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Glass Recycling in the Southeast

A Report on Material Recovery Facility Activities | Sept. 2020

Eleven states united to develop and promote sustainable recycling programs.

**Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana,
Mississippi, North Carolina, South Carolina, Tennessee, Virginia**

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About SERDC

The mission of SERDC is to unite industry professionals, organizations, government agencies and individuals engaged in the business of recycling; to foster communications among those groups; to promote sustainable recycling programs; and, to coordinate education and public awareness activities related to recycling.



SERDC is supported by membership fees from over 60 Business, Trade, Organizational and Individual Members. In addition, SERDC provides [professional consulting services](#) based on extensive expertise and experience in the recycling sector.

Study Background

The Southeast Recycling Development Council (SERDC), with support from the Glass Packaging Institute and the North American Insulation Manufacturers Association, surveyed the recycling Material Recovery Facilities (MRFs) in the eleven state SERDC region. Several recycling programs in the Southeast have recently discontinued the acceptance of glass containers in their collection programs, citing restrictions and/or fee increases from the Material Recovery Facilities (MRFs) that sort their collected material for marketing. The survey sought to identify the specific challenges leading to the suspensions of glass program acceptance.

For this report, a Material Recovery Facility (MRF) was defined as an operation, public or private, that receives mixed recyclables materials from residential collection programs operating either single or dual stream collection. Some of the MRFs also processed



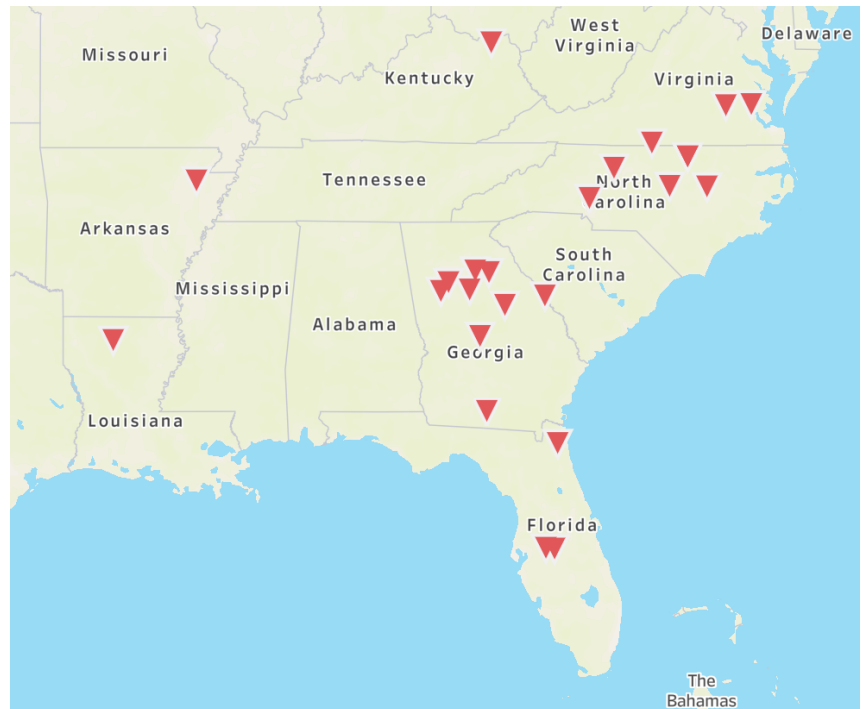
material collected from commercial generation. Operations that processed materials collected solely from the commercial sector were not included. Commercial sources are an important component of the manufacturing material supply, they but are outside the scope of the project. Commercial collections of glass containers for recycling are not impacted by the current program suspension threats.

The potentially diminishing supply of recycled glass, cullet, is of great concern to the glass bottle and fiberglass insulation manufacturers. Their furnaces operate more efficiently and use less fuel with greater amounts of cullet replacing virgin extracted resources. Maintaining this feedstock supply for manufacturing is central to SERDC's purpose. The glass industry provides 4,720 manufacturing jobs in the Southeast¹.

SERDC works closely with the region's individual state agencies responsible for material management and enjoys a supportive relationship with each. These agencies were key resources to identify all the MRFs in their respective state and provided contact information for nearly all locations. Some of the state responses included any facility, public or private, that had a material handling permit to operate, issued by the state agency. Some of these locations were not actual MRFs, rather several were hauling companies and other service providers, operating under permit from their respective state. Those lists were organized and purged to only include communication with valid residential MRF operators.

