

As the Workgroup reviewed the data gathered over the previous year, the overall questions were:

- *What do you include in the commingled system?*
- *How much can be effectively separated and recovered?*

The following key issues, and their associated recommendations, are the critical focus areas in order to address contamination and material loss in single-family residential commingled curbside recycling programs in the Southwest Region of Washington (listed in no particular order).

1. **Consumer awareness and level of responsibility – Their reasonable expectation that if it goes in the cart, it's recycled**
   *Recommendations:*
   1. Educate that not everything is recyclable curbside or in the commingled cart.
   2. Establish feedback loops throughout the system.
   3. Recycling isn't free—Educate residents on what they are paying for to have curbside recycling service.

2. **Glass is a contaminant in the commingled stream and very little is going back to glass**
   *Recommendation:*
   Keep glass separate from other recyclables.

3. **Plastic film has significant processing issues and the result is very dirty ('MRF film')**
   *Recommendation:*
   Keep plastic film out of curbside collection programs.

4. **MRF employee safety regarding sharps, other medical waste, and explosives**
   *Recommendation:*
   Educate the public about proper disposal of these materials.

5. **Lack of consistency in our programs and messages across the region**
   *Recommendations:*
   1. Combine Western county/city programs for those that share media sheds.
   2. Combine education resources for clarity and consistency.
   3. Convene municipal governments and haulers within regions to establish program standards.
   4. Educate our own local jurisdictions to affect change.
   5. Choose materials based on those that get recycled – Those that are cost-effectively and sustainably recovered at their intended market.

6. **Lack of product stewardship/producer responsibility for materials**
   *Recommendation:*
   Educate local policy makers about problem materials in the commingled stream and advocate for solutions and financing.

7. **State and federal goals are driving local diversion goals**
   *Recommendation:*
   Switch the focus from collection to recovery. Recovering usable materials suitable for manufacturers is the priority of recycling programs. Diverting materials from the garbage can to the recycling can at the point of collection when those materials end up disposed at a processor or manufacturer is not recycling or diversion.

The Southwest Region Workgroup will resume meeting late summer of this year to discuss an implementation strategy. It will prioritize and pursue the above recommendations towards the overall goal of reducing contamination and material loss in single-family residential commingled curbside recycling programs in this region.

# Background

In 2006, U.S. EPA Region 10 convened a series of meetings called the Washington Beverage Container dialogues to address how to increase beverage container recycling in the absence of a state bottle deposit law. An issue identified during these meetings was the quantity of beverage containers 'lost' in the commingled recycling processing system. These lost bottles and cans contaminate paper bales and end up at paper mills where they are eventually disposed.

Due to the interest in this issue, EPA Region 10 convened the Contamination in Commingled Recycling Systems Standards & Guidelines Initiative and hosted a kickoff meeting in Seattle in July 2007. The regional workgroup's vision was to develop standards and guidelines for commingled recycling systems to reduce cross-contamination of recycled materials, increase the quality and quantity of materials recycled, and capture the highest percentage of materials intended to be recycled. The timeframe for this work was approximately one year. In September 2008, EPA Region 10 handed off the deliverables of the Initiative to the states of Oregon and Washington to pursue their individual implementation processes. For more details on the work of the Initiative including stakeholders, process, white paper, and slideshow presentation, please visit http://yosemite.epa.gov/R10/homepage.nsf/topics/ccrs.

In March 2009, the Washington Department of Ecology (Ecology) followed up the effort of the regional Initiative and held a statewide kickoff meeting of the WA Commingled Recycling Improvements Project. The purpose of this meeting was to gather local government stakeholders, share information on the contamination issues associated with commingled recycling, discuss the process and outcomes of the EPA Region 10 facilitated Initiative project, and determine if local governments had an interest in working on this issue in Washington. Ecology focused its attention on local government for two reasons: they were largely absent during EPA's Region 10 Initiative project and they are critical decision-makers for residential recycling programs in Washington State.

The result of the kickoff meeting was that local government participants agreed to collaborate regionally to address reducing contamination in commingled recycling systems in Washington. Three workgroups formed based on Ecology's regional divisions of the state – Northwest, Southwest, and a combined Central/Eastern/Idaho border group. Each agreed to involve all stakeholders including local governments, MRFs, haulers, and end-users. Each group would decide their approach and objectives and each regional group lead was to report progress to the statewide WA Commingled Recycling Improvements Project coordinator.

This report is the result of the work accomplished by the Southwest Region Workgroup over the course of approximately one year, starting in April 2009.

# Methodology

The Southwest Region Workgroup (Workgroup) convened in April 2009 and began the process with a shared understanding of the similarities and differences of the commingled collection programs in the region (Appendix B), identified which processors were receiving material flow from each jurisdiction (Appendix B), and determined their overall objective was to address contamination and material loss in single-family residential commingled curbside recycling programs in the counties of Clark, Grays Harbor, Lewis, Mason, Pierce, and Thurston, and the cities of Longview and Port Angeles. A fact-finding mission was the first step for the Workgroup in order to meet their agreed upon goals:

1. Obtain the knowledge necessary to make informed decisions on programs
2. Provide data and context to elected officials
3. Provide consistency in public education messages (including dangerous items like sharps)
4. Reduce problems in sorting at material recovery facilities (MRFs)
5. Create feedback loops, both positive and negative, for the system as a whole
6. Identify possible funding mechanisms for increased public education

In short, the Workgroup was seeking the truth about how our regional recycling system functions and why. For the purposes this work, 'the commingled system' was defined the as places, including the house, curb, MRF, and mill; and the people, including residents, recycling program managers, policy makers, haulers, processors, brokers, and manufactures which are involved in the inputs or outputs of the residential commingled recycling programs.

The group held half-day meetings once per month to focus on one material type per meeting, for all materials except glass. Because glass has unique properties (it breaks and it's heavy), it poses challenges in the commingled system like no other material, tends to generate lively discussions, and presents economic challenges across the state due to its low value. Due to these issues, it was decided to hold a statewide, all day Glass Summit as part of this effort. The information in the report, however, is based on what is true for the glass in the Southwest Region.

During each meeting, all stakeholders shared their perspective on the issues they face with each material. Guests representing end-users were invited to present in order to obtain data on the final use of each material. Only local paper mills were consistent end-user members of the workgroup. By using an identical set of questions for each material (Appendix C), we were able to track materials and obtain data in a consistent and fair manner, giving each material focused attention.

Due to the scope of the project, the workgroup agreed to rely on existing data when available and on anecdotal information to understand the 'story' of each material as it made its way from the curb, to the MRF(s), to eventually its final end-use.

# Materials Tracked

The Workgroup held focused meetings to address each material category collected in the commingled residential recycling programs in the counties of Clark, Grays Harbor, Lewis, Mason, Pierce, and Thurston, and the cities of Longview and Port Angeles: cardboard (OCC), glass containers, metal, mixed waste paper (MWP), newspaper (ONP), and plastic containers (PET, HDPE). In order to gather data from each perspective and from each part of the commingled recycling system, an identical set of questions were used for discussion about each material as it passed through the system (Appendix D). The following material snapshots are the results of those discussions.

## Cardboard – OCC

### What is included?

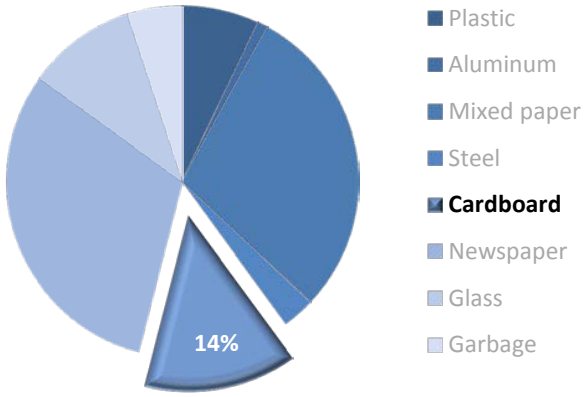
**Yes:**

OCC includes all fiberboard that has corrugated layers

**No:**

Waxed boxboard or boxboard (e.g. cereal boxes)

### How much is in the cart (by weight)?




### What are we telling the public on how to prepare it?

Messages are consistent across the region – flatten and fit in the cart.

### What are the collection issues?

All jurisdictions collect cardboard in the cart, mixed with the other materials. In addition, two jurisdictions reported that residents have the option of placing it outside the cart on collection day.

### What are the issues in processing?

**Quality of Incoming:** Good to great

**Key Issues:** Small pieces and wet cardboard

MRFs prefer larger pieces of cardboard as the smaller sizes end up sorted with the other fiber grades. Wet cardboard tears into small pieces and falls through the sorting screens.

## Where are the markets?

**Domestic/Local:** Georgia Pacific and International Paper, Oregon; Longview Fiber, Longview, WA. There are other consumers of OCC in the Pacific Northwest (Simpson and Caraustar) that will not buy OCC from commingled MRFs due to the high percentages of prohibitives in the bales.

**Export:** Foreign markets that were formally importers of U.S. OCC are now either exporters or self-sustaining. Japan is a huge net exporter. Mexico is almost entirely internally supported. China's inspection standards are getting stricter as they become more domestically sustained.

## What are the issues as a recycled feedstock?

**Key Issue:** Manufacturers using OCC as a feedstock report the largest issue is a 10-20% contamination from suppliers.

**Prohibitives:** The most significant prohibitive in OCC is plastics. Waxed OCC is also considered a prohibitive.

**Outthrows:** Fiberboard and wet strength fiber are the main outhrows.

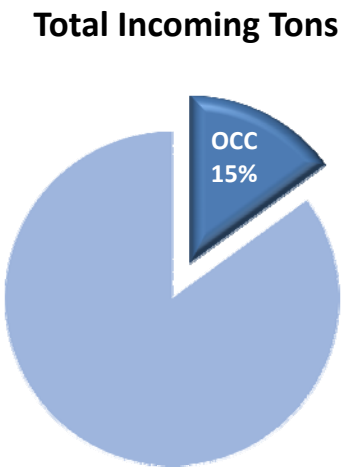
Due to these prohibitives and outhrows, manufacturers experience an approximate 15% yield loss from OCC bales sourced from our commingled residential programs.

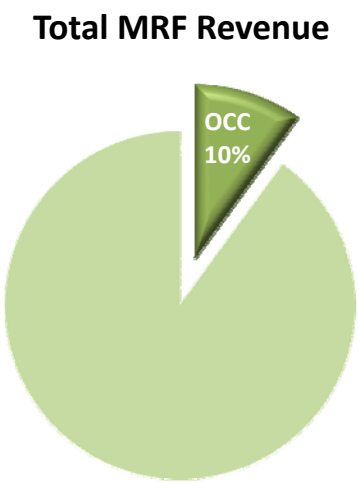
**Equipment Issues:** The only manufacturing equipment issues with using OCC as a feedstock is getting enough volume of OCC to move through the mill efficiently. Manufacturers can use between 30% - 100% of OCC as a feedstock. The combination of customer needs, product needs, and customer want will determine recycled content.

## What is the material contribution to the manufacturing process?

Recycled cardboard saves 24% of the total energy needed to manufacture new cardboard, providing manufacturers with a reduction in operating expenses.

## Where does this material fit into the big picture – % of tons, % of revenue?




*Source: Aggregated data from Southwest WA Region MRFs*

## What is the environmental benefit and reduction of greenhouse gases if recycled?

Recycling one ton of corrugated cardboard results in a net savings of 15.42 million BTUs of energy (U.S. EPA 2006).

## Is this material impacting the value of the other commodities?

Yes. It is affecting the value of newspaper grades as smaller pieces get mis-sorted into newspaper bales.

## What is the final product?

Manufactures using OCC from the region produce liner medium, boxboard (cereal boxes, etc), corrugated boxes, and bag grades.

## Is it 'worth it' to collect this material in the commingled singlestream system?

Yes. Old cardboard is effectively sorted, has local and export markets, has a high market value, and is recycled into products that would otherwise use wood chips to manufacture. Of all the materials in the commingled cart, it's the quickest, easiest, and least expensive to remove from the commingled mix.

# Glass Containers

## What is included?

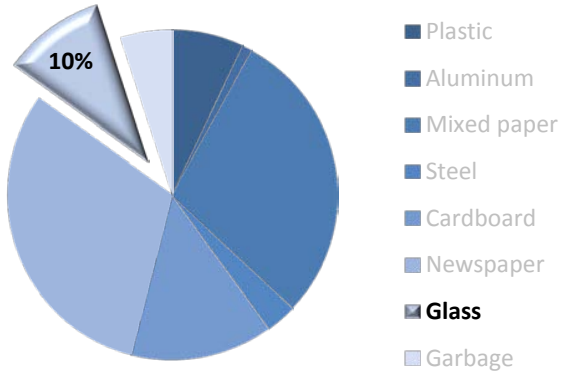
**Yes:**

Bottles and jars

**No:**

Pyrex, vases, ceramics, mirrors, windows, plate glass, light bulbs

## How much is in the cart (if commingled)?




## What are we telling the public on how to prepare it?

Rinse containers and throw away lids and caps. For those jurisdictions that operate a drop-off collection system for glass in tandem with their commingled curbside programs, most programs ask the public to color sort the glass.

## What are the collection issues?

All jurisdictions are diverting glass from disposal at point of collection. The collection methods vary largely across the region: Only two jurisdictions collect glass singlestream in Southwest WA; only one jurisdiction collects it commingled with other containers, but separated from the fiber; three jurisdictions collect glass in a separate curbside bin; and five jurisdictions collect glass at drop-off sites rather than at curbside.

The most significant collection issue for glass is the added cost to collect it (labor and equipment) if it is not collected in the commingled cart. The added costs to collect glass in a separate container curbside or at drop-sites *may* be offset in a calculation of net program costs (collection costs minus net commodity value) for some jurisdictions. There are also safety concerns when collected separately at the curb. If the collection trucks are equipped with fully automated arms, the driver remains in the vehicle to empty the commingled carts. However, if glass is collected in a separate bin at the curb, there are reduced efficiencies in collection times, safety hazards from vehicles, worker injury in lifting, and shattered glass (shattered glass is hazardous in itself, but also indirectly as its cleanup can put the driver at risk in traffic). If collection trucks are semi-automated (the driver manually places the cart on the automated lifting arm), the driver is already exposed to traffic and cart maneuvering (reducing efficiencies compared to fully automated), but will experience further delays and safety concerns if additional manual glass collection occurs.

## What are the issues in processing?

### *Primary Processing*

**Quality of Incoming:** Poor

**Key Issues:** Removal of glass from paper and removal of small, non-glass materials (lids, shredded paper, caps, etc) from glass.

Glass will break early in the processing system if it's not already broken in the collection process. Processing equipment removes anything smaller than 2 inches (fines) and does not remove glass exclusively (known as a positive sort). The resulting 'glass material' after processing is only about 70% glass and not suitable for container or fiberglass manufacturing without additional screening at a secondary processing facility. Glass is viewed by processors as a contaminant to remove rather than a commodity to recover.

The glass that does not fall through equipment and become fines, sticks to the paper and is transported with the news and mixed paper bales. This is a significant problem for the paper industry and is discussed further under the section, **Is this material impacting the value of the other commodities?**

### *Secondary Processing*

**Quality of Incoming:** Poor if commingled singlestream (15-25% contamination)

**Key Issues:** Contamination—defined as ceramics, porcelain, rocks and fines.

eCullet is a glass processor located in Seattle. They prefer color separated and mixed color glass free of ceramics, porcelain, rocks, and a minimal level of fines. Jar lids, paper labels, and bottle caps and not classified as contaminants by eCullet. Glass with varying quality levels is acceptable and pricing is based on the amount of glass recovered after processing. MRFs in the Workgroup reported that eCullet is not currently accepting singlestream glass from their facilities.

Processed glass is supplied to glass container manufacturers as a replacement for raw materials. The savings for the glass manufacturer is in energy savings and a major reduction in green house gasses emissions.

## Where are the markets?

**Domestic/Local:** Singlestream glass is used locally for aggregate by Concrete Recyclers, Olympia; Lloyd Enterprises, Milton, and others. Non-singlestream glass collected at public drop-off sites from some jurisdictions is sent to a secondary processor and then to Saint Gobain, Seattle, and Owens-Illinois, Portland, for use in glass containers; but some non-singlestream glass is being sent directly for use as local aggregate. Saint Gobain does not accept glass unless it has been cleaned by a glass processor.

**Export:** None

Glass cullet can be used in all sectors of glass manufacturing. Glass containers are 100% recyclable; yet, in container glass manufacturing, cullet use can vary from 10% to over 90%. Currently, the United States uses about 30% cullet in container glass manufacturing (Ruth and Dell'Anno 1997).

Within the U.S., fiberglass is the largest secondary market for post-consumer and industrial waste glass. Fiberglass manufacturers in the U.S. recycle about 1 billion pounds of waste glass annually (GMIC 2002), and use 10-40% recycled glass in their final products. Strategic Materials, based in Commerce, CA, is purchasing some mixed cullet from this region and charges approximately $18.00 ton and requires less than 2-3% contamination.

States and provinces that have bottle deposit programs generate much cleaner cullet (2 -3% contamination versus 15-25% from curbside programs) and are the first choice of suppliers looking for container glass cullet.

## What are the issues as a recycled feedstock?

### *Glass to Aggregate*

**Key Issue:** Marketing the glass aggregate to the construction industry

**Prohibitives:** Plastic and paper (2-4%)

**Outthrows:** Window and safety glass (windshields)

Incoming glass is run through a screen to remove prohibitives and then crushed, resulting in 3/8 inch minus crushed glass aggregate. Incoming glass is charged at $20 per ton and sold at $3 per ton to contractors. Supply and demand is not consistent. The material is tested and meets three of the specifications in the WA Department of Transportation manual for use in road construction applications. The product has been used for pipe bedding, slabs on grade applications (sidewalks, under concrete), locate layer for utility companies, water filtration layer, backfill, and as a replacement for pea gravel and 'pit run' (a Class A structural fill). There is general resistance by engineers and contractors to use glass aggregate because they are unfamiliar with it as a product. Some facilities will mix glass aggregate with pit run. It no longer looks like glass and is more readily accepted.

### *Glass to Containers*

*We were unable to get any information from either of the glass container manufacturing plants near the region. The following information is from other published reports.*

**Key Issue:** Getting clean, non-contaminated, color separated cullet

**Prohibitives:** Metal

**Outthrows:** (no information available)

Container glass manufactures produce about 10 million tons of annual products and are the glass industry's l argest pr oducers (U.S. D OE 2002a ). Three m anufacturers—Owens-Illinois, S aint-

Gobain Containers, and Anchor Glass Containers—together account for more than 95% of container glass production (GMIC 2004). The majority of glass container products are made of clear (flint) (64%), amber (23%) or green glass (13%) comprising the remainder (GMIC 2002). The major markets are beer bottles (53%), food packaging (21%), non-alcoholic beverage bottles (10%), and wine bottles (6%) (Cattaneo 2001). Competition with alternative materials such as plastic, aluminum, and steel in these markets is intense.

