"Partnering to make recycling strong through economic and environmentally sound solutions"

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The State of Recycling Markets in New Hampshire

Prepared by the Northeast Resource Recovery Association
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1. About the Northeast Resource Recovery Association

The Northeast Resource Recovery Association ("NRRA") is a nonprofit that enables both small and large communities to manage their own recycling programs. NRRA is one of only a handful of nonprofits in the country that provides cooperative marketing programs for recyclables. This means that we negotiate competitive pricing from companies who purchase recyclables and help our members sell their recyclables to those companies.

In addition, we provide cooperative purchasing programs, educational and networking opportunities, technical assistance, and school programs in the general areas of waste reduction and recycling. For example, NRRA offers a variety of educational programs that qualify for continuing education credits required by NHDES certified solid waste operators.

The membership of NRRA includes over 400 municipalities, individuals, and businesses in New Hampshire, Vermont, Massachusetts, Connecticut and Southern Maine. Originally founded in New Hampshire, approximately 65% of NRRA's municipal members are located in New Hampshire. In the past three years, over 75% of the recyclable commodities NRRA marketed came from New Hampshire members.

2. The Financial Value of Recycling over Disposal

One myth to dispel is that if recyclables can't be sold for a profit, then they should be thrown away. Rather, recycling should be viewed as a cost avoidance strategy rather than a money maker, and recycling will continue to make financial sense in the future. Here's why.

Two key costs for municipalities in the disposal of municipal solid waste are the tipping fee—the cost to dispose of waste at a landfill or incinerator—and the hauling fee—the cost of transportation to get the material to the landfill or incinerator. Both of these costs are determined by weight.

The northeast has the highest tipping fees in the country because we have the least amount of available space for new or expanded landfills. This high cost will only continue to increase and have an even bigger impact on community budgets, which will make recycling more attractive over time. While it makes financial sense for some communities with high single stream recycling costs

to landfill or burn recyclables in the short term, this only guarantees a shorter lifespan for landfills and higher tipping fees sooner for everyone.

3. Types of Recyclable Commodities

The four core recyclable commodities from municipal solid waste in order by weight are: (1) fibers (primarily cardboard and mixed paper), (2) glass, (3) plastic, and (4) metal (aluminum cans and steel cans).

A recent report by the Northeast Recycling Council provides a useful overview of the average composition of recyclable commodities in the northeast.[1] The report was based on a survey of materials recovery facilities ("MRFs") in the northeast and provided an average percentage of outbound tons marketed per commodity in 2018. MRFs receive, separate, and prepare recyclable materials from the public, typically through single stream recycling systems, for marketing to processors and end user manufacturers.

Average Percentage of Tons Marketed per Commodity

Fiber	OCC Grade #11 (Cardboard)	24.40%	52.42%
	Mixed Paper Grade #54	27.97%	
	Aseptic and Gable-top Cartons (Grade #52)	0.05%	
Glass	Clear	4.41%	25.14%
	Green	1.75%	
	Brown	4.41%	
	Clear, Green & Brown Mix	14.57%	
Residue	Residue (aka contamination, trash, nonrecyclables)	12.19%	12.19%
Plastic	#1 PET (Polyethylene Terephthalate)	3.08%	8.70%
	#2 HDPE Natural (High-Density Polyethylene)	0.67%	
	#2 HDPE Colored (High-Density Polyethylene)	0.93%	
	#5 PP (Polypropylene)	0.89%	
	#3-7 Plastic Mix	2.41%	
	Bulky Rigids	0.72%	
Metal	Uniform Beverage Cans (aluminum cans)	0.72%	3.06%
	Steel Cans	2.34%	
	Total	**101.51%**	**101.51%**

Note: Disparity over 100% is due to how glass was reported (data from NERC).

Note that over 50% of the recycling stream consists of fibers (cardboard and paper). A quarter of the material by weight is glass, and nonrecyclable materials, here called residue, outweigh plastic and metals combined.

[1] https://nerc.org/documents/Recycling%20Market%20Development/Blended_Commodity_Values_in_the_Northeast%20-%20August_2019.pdf

In general, commodities separated into distinct subcategories have a higher price at market than the subcategories being mixed together. *For example, mixed paper is different types of paper mixed together (ex. newspaper, magazines, junk mail, office paper). If a community separates out office paper or newspaper separately from its mixed paper, it can receive much higher value for those commodities versus just mixed paper.*

4. Source Separation versus Single Stream Recycling

The reported death of recycling has been greatly exaggerated. The challenges facing municipalities in New Hampshire are related to trash (especially related to single stream recycling), not recycling. Single stream recycling isn't representative of all communities.