Glass use in the Southeast

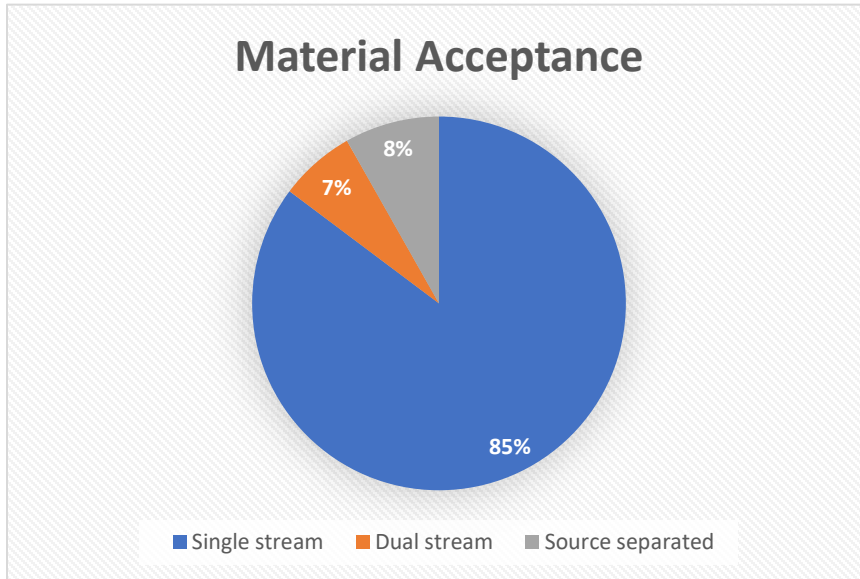
SERDC has identified 25 glass manufacturers in the region using recycled content from residential recycling sources. These operations provide nearly 5,000 manufacturing jobs and generate over one and a half billion dollars in sales¹. Establishing a sustainable supply chain for these many facilities, collection programs and MRF processors is a necessity. Upon evaluation of the results from this survey, glass recycling barriers remain to be addressed.



Findings

- SERDC staff contacted a total of 90 MRFs and received 61 responses to the survey, for a response rate of 68%.
- Glass is accepted at 50 of 61 that listed their accepted materials list MRFs.
- Of the 50 that accept glass, eight (8) accept only source separated glass.
- The majority of MRFs (39) reported accepting glass as a part of single stream.
- Feedback received: Glass recycling remains problematic for most MRFs, primarily due to equipment damage, contamination in other materials and market value.
- MRFs are interested in investing in equipment improvements to improve glass recycling.
- The low market value of glass prohibits many smaller MRFs from accepting in residential mix.