### *Glass to Fiberglass*

*The information in this section is from Owens Corning, whose closest insulation facility is located in Edmonton, Alberta, Canada. None of the Southwest Region's glass is going to this facility.*

**Key Issue:** Supply of clean cullet

**Prohibitives:** Ceramic, metal, plastic, paper

**Outthrows:** Pyrex

Two-thirds of the traditional supply for fiberglass manufacturing has been plate glass. Plate glass supply is now scarce due to growing demand for plate glass and reduced supply in North America. In an effort to meet sustainability goals, including post-consumer content goals, and diversify their supply, Owens Corning is now sourcing hundreds of thousands of tons of additional container glass cullet.

Color segregation is not required for fiberglass manufacturing, but the cullet must be free of contaminants and must be the consistency of sand if the source is bottle glass. The tolerance for contaminants is 40 parts per million (ppm) for ceramics, and less than 10ppm for metals, paper and plastic, respectively. Owens Corning pays $80 per ton for glass cullet and can usually source as far away as 400-500 miles from the facility before it is not cost effective.

## What is the material contribution to the manufacturing process?

Glass manufacturing uses about 1% of all United States industrial energy. Purchasing energy accounts for approximately 14% of the total cost to produce glass (Worrell et al. 2008). Increasing the cullet share by 10% (based on weight) reduces net energy consumption by 2-3.5% (Beerkens et al. 2004). Reduced energy consumption results in reduced operating costs. Owens Corning reports a 13% energy savings when using cullet versus virgin materials for their feedstock.

In addition, exponential savings occur in the reduction of raw materials needed. Owens Corning reports that compared to using 100% raw materials, using 30% cullet reduces silica use by 60%, and soda ash by 40% (Papke 1993).

For fiberglass manufacturers, using glass cullet can increase fiberglass manufacturing yield by up to 10%, as compared to making fiberglass from virgin materials. This is an important benefit, especially when all mills are running at maximum capacity.

## What is the environmental benefit and reduction of greenhouse gases if recycled?

As mentioned above, using recycled glass cullet as a feedstcok saves energy in glass production. The following table illustrates energy use per ton of production.

**Table 1 – Energy Use for 1 Ton of Materials[1]**

| Product | Energy per ton (Million BTUs) |
|---|---|
| Production of 1 ton of container glass from virgin materials[2] | 6.49 |
| Production of 1 ton container glass from cullet (recycled glass)[3] | 4.32 |
| Production of 1 ton of aggregate (crushing)[3] | 0.05 |
| Transport by dump truck 100 miles[4] | 0.623 |
| Transport of 1 ton of cullet by tractor/trailer 100 miles[4] | 0.14 |
| Transport 1 ton of cullet by rail 100 miles[4] | 0.033 |
| Transport 1 ton of cullet by freighter (ship) 100 miles[4] | 0.026 |

1. Because of material losses in manufacturing, slightly more than 1 ton cullet is required to produce 1 ton of container glass.
2. Transport of virgin feedstocks not included (estimated at an additional 0.58 MMBTU/ton)
3. Collection transportation not included.
4. Includes the energy used to make the fuel (called pre-combustion energy) and combustion energy

*Source: Personal communication from David Allaway, OR DEQ, 2009*

Increased cullet use in glass manufacturing will also lead to reduced emissions of greenhouse gases. Nitrous oxide (a greenhouse gas) emissions will be reduced because less fuel is used, while the sulfur oxide emissions are also reduced due to the lower consumption of sodium sulfate (Enneking 1994).

To translate the above table into energy use savings depending on the end-use of the glass, the following example and illustration (Figure 1) is provided by David Allaway, Oregon Department of Environmental Quality:

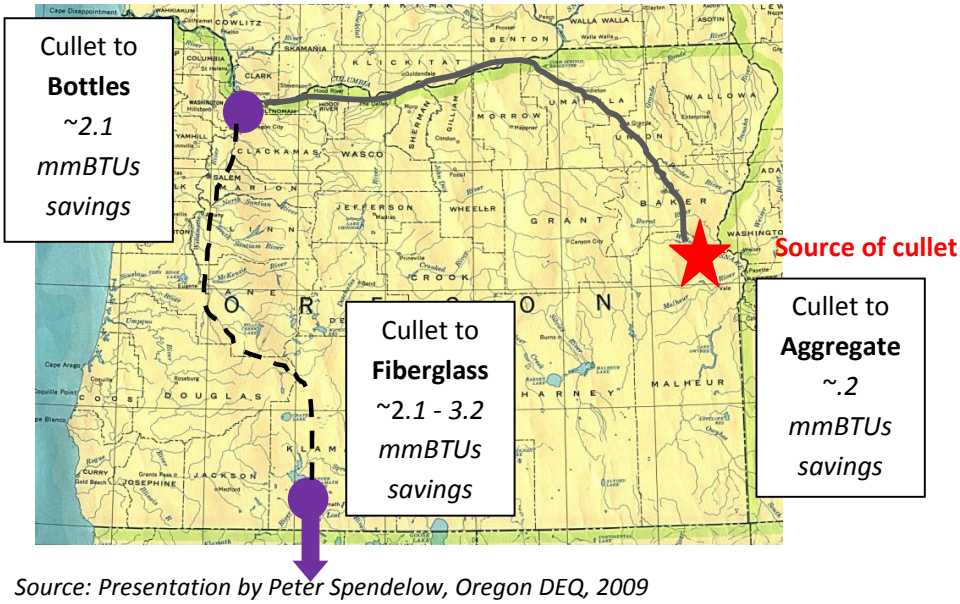
*If one ton of glass cullet were collected in eastern Oregon and used locally for aggregate, there would be a net energy savings of ~.2 million BTUs per ton of cullet.*

*If that cullet was transported by truck to Portland, instead, and used for glass bottle production, there would be a net energy savings of ~2.1 million BTUs per ton of cullet.*

*If that cullet was trucked to Portland and then shipped to California by rail and used to produce fiberglass, there would be a net energy savings of ~2.1 – 3.2 million BTUs per ton of cullet.*

*Overall, the ultimate end-use of the glass is far more important from an energy-savings standpoint, than the energy used in transportation to get it into production.*

**Figure 1 – Map of Glass End-use Options:**
**Minimal Impact of Transportation on Net Energy Benefits**

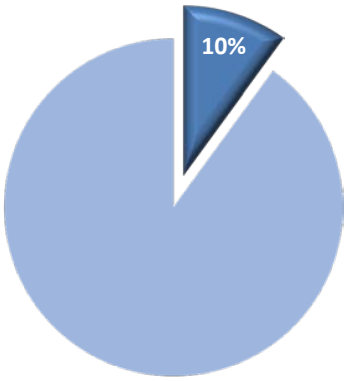



*Source: Presentation by Peter Spendelow, Oregon DEQ, 2009*

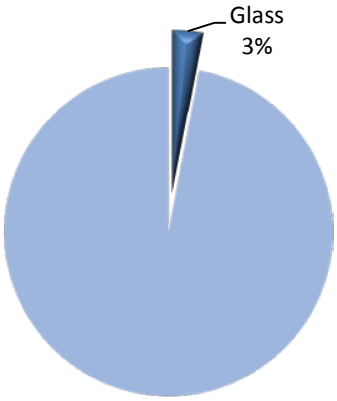
## Where does this material fit into the big picture – % of tons, % of revenue?

Of the total incoming material to MRFs, 10% is glass in singlestream and 2-4% in commingled, glass *separate* collection systems (due to confusion by residents).

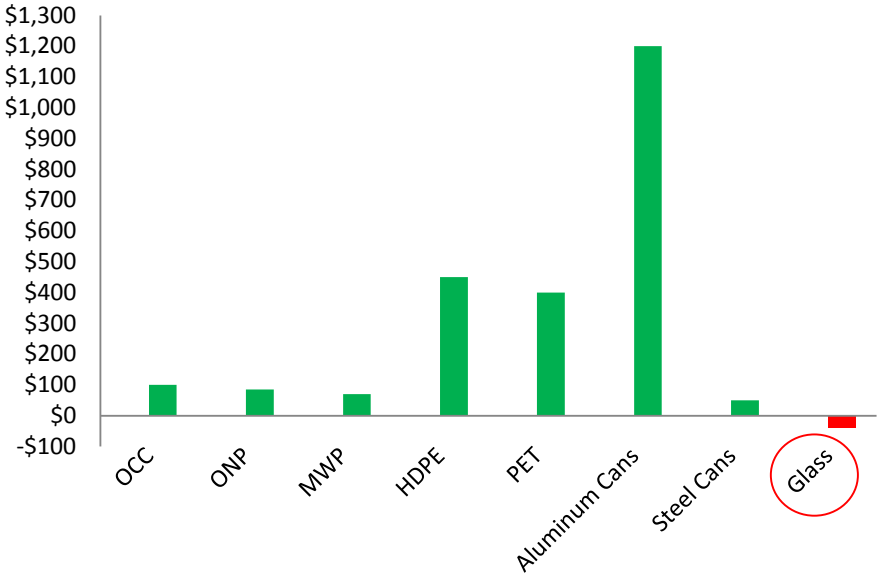
**Glass in the Cart - Single stream**




**Glass in the Cart - Non-program**




**Revenue by Material Type[1] (per ton)**




1. Prices per ton for fiber grades are closer to double on the export market.

Note: This is an aggregate average for prices in the PNW at time of publishing and are meant for comparison purposes only.

*Source: Aggregated data from Southwest WA Region MRFs*

## Is this material impacting the value of the other commodities?

Yes. While low in overall volume of contaminants by weight, glass is the single most damaging commodity for the recovered paper industry. NORPAC newsprint mill averaged 37 tons of glass per month during May 1 – October 28, 2009 (based on material from six suppliers). Table 2 shows the differences in quantities of glass received based on whether the supplier's source had singlestream glass (*Glass In*), glass collected separately at the curb (*Glass on Side*), or whether the supply came from a bottle bill state where glass is not collected at curbside and there is an incentive to return the bottle to claim the deposit (*Bottle Bill*). Photos 1, 2, and 3 show the size of glass and its impact in the paper stream.

The costs of dealing with glass in the fiber stream are significant especially considering the percent of the glass in the paper by weight (.3%). Because glass is abrasive, a small amount can do a lot of damage to equipment. Annual maintenance costs directly attributable to the increased wear and tear by glass on mill machinery total an estimated $306,000 a year and include:

- ~ $60,000 for replacing values (see Photo 3)
- $80,000 improved metallurgy/components *(see description below)*
- $100,000 for replacement of piping, conveyors, pulper, and pumps
- $66,000 for fiber replacement costs

The total dollar impacts to a newspaper mill from glass are not as large in comparison to the effect from mixed paper (see pg. 35). However, when taken into consideration the level is only about 0.3% by weight as compared to the total contamination found in mixed paper, the impacts are significant on a per ton basis.

Additional costs for improving metallurgy are due to equipment suppliers changing the metals they typically use in manufacturing products to supply to paper mills. The pulp and paper industry uses stainless steel in almost all equipment that is in contact with pulp slurry and certain chemicals. The pulp slurry is so abrasive with glass in it that it erodes the stainless steel parts much more quickly (see Photo 3). Equipment that typically requires replacement every 15 to 20 years, is now being replaced within the first year. NORPAC has tried different grades of stainless steel which are more expensive, but with only slightly improved life. They have also worked with the equipment manufacture to add different levels of other metals, which has improved its susceptibility to glass, but is more prone to cracking from vibration, reducing its life as well. They have not found a solution and are continuing to trial different metallurgy in each of the high wear areas in the process caused by the glass.

Additional impacts from glass in the fiber stream include:

- Employee safety impacts such as airborne glass dust during daily cleanup
- Unplanned shutdowns due to mechanical failures
- Replacing plugged equipment (i.e. screens plugged with glass shards).
- Reduced quality of the final paper product due to poor performing equipment

Recently, NORPAC has increased the level of intermittent shutdowns for cleaning due to the level of glass and customer requirements for cleaner paper, and so the full cost of glass is higher than reported above.


**Photo 1. Glass in the Paper Bales – Sample Rejected after Drum-Pulper Pulping Process**

*Source: NORPAC 2009*


**Photo 2. Glass in the Paper Bales – Sample Rejected by Sand Cleaner**

*Source: NORPAC 2009*

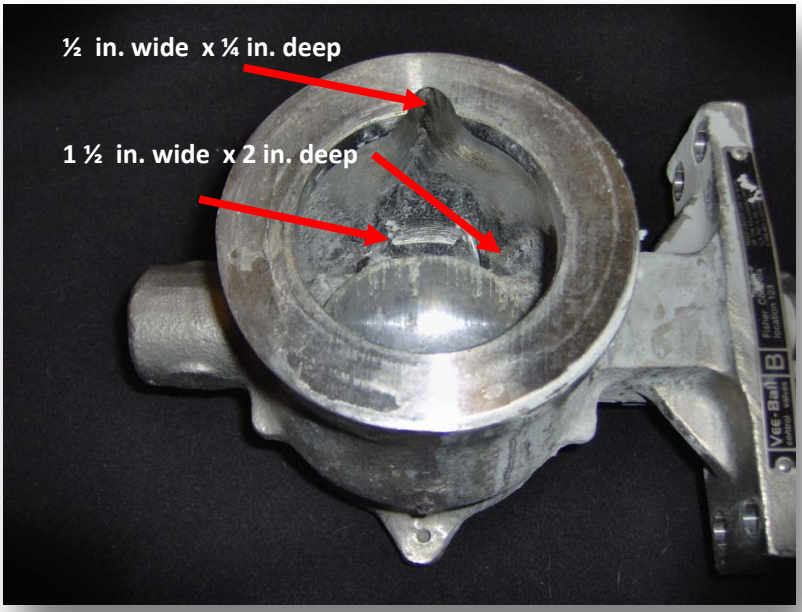



**Photo 3. Wear on Stainless Steel Valve Due to Glass**

*Source: NORPAC 2009 (valve), S. McClelland (photo)*

**Table 2 – Glass Quantity by Supplier of Fiber to NORPAC Mill in Longview, WA**

*(May 1 – October 28, 2009)*

| Source of Fiber/ Type of Collection System | Average % Glass Content | % of Total Volume of ONP supplied | Approximate Tons Glass (per month) |
|---|---|---|---|
| 1. Glass In | 1.5% | 13% | 20 |
| 2. Glass In | 0.66% | 5% | 3 |
| 3. Glass on Side | .14% | 30% | 4 |
| 4. Glass In | .78% | 5% | 4 |
| 5. Bottle Bill | .08% | 8% | 0.6 |
| 6. Glass In | .35% | 15% | 5 |
| TOTAL | .46% | 76% [1] | 37 Tons |

1. Approximately 75-79% of NORPACs recovered fiber supply comes from commingled suppliers
Source: NORPAC, 2009

## What is the final product?

The glass from singlestream collection systems in Southwest Washington is used as aggregate for road base at landfills or other construction aggregate applications. Most of the color-mixed glass that is collected separately is also used as aggregate. Color-separated glass, collected in drop-off systems in the region, is typically being recycled back into containers.

## Is it 'worth it' to collect this material in the commingled singlestream system?

No. Because glass breaks—unlike the other commodities—it poses significant problems and hazards for processing and end-use parts of the commingled system. Not only does it contaminate paper, but because it has been commingled, its potential end-uses are dramatically reduced from an environmental and economic standpoint. When glass is commingled in singlestream collection programs in Southwest Washington, it eliminates the ability for the glass to be recycled into another glass container or for use in fiberglass.

# Metal

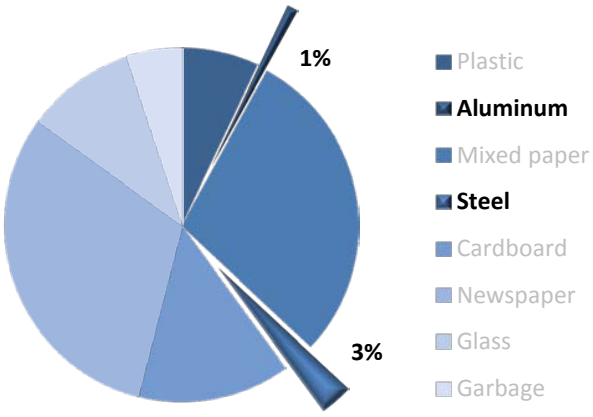
## What is included?

**Yes:**
Aluminum and steel cans

**Maybe (some programs accept):**
Aluminum foil, pots and pans, aerosol cans, and scrap metal smaller than 2 ft and less than 35lbs

**No:**
Large scrap metal, hangers, foil juice pouches, batteries and ammo

## How much is in the cart (by weight)?




## What are we telling the public on how to prepare it?

Consistent messages include rinse, no food residue, labels ok. Special or extra messages include size and weight restrictions for scrap metal (35lbs, 2'x2'x2' with no wood, metal, plastic attached), no hangers and no batteries.

## What are the collection issues?

Haulers reported that scrap metal can be a hazard in the truck for compaction (long pipes, etc). Aerosol cans are also problematic due to insecticide, paint spray mess, and hauler safety.

## What are the issues in processing?

**Quality of Incoming:** Good

**Key Issues:** Crushed aluminum cans, lids, and accepting scrap metal

**Problems in Processing:** Smashed aluminum cans are a problem because of their shape. When crushed, they act like paper because there is not enough surface area to get caught by the eddy current (magnetic field that ejects non-ferrous metals). This often results in cans sent to residual, or fines – contaminating the crushed glass. Tacoma Recycling hand picks the metal (no eddy current). The hockey puck cans (smashed from top to bottom) aren't as big of a problem, but long, skinny, flat cans get mixed in with paper.

Lids are problematic as they are a safety issue for employees, and they get caught in fines or stick to newspaper and are not recovered.

Scrap metal is an issue due to its size and inconsistent shape. Small, ferrous metal will get picked up by the magnet and sent to the tin sort, but non-ferrous large and irregular shapes get caught and cause machine damage (mainly belt damage). Pipes can fling causing a serious safety issue

or can tear up the belt. Heavy scrap metal is also a significant safety issue on a fast belt as it is hand sorted. Pots and pans are not a problem due to their shape and weight.

There are no reported processing problems with aerosol cans.

Aluminum foil that is smaller than a fist ends up with the fines and is not recovered.

Foil pans, due to their shape, end up getting sorted into the newspaper.

Cat food cans are okay, but not great. Not all small cat food cans are made of aluminum. In addition, due to their shape, small size and weight, they don't perform as well in the processing system as aluminum beverage cans do, and often get automatically sorted into the paper.

Buyers that are purchasing aluminum used beverage containers want beverage containers, not just any aluminum, but they won't refuse a shipment if it contains a small percentage of foil or other aluminum products. MRFs do have the option of producing an off-specification UBC bale that can contain up to 10% non-UBC aluminum, but it is worth much less and the demand is not as high.