Recycling programs initially began as either source separated or dual stream. In a fully source separated system, residents bring recyclables to their local recycling center and separate out each commodity manually. Many communities in New Hampshire still do this today, including most of NRRA's members. In dual stream systems, fibers (cardboard and paper) are separated from containers (metal, glass, and plastic).

The idea behind single stream recycling was that it would be more convenient for people to recycle everything in one bin, and therefore recycling rates would increase. However, the downside of single stream recycling is increased contamination. Contamination means anything in a final recyclable commodity other than the intended commodity. For example, broken glass can contaminate paper and plastic in single stream systems. Therefore, use of single stream recycling typically results in lower quality commodities than source separated or dual stream systems because of higher levels of contamination in the final commodities.

Municipalities that source separate, rather than using single stream, typically produce cleaner material for market and get paid higher value than for single stream commodities due to lower levels of contamination associated with source separated material. NRRA estimates that 71% of the communities in New Hampshire source separate rather than use single stream recycling. But by population, an estimated 43% of the population is served by source separation because larger communities are more likely to use single stream. *NRRA members with single stream recycling programs include Nashua, Merrimack, Manchester, and Portsmouth.*

The mechanics of source separated recycling and single stream recycling vary considerably. A municipality that source separates will need containers to hold the final material loose, or better yet, machinery called balers to compact commodities into rectangular bales and secure them with wire or strapping. Covered storage space is needed to keep sorted commodities clean and dry until they can be sold. Municipalities in New Hampshire can benefit from grants available through New Hampshire the Beautiful, a beverage industry group, to purchase equipment and storage for recycling.

On the other hand, single stream recycling systems rely on regional MRFs. Communities using single stream recycling typically do not need the same space and equipment as a source separating community.

5. Impact of China's National Sword Policy on Recycling Markets

China's National Sword Policy

In recent decades, population growth in China led to higher demand for importing recyclables into the country, especially paper. According to the Institute of Scrap Recycling Industries, Inc., 31% of all United States scrap commodity exports—worth $5.6 billion—was shipped to China in 2017. China was willing to accept relatively high levels of contamination in the recyclables it imported, but this led to severe negative environmental impacts.

In 2013, China enacted Operation Green Fence, which involved inspections of recycling coming into China. Then in July of 2017, China announced that its National Sword policy would take effect on January 1, 2018. The policy banned importation of all plastics, unsorted mixed paper, textiles, and some glass and metals into China. For materials China would still accept, contamination rates could not be over 0.5%, whereas 2% was the prior accepted standard. 0.5% contamination is extremely hard for single stream MRFs to meet due to the higher levels of contamination associated with single stream recycling systems.

Impact on Fibers - Mixed Paper and Cardboard

Mixed paper is the piece of the waste stream that was hit the hardest by the China's National Sword. When China's National Sword policy was announced, China purchased approximately 55% of the world's scrap paper. The resulting drop in demand for paper resulted in the price dropping precipitously worldwide. In the northeast, for example, the average price dropped from a high of $85 in March 2017 to below zero now.

Unlike other markets, when demand falls for recyclables, the supply does not likewise fall. There is no practical way to stockpile all the material that was previously shipped to China. Unfortunately, that means there will be a need to burn or bury large amounts of material until the market responds to make recycling domestically more economical.

Similarly, the price of cardboard has dropped following the announcement of China's National Sword Policy. This precipitated an increase of supply in mills in the United States, keeping the value at $40 to $50 a ton.

Impact on Municipalities and Materials Recovery Facilities

Since over 50% of a typical municipal recycling stream consists of mixed paper and cardboard, the drop in mixed paper and cardboard prices has major budget implications for both New Hampshire communities and MRFs.

A MRF typically earns revenue from two sources: (1) the tipping fee (the fee charged to customers to bring in material) and (2) the revenue from selling the sorted commodities. In order to make a profit, those amounts must be greater than the cost to sort and prepare the commodities for sale. Given the reduction in the value of commodities, many MRFs are facing financial challenges as well.