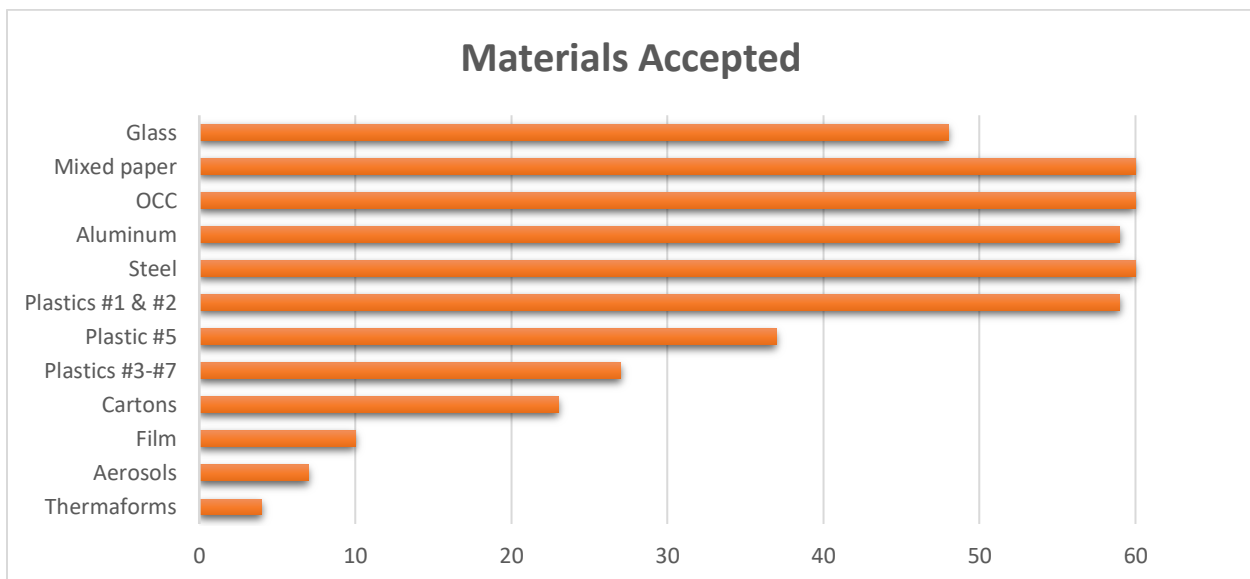
Method



When it comes to recycling destined for a Material Recovery Facility as defined in the [Background](#) above, the Southeast has generally accepted single stream as the primary collection method. Fifty-two (52) of the responding 61 MRFs are operating as single stream MRFs.

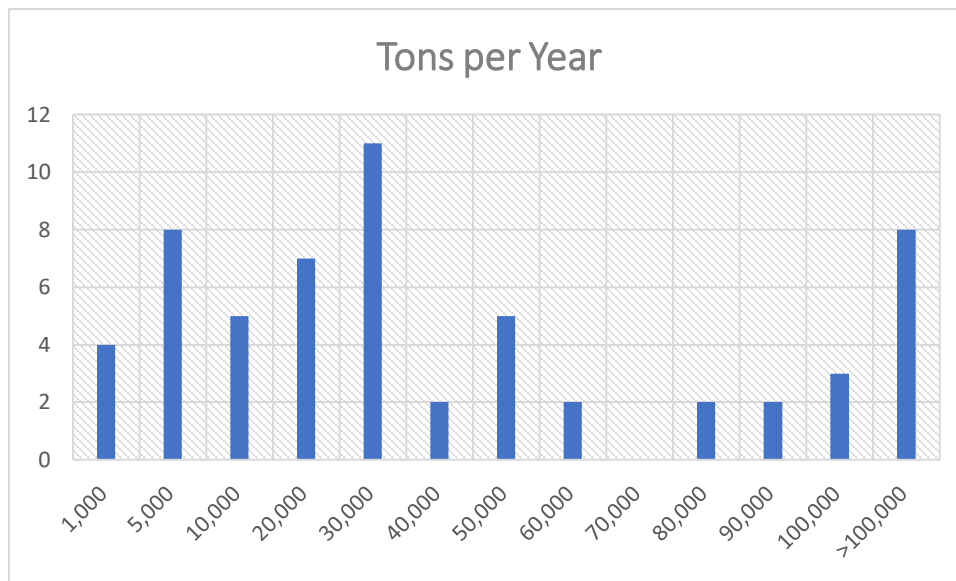
There were only four dual stream MRFs reporting to the survey. Forty-eight (48) of the 61 accepted glass containers.

Materials



Capacity

Of 60 respondents to this question, MRF capacity ranged from 800 to 450,000 tons per year. Most of the MRFs process less than 30,000 tons per year (TPY). Eleven (11) processed over 90,000 TPY.



The facilities reporting cluster around large and small operations. There were fewer, eleven (11), in the mid-range, 40,000 to 90,000 TPY.

- The larger MRFs tend to be the ones accepting glass, especially the single stream facilities that accept glass included in the single stream accepted materials lists.
- The average of annual total material managed for those accepting glass in single stream was 59,396 TPY. (range: 1,000 TPY to 450,000 TPY).
- The average total annual material managed for MRFs that accept only source separated glass was 23,204 TPY. (range: 2,200 TPY to 48,000 TPY).
- The average tons managed per year for MRFs that do not accept glass was 7,720 TPY. (range: 120 TYP to 24,000 TPY). Of those MRFs that do not accept glass, only four process over 1,000 tons a month.

MRF operating capacity in the region varies from very small 120 TPY to very large 450,000 TPY, with the median being 20,400 TPY and the mean 43,023 TPY.

The survey also questioned the MRFs whether they were running above or below their design speed. Most were operating at or below the design capacity. Running beyond capacity increases the opportunity for cross sorting of materials and reduced removal of nonrecyclable items. Both increase the contamination of the outgoing materials.

Population Served

Thirty-seven (37) of the respondents reported the estimated population of the area they serve. (Note that several of these reported numbers are extrapolated based on geographic region reported.) Of these reported,

- 95 percent of the population are within a MRF that accepts glass.
 - 83 percent can recycle in their single or dual stream program.
 - 12 percent have a separate glass collection system
 - 5 percent have no access for glass recycling.