**Not recovered:** Aluminum foil and foil pans, and all lids.

**Areas that could be improved from MRF perspective:**

- Accepting scrap metal commingled curbside gives the impression MRFS can take everything
- Don't flatten metal containers
- Leave lids off and throw away. An alternative is to leave the lid *securely* attached to the can and bend it inside the can, although this method can be a safety hazard for the customer

## Where are the markets?

**Domestic/Local:** Aluminum is mostly domestic. Anheuser Busch is a large consumer of aluminum cans from this region. Their mills are located in Alabama, Kentucky, and Tennessee. Fifty percent of steel is sent to domestic markets. Nucor Steel, Seattle, WA and Schnitzer Steel, McMinnville, OR are local end-users.

**Export:** Fifty percent of steel is exported.

The aluminum market is strong, but half of what it was in 2008. Aluminum is a high value commodity ($2,000 a ton, direct to manufacturer; minus $300-$400 spent on secondary processing). The aluminum beverage container (UBC) industry relies on ISRI standards to determine quality.

The steel market was ranked as medium. Steel cans are a low value commodity.

## What are the issues as a recycled feedstock?

### *Steel*

**Key Issues:** Plastics, paper, closed containers (whole) and liquids

**Prohibitives:** Lead, paper (cause emissions problems due to increased temperature of vapor, increased energy used), and plastics (emissions/temperature issue, can tolerate .5 -1% max).

**Outthrows:** Non-ferrous metals

Nucor Steel in Seattle reported that 99.8% of their feedstock supply is scrap steel. Eighty-seven percent of their feedstock comes from within Washington State. Curbside residential makes up a small percentage of their overall supply (5-8% based on weight).

Labels are undesirable, but not enough to refuse a load. Food is not an issue from a product quality standpoint, but it does cause vector concerns.

**Equipment Issues:** Both paper and plastics cause problems with the emissions equipment (high temperature destroys the bags in the baghouse that filter the emissions. Bags are expensive to replace as they are very large and many are needed (35'x 8' in size, 3500 in qty.). Liquids are a problem as they cause explosions in the melting pot (safety and 'good neighbor' issue).

### *Aluminum* *(Sent to a manufacturer of used beverage containers – the primary market)*

**Key Issues:** Plastics, glass, and liquids

**Prohibitives:** Plastic, glass, moisture, and shredded paper

**Outthrows:** Aluminum that is not a used beverage container (pet food cans, foil and foil pans and trays, siding, etc.)

The quality of cans coming from the Southwest Regions' MRFs is good to great. Markets for used aluminum beverage containers (UBCs) are interested in cans, not other aluminum products. Aluminum foil products contain more iron and melt at a much lower temperature than cans. Consequently, they end up as ash when melted with cans.

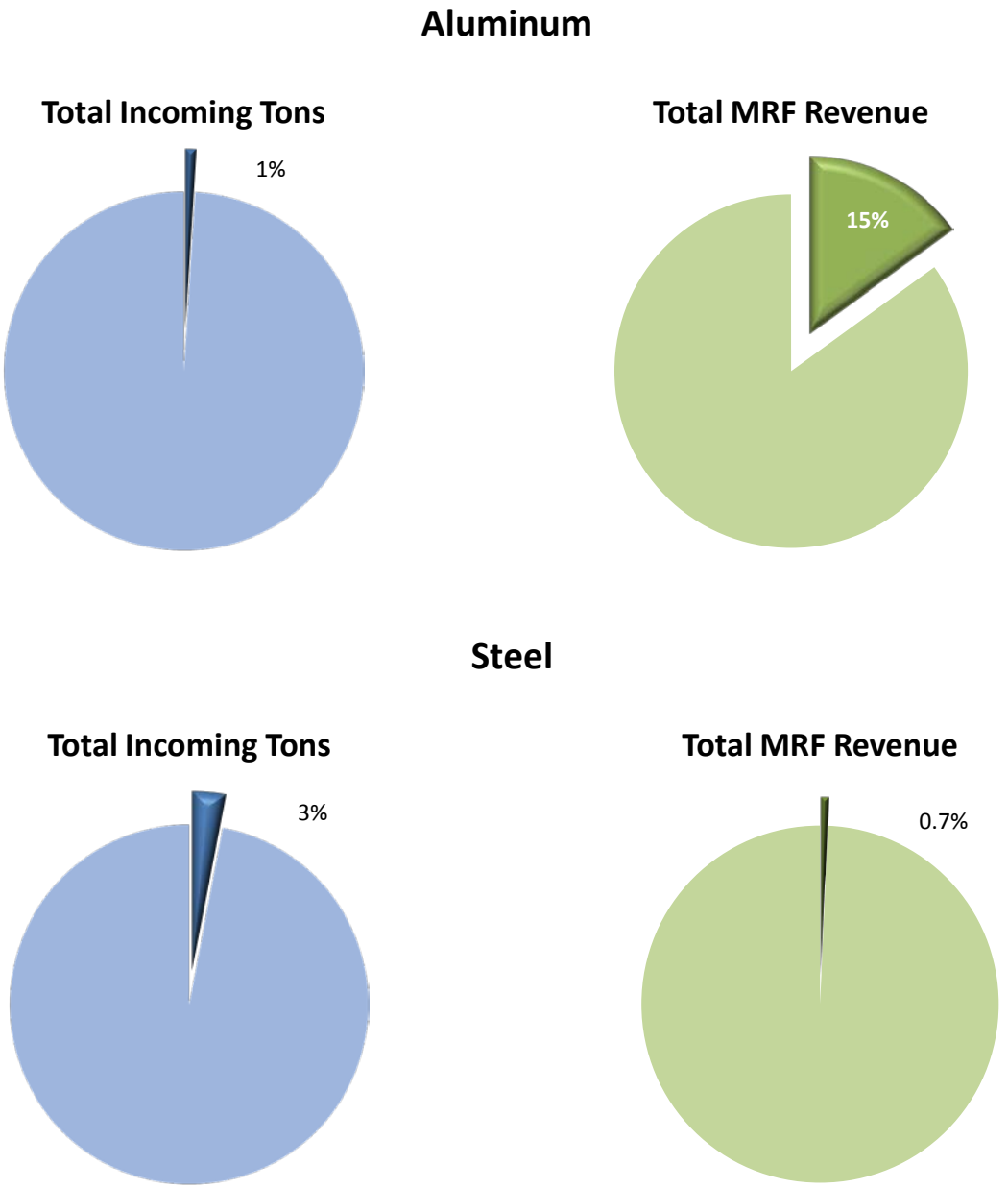
UBC buyers are not interested in pet food cans due to the paper wrapper and tendency to have mold and odors which can become a vector issue. The shipment is refused if there is crushed glass either falling out of a UBC bale while it's being unloaded or on the floor of the shipping container. A refused shipment can be expensive because our cans are being shipped from the West Coast to manufacturers in the Southeast USA. The reputation of the supplier can also be damaged. Bales of UBCs also need to be kept out of the rain and snow. A shipment that has higher than 4% moisture by weight will be deducted in value because buyers don't want to pay for liquid.

**Equipment Issues:** The most problematic issue for UBC end-users is plastic (particularly PET bottles) due to its combustibility. When furnaces are burning paint from the aluminum cans, plastic can ignite and shut the entire mill down. Shredded paper can also cause similar problems if a bale contains a high amount.

## What is the material contribution to the manufacturing process?

Recycling aluminum takes 95% less energy than making aluminum from raw materials. Recycling steel takes about one third of the energy to make steel, on average, than from raw materials in the U.S.

## Where does this material fit into the big picture – % of tons, % of revenue?




*Source: Aggregated data from Southwest WA Region MRFs*

## What is the environmental benefit and reduction of greenhouse gases if recycled?

Recycling one ton of aluminum cans results in a net savings of 206.42 million BTUs of energy – the highest net savings of all materials included in EPAs study (U.S. EPA 2006). Recycling one ton of steel cans results in a net savings of 19.97 million BTUs of energy (U.S. EPA 2006).

## Is this material impacting the value of the other commodities?

Yes, crushed aluminum cans and aluminum foil pans are contaminants in the mixed paper and newspaper bales.

## What is the final product?

**Aluminum cans:** Aluminum cans and tops.

**Steel:** Steel billets to roll or sell worldwide. Eighty-five percent is used to make rebar and 15% is used for merchant grade steel products such as angles, channels and flats. Roof trusses are an example for using merchant grade steel angles.

## Is it 'worth it' to collect this material in the commingled singlestream system?

**Aluminum:** Yes for aluminum cans, but no for aluminum foil and foil containers. While smashed aluminum cans do have the potential to get missorted with paper or fall through the processing equipment and end up as a residual, they cause few problems in the system as a whole. They have a very high value in proportion to percentage of their volume in the commingled mix, there are local end-markets that complete the closed-loop system by manufacturing them back into cans, and recycling aluminum cans has significant environmental benefits in energy use reductions. All other aluminum products such as foil, foil sheet pans, and cat food cans are collected in such small amounts that they cannot be reasonably separated at MRF's and end up as a contaminant. Foil products move through the processing system like paper, contaminating paper bales and are ultimately disposed of by paper mills.

**Steel:** Yes. While the contribution to overall steel production is minimal, steel cans do have value to steel manufacturers as well as processors. Steel cans are easy to separate from the other commodities and cause minimal problems throughout the system. Loose steel lids are not recovered due to size and shape.

# Mixed Waste Paper – MWP

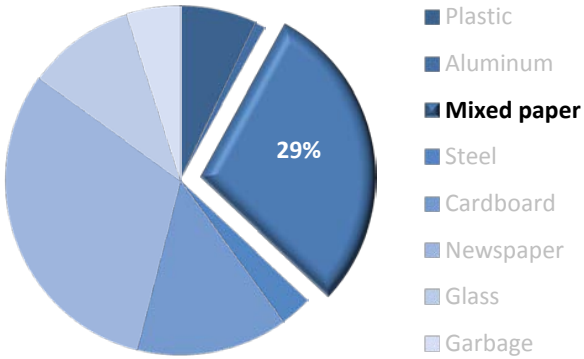
## What is included?

**Yes:**
Phone books, mail, magazines, catalogs, envelopes, boxboard (cereal, shoe), and paper bags

**Maybe (some programs accept):**
Frozen food boxes, shredded paper, milk cartons, juice boxes, 'plastic coated' cartons, egg cartons, soda and beer cartons, aseptic cartons, ice cream cartons, paper cores/rolls, gift wrap, paperback books

**No:**
Paper towels, plates and cups, napkins, tissues, food contaminated paper, and metallic gift wrap

## How much is in the cart (by weight)?




## What are we telling the public on how to prepare it?

The only common messages for mixed paper for all jurisdictions is to keep it loose, clean and dry. For those that accept shredded paper, telling residents to put it in paper bags is also common. Many jurisdictions promote shredded paper and composting, but not exclusively.

## What are the collection issues?

Loose shredded paper can be problematic during collection as it can fail to land inside the truck, littering the street instead.

## What are the processing issues?

**Quality of Incoming:** Fair

**Key Issues:** Small fiber sizes and fiber types included in collection programs that no end-users want (not OCC, ONP, or MWP markets).

**Problems in Processing:** Items that look like newspaper get sorted into newspaper, like cereal boxes. These items must be removed by hand because the equipment cannot sort it. Shredded paper is an issue if it is in a bag; loose shred is preferred, if at all. The more the shredded paper is contained, the farther it makes it down the processing system and blows around from other sorters. Separating shred from glass is a problem. Vacuums can be used, but it is still an issue. Wet paper gets torn into small pieces and small pieces do not end up with paper, but rather with the fines or residual.

**Not Recovered:** Small-sized fiber and wet fiber

**Areas that could be improved from a MRF perspective:**

- Keep items in their regular size—small size fiber is a problem because they get sorted to other destinations other than fiber
- Polycoated milk and similar cartons are an issue at mills (an outthrow), yet collection programs accept them
- Chinese customs no longer allow aseptic packages or egg cartons now in mixed paper shipments, yet some collection programs accept them. Foil lined juice boxes and soy milk boxes are examples of aseptic packaging

## Where are the markets?

**Domestic/Local:** NORPAC, Longview WA; Nippon, Port Angeles, WA; and SP, Newberg, OR are domestic news mills, but because so much mixed paper gets sold as ONP, they are considered a market for the purposes of this report.

**Export:** China – Nine Dragons Paper Industries (7 mills), and other smaller Chinese mills

The vast majority of MWP produced in Washington is exported, and almost all exported MWP goes to China. Even as China increases domestic sourcing of recovered paper, the demand will continue for US produced recovered paper. The paper consumed in China that becomes domestic MWP is not as high a grade as the imported MWP (see **Quality Standards in a Global Market**, below). Nine Dragons is increasing production capacity from 8.55 million metric tons in 2009 to 10.4 million metric tons in 2010. One million metric tons of new production will be duplex board (commonly used to make food packaging boxes).

## What are the issues as a recycled feedstock in China?

Nine Dragons uses 99% recovered paper for their feedstock. Seven million tons of recovered paper was exported to China in 2008 from the US, Europe, and Japan. Nine Dragons is the largest recycled containerboard producer in Asia and among the top three in the world.

**Key Issues:** Glass and the high percentage of other prohibitives and outthrows

**Quality Standards in a Global Market:** Japan produces the cleanest of all waste paper grades. Their MWP grade meets the ISRI standard (sold using Japan's industry standard, not ISRI). Compared to Japan, the U.S. and Europe produce waste paper that is of poor quality, certainly more so now than pre-singlestream days.

The Chinese government is very leery of mixed paper imports. The government has concern, and unfortunately it is well founded, that it may contain garbage and other undesirables. Traditionally, mixed paper has been produced at MRFs from the floor sweepings when cleaning up between shifts, and has included the residual that goes over the end of the belt once the majority of good paper has been separated out. Between a desire for MRFs to sell the maximum amount of product, and possibly some language in contracts with municipalities that set limits on how much trash can be generated as a percentage of the total inbound materials, occasionally bales were shipped to China or elsewhere that should have been re-sorted or taken to the landfill.

The Chinese Government has specified that imported recovered paper may have no more than 1.5% non-paper contamination (although some outthrows are considered prohibitive and fall under the 1.5% limit). The experience of a broker in the Workgroup is a lot of mixed paper exceeds these percentages, particularly mixed paper from residential single stream MRFs. MRFs need to be very mindful of the stigma that the Chinese government puts on this grade and treat mixed paper like they would treat higher grades of paper. MRFs need to create mixed paper through the sorting process and stop treating it as leftovers at the end of the process can be baled and sold as mixed paper.

As the rapid expansion of Chinese paper production begins to slow, they will supply more of their raw material needs from domestic collections. Although they will still need to import significant quantities, quality is going to become one of the first criteria for deciding who they will buy from. The U.S. and Europe will need to improve quality if they want to continue exporting to China. Chinese Customs have and will refuse loads at the port of entry.

### Prohibitives (unacceptable materials that cause contamination):

- Glass – Highly damaging to paper machines. It destroys screens. Fine glass can cause streaking during coating process. It can be imbedded in the finished product
- Yard waste and wood—Chinese Customs will not allow non-heat treated wood to be exported to China
- Food waste
- Flammable/Hazardous items such as lighter, container with flammable substance and powder—Nine Dragons had a fire started by a lighter and other unknown hazardous materials
- Metal
- Plastic
- Aluminum
- Unhogged pornographic material—Pornographic materials are banned in China *(this is not a prohibitive at domestic mills)*
- Self Adhesive Paper
- Waxed Material
- Poly Coated Paper (milk and juice cartons, frozen food boxes)
- Aluminum foil coated paper
- Heavily glued material (book bindings are an example)
- Mill wrappers
- Non-tear paper
- Egg Cartons—Banned by Chinese Customs due to food waste in past shipments *(this is not a prohibitive at domestic mills)*

### Outthrows (undesirable materials):

- Cores (toilet paper and paper towel rolls)
- Wet Strength (beer and soda carrier stock)
- Finely shredded (less than ½ inch wide or hole punches)
- Window envelopes

**Equipment Issues:** Wear and tear on the machines is accelerated by the amount of prohibitive and outhrows. Heavy glue can create a sticky mess that clogs screens. Glass is extremely damaging to paper industry machines.

**Not Recycled:** There is a belief that all material sent to China gets resorted and sent to the right market for remanufacturing. At the Nine Dragons facilities, only shipments with questionable quality are set aside for re-sorting—not every shipment. Material rejected by the paper pulping process, but that which is not suitable for fuel, is sent to a landfill. Each of the Nine Dragon facilities has a waste-to-energy boiler that is fueled, in part or all, from the rejects of the process and provides steam and electricity for that facility.

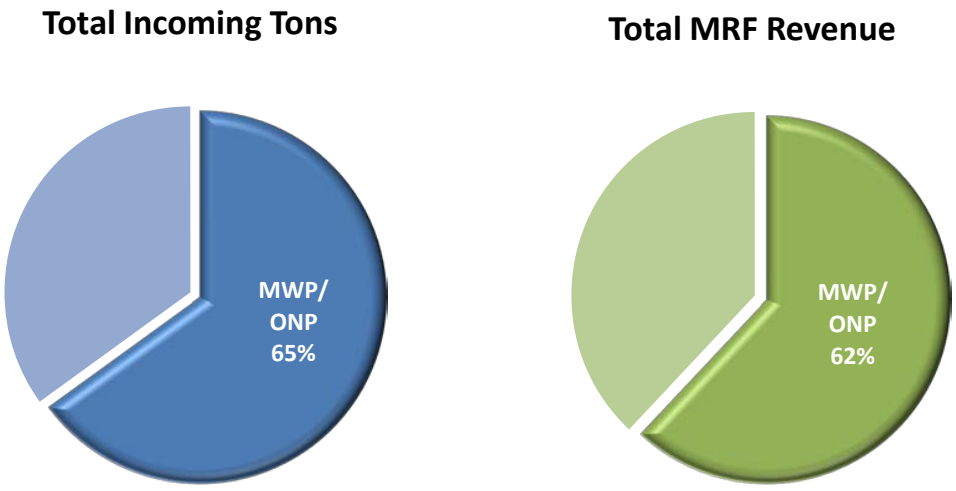
The smaller Chinese mills *do* sort everything out of the bales they receive and send materials to the proper end-users, but their incoming volume is much smaller than that of the Nine Dragon facilities.

## What is the material contribution to the manufacturing process?

Recovered paper is more economical compared to virgin fiber and reduces energy and water use.

## Where does this material fit into the big picture – % of tons, % of revenue?

Due to the market dynamics for mixed waste paper and newspaper, they are often combined. The two have been combined here to illustrate total incoming tons and MRF revenues.




Source: Aggregated data from Southwest WA Region MRFs

## What is the environmental benefit and reduction of greenhouse gases if recycled?

Recycling one ton of residential mixed paper results in a net savings of 22.94 million BTUs of energy (U.S. EPA 2006).