6. Effects in New Hampshire

Single Stream Recycling

Communities in New Hampshire that utilize single stream recycling have felt the impacts of China's National Sword policy to varying degrees. Some have long term contracts and can expect to see large increases in the fees charged for single stream recycling once those contracts are renegotiated. Others have seen their costs increase already. Some have decided to end their single stream recycling programs, and some have switched from single stream back to source separation.

Two communities that ended their curbside single stream recycling programs in recent years include Franklin and Hooksett. Both still allow residents to source separate some materials at their town transfer center. Bow briefly stopped single stream recycling, but due to public demand, it was reinstated. Rollinsford switched from single stream back to source separation, which required it to purchase a baler so it could bale the separated commodities for sale.

NRRA's advice for communities with single stream recycling includes educating residents to clean up the recycling stream by reducing contamination, such as plastic bags and garden hoses. In addition, NRRA recommends avoiding making big changes to recycling programs to keep residents in the habit of recycling for when markets rebound. Many MRFs are investing in new technology to reduce contamination and attempt to reach the 0.5% contamination standard set by China.

Mixed Paper

NRRA members currently must pay to recycle their mixed paper. So long as the cost of recycling mixed paper is lower than the cost to dispose of paper in a landfill or incinerator, it makes financial sense to keep recycling. But some communities have decided to throw away their mixed paper until markets improve.

For example, Marlborough has decided to throw away its mixed paper until markets improve. They still separate and bale cardboard and separate valuable newspaper. Their mixed paper is going with their municipal solid waste to be incinerated. The recycling facility is asking residents to continue to separate and bring their mixed paper to the recycling facility to keep up the habit for when the market makes it economical for the community to recycle mixed paper again.

Like Marlborough, communities with enough storage and equipment are sorting out fiber commodities that are more valuable than mixed paper alone. *For example, Meredith separates out newspaper, which sells for a higher value than mixed paper. Littleton separates office paper, which likewise is sold for a higher value than mixed paper.*

The silver lining of China's National Sword policy is that the impacts are driving domestic investment in recycling infrastructure. Another report from the Northeast Recycling Council tracks announced increases in the capacity of North American paper mills to use recyclable paper as a raw

material.[2] The report identifies 19 new or existing mills that will use recycled paper as a raw material, thus increasing demand for recycled paper.

NRRA has searched for alternative uses and for a long-term domestic capacity solution for mixed paper. Some possible new markets for mixed paper include animal bedding and pellets for fuel.

Glass

Markets for glass have decreased over the years, though China's National Sword policy didn't have a big impact on glass recycling in the northeast. The heavy weight of glass makes both transportation and disposal expensive. Over time, it became difficult to keep glass-like contaminants, such as porcelain, window glass, and ceramics, out of clean glass bottles and jars. Glass can also contaminate single stream recycling when it breaks and gets into other commodities, such as paper. Therefore, some MRFs no longer accept glass, and it may be less expensive for other communities to throw their glass away than pay to recycle it through a single stream system.

NRRA members can recycle glass with an NRRA vendor in Canada that processes the glass, which is then turned into fiberglass insulation back in the United States. *NRRA currently has two host sites for glass recycling in New Hampshire—Keene and Lebanon—which serve 35 municipalities and businesses in New Hampshire.* Municipalities can deliver the glass to these host sites for a cost that is typically less than the cost to otherwise dispose of the glass in landfills. The glass that is being recycled must be very clean and not contain glass-like contaminants such as ceramics, Pyrex, or window glass.

For communities that find it difficult to meet these clean glass requirements, NRRA has a processed glass aggregate program that was developed decades ago. This program allows municipalities to combine all colors of glass and include ceramics, window glass, and porcelain to be crushed into an aggregate at specific NRRA sites. *NRRA currently has two host sites in New Hampshire—New London and the Waste Management Turkey Landfill in Rochester—serving 50 municipalities and businesses in New Hampshire.* Once stockpiles reach 1,000 tons, an NRRA vendor brings in a machine to crush the glass. The processed glass aggregate can be used as a subbase for roads, bedding for pipes, and a subbase for retaining walls and foundations. Municipalities can use 100% processed glass aggregate in public works projects, whereas similar private or commercial use must be approved by a professional engineer or architect. NH DOT also approves processed glass aggregate for use in State roadway projects in up to a 20/80 mix with gravel (20% processed glass aggregate, 80% gravel).