## Is this material impacting the value of the other commodities?

Yes. Due to the market demand for mixed waste paper, there is no economic benefit for processors to sort and sell at an ISRI newspaper grade. The result is that local news mills buy mixed paper sold as news grade. Compounding this issue, Chinese mills prefer mixed paper grades that include newspaper. Table 3 illustrates the negative impacts that deinking news mills face when receiving mixed waste paper instead of newspaper.

**Table 3 - Additional Mill Processing Costs - NORPAC (2008)**

| Outthrows | Issue | Operating Impact | Cost |
|---|---|---|---|
| OCC | Brightness Impact | Increase Bleach Cost | $$$ |
| Carrier Board | 100% Yield Loss | Fiber Replacement | $$$$ |
| Junk Mail | Contaminants | Chemical Cost | $$ |
| White Frozen Food Boxes | Significant to 100% Yield Loss | Fiber Replacement | $$$$ |
| White Ledger | Significant Yield Loss | Fiber Replacement | $$ |
| Phone Book | Brightness Impact | Brightness Impact | $$ |
| **Actual Annual Cost** | **$1,350,000 – Value of Unusable Material**[1] | **$1,687,500 – Cost of Buying Replacement Fiber**[2] | **$3,037,500**[3] |

1. *Everything that does not re-pulp or is selectively rejected by the process is classified as yield loss and NORPAC receives no value from the money spent to have the material delivered to their facility.*
2. *The way sourcing economics work, replacement tons are always valued at a higher cost. In that fashion there is a greater incentive to reduce or eliminate those higher cost tons.*
3. *This figure represents the costs incurred in the last eight years since the percentage of single stream materials have been the bulk of feedstock (see pa. 42). This total does not include the cost impacts from glass (see pg.26).*

Source: NORPAC 2008

## What is the final product?

Kraft linerboard (for shoe boxes, etc), test linerboard (for corrugated boxes), white top linerboard (for corrugated boxes), high performance corrugating medium (for corrugated boxes), coated duplex board (for example, cereal boxes that have a white exterior to advertise the product), and unbleached kraft pulp.

## Is it 'worth it' to collect this material in the commingled singlestream system?

Yes. As an overall category, mixed waste paper makes up a large percentage by weight and volume of the residential waste stream, has a strong export market, and has environmental benefits when used as a feedstock for making fiber products. However, it is important to remember that the category of mixed waste paper is a specific commodity, and that not all types of residential waste paper can be recycled with mixed paper. Because Chinese mills are purchasing the vast majority of the mixed paper produced in this region, the following types of paper products that are going to those mills are not recycled and should be avoided in commingled collection programs (these are also problematic at local newsprint mills):

- poly-coated containers (milk, juice, frozen food boxes)
- aluminum coated containers (aseptic boxes)
- cores (tissue and paper towel rolls)
- book bindings
- wet strength paper (beer and soda carriers)
- window envelopes
- finely shredded paper (also problematic for processors)

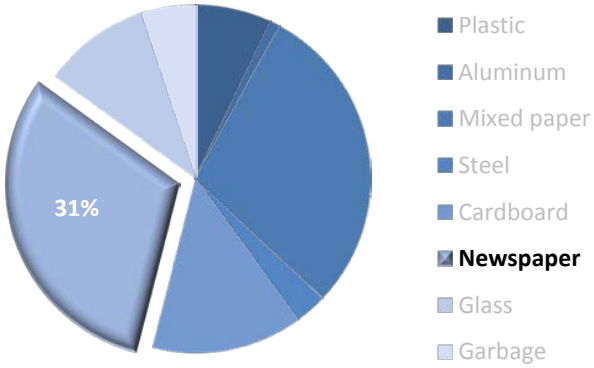
# Newspaper – ONP

## What is included?

**Yes:**
Newspaper and all paper that comes inserted with the newspaper

**No:**
Any non-news grades not typically inserted with the newspaper

## How much is in the cart (by weight)?




## What are we telling the public on how to prepare it?

Keep it clean, dry and loose—don't bundle, bag or tie. Some jurisdictions include special messages focusing on no plastic bags.

## What are the collection issues?

None.

## What are the issues in processing?

**Quality of Incoming:** Pretty good to great

**Key Issues:** Because newspaper is a negative sort material, the biggest issue in processing is keeping it uncontaminated at the end of the line. Everything not included in a positive sort, such as plastics and metals, ends up in the newspaper.

## Where are the markets?

**Domestic/Local:** NORPAC, Longview, WA; Nippon, Port Angeles, WA; SP Newsprint, Newberg, OR

Forty percent of the incoming commingled materials to NORPAC's mill are from the Northwest and 75% of the materials coming into SP's mill are from the Northwest.

**Export:** China – Nine Dragons Paper Industries (7 mills)
Foreign markets that were formerly importers of US ONP are now either exporters or self-sustaining. Japan is a huge net exporter. Mexico is almost entirely internally supported. China's inspection standards are getting stricter as they become more domestically sustained.

Both local and export markets are strong for ONP. Recycled content is mostly customer driven, but the cost of energy and the cost of competing raw materials are also factors. Using wastepaper as a feedstock also provides some strength properties to the new paper produced. Fifty percent recycled content is common, some ONP products can be as high as 72%. SP's mill is producing 100% recycled newsprint. Phonebook manufacturers (Nippon) can use 100% ONP as feedstock. The customer needs, product needs, and customer want all combine to determine recycled content percentage.

## What are the issues as a recycled feedstock?

**Key Issues:** Glass, brown fiber, and plastic bottles and jugs

**Prohibitives:** The most problematic is glass, but there is a high volume of plastic bottles and jugs, metal containers and other non-fiber objects that are rejected at the drum pulper.

**Outthrows:** Small, colored OCC and brown fiber comprise 50-60% of the outthrows. There is significant wet strength fiber in the following packaging that contributes to the poor recovery, contamination and/or total yield loss:

- carrier board (beer and soda cartons)
- polycoated cartons (Milk and juice cartons)
- aseptic containers (TetraPak is an example. Products include soy/rice milks, soups and stocks, juices,etc)
- microwavable food boxes
- frozen food boxes and cartons

Manufacturers are experiencing significant issues with using newspaper collected in commingled recycling systems. Glass is the primary issue since small volumes have costly impacts to paper manufacturing equipment. See page 30 under the Glass section for details relating to the impacts of glass to the recovered paper industry.

**Yield loss:** Over 16%

**Equipment Problems:** Table 4 details the impacts of the various contaminants that local newsprint mills deal with as more of the fiber sources are going to commingled collection programs. Figure 2 illustrates the rise of the fiber contamination on page 32.

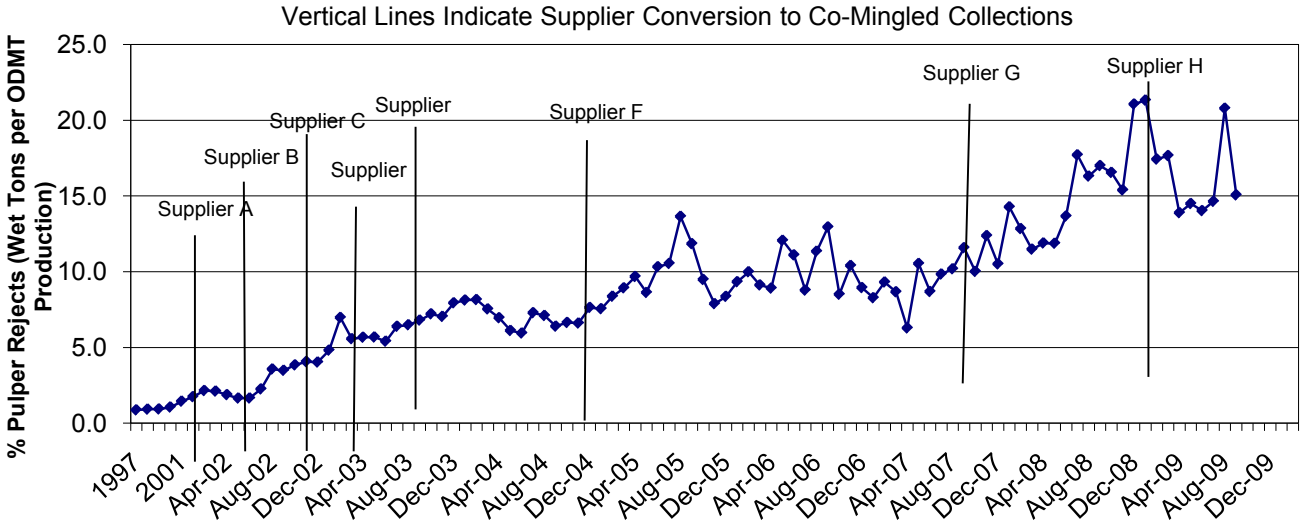
**Table 4 – Commingled Contaminants and Operating Impacts at NORPAC's Paper Mill**

| Contaminant | Cost Impact | Quality Impact | Operating Impact |
|---|---|---|---|
| Glass | Increasing wear rate of process equipment, maintenance, downtime and safety risks | Decreases efficiency of stickies removal | Will shut process down |
| Brown Fibers | Rejected by pulper, replaced with additional fiber purchases. Disposal costs. Bleaching costs | Increases risk of hot melt and glue stickies. Reduced brightness | No measurable impact on operating efficiency at this time |
| Junk Mail | Requires more chemicals to counter macro and micro stickies | Viewed as significant contributor to increased macro and micro stickies | No measurable impact on operating efficiency at this time |
| White Ledger/Colored Ledger | Inks can contribute to macro and micro stickies increasing costs to manage contaminants | Toner/heat fused inks not easily removed with news deinking chemistry / technology | No measurable impact on operating efficiency at this time |
| Tin/Aluminum | Small impact to cost as this is a small percentage of total | No measurable impact to quality | Will reduce yield and operating efficiency |
| Plastic | Large impact to cost as the volume is rather large. Disposal and fiber displacement costs high | No measurable impact to quality as it is easily removed by our process equipment | Will reduce yield and operating efficiency |

*Source: NORPAC 2009*

**Figure 2- Commingled Collection and the Rise of Contamination of Fiber**

**NORPAC Paper Mill – Deinking Facility, Longview, WA**




*Source: NORPAC*

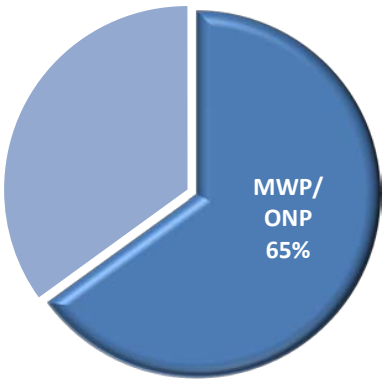
## What is the material contribution to the manufacturing process?

Recovered newspaper is more economical compared to virgin fiber and reduces energy and water use.

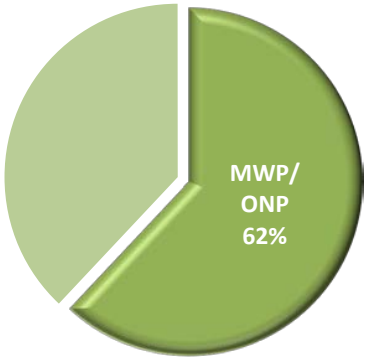
## Where does this material fit into the big picture– % of tons, % of revenue?

Due to the market dynamics for mixed waste paper and newspaper, they are often combined. We have combined the two here to illustrate total incoming tons and MRF revenues.

**Total Incoming Tons**




**Total MRF Revenue**




**Source: Aggregated data from Southwest WA Region MRFs**

## What is the environmental benefit and reduction of greenhouse gases if recycled?

Recycling one ton of newspaper results in a net savings of 16.49 million BTUs of energy (U.S. EPA 2006) .

## Is this material impacting the value of the other commodities?

Yes. It is actually adding value to exported mixed paper. Most mills in China that buy mixed paper prefer, if not demand, a soft mixed paper. Soft mixed paper contains a high percentage of groundwood papers such as newspaper. Soft mixed paper is typically what is produced in a residential single stream MRF. While this is a positive trend for the export MWP markets it is a negative trend for domestic ONP markets.

## What is the final product?

Old newspapers from this region become phone books, newspaper, and paper bags.

## Is it 'worth it' to collect this material in the commingled singlestream system?

Yes. Although it is declining in volume as part of the residential mix, newspaper has value to local and export mills. It is a material that is easily understood by the public, is universally collected in all programs, and does not cause cross-contamination for most materials, but can cause yield loss at cardboard mills.

# Plastic Containers – PET, HDPE

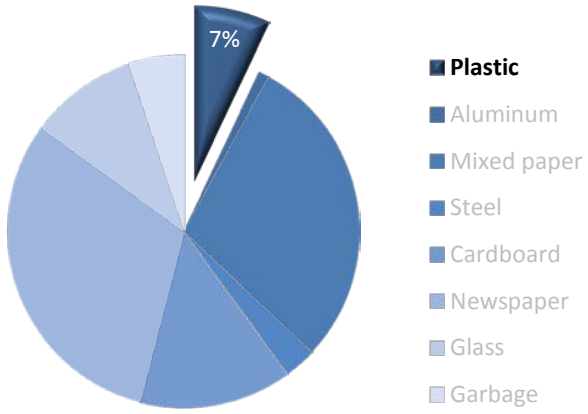
## What is included?

**Yes:**
PET bottles, natural HDPE jugs, and colored HDPE bottles and jugs

**Maybe (some programs accept):**
Plastic bags, buckets, dairy tubs and cups, pill bottles, nursery pots

**No:**
Expanded polystyrene, film, chip bags, frozen food bags, lids, caps, toys, HazWaste containers, trays or clamshells

## How much is in the cart (by weight)?




## What are we telling the public on how to prepare it?

Most jurisdictions focus on shapes of containers and use photos rather than the resin codes (only two jurisdictions focus messaging on numbers). Rinse, empty, remove caps and lids are also consistent messages. Three jurisdictions also include an extra message on prohibiting plastic bags in the commingled cart.

## What are the collection issues?

Because the carts are bigger and materials are hidden from view from the previously used curbside bins, customers can place many non-program plastics in the bin such as plastic toys, laundry baskets, bags, sharps, hoses, etc. As more plastics are included in the collection program the public becomes confused, as evidenced by the high number of non-program plastics included and the numerous phone calls by residents to local government and hauler recycling staff. Varying lists of acceptable plastics between jurisdictions was also cited as a point of confusion for residents. While accepting multiple types of plastics is not a problem at the collection point, it does contribute to problems in processing.

## What are the issues in processing?

**Quality of incoming:** Poor to good
SP Recycling Corp.'s MRF is experiencing 30% of incoming plastics are non-program plastics. Columbia Resource Company's MRF reported their incoming plastics are of a good quality because the outreach messages throughout the county are the same (Note: SP accepts material from multiple counties/jurisdictions).

**Key Issues:** Film and non-program plastics
Film: Even though it is a small percentage of incoming material by weight (.2% - approximately a bale a day), plastic film causes significant problems for processors. They can usually remove 30-40%, but the rest cause problems. Its costs $700-$1000 a ton to remove; $50-60 a ton to sell the recovered film, 20-30% of labor spent dealing with film.

Non-program plastics: Lots of blister-pack packaging. Crinkly plastics are the worst. Due to the high volume and associated high cost of disposal, SP staffed six people on their residual line to pull out plastics. Smashed metal cans that get missed after the eddy current and end up on the residual line are actually paying for the plastic sorters on the residual line—not the revenue from the plastics recovered.

**Not recovered:** Lids and small bottles.
Lids either end up with fines and disposed, or baled with fiber due to shape/size. Bottles smaller than a fist aren't recovered due to size. They either end up with fines or residuals and are disposed of either way.

**Areas that could be improved from a MRF perspective:**

- Use container descriptions instead of numbers when educating residents
- If it's crinkly, stretchy or smaller than a fist, throw it out
- Do not flatten—flattened plastics cause cross-contamination with paper
- Rinsing is not a big issue—there has never been a problem from a sales perspective *(Note: This could be due to the frequent and consistent messages to the residents about rinsing)*
- MRFs recommend at-curb checks for non-program materials

## Where are the markets?

**Domestic/Local:** Merlin Plastics, British Columbia; KW Plastics, Bakersfield, CA and Troy AL; Mohawk Industries, Calhoun, GA

**Export:** China

Plastics have a strong export market. You can sell 99% of plastics. It's a high value commodity, but there are high labor costs to get it to the 'bale-quality' point. The more you sort it, the easier you can sell it.

**Bottles/Jugs:**

- PET & HDPE are the strongest domestic markets. Mohawk and KW Plastics are domestic manufacturers that source from Asia because the export market is out-competing the domestic market and buying up the domestic supply—particularly true for HDPE. There is a significant concern about the sustainability of the domestic end-users.
- Domestic HDPE end-users struggle with China taking over the market because China pays more. Obtaining enough supply is very difficult for domestic end-users.
- PET sheet vs. flake. Vertically integrating for processors to turn flake into sheet rather than shipping flake for export. Sheet has higher markets.

- Transportation myths (*It's cheaper to ship to China than transport it nationally*) are really due to cheaper processing costs and a stronger economy in China right now.

**Non-bottle Rigids** *(also called Mixed Rigids - includes buckets, plant pots, dairy tubs, etc.):*

- Domestic and export markets. High value material for the bulk since it is heavy and easier to sort.

**Everything-Else-Bale** *(sometimes mixed with Mixed Rigids – includes plastic toys, clear plastic packaging (blister packs), trays, etc.):*

- No domestic market—15% is probably disposed overseas.

**Film** *(includes pallet shrink wrap, bags, etc.):*

- 'MRF film' (plastic bags collected and processed with curbside materials) is *very* dirty and relies solely on the export market.

## What are the issues as a recycled feedstock?

Virgin PET (vPET) competes with cotton in manufacturing. Manufacturers can use either one for textiles. Suppliers purchase either depending on price. The price of one affects the other. The price of vPET then affects the price of reprocessed PET (rPET) supplies.

There is growing interest to use rPET in thermoform (*see Glossary*). Thin-gauge thermoforming is primarily used to make disposable cups, containers, lids, trays, blister packs, clamshells, and other products for the food, medical, and general retail industries. It used to be made out of vinyl and polystyrene, but the shift away from those materials towards using recycled feedstock is based on process ability, durability (product protection), and sustainability.

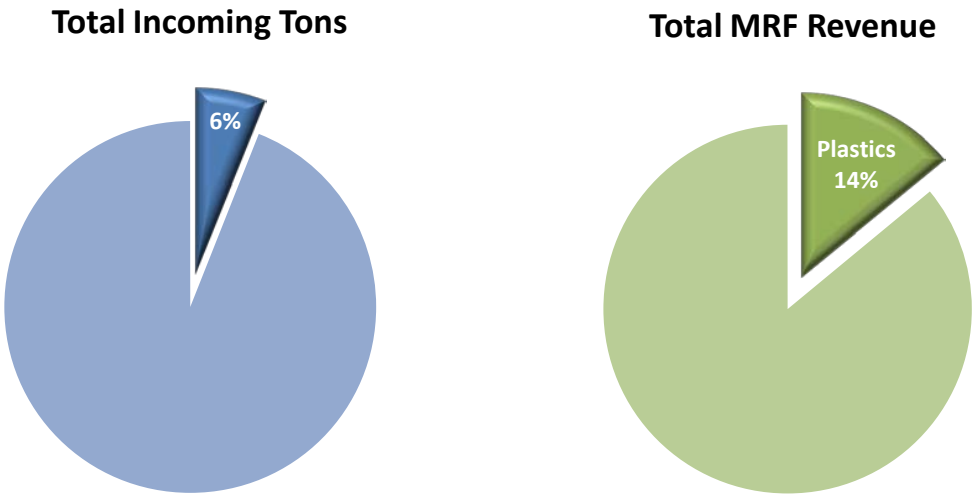
## What is the material contribution to the manufacturing process?

There are uncertainties as to how much is actually getting recycled once exported. Is China recycling all plastic grades or just cherry picking the PET and HDPE containers and using the rest as fuel sources?

## Where does this fit into the big picture – % of tons, % of revenue?

There is a bit more HDPE than PET in the incoming plastic stream.

*(Pie charts on following page)*




**Source: Aggregated data from Southwest WA Region MRFs**

## What is the environmental benefit and reduction of greenhouse gases if recycled?

Recycling one ton of PET results in a net savings of 52.83 million BTUs of energy (U.S. EPA 2006). Recycling one ton of HDPE results in a net savings of 50.90 million BTUs of energy (U.S. EPA 2006).

## Is this material impacting the value of the other commodities?

Yes. High volumes of plastic bottles and jugs (esp. milk jugs) are problematic at the newspaper mill. Plastics are also a contamination issue for OCC manufacturers.

## What is the final product?

Recovered PET goes into fiber such as carpet, clothing, and fiber fill. Its use in packaging is rapidly growing. Non-bottle rigids are used for blow molding for thick-walled products such as crates, carts, buckets.

## Is it 'worth it' to collect this material in the commingled singlestream system?

Yes. PET, HDPE bottles and jugs have value, sustainable markets, and the public understands descriptions of these plastics. However, flattened bottles and jugs do cross-contaminate paper and cardboard and end up disposed by the large paper mills. Other than bottles and jugs, as more plastics are included in the collection program, the public becomes confused. The result is an 30% increase of non-program plastics included in the cart. The non-program plastics, once mixed, have few markets due to the low grade.

# Key Issues & Recommendations

As the Workgroup reviewed the data gathered over the previous year, the overall questions were:

- *What do you include in the single-cart system?*
- *How much can be effectively separated and recovered?*

The following key issues, and their associated recommendations, are the critical focus areas in order to address contamination and material loss in single-family residential commingled curbside recycling programs in the Southwest Region of Washington (listed in no particular order).

**1. Consumer awareness and level of responsibility – Their reasonable expectation that if it goes in the cart, it's recycled**

*Recommendations:*

1. Educate that not everything is recyclable curbside or in the commingled cart.
2. Establish feedback loops throughout the system.
3. Recycling isn't free: Educate residents on what they are paying for to have curbside recycling service.

**2. Glass is a contaminant in the commingled stream and very little is going back to glass**

*Recommendation:*

Keep glass separate from other recyclables.

**3. Plastic film has significant processing issues and the result is very dirty ('MRF film')**

*Recommendation:*

Keep plastic film out of curbside collection programs.

**4. MRF employee safety regarding sharps, other medical waste, and explosives**

*Recommendation:*

Educate the public about proper disposal of these materials.

**5. Lack of consistency in our programs and messages across the region**

*Recommendations:*

1. Combine Western county/city programs for those that share media sheds.
2. Combine education resources for clarity and consistency.
3. Convene municipal governments and haulers within regions to establish program standards.
4. Educate our own local jurisdictions to affect change.
5. Choose materials based on those that get recycled – Those that are cost-effectively and sustainably recovered at their intended market.

**6. Lack of product stewardship/producer responsibility for materials**

*Recommendation:*

Educate local policy makers about problem materials in the commingled stream and advocate for solutions and financing.

**7. State and federal goals are driving local diversion goals**

*Recommendation:*

Switch the focus from collection to recovery. Recovering usable materials suitable for manufacturers is the priority of recycling programs. Diverting materials from the garbage can to the recycling can at the point of collection when those materials end up disposed at a processor or manufacturer is not recycling or diversion.

Fourteen Workgroup participants—representing city and county local governments, processors, and end-users—drafted attached letters of support for the process and the above key issues and recommendations (Appendix D). The Southwest Region Workgroup will resume meeting late summer of this year to discuss an implementation strategy. It will prioritize and pursue the above recommendations towards the overall goal of reducing contamination and material loss in single-family residential commingled curbside recycling programs in this region.

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# Glossary

**Boxboard** – Thin, lightweight paperboard used in making packaging boxes or cartons such as for cereals or shoes. Boxboard is often confused with cardboard because of its shared usage and similar general form. Besides not having the wavy middle layer, boxboard is usually grayish in color when you tear it and look at the inner layer.

**Brightness Impact –** Something that affects the reflectance or brilliance of the paper when measured under a specially calibrated blue light. Not necessarily related to color or whiteness. Brightness is expressed in %.

**Cardboard –** see **Old Corrugated Containers (OCC).**

**Carrier Stock** – Consists of printed or unprinted, unbleached new beverage carrier sheets and cuttings. May contain wet strength properties. Examples include beer bottle 6-packs and soda 12-pack cartons.

**Chipboard –** see **Boxboard**

**Commingled Recycling –** Mixing recyclable materials for the purposes of efficient collection. Commingled recycling collection systems usually involve a wheeled cart with a lid that ranges from 32-90 gallons in capacity.

**Commingled System—**For the purposes this work, 'the commingled system' was defined the as places, including the house, curb, MRF, and mill; and the people, including residents, recycling program managers, policy makers, haulers, processors, brokers, and manufactures which are involved in the inputs or outputs of the residential commingled recycling programs.

**Containerboard –** The term encompasses both the linerboard and corrugating medium, the two types of paper that make up corrugated containers.

**Drum-pulper –** A horizontal tube where wastepaper, water and deinking chemicals are added to begin separation of ink from fiber—creating a mix of fibers, water and ink. It is at this stage that non-fiber materials are rejected out of the spinning tube.

**Dual-stream** – One type of a commingled collection system in which some recyclable materials are placed in a cart or bin at the curb, and one or more different materials are placed in another cart or bin. Examples – all materials except glass in one cart, and glass in a bin next to the cart; all fibers in one cart and all containers in another cart.

**Eddy Current** – Eddy current separation is used to extract aluminum from a mixture containing various ferrous and non-ferrous metals or waste products. The effect is to create a magnetic field around the non-ferrous material. This field reacts with the magnetic field of the rotor, resulting in a combined driving and repelling force which literally ejects the conducting material from the stream of mixed materials. This repulsion force in combination with the conveyer belt speed and vibration provides the means for an effective separation.

**End User** –The company that first uses recycled material to manufacture a product. The product of an end-user may be further converted into further value-added products, such as a sheet of boxboard from a paper mill being converted into a box.

**Fines –**With respect to commingled MRFs, anything smaller than 2 inches.

**HDPE –** High density polyethylene. Its resin identification code is 2.

**Hogged –**Paper that has been mechanically torn or ripped to reduce its original size.

**ISRI -** Institute of Scrap Recycling Industries is a private, non-profit trade association working on behalf of recycling companies that deal with scrap goods. In 1989, ISRI combined all of the scrap trade specifications created by the previous associations and published them in one book for the first time in the scrap industry's history. The Scrap Specifications Circular provides guidelines for buying and selling a variety of processed scrap commodities, including ferrous, nonferrous, paper, plastics, electronics, rubber, and glass and has been through many iterations since then, with new editions published whenever new specs are added or old specs are deleted or modified.

**Kraft Paper** — A sturdy brown paper with a high-pulp content used for wrapping paper, grocery bags, and some varieties of envelopes. Kraft paper is a generic description for fibers produced using the kraft pulping technology. These fibers can either be unbleached or bleached. Most fibers used in manufacturing office paper for printers, copiers and commercial printing are generated using the kraft pulping process followed by various bleaching technologies to reach the higher brightness fibers required by these high grades.

**Linerboard** – Outside layers of a combination board used tomanufacture corrugated shipping containers.

**Materials Recovery Facility (MRF) -** Pronounced "merf," it is a facility that accepts, sorts, processes, and bales different types of recyclables for sale to an end-user. For the purposes of this report, a MRF refers to facilities that sort residential commingled recyclables.

**Mixed Waste Paper (MWP)** – Mixed paperboard, magazines, and catalogs. Mills use mixed paper to produce paperboard and tissue, as a secondary fiber in the production of new paper, or as a raw material in a non-paper product such as gypsum wallboard, chipboard, roofing felt, cellulose insulation, and molded pulp products such as egg cartons. Typically not used for molded pulp products due to the contamination level and risk of damage to food. Also used for production of medium used in corrugated containers.

**Negative Sort** – In a MRF, a negative sort occurs when an identified material is left to remain on a conveyor line for accumulation at the end of the line while contaminants and other materials are picked or removed from the line. Opposite of "Positive Sort"

**Old Corrugated Containers (OCC)** – Contains a wavy middle layer. Mills use old corrugated containers to make new recycled-content shipping boxes. AKA - corrugated containers, cardboard.

**Old Newspapers (ONP)** – Mills primarily use old newspapers to make new recycled-content newsprint and in recycled paperboard and tissue. This grade is also used in cellulose insulation, molded food products, and as fiber source in medium production for corrugated containers.

**Outthrow –** Materials of like type (paper at a paer mill) that create quality issues or are unsuitable to make the final product. Examples: aluminum foil is an outthrow for an aluminum beverage container bale. OCC is an outthrow for a newsprint manufacturer.

**Paperboard** – Denotes paper products used for packaging (corrugated boxes, folding cartons, set-up boxes, etc.).

**PET –**Polyethylene terephthalate. Also abbreviated as PETE. Its resin identification code is 1.

**Plastic Film** – A thin flexible sheet of plastic which does not hold a particular shape when unsupported.

**Polycoated** – A type of fiber packaging that contains an outer layer of plastic coating to protect the fiber from breaking down in wet and freezing conditions.

**Positive Sort**—In a MRF, a positive sort occurs when a person or machine physically pulls out and accumulates an identified material from the rest of the material.

**Prohibitve –** Materials of dissimilar types (plastic at a paper mill) that cannot be converted into final product. This can also include material types that are similar (paper at a paper mill) but either damage equipment or is completely unusable as a feedstock source for that mill. Examples: Glass for aluminum container manufacture; ceramics for glass manufacture, glass or any non-fiber for paper manufacture; and milk cartons for a non-tissue paper mill.

**Pulp Substitutes –** A high grade paper, pulp substitutes are often shavings and clippings from converting operations at paper mills and print shops. Mills can use pulp substitutes in place of virgin materials to make high grade paper products. Pulp substitute grades typically have zero printing or glues, thus allowing it to be re-pulped and used directly back into paper machines.

**Pulper–** A generic term to describe technology used to convert dried paper into an liquid solution using a vessel where mechanical energy is used in the conversion process

**Rigid Plastic Container--** A package (formed or molded container) which maintains its shape when empty and unsupported.

**Shredded Paper** – Although not a separate grade of paper, shredded paper can be recycled (usually as a mixed grade) as long as it is shredded to an appropriate size and does not contain an

unacceptable level of contaminants, such as plastics, or outthrows such as manila folder, gold bond paper, or other dyed papers.

**Singlestream –** One type of a commingled collection system in which all recyclable materials are placed in one cart at the curb.

**Stickies–** Classified as any glue or ink based materials that are used in producing a product to the customer that when recycled turn into microscopic tacky particles. Typical sources of stickies are envelope glues, stamps, magazine/paperback book bindings, credit card promotional mailings, etc.

**Test Liner –** Liners, which are the outer ply of any kind of paperboard, containing 100% recycled material.

**Thermoforming**—A manufacturing process where a plastic sheet is heated to a pliable forming temperature, formed to a specific shape in a mold, and trimmed to create a usable product.

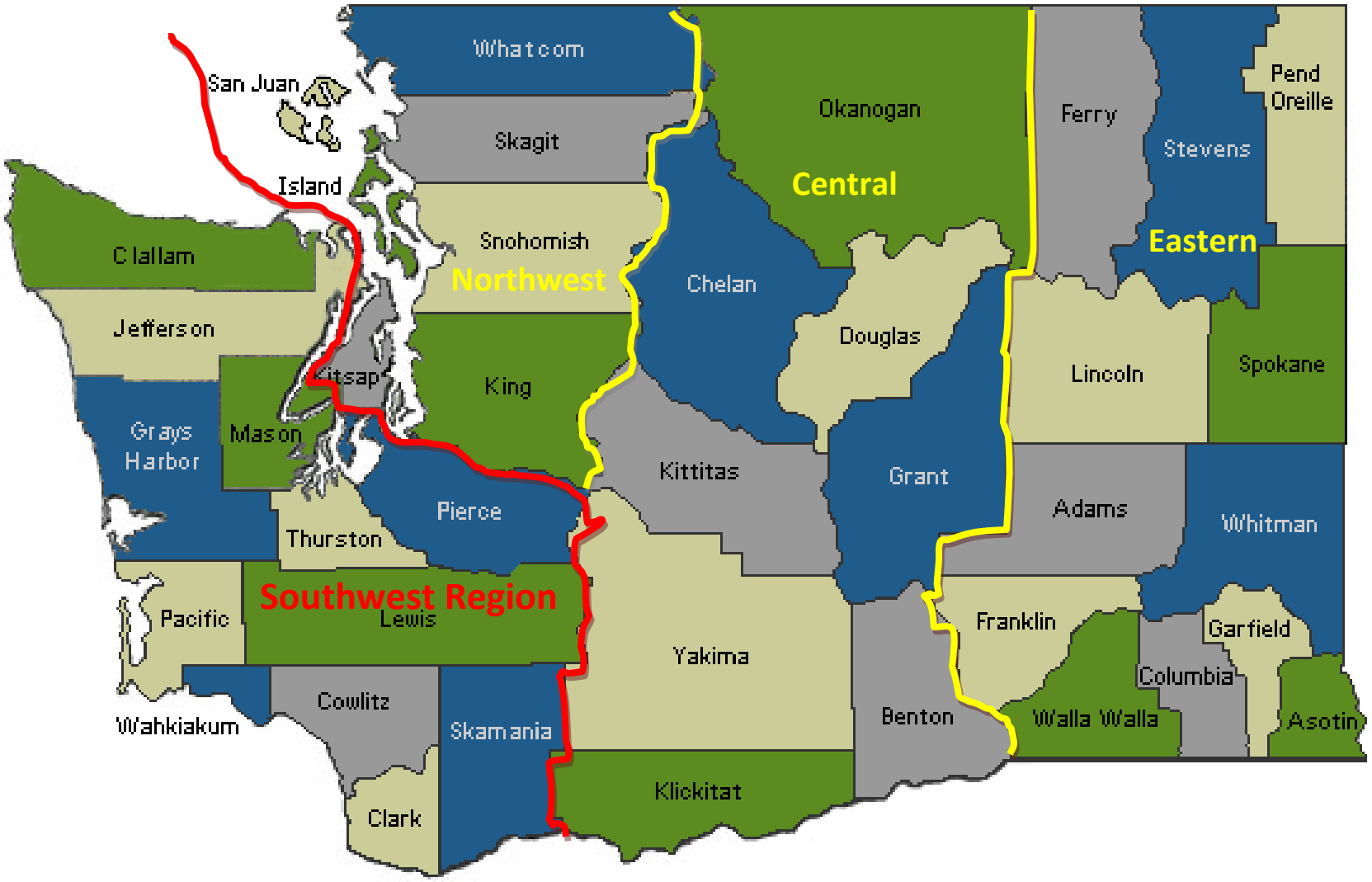
**UBCs –**Used beverage containers.

**Wet Strength** – Paper that has been treated with a moisture resistant chemical and gives it the ability to maintain a percentage of its strength when it has been saturated with water. It possesses properties that are resistant to rupturing and disintegrating when wet. See **Polycoated.**

**Yield Loss –** Loss of material generated through the conversion of one form of material into the form required by the customer.

# Appendix A
# Map of Workgroup Region

# Map of Workgroup Region



# Appendix B
# Collection System & MRF Comparison Chart

## Collection System and MRF Comparison Chart

| Jurisdiction | Collection System | | | Type of Sort | | Glass | | | | Annomaly Materials | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bins | Cart | Both | Single-stream | Dual-stream | Separate | All Mixed | Mixed w/Containers | Drop-off | Tubs | Scrap Metal | Aerosol | Bags | Shred Paper | Foil | Frozen Boxes | Plant Pots | Buckets |
| **Clallam** (No curbside) | | | | | | | | | | | | | | | | | | |
| Port Angeles | | ● | | ● | | | | | ● | | | | | ● | | ● | | |
| **Clark** | | | ● | | ● | ● | | | | ● | ● | ● | | ● | ● | | ● | ● |
| **Vancouver**[1] | | | ● | | ● | ● | | | | ● | ● | ● | | ● | ● | | ● | ● |
| **Cowlitz** (No curbside) | | | | | | | | | | | | | | | | | | |
| Longview | | ● | | ● | | | ● | | | | | | | | ● | | | |
| **Grays Harbor** | | ● | | | | | | | ● | | | | | ● | | ● | | |
| **King** (NW Region) | | | | | | | | | | | | | | | | | | |
| Auburn | | ● | | ● | | | ● | | | ● | ● | | | | | ● | | |
| **Lewis** | | ● | | ● | | | | | ● | | | | | | | | | |
| **Mason** | | ● | | ● | | | | | ● | | | | | | | | | |
| Shelton | | ● | | | ● | | | ● | | | | | | ● | | | | |
| **Pierce** | | ● | | ● | | | | | ● | | | | | ● | | ● | | |
| Tacoma | | | ● | | ● | ● | | | | ● | | ● | ● | ● | ● | ● | | |
| **Thurston** | | | ● | | ● | ● | | | | ● | ● | | | ● | ● | ● | | |
| Olympia | | ● | | ● | | | ● | | | ● | | ● | | ● | ● | ● | | |

**MRF**

- SP
- West Van
- KB (OR)
- Tacoma Recycling
- JMK
- Waste Control

*1. Vancouver switched to a commingled system during the course of the Workgroup. This chart reflects the current program.*

**Southwest Workgroup Kickoff Meeting - April 29, 2009**

**Meeting Objectives**

1. Identifying the current commingled collection systems in the Southwest Region
2. Identifying which MRFs receive materials by jurisdiction
3. Identifying project objectives and desired outcomes to improve contamination issues for materials collected and processed in the Southwest Region
4. Setting a meeting schedule to achieve project objectives

**Desired Outcomes**

1. Shared understanding of the similarities and differences of the commingled collection programs in the region
2. Shared understanding of material flow to processers from each jurisdiction's commingled collection program
3. Agreement on project objectives and desired outcomes to improve contamination issues for materials collected and processed in the Southwest Region

# Appendix C
# Discussion Questions for Each Material Category

## Discussion Questions for Each Material Category

For Local Governments and Collectors

- What is the messaging for preparation?
- Special/extra messaging?
- Collected the same as other materials?
- Does it provide revenue for your program or is it only a cost?
- Percent of total materials collected in program?