For example, New London has used 100% processed glass aggregate as a base for several public works projects, including as a subbase for a new maintenance building foundation.

Metal and Plastic

Although metal and plastic commodities represent the smallest portion by weight (less than 12% combined) of the average blended ton from single stream recycling, they account for a

[2] https://nerc.org/documents/Recycled%20Paper%20Market%20Expansion%20-%20Updated%20June%2020,%202019.pdf

disproportionately high amount of the revenue received from recycling. This is true for both municipalities that source separate and MRFs that process single stream recycling.

NRRA markets plastics to buyers in the United States, with few exceptions. Therefore, although China's National Sword prohibited the importation of plastics, municipalities marketing plastic material through NRRA have seen few impacts on plastic values from the ban. Similarly, China's National Sword had little impact on the value of metals, such as aluminum cans.

The primary source of income from plastic recycling is from #1 PET and both natural and colored #2 HDPE containers, which are those often associated with soda bottles, milk jugs, and detergent bottles. The remaining plastics #3 through #7 have little value and limited end markets for recycling. Examples of plastics with lower value include plastic film, plastic bags, and black plastic. These are the types of plastic that are increasing in volume as packaging for products changes over time.

As with most commodities, municipalities can receive a higher value for their plastics if they separate them further into subcategories. However, space and equipment limitations, as well as a community's ability to educate its residents, limit a municipality's ability to separate out plastic effectively. Some communities choose to throw away all their #3-7 plastics due to the lower value received for these commodities and limited end markets.

For example, BCEP Solid Waste District, which serves the towns of Barnstead, Chichester, Epsom, and Pittsfield, recently made changes to is recycling center so residents can separate out #1 PET, #2 HDPE natural, and #2 HDPE colored. The remaining plastics are currently being thrown away.

As another example, Northwood temporarily stopped its entire plastics recycling program due to high contamination levels. With input from NRRA, Northwood is working on re-establishing their plastics recycling. This will involve improving the grounds of the facility and hours of volunteer work at the facility to ensure residents are recycling correctly.

Sample Pricing of Commodities in Northeast

The following pricing list shows the average range of pricing NRRA members can expect to receive for the four key commodities in August 2019. These prices are for illustrative purposes only because they assume most material is baled and shipped in full tractor trailer loads (rather than loose in gaylords) and actual pricing varies depending on how the material will get delivered to the purchaser and other factors. Note that the lightest materials by weight—plastic and metals—account for the greatest prices per ton, whereas the heaviest items by weight—fiber and glass—receive the lowest value per ton.

Sample Market Pricing for August 2019

		Revenue / (Cost) Per Ton	
		Low	**High**
Metal	Aluminum Cans	$500	$880
Plastic	HDPE Natural	$180	$370
Plastic	PET	$140	$260
Plastic	HDPE Colored	$140	$180
Metal	Steel Cans	$70	$142
Fiber	Sorted Office Paper	$95	$105
Fiber	#8 Newsprint	$45	$65
Plastic	#1 - #7	$40	$60
Fiber	OCC (Cardboard)	$25	$50
Fiber	Mixed Paper	($35)	($5)
Glass	Glass PGA	($60)	($35)

7. How the State Can Help Municipalities

Solid Waste Task Force

In 1999, then Governor Jeanne Shaheen created a Solid Waste Task Force charged with analyzing and reporting on three main issues: solid waste disposal options; importation of solid waste; and cost increases in solid waste management. The Task Force issued a detailed report in 2001. Given that recycling markets, especially single stream, are intertwined with the municipal solid waste infrastructure, it may be worthwhile to create another similar task force, which could inform the update of the State's Solid Waste Management Plan.

NRRA participated in the original Task Force and would welcome the opportunity to participate if a new one was convened.

Increase NHDES Funding

The State could increase funding for NHDES so it could focus more on solid waste planning and waste reduction. With additional resources, NHDES could devote more time to updating the State's Solid Waste Management Plan and providing technical assistance and perhaps grants to municipalities to support proactive waste reduction efforts.

Use Recycled Content Products

The State could support markets for recyclable materials by purchasing products with recycled content. This could include encouraging the use of recyclables in State infrastructure projects, such as processed glass aggregate, when markets for recycling those materials are limited.