For Processors

- Percent of total incoming?
- Quality of incoming?
- Problems in processing?
- Areas that could be improved from MRF perspective?
- Percent of residual?
- Rate the market: Strong, medium, weak for local and export?
- High value commodity?
- Easy to move?

For Manufacturers/End users

- Prohibitives?
- Outhrows?
- Yield loss?
- Capacity/ Need to use more?
- Problems with your equipment?
- Value in using vs. other virgin feedstock?
- Final product?

# Appendix D
# Letters of Endorsement by Workgroup Participants

PUBLIC WORKS DEPARTMENT
Environmental Management Division
P.O. Box 1995 • Vancouver, WA 98668-1995
www.cityofvancouver.us



June 11, 2010

Shannon McClelland,
Waste Reduction and Recycling Specialist
Washington Department of Ecology
PO Box 47775
Olympia, WA 98504-7775

RE: Support for Findings of the Southwest Region Workgroup for Improving the Quality of Commingled Curbside Recycling

Dear Shannon:

As you know, Tanya Gray from the City of Vancouver along with Rob Guttridge from Clark County, Scott Campbell from Columbia Resource Company, and Josy Wright from Waste Connections – all representing our local collection and processing system, have participated with many others, including stakeholders and guest speakers, over the last year or more in discussions of the Southwest Region Workgroup looking at opportunities for improving the quality of recyclables collected through commingled curbside recycling programs within the region. The focus has been on strategies for reducing contamination and material loss as well as on opportunities for improving the quality and recoverability of materials that are delivered to our regional end markets.

The City of Vancouver made a decision in the Spring of 2009 to move forward with the implementation of a commingled curbside program, generally consistent with that of all other Clark County communities, that utilizes a large roll-cart for each residence (generally 96-gallons) collected on an every-other-week schedule for all targeted recyclables (paper/cardboard, metal, plastic bottles and tubs) except for glass bottles and jars which are collected in a separate bin on the side (household batteries, used oil and anti-freeze are also set-out separately from the roll-cart). With the opening of a reconfigured processing system at the West Van Materials Recovery Facility in October, the new collection program was rolled-out city-wide in October and November of 2009. The timing of the workgroup's efforts and the topics being considered are quite relevant to the needs of our community as we have a high interest in wanting to maximize recovery from the volumes of materials that our residents set-out.

We endorse the key findings and conclusions presented in the project's report, including the following:

Phone: 360-619-4125 rich.mcconaghy@ci.vancouver.wa.us Fax: 360-693-8878

- From both a resource conservation and energy saving perspective, recovering cardboard, newspaper, mixed waste paper, aluminum and steel cans as well as plastic containers makes good sense.
- Separate collection of glass containers (apart from other commingled commodities) is a best practice.
- Improvements in processes and or refinement of messages should be considered to improve the handling of the following materials: aluminum foil and foil containers, some items included in the mixed waste paper category (poly-coated paper, aluminum coated containers, cores, wet strength paper, window envelopes and finely shredded paper), and the many "non-program" low-grade plastic items being set out.

Additional issues and recommendations are identified within the report and it is our understanding that the Workgroup will reconvene late this summer to discuss priorities and an implementation strategy for moving forward. The City of Vancouver supports and intends to remain engaged in this effort.

Sincerely,

Richard P. McConaghy

Rich McConaghy,
Environmental Resources Manager

Phone: 360-619-4125 rich.mcconaghy@ci.vancouver.wa.us Fax: 360-693-8878

NIPPON PAPER
INDUSTRIES USA

June 14, 2010

To Whom It May Concern:

Nippon Paper Industries (NPI) has been an active participant in programs to reduce the amount of contaminates in the fiber collection systems. The Washington State Department of Ecology has devoted significant resources to address industry concerns in this area.

The establishment of the Southwest Regional Comingled working group has resulted in a very successful project that has brought all involved parties together to discuss the issues of comingled recycling in the region.

It is very important that all recycled material is processed to its highest and best use in an economical viable system. Nippon Paper appreciates the efforts of the Department of Ecology in this area and will continue to support programs to improve quality through the commingled collection systems.

Sincerely,

Edward H. Tolan
Fiber Procurement Manager

NIPPON PAPER INDUSTRIES USA CO., LTD.
1902 Marine Dr. Post Office Box 271 Port Angeles, Washington 98362 360-457-4474

Columbia Resource Company
P.O. BOX 61726, VANCOUVER, WA 98666
360/695-4858; FAX 360/695-5091

June 15, 2010

Shannon McClelland
Waste Reduction and Recycling Specialist
Washington Department of Ecology
P.O. Box 47775
Olympia, WA 98504

Re: Beyond the Curb Report

Columbia Resource Company supports the recommendations found in the Beyond the Curb report complied by the Southwest Region Workgroup.

We believe that educating the public is one of the most important tools in the recycling industry. Some of the basic issues are listed in this report and are as follows:

- Use container descriptions instead of numbers when educating residents
- If it's crinkly, stretchy or smaller than a fist, throw it out
- Do not flatten—flattened plastics cause cross-contamination with paper
- Rinsing is not a big issue—there has never been a problem from a sales perspective *(Note: This could be due to the frequent and consistent messages to the residents about rinsing)*
- MRFs recommend at-curb checks for non-program materials.

Columbia Resource Company also agrees with many key issues and recommendations in this report and we look forward to the continued work of the Southwest Region Workgroup to carry out these action items.

Sincerely,

Scott Campbell
District Manager
Columbia Resource Company

City of Tacoma
Public Works Department

June 1, 2010

To Whom It May Concern:

SUBJECT: *Beyond the Curb* Report

In the last year, various representatives from the Washington State Southwest Region's (Southwest Region) recycling community have been meeting and working together on the Commingled Recycling Improvement Project. These meetings have been facilitated by Shannon McClelland, of the Department of Ecology, in Lacey, Washington.

Representatives from the Southwest Region's paper mills, haulers, city and county governments, material recovery facilities (MRFs) and private companies met monthly to address the issue of the increasing problem of contamination and the end result of this contamination in the State's curbside commingled recycling programs. As the programs have grown and with the increasing demands to reduce and divert the amount of solid waste sent to landfills, contamination has increased dramatically and inconsistencies in reporting what is actually recycled have been realized.

Along with other issues of contamination, it was found that by adding glass and plastic bags to the commingled mix, the end result is causing the MRFs and mills dramatic increases in costs and inefficiencies to repair machinery and dispose of non-recyclable materials. Also, the mills have had to supplement their feedstock with more raw materials to replace the contaminated materials.

Another important factor discovered is that there are several safety issues that the MRFs have to contend with because of improper materials added to the commingled stream. This includes items such as broken glass from single-stream systems, needles and explosives.

It was also found that the message being provided to the customers on what to recycle varies from area to area which has caused confusion and inconsistency across the state as a whole. This group's mission was to work together within the Southwest Region to develop a consistent message by the collectors of what to recycle in order to provide a cleaner sort by the MRFs which will result in a better product being delivered to the mills.

Environmental Services / Solid Waste Management ▮ 3510 South Mullen Street ▮ Tacoma, WA 98409-2200 ▮ (253) 591-5543
www.cityoftacoma.org

Charlene Gallagher, the representative for the City of Tacoma, actively participated in this project and thought the process was extremely rewarding because of the diverse group working together to evaluate the facts and making recommendations at a regional level. The consensus of the group is that there is great benefit in taking action at a regional level. When residents have consistent information on what can and cannot go into the commingled recycling, there is less chance of contamination. The focus needs to be on materials actually recovered and not the amount placed in the recycle container.

The City of Tacoma supports the recommendations and action items found in the *Beyond the Curb* report and is looking forward to the continued effort of the Southwest Region work group in developing an action plan to carry out the recommendations and facilitate the Commingled Recycling Improvement Project statewide.

Sincerely,

G. Kenneth Tross
Division Manager
Solid Waste Management

GJT:CG:mmt (Letter of support_COT_June2010)

File: SWM/Recycling/Processing Commingled Recyclable

SP Recycling Corporation

June 8, 2010

Shannon McClelland
Waste2 Resources
Washington Department of Ecology
Southwest Regional Office
300 Desmond Drive
P.O. Box 47775
Olympia, WA 98504

Dear Shannon,

In 2009 SP Recycling was asked to participate in a work group that was tasked to review the current status of the residential curbside recycling system in Southwest Washington, define issues, and develop recommendations. After a year of hard work, and through your leadership, this group has developed a comprehensive report that will serve as a valuable resource to promote, educate and improve the already highly effective curbside recycling systems in SW Washington.

SP Recycling fully supports the recommendations contained in the report. We will continue our commitment to support for project as the group follows up on these recommendations and pursues our shared objective to enhance curbside recycling systems throughout the State.

Thanks again for your time and effort on behalf of all the stakeholders in this process.

Sincerely,

John Lucini
Vice President, Pacific Region
SP Recycling Corp.
June 4, 2010

16810 SE 120th Avenue – Clackamas, Oregon 97015
Phone (503) 537-5428 – Fax (503) 723-3086

NORTH PACIFIC PAPER CORPORATION
BOX 2069, LONGVIEW, WA 98632-0172
(360) 636-6400
FAX (360) 423-1514

June 8, 2010

To Whom it May Concern:

North Pacific Paper Corporation (NORPAC) has been an active proponent of reducing contamination in Commingle Recycling Systems over the past six years. The Washington Department of Ecology efforts to address this contamination issue have resulted in a statewide project, more commonly known as the Washington Commingled Recycling Improvement Project.

In the past year, Ecology's Southwest Region group has identified key issues and the corresponding recommendations for improvement. This has been an extremely comprehensive project involving county and city recycling program leaders, haulers, processers and end product users.

The quality of all commodities is a key component to assure they are an economically viable raw material for conversion into the highest value product possible. NORPAC supports, and willing to assist, efforts led by the Department of Ecology to improve the quality of all commodities generated and processed through commingled collection systems.

Sincerely,

Craig Anneberg

Craig Anneberg
NORPAC
Vice President/Mill Manager

**Tacoma Recycling Co., Inc.**
2318 South Tacoma Way
Tacoma, WA 98409-7597
Phone (253) 474-9559
Fax (253) 473-2004
e-mail:joeb@wasteconnections.com

6/4/2010

Shannon McClelland
Washington Dept. of Ecology
PO Box 47775
Olympia, WA 98504-7775

Dear Shannon,

For over two years now, we have been participating in a joint Government, private industry workshops trying to piece together our current system of Co-mingled Recycling. The scope has been everything from a National level looking at Region X to a localized level looking at the standards and practices in South West Washington.

It is imperative that we stop and take a quick look and see what we have been and collective take a closer look and see where we want the Co-mingled recycling in the region to go. There are a lot of political and local pressures to recycle using old ideas about what's recyclable, and what can and should be recycled. The consequence of all these individual initiatives has been a lot of ambiguous and contradicting programs across the region.

There has been a fundamental paradigm shift taking place in the recycling world. We need to change our methodology and practices away from just raw tonnages and focus on the impact of our waste stream on the environment. This report Beyond the Curb sets out far reaching recommendations that I believe will become the fundamental building blocks in re-shaping how we look at recycling and the actions and consequences to those actions.

Without this c-change we could find ourselves in the near future spending precious financial resources pulling out inconsequential items at the expense of other hazardous waste that are clogging up our waste stream and cross contaminating our existing recycling systems.

We here in Washington State have the unique opportunity to shape the future of recycling across this country by expanding on ideas and concepts of focusing on the reuse and removal of the waste stream that is causing the most amount of problems.

This Beyond the Curb report for the first time brings to light and starts to look at the consequences of recycling the wrong things through the various co-mingled systems. These include but not limited to sharps and needles, live ammunition and commercial batteries that are causing fires.

I believe that this report is the first step in bringing together industry, processor, haulers, cities and towns and other interested stake holders to better assemble programs that are clear and concise to the public and leave out the ambiguities that are endemic with the current disjointed systems around the State.

I support the conclusions and recommendations that the groups have fostered and applaud the efforts that the Department of Ecology have put into this workgroup. Likewise I'm looking forward in taking this to the next level and seeing the recommendations move forward.

Respectfully,

Joe Bushnell,
Sales Mgr.
Tacoma Recycling Co., Inc.

JORDAN TRADING INC.

CORPORATE HEADQUARTERS

31 Albany Avenue
PO Box 3844
Kingston, NY 12402 USA
Tel: 845-338-5379
Fax: 845-339-7074
mail@jordantrading.com



ADDITIONAL OFFICES

Bristol, RI, USA
Diamond Bar, CA, USA
Lakewood, WA, USA
Maidstone, United Kingdom
Santiago, Chile

May 27, 2010

Ms. Shannon McClelland
Department of Ecology
State of Washington

Dear Ms. McClelland:

I first want to thank-you for allowing Jordan Trading to participate in the review of the various curbside recycling programs throughout Southwest Washington. As a direct exporter of paper, primarily to China, Asia and South America we often hear from our customers and government officials how important the quality of the product we ship is. Unfortunately, since single stream recycling has been implemented, and more products continue to be added to the curb for recycling, we have experienced a notable deterioration in the quality of all of the products being sorted and recycled.

In light of the concern from our customers, and on their behalf, we fully endorse the recommendations set forth from the group in the commingled report "beyond the curb". We sincerely hope that these recommendations cannot only be implemented in Southwest Washington, but throughout the entire Pacific Northwest. The single stream mrf's that receive and process tons from Southwest Washington also receive tons from throughout the Pacific Northwest. The collectors, processors and end user's would all benefit by having a safer work place, improved efficiencies and yields as a result of a cleaner stream of recyclables. I just want to thank-you again for a very thorough review of the process.

Respectfully,

Robert M. Kovich
Jordan Trading

MASON COUNTY
UTILITIES & WASTE MANAGEMENT
MASON COUNTY BLDG. II • 410 N. 4TH ST. • P.O. BOX 578
SHELTON, WA 98584 • (360) 427-9670

TO: Shannon McClelland

FROM: David Baker, Solid Waste Manager

RE: Commingle Recycle workgroup and report

DATE: May 27, 2010

For the past year, Shannon has convened regular meetings with a group of folks to discuss the reality of commingled recycling. When material is placed in a cart at the curb, what happens? This question takes quite a bit to answer, and our analysis was thorough and data-driven.

This group includes a complete view of all aspects of the system, with local governments, processing facilities, haulers and end users. Our meetings were both fact based and candid, providing true insight into each component.

The resulting report represents countless hours of real work. Each perspective and each material was explored in detail by the workgroup. Your efforts as facilitator have paid off with this process in bringing everyone to the table and generating the dialogue and final recommendations this report represents. Your skills and hard work have delivered an exceptionally useful tool for decision makers in our region and beyond.

It would not be an understatement to say that it wouldn't have turned out this well without your efforts. The number of people and the programs that will be affected for the better honestly cannot thank you enough for what you have accomplished.

Pierce County
Public Works and Utilities

9850 64th Street West
University Place, Washington 98467-1078
(253) 798-4050 Fax (253) 798-4637

Brian J. Ziegler, P.E.
Director
Brian.Ziegler@co.pierce.wa.us



May 21, 2010

Shannon McClelland, Sustainability Specialist
Waste 2 Resources Program
Washington Department of Ecology
Southwest Regional Office
300 Desmond Drive
P.O. Box 47775
Olympia, WA 98504-7775

Dear Ms. McClelland:

In the spring of 2009, local governments, the private sector, and the Department of Ecology convened a workgroup tasked with improving the quality of the recyclables collected from households throughout Ecology's Southwest Region. Pierce County has been pleased to take part and endorses the seven recommendations contained within the group's report: *Beyond the Curb – Tracking the Commingled Residential Recyclables from Southwest Washington.*

We look forward to working with the Department, other local governments, recycling haulers, processors, and end-users to prioritize recommendations and raise consumer awareness. We have learned a lot so far and made many worthwhile connections along the way. We should go forward with confidence there is much we can do cooperatively to increase the quality and quantity of residential recyclables.

Please keep me informed about upcoming meetings. My telephone number is (253) 798-4656 and e-mail address is steve.wamback@co.pierce.wa.us.

On a final note, thank you for your leadership! We recognize that much effort was necessary to coordinate workgroup meetings.

Respectfully,

Stephen C. Wamback
Solid Waste Administrator

SO3370-SCW
Project File: OP-10.1.8

Lewis County

# Public Works Department

Solid Waste Utility Division

1411 South Tower Avenue ♦ Post Office Box 180 ♦ Centralia, WA 98531 ♦ Phone (360) 740-1451 ♦ FAX (360) 330-7805

May 27, 2010

Shannon McClelland
Washington State Department of Ecology
Waste 2 Resources Program
P.O. Box 47775
Olympia, WA 98504

Dear Ms. McClelland,

Lewis County was cautious about moving to commingled curbside recycling in 2007. We researched the options and discussed the matter at length with our hauler, LeMay, and S.P. Recycling, the materials recovery facility that would handle our recyclables. We were concerned about the cleanliness and recyclability of the material, moving from a three-bin source-separated system to a commingled program in most of the county.

On the advice of our hauler and the S.P. representative, we designed our program without glass bottles and jars in the commingled stream. We offered community glass drop boxes at various points throughout the county.

When Department of Ecology began hosting the Southwest Commingled Workgroup meetings, Lewis County was interested in participating to produce the best possible outcome for our recyclable commodities. We also wanted to learn first-hand what is happening to the recyclables at the end markets.

The workgroup meetings were eye-opening and enlightening. We learned that the "story" of recyclables doesn't end at the curb. That message needs to be shared with the public, who believe any material placed in the commingled bin will get recycled.

Lewis County supports the "Beyond the Curb – Tracking the Commingled Residential Recyclables from Southwest Washington" report. We commend you in your efforts in bringing all the recycling parties together. We also appreciate the time that our peers spent at the meeting as well as the representatives from the collectors, processors and manufacturers.

Lewis County is committed to continue working with the Southwest group to fine tune our commingled curbside recycling program and align it with our regional partners to reduce contamination and material loss.

Thank you for the opportunity to participate in this process.

Sincerely,

Steve Skinner
Solid Waste Utility Manager

THURSTON COUNTY
WASHINGTON
SINCE 1852

COUNTY COMMISSIONERS
Cathy Wolfe
District One
Sandra Romero
District Two
Karen Valenzuela
District Three

PUBLIC WORKS

Lester Olson
Director

May 20, 2010

WA Dept. of Ecology
Waste 2 Resources Program
PO Box 4777
Olympia WA 98504.

To Whom It May Concern:

SUBJECT: *Beyond the Curb* Report

Thurston County Public Works supports the recommendations and action items found in the *Beyond the Curb* report, which was the result of the efforts of the Washington Commingled Improvements Project: Southwest Region Workgroup.

This group has been meeting, researching and analyzing for over a year and has compiled excellent information on the effects that commingled curbside recycling has had on the manufacturing systems that rely on recycled feedstock. The report provides a comprehensive approach to problem solving, since the work was done by a team consisting of state and local government, haulers, material recovery facilities (MRFs) and manufacturing end users.

Terri Thomas, our representative for Thurston County, informs us that the process was extremely eye-opening. While local governments were certainly aware of some problems, such as the affects of glass in commingled recycling, there were many other serious issues faced by the MRFs and manufacturers that few were aware of.

There is great benefit in taking action at a regional level. When residents have consistent information on what can and cannot go into the commingled recycling, there is less chance of non-program materials being included. If local governments work together to make decisions based on the quality of materials, the markets will thrive. Our focus needs to be on materials actually recovered, not the amount placed in the recycling bin. Actions by local government have the ability to influence the actions of the haulers and MRFs; therefore we have a responsibility to act.

2404-A Heritage Ct. SW • Olympia, WA 98502 • (360) 754-4580 • FAX (360) 786-5582

Recycled Paper

This project, coordinated by Shannon McClelland of Ecology, was well facilitated and a productive use of resources. Thurston County looks forward to the continued work of the Southwest Region Workgroup to carry out the action items recommended in the report.

Sincerely,

Lester Olson
Director

LO\rp\O:\UTILITIES_SERVICES_UTILITY_SERVICES_Teams\Education_Team\Curbside\Commingled Ecology Work\Letter of support.docx

# JMK FIBERS, LLC

*1440 PORT OF TACOMA ROAD*
*TACOMA, WA 98421*
*PHONE: (253) 272-6208*
*FAX: (253) 272-3442*

June 24, 2010

Shannon McClelland
Washington Department of Ecology
Southwest Regional Office
300 Desmond Drive
P.O. Box 47775
Olympia, WA 98504

Dear Shannon,

JMK Fibers LLC fully supports the recommendations of the Beyond the Curb report compiled by a host of processors, end users, local city and county government, and concerned citizens participating in the Southwest Region Workgroup. Your commitment and facilitation skills allowed us all to work through the many points of contention and concern surrounding the comingled residential curbside process.

Education is the key, collecting materials at the curb that can be recycled, not simply diversion from the landfill has to become the driving force of the curbside process, not all recyclables belong in a comingled program. I believe the Beyond the Curb report gives a clear indication of the direction to take in accomplishing these goals.

I look forward to the continuing process and feel very good about the recommendations of the group.

Sincerely,

Doug Swan
General Manager
JMK Fibers, LLC

CLARK COUNTY
WASHINGTON
proud past, promising future

ENVIRONMENTAL SERVICES



June 16, 2010

Shannon McClelland, Sustainability Specialist
Waste 2 Resources Program
Washington Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

Dear Ms. McClelland,

Clark County has received a copy of the report, *Beyond the Curb – Tracking the Commingled Residential Recyclables from Southwest Washington.* As you know, County staff participated in the work group along with the Department of Ecology, other local governments and members of the private sector. We support the recommendations and action items found in the report.

Clark County has recently implemented a commingled curbside collection program and upgraded its processing equipment at the materials recovery facility. Our curbside collection program and processing does incorporate many of the recommendations in the report. As this is a recent change, our next focus (which is also a report recommendation) is to enhance our public education and target materials for increased participation and recovery.

It is our understanding that the work group will reconvene to discuss implementation strategies. Clark County Environmental Services will continue to support and participate in this effort.

Thank you for taking the lead on this. We certainly appreciate all of your efforts. If needed, please feel free to contact me at 360-397-2121 ext. 4484 or anita.largent@clark.wa.gov.

Sincerely,

Anita Largent
Sustainability & Outreach Manager

1300 Franklin Street • P.O. Box 9810 • Vancouver, WA 98666-9810 • tel: [360] 397-2121 • fax: [360] 397-2062 • www.clark.wa.gov

# Appendix E
# Material & Recycling System Issues Comparison Chart

# Material Recycling System Issues Comparison Chart

| Material | Collection: % of Tonnage | Collection: Consistent Collection | Collection: Consistent Messages | Processing: % of MRF Revenue | Processing: Significant Processing Issues | Processing: Source of Cross-Contamination | Manufacturing: Export/ Local[4] | Manufacturing: Yield Loss | Manufacturing: Prohibitives | Manufacturing: Outthrows | Manufacturing: Final Product |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cardboard** | **14%** | 🟡 | 🟢 | **10%** | 🟢 | 🟡 | 🟢 | **15%** | 🔴 | 🟡 | *Liner medium* |
| Corrugated | | *In cart* | | | | | *Both* | | *Plastics* | *Boxboard* | *Boxboard* |
| Non-waxed | | *Beside cart* | | | | | | | *Wax/glue* | *Carrier stock* | *Paper bags* |
| **Glass** | **5% - 10%** | 🔴 | 🟢 | (cost?) | 🔴 | 🔴 | 🔴 | **?** | 🔴 | 🟢 | |
| Containers | | *In cart* | | | | | *Local (1)* | | *Caps,lids,shred* | | *Aggregate* |
| | | *Beside cart* | | | 🟢 | 🟢 | *Local (1+)* | | 🟢 | | *Fiberglass* |
| | | *Drop-off* | | | 🟢 | 🟢 | *Local (1+)* | | 🟢 | | *Containers* |
| **Metal** | **4%** | 🟡 | 🟢 | **14%** | 🟡 | 🟡 | 🟢 | **?** | 🟡 | 🟢 | |
| Aluminum cans | 1% | 🟢 | 🟢 | 14% | 🟢 | 🟡 | *Both* | | *Plastic* | *Foil* | *Aluminum cans* |
| Aluminum foil | | 🔴 | 🔴 | | 🟡 | 🔴 | | | | | |
| Steel cans | 3% | 🟢 | 🟡 | Less than 1% | 🟢 | 🟢 | | | | | *Steel billets* |
| Pots/Pans | | 🔴 | 🔴 | | 🟢 | 🟢 | | | | | |
| Scrap | | 🔴 | 🔴 | | 🔴 | 🟢 | | | | | |
| **Newspaper** | **31%** | 🟢 | 🟢 | **3%[1]** | 🟢[3] | 🟢[3] | 🟢 | **16%** | 🔴 | 🔴 | *Newspaper* |
| Newspapers | | 🟢 | 🟢 | | 🟢 | 🟢 | *Both* | | *Glass, plastic* | *Browns* | *Phone books* |
| Inserts | | 🟢 | 🟢 | | 🟢 | 🟢 | | | | | *Paper bags* |
| **Plastics** | **7%** | 🔴 | 🟢 | **6%** | 🔴 | 🔴 | 🟢 | **?** | **?** | **?** | |
| PET bottles | | 🟢 | 🟢 | PET bottles | 🟢 | 🔴 | *Both* | | *Shred paper* | *Caps & lids* | *Fiber products* |
| HDPE bottles | | 🟢 | 🟢 | HDPE bottles | 🟢 | 🔴 | | | *Fiber* | | *Crates* |
| Bags | | 🔴 | 🔴 | Bags | 🔴 | 🔴 | | | | | *Buckets* |
| Buckets | | 🔴 | 🟢 | Buckets | 🟢 | 🟡 | | | | | *Carts* |
| Dairy tubs/cups | | 🔴 | 🟢 | Dairy tubs/cups | 🟢 | 🔴 | | | | | |
| Pill bottles - sm | | 🔴 | 🔴 | Pill bottles - sm | 🔴 | 🔴 | | | | | |
| Nursery pots | | 🔴 | 🟢 | Nursery pots | 🟢 | 🟡 | | | | | |
| Non-program | | ☒ | ☒ | Non-program | 🔴 | 🔴 | | | | | |
| **Mixed Paper** | **29%** | 🔴 | 🔴 | **59%[2]** | 🟡 | 🟡 | 🔴 | **?** | 🟡 | 🟢 | |
| Phone books | | 🟢 | 🟢 | Phone books | 🟡 | 🟡 | *Export (1)* | | 🟢 | | *Boxboard* |
| Mail/Envelops | | 🟢 | 🟢 | Mail/Envelops | 🟢 | 🟢 | | | 🟢 | | *Corrugated boxes* |
| Mags/Catalogs | | 🟢 | 🟢 | Mags/Catalogs | 🟢 | 🟢 | | | 🟢 | | *Printed boxboard* |
| Boxboard | | 🟢 | 🟢 | Boxboard | 🟡 | 🟡 | | | 🟢 | | |
| Paper bags | | 🟢 | 🟢 | Paper bags | 🟢 | 🟡 | | | 🟢 | | |
| Frozen food boxes | | 🔴 | 🔴 | Frozen food boxes | 🟡 | 🔴 | | | 🔴 | | |
| Shredded paper | | 🔴 | 🔴 | Shredded paper | 🔴 | 🔴 | | | 🟢 | | |
| Milk/Juice cartons | | 🔴 | 🔴 | Milk/Juice cartons | 🟡 | 🔴 | | | 🔴 | | |
| Egg cartons | | 🔴 | 🔴 | Egg cartons | 🟡 | 🟡 | | | 🔴 | | |
| Soda/Beer cartons | | 🔴 | 🔴 | Soda/Beer cartons | 🟡 | 🔴 | | | 🟡 | | |
| Aseptic | | 🔴 | 🔴 | Aseptic | 🟡 | 🔴 | | | 🔴 | | |
| Paperback books | | 🔴 | 🔴 | Paperback books | 🟡 | 🟢 | | | 🟢 | | |
| Paper rolls/cores | | 🔴 | 🔴 | Paper rolls/cores | 🟡 | 🟡 | | | 🟢 | | |
| Gift wrap | | 🔴 | 🔴 | Gift wrap | 🟡 | 🟡 | | | 🟢 | | |
| Non-fiber | | ☒ | ☒ | Non-fiber | ☒ | ☒ | | | 🔴 | | |

**KEY** 🟢 Not An Issue 🟡 Minor Issue 🔴 Major Issue ☒ N/A

*Notes*

1. *This is reversed with the Mixed Paper % if the supplier is selling their bales as MWP rather than ONP. Either way, soft fiber (non-OCC) makes up 60% of MRF revenues.*
2. *This is reversed with the Newspaper % if the supplier is selling their bales as ONP rather than MWP. Either way, soft fiber (non-OCC) makes up 60% of MRF revenues.*
3. *Because newspaper is a negative sort material, the issue is not that newspaper has processing issues, but that other materials--if not processed correctly--cause issues for the paper.*
4. *Received a green dot if there were multiple markets and a red dot if there is only one market.*

## Energy Savings for Recycling[5]
**(Million Btu/Ton of Material Recycled)**

| Materials | Net Energy Savings[6] (Postconsumer) |
|---|---|
| Aluminum cans | 206.42 |
| Cardboard | 15.42 |
| Glass | 2.13 |
| Mixed paper | 22.94 |
| Newspaper | 16.49 |
| Plastic - HDPE | 50.9 |
| Plastic - PET | 52.83 |
| Steel cans | 19.97 |

5. *When compared to landfilling*
6. *Includes process and transportation energy inputs*

*Source: U.S. EPA 2006*

# Appendix F
# Outreach Materials by Jurisdiction – YES/NO Lists

# CURBSIDE RECYCLING GUIDE

LeMay INC.

## 1 Recycle in Rollcart

### PAPER & Cardboard

**YES:**
- Mixed waste paper, magazines and catalogs, newspaper, telephone books, junk mail, cereal boxes, paper bags
- Cardboard
- Frozen food boxes, milk cartons and juice boxes – *Rinse out*
- Shredded paper – *Place in paper bag*
- Gift wrap – *No shiny foil wrapping*

**NO:**
- Tissue paper, toilet paper, paper towels and napkins
- Cardboard or paper that is waxed or plastic coated
- Paper cups or plates
- Ice cream cartons
- Frozen juice containers
- Pizza boxes and other food soiled paper and cardboard

### METAL

**YES:**
- Aluminum and tin cans
- Soda cans
- Aluminum foil – *Must be clean*
- Pots and pans

**NO:**
- Scrap metal
- Foil juice pouches
- Aerosol cans

### PLASTIC Bottles & Tubs

**YES:**
- Dairy tubs such as butter, cottage cheese, sour cream
- Yogurt cups
- Plastic jugs such as milk, detergent, fabric softener
- Plastic jars such as peanut butter containers
- Plastic bottles such as water, soda, shampoo

**NO:**
- Lids or caps
- Microwave cookware
- Food trays or lids
- Plastic bags
- Takeout containers
- Cups, plates or utensils
- Pill bottles
- Styrofoam

## 2 Recycle in Glass Bin

### GLASS Bottles & Jars

**YES:**
- Glass bottles and jars – *Remove lids and rinse*

**NO:**
- Light bulbs
- Window, plate, or mirror glass
- Ceramics

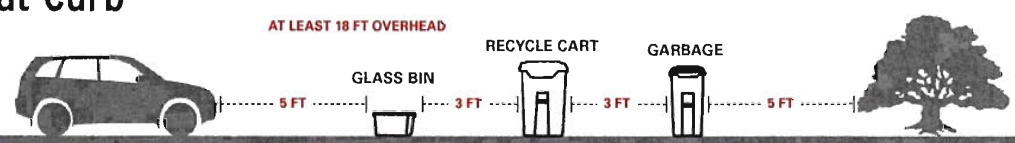
**Please have all recyclables at the curb by 6 am**

**AND PLEASE SET OUT ONLY WHEN FULL**

**QUESTIONS? Ask LeMay:**
**www.lemayinc.com**
**360-736-4769**

## 3 Place at Curb

Please leave correct spacing between carts, bins, cans and other objects (cars, mailboxes, basketball hoops). The trucks need room to pick up your containers.




## What We CAN'T Recycle

These items should NEVER be placed in your recycling cart or bin.

- Plastic bags
- Items contaminated with food or other substances
- Ceramic, porcelain, or china dishes and cups
- Styrofoam™ and other block foam
- Wire clothes hangers
- Batteries
- Food waste
- Containers that held toxic materials (marked DANGER, WARNING, or CAUTION)
- Tires
- Garbage

## Recycle "It's Easy"

**Newspaper:** No need to remove labels. Do not bundle with string.

**Junk Mail, Mixed Paper:** Includes colored paper. Envelopes with plastic windows are acceptable.

**Magazines:** No need to remove labels. Do not bundle with string.

**Cereal Type Boxes:** Remove liner before recycling.

**Cardboard:** Break down boxes to save space.

**PETE #1 Plastic:** (Polyethylene Terephthalate) Remove and discard plastic lids before recycling.

**HDPE #2 Plastic:** (High Density Polyethylene) Remove and discard plastic lids before recycling.

**Glass:** Clear, Green, Brown. Please no window glass or auto glass.


**Aluminum Cans:** Flatten to save room. Clean foil also recycles.

**Tin cans:** Rinse, remove labels and flatten to save room.

City of Longview

# Do you recycle?

The following are general guidelines for preparing your recyclables.

**NEWSPAPERS**
No need to remove labels.
Do not bundle with string.

**TIN CANS**
These cans are magnetic and will have a seam.
*Rinse, remove all labels, remove both ends and flatten.*

**ALUMINUM CANS AND FOIL**
These cans are not magnetic and will not have a seam.
*Rinse and flatten (optional).*

**MIXED PAPER AND JUNK MAIL**
This includes slicks or glossies, cereal boxes, egg cartons and tablet backings (basically any clean paper).

LONG VIEW RECYCLES

**BOTTLES AND JARS**
No drinking glass, plate glass or light bulbs. *Rinse and remove lids. No need to remove paper labels.*

**MAGAZINES**
These should be glossy throughout.

**#2 H.D.P.E. PLASTICS**
(natural and colored) - Natural includes milk jugs, distilled water and juice bottles. Colored includes detergents, soaps, shampoos, bleaches, juices, etc. *Rinse, flatten, remove lids and leave labels.*

**CARDBOARD**
*Empty contents, remove liners and flatten boxes.*

**#1 P.E.T. PLASTICS**
These include pop, cranberry and cooking oil bottles, peanut butter jars, etc.

Do you have questions about recycling?
Contact the Solid Waste/Recycling Office at 442.5222 for more specific information,
or visit us online at www.mylongview.com.

Cities of Olympia & Shelton

# Recycle Right

## *Know Before You Throw*

**Plastics: Do I need to pay attention to the recycle number 1-7?**
No, just make sure it is a bottle, jug, or tub.

## Yes


Coffee tubs


Pill bottles


Plastic bottles & jugs


Dairy tubs & yogurt cups


Aerosol & tin cans


Aluminum cans & foil

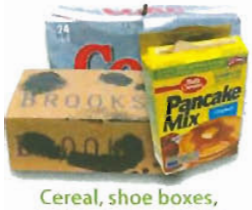

Glass bottles & jars


Frozen food boxes


Milk cartons & drink boxes


Paper egg cartons


Magazines, catalogs, & phone books


Cereal, shoe boxes, soda, & beer cartons


Newspapers & junk mail


Cardboard packing paper, flattened


Paper bags & shredded paper (placed in paper bag)

## No


Plastic bags


Plastic Buckets


Prescription vials (clear plastic type that is straight walled)


Styrofoam of any kind


Clamshells, trays, & lids


Plant pots


Lids, caps & tops, or CDs


Coat hangers (plastic or metal)


Scrap metal


Light bulbs & window glass


Glassware


Mirrors, pyrex, & ceramic


Paper towels, plates, & napkins


Motor oil & hazardous waste containers (empty)

Put all recyclables inside the dark green cart and close the lid. Empty and rinse containers. Flatten containers, boxes, and cardboard.

If an item is reusable, please consider donating or reusing before throwing it in the garbage.

Fall 2007

City of Port Angeles

# What goes in my new recycling cart?

## Yes — Put these items in your recycling cart.


Milk jugs


Plastic bottles
(necks smaller than base)


Shredded paper


Phone books


Mail, magazines, mixed paper and catalogs


Metal cans


Aluminum cans


Newspaper & inserts


Paper bags


Cereal boxes


Cardboard


Paper or frozen food boxes

## No — DO NOT put these items in your recycling cart.


Glass


Ceramics

Styrofoam peanuts


Glassware


Batteries


Aerosol cans


Toxic product containers


Plastic tubs


Plastic lids


Foil


Plastic bags


Light bulbs


Chip bags

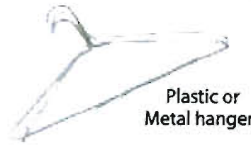

Plastic cups

Styrofoam containers


Frozen food bags


Pill bottles


Juice boxes


Plastic or Metal hangers


Food-contaminated paper plates and napkins

## GLASS RECYCLING DROP-OFF SITES

**Albertsons**
114 E. Lauridsen Blvd.

**Swains General Store**
602 E. First St.

**Port Angeles Plaza East**
at the intersection of Golf Course Rd. and Hwy. 101

## Solid Waste Management

takes pride in its commitment to the environment and strives to provide superb customer service. This is demonstrated by the many services and programs we offer. They are designed to meet most of your solid waste and recycling-related needs, as well as offering you ways to reduce your waste and help protect our natural resources. Please refer to this guide as a resource for general Solid Waste Management questions. You can find additional information about environmental education, volunteer opportunities, programs and more at www.cityoftacoma.org/solidwaste. You also may call Solid Waste Management with your questions.

## Customer Information

| | |
|---|---|
| Call-2-Haul | (253) 573-2468 |
| EnviroHouse (green building exhibit) | (253) 573-2426 |
| Garbage | (253) 591-5543 |
| Household Hazardous Waste | (253) 591-5418 |
| Information Line (recorded message only) | (253) 565-5955 |
| Landfill | (253) 591-5543 |
| Recycling | (253) 591-5543 |
| Scalehouse | (253) 593-7724 |
| Yard Waste | (253) 591-5543 |
| E-mail | solidwaste@cityoftacoma.org |
| Web | www.cityoftacoma.org/solidwaste |

## Curbside recycling – Yes

Curbside recycling is picked up every other week on your garbage day. To find out your garbage day and recycling week, go to *www.cityoftacoma.org/collectioncalendar*, or call (253) 591-5543.

Here is a general list of the most common accepted recyclable items in the curbside service. Not all recyclable items are pictured. Please rinse out bottles, jugs, jars, tubs, cans and other items that may have food residue. Remove all caps and lids and place them in the garbage

### Big blue container

**Aluminum & tin**

Aluminum cans, foil, trays

Tin & aerosol cans

**Boxes & cardboard**

Boxes & plastic-coated cartons

Corrugated cardboard

**Paper**

- Newspaper & inserts
- Mixed paper
- Phone books, magazines, catalogs

Shredded paper

**Plastics**

Bottles & jugs

Jars & tubs

Bags

### Glass & battery bin

Clear glass bottles & jars

Brown glass bottles & jars

Green glass bottles & jars

Household batteries

# CURBSIDE RECYCLING GUIDE

WASTE CONNECTIONS INC.
*Connect with the Future*

## 1 IN THE BLUE CART

### PAPER & CARDBOARD

**YES:**
- Newspaper, magazines, junk mail, phonebooks, paper bags, cereal boxes, gift and shoe boxes, writing and printing paper
- Shredded paper – *Contain in brown paper bag*
- Milk cartons, drink boxes, soymilk and soup boxes – *Rinse out*
- Cardboard – *Flatten boxes and cut down to fit inside cart*

**NO:**
- Tissues, paper towels or plates
- Food-soiled paper
- Foil wrapping paper, pet food bags with plastic liners, or waxed paper liners as found in cereal boxes
- Frozen food or juice concentrate containers

### METAL

**YES:**
- Aluminum and tin cans – *Rinse clean*
- Clean foil
- Aerosol cans – *Empty cans only; remove lids and nozzles*
- Scrap metal – *No larger than 24 inches in any direction and less than 35 pounds, remove any attached plastic, rubber or wood*

**NO:**
- Foil with food on it
- Partial or full cans used for paint or chemicals – *Must be taken to a Household Hazardous Waste collection site*
- Partial or full aerosol cans – *Must be taken to a Household Hazardous Waste collection site*
- Automotive parts

### PLASTIC BOTTLES & TUBS

**YES:**
- Plastic tubs
- Plastic buckets, 5 gallons or less
- Nursery pots
- All plastic bottles – *Rinse and remove lids*

**NO:**
- Lids
- Bottles used for chemicals
- Plastic trays or clamshells
- Styrofoam™ or other block foam
- Motor oil bottles
- Plastic bags
- Plastic wrap
- Plastic film

## 2 IN THE GREEN BIN
NEAR CART


### GLASS BOTTLES & JARS

**YES:**
- Glass bottles and jars – *Rinse and remove lids*

**NO:**
- Light bulbs
- Window glass
- Flower vases
- Ceramics
- Lids
- Mirrors

**Please have all recyclables at the curb by 6 am**

AND PLEASE SET OUT ONLY WHEN FULL ON YOUR REGULARLY SCHEDULED COLLECTION DAY

QUESTIONS?
Ask Waste Connections:
www.wcnorthwest.com
360-892-5370

## 3 OTHER ITEMS
NEAR CART

### BATTERIES

**YES:**
- Put in a clear plastic sealable bag, on top of the blue cart

### MOTOR OIL OR ANTI-FREEZE

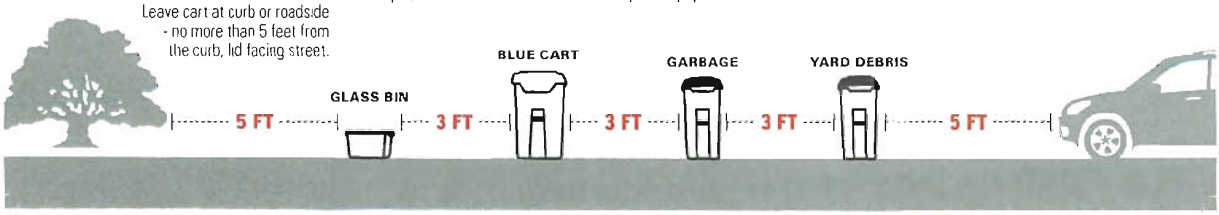
**YES:**
- Put in a clear one gallon plastic jug with a screw top lid

**NO:**
- Do not mix with other liquids, please

## CART PLACEMENT

Leave cart at curb or roadside - no more than 5 feet from the curb, lid facing street.

Please leave spacing between carts, bins, cans and other objects (cars, mailboxes, basketball hoops). The trucks need room to pick up your containers.



Clark County

# CURBSIDE RECYCLING GUIDE

WASTE CONNECTIONS INC.
*Connect with the Future*

## 1 IN THE BLUE CART

### PAPER & CARDBOARD

**YES:**
- Newspaper, magazines, junk mail, phonebooks, paper bags, cereal boxes, gift and shoe boxes, writing and printing paper
- Shredded paper – *Contain in brown paper bag*
- Milk cartons, drink boxes, soymilk and soup boxes – *Rinse out*
- Cardboard – *Flatten boxes and cut down to fit inside cart*

**NO:**
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- Food-soiled paper
- Foil wrapping paper, pet food bags with plastic liners, or waxed paper liners as found in cereal boxes
- Frozen food or juice concentrate containers

### METAL

**YES:**
- Aluminum and tin cans – *Rinse clean*
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- Partial or full cans used for paint or chemicals - *Must be taken to a Household Hazardous Waste collection site*
- Partial or full aerosol cans – *Must be taken to a Household Hazardous Waste collection site*
- Automotive parts

### PLASTIC BOTTLES & TUBS

**YES:**
- Plastic tubs
- Plastic buckets, 5 gallons or less
- Nursery pots
- All plastic bottles – *Rinse and remove lids*

**NO:**
- Lids
- Bottles used for chemicals
- Plastic trays or clamshells
- Styrofoam™ or other block foam
- Motor oil bottles
- Plastic bags
- Plastic wrap
- Plastic film

**Please have all recyclables at the curb by 6 am**

**AND PLEASE SET OUT ONLY WHEN FULL**

**QUESTIONS?**
**Ask Waste Connections:**
**www.wcnorthwest.com**
**360-892-5370**

## 2 IN THE GREEN BIN
NEAR CART


### GLASS BOTTLES & JARS

**YES:**
- Glass bottles and jars – *Rinse and remove lids*

**NO:**
- Light bulbs
- Window glass
- Flower vases
- Ceramics
- Lids
- Mirrors

## 3 OTHER ITEMS
NEAR CART

### BATTERIES

**YES:**
- Put in a clear plastic sealable bag, on top of the blue cart

### MOTOR OIL OR ANTI-FREEZE

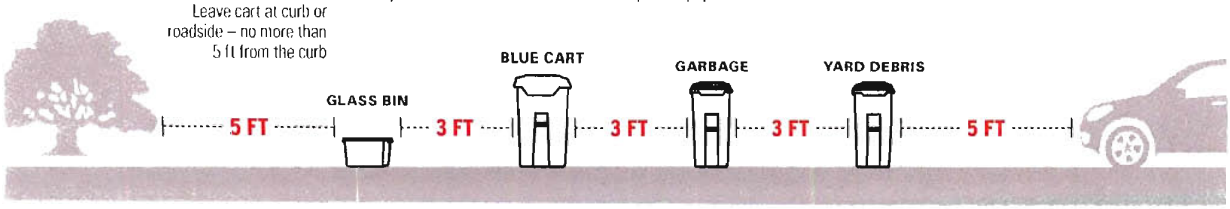
**YES:**
- Put in a clear one gallon plastic jug with a screw top lid

**NO:**
- Do not mix with other liquids, please

## CART PLACEMENT

Leave cart at curb or roadside – no more than 5 ft from the curb

Please leave spacing between carts, bins, cans and other objects (cars, mailboxes, basketball hoops). The trucks need room to pick up your containers.



# What goes in my new recycling cart?

## Yes Put these items in your recycling cart.


Milk jugs


Plastic bottles
(necks smaller than base)


Paper milk-style cartons


Phone books


Shredded paper


Mail, magazines, mixed paper and catalogs


Metal cans


Aluminum cans


Newspaper& inserts


Paper bags


Cereal boxes


Cardboard


Paper or frozen food boxes

## No DO NOT put these items in your recycling cart.


Glass


Ceramics

Styrofoam peanuts


Glassware


Batteries


Aerosol cans


Toxic product containers


Plastic tubs


Plastic lids


Foil


Plastic bags


Light bulbs


Chip bags


Plastic cups

Styrofoam containers


Frozen food bags


Pill bottles


Juice boxes


Metal hangers


Food-contaminated paper plates and napkins

## Lewis County (unincorporated)

### Yes Put these items in your recycling cart.

*ALL ITEMS MUST BE FREE OF FOOD AND OTHER CONTAMINANTS.*
***PLEASE RINSE PROPERLY.***

**PAPER**
(LOOSE IN CONTAINER - NO PLASTIC BAGS)
Mixed waste paper including sticky notes
Magazines & catalogs
Newspaper (including glossy ads)
Telephone books
Junk mail (including envelopes with plastic windows)
Cardboard
Cereal & other dry food boxes (remove waxed liner)
Paper bags & sacks
Frozen food boxes
Milk cartons & juice boxes
Shredded paper (only if placed in a paper bag)
Gift wrap (no shiny foil wrapping)

**METALS**
Aluminum and tin cans
Soda cans
Aluminum foil (must be clean)
Pots and pans

**PLASTICS**
Dairy tubs (such as butter, cottage cheese, sour cream)
Yogurt cups
Plastic jugs (such as milk, detergent, and fabric softener)
Plastic jars (such as peanut butter containers)
Plastic bottles (such as water, soda, shampoo)*

**CHECK THE NECK! An acceptable plastic bottle has an opening that is smaller than the base.*

**GLASS (collected separately - do not place in cart)**
Bottles (such as soda, beer, wine, etc..)
Jars (such as pickles)

### No DO NOT put these items in your recycling cart.

*NO ITEMS THAT ARE CONTAMINATED WITH FOOD OR OTHER SUBSTANCES.*

**PAPER**
Tissue paper, toilet paper, paper towels & napkins
Cardboard or paper that is waxed or plastic coated
Paper cups or plates
Ice cream cartons
Frozen juice containers
Pizza boxes & other food soiled papers & cardboard


**METALS**
Scrap metal
Foil juice pouches
Aerosol cans

**PLASTICS**
Microwave cookware
Meat, bakery, vegetable trays & lids
Plastic bags
Takeout containers (usually clear or black plastic)
Cups, plates or utensils
Pill bottles
Lids or caps from plastic bottles & tubs

**STYROFOAM**

**HOUSEHOLD ITEMS**
Ceramic, porcelain, china dishes & cups
Window, plate & mirror glass
Light bulbs
Wire clothes hangers
Batteries
Tires
Food waste
Garbage

**CONTAINERS THAT HELD TOXIC MATERIALS**
**(Any container with a DANGER, WARNING or CAUTION label)**

# What goes in the recycling cart?

Pierce County

## Yes — Put these items in your recycling cart.


Milk jugs


Plastic bottles (necks smaller than base)


Paper milk-style cartons


Phone books


Shredded paper


Mail, magazines, mixed paper and catalogs


Metal cans


Aluminum cans


Newspaper & inserts


Paper bags


Cereal boxes


Cardboard


Paper or frozen food boxes

## No — DO NOT put these items in your recycling cart.

### No Styrofoam or Plastic Bags!



Glass


Batteries


Pill bottles


Toxic product containers


Plastic tubs


Plastic lids & caps


Frozen food bags


Juice boxes


Foil


Food-contaminated paper plates and napkins


Plastic cups


Glassware


Ceramics


Light bulbs


Metal hangers


Chip bags


Aerosol cans

## Preparing recyclables is easy

- Recyclables should be clean, rinsed, dry and empty. (Milk sours and will leave odors in the cart. It also can contaminate the paper.)
- Rinse containers with water and leave no food residue.
- Do not bag items, unless it is shredded paper. Put shredded paper in a paper bag.
- Labels can stay on.
- Plastic lids & caps must come off. Throw them away.

**PLASTIC BAGS WILL CAUSE MACHINERY TO JAM! After placing recyclables in bin, put plastic bags in garbage or recycle them at your local grocery store.**

Pierce County
Public Works and Utilities
Solid Waste Division

(253) 798-2179
www. piercecountywa.org/recycle

# Recycle Right!

## Recycling tips for curbside recycling in Thurston County

### An easy way to make a big difference

Recycling is a great way to reduce trash disposal costs, conserve resources, and cut down on the amount of waste going to the landfill. Do YOUR part and recycle the right way – it's easy!

- Be sure items are recyclable before placing them in the bins.
- Recyclables must be free of food waste and other contaminants.
- Place glass in a separate container – do not mix with other recyclables. You are responsible for supplying your own glass bin. Please make sure it is between 5 and 20 gallons.

### Have questions?

If you are unsure which items go in your recycling bin, the rule of thumb is "when in doubt, leave it out." When recyclables are contaminated with other materials, the processing costs increase. The result is a more expensive recycling program and a lower commodity credit (rebate) on your bill.

Your hauler will be happy to answer questions about what is recyclable. See the back page for contact information and where you can download a PDF of this publication.



## Where Do I Take My...?

**www.WhereDoITakeMy.org**

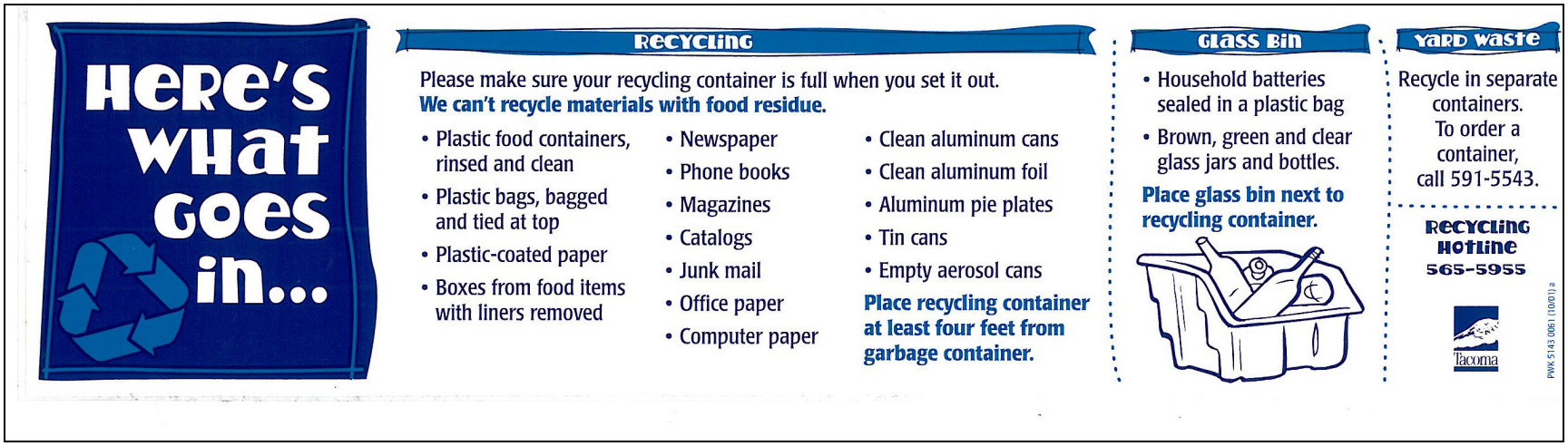
Wondering what to do with those unwanted bikes, bricks and lawn chairs? You know they don't belong in a recycle bin, but where should they go? Worry no more! Thurston County Solid Waste has compiled a list of reuse and recycling locations throughout the county. Visit www.WhereDoITakeMy.org for details. Also visit the following free materials-exchange websites to buy, sell or give away items.

- www.2good2toss.com
- seattle.craigslist.org
- www.freecycle.org
- groups.yahoo.com/group/OlyReusables

# Appendix G
# Outreach Materials by Jurisdiction – Cart Label

## City of Olympia


## City of Tacoma



## Mason and Pierce Counties


## Thurston County


RECYCLE IN THIS CART
WASTE CONNECTIONS INC
360-892-5370 WWW.WCNORTHWEST.COM
PAPER & CARDBOARD
Newspapers & phonebooks
Magazines & catalogs
Milk & juice cartons
Cereal & shoe boxes
Cardboard & paper bags
Mail & office paper
METAL
Clean metal cans & lids
Clean foil pie plates & trays (no food residue)
Empty aerosol cans
Other small metal items
PLASTIC BOTTLES & TUBS
Plastic bottles
Plastic tubs
Nursery pots
Plastic buckets
NEAR CART
GLASS BOTTLES & JARS
Place in designated glass bin
MOTOR OIL OR ANTIFREEZE
Place in clear one-gallon milk jug with screw-on top
NO Garbage, Plastic Bags, Plastic Lids, Styrofoam, Hazardous Waste, or Food Soiled Paper