Contamination

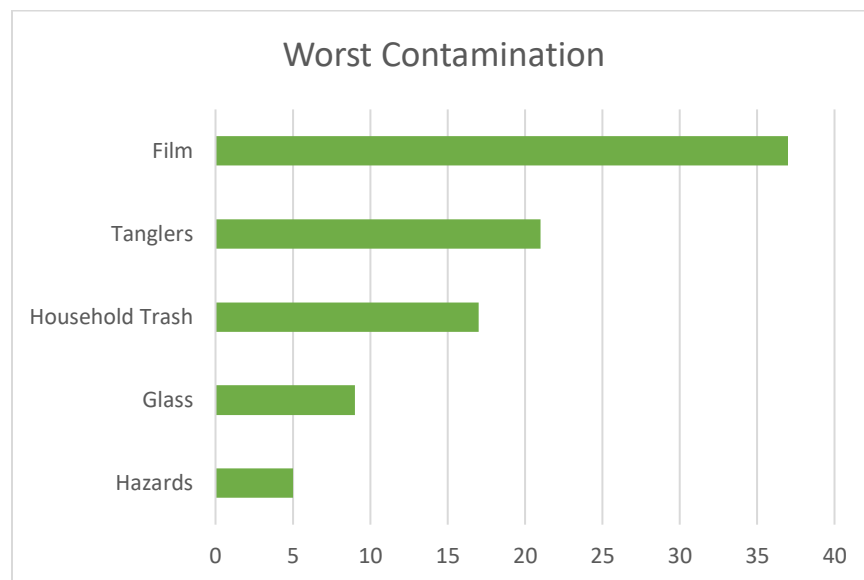
What is the worst kind of contamination that appears in inbound material? In other words, if you could effectively eliminate one contaminant at the source, what would it be?

Film was the leading reported contaminate for inbound material with 37 of the 58 respondents identifying it as the most problematic. Tanglers and general household garbage also scored high in the responses.



Several respondents listed multiple items as the worst. This likely indicates a general frustration with continued high levels of contamination, despite a regional focus on outreach to reduce contamination. Multiple contaminants identified were listed within each of the specified categories for a total greater than the overall facility response rate.

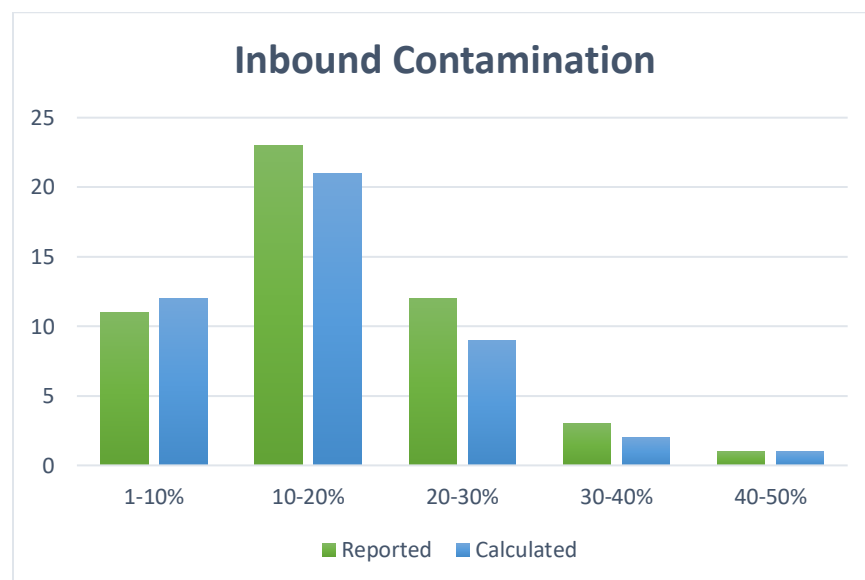
It was observed that nine respondents listed glass as a contaminate. Five of those nine listed glass on their accepted materials list, but only as source separated. Glass in their single stream mix was not captured and was reported and treated as contamination.



Fifty-two (52) respondents reported a percentage of contamination in the inbound tons. The percentages reported ranged from 3% to a high of 50%. **The average reported contamination rate is 19%.** Only two reports were above 35%.

The survey also asked how much material was sent directly to disposal from the MRF, representing removed contamination. Forty-nine (49) reported with responses varying from ten (10) to 36,000 tons per year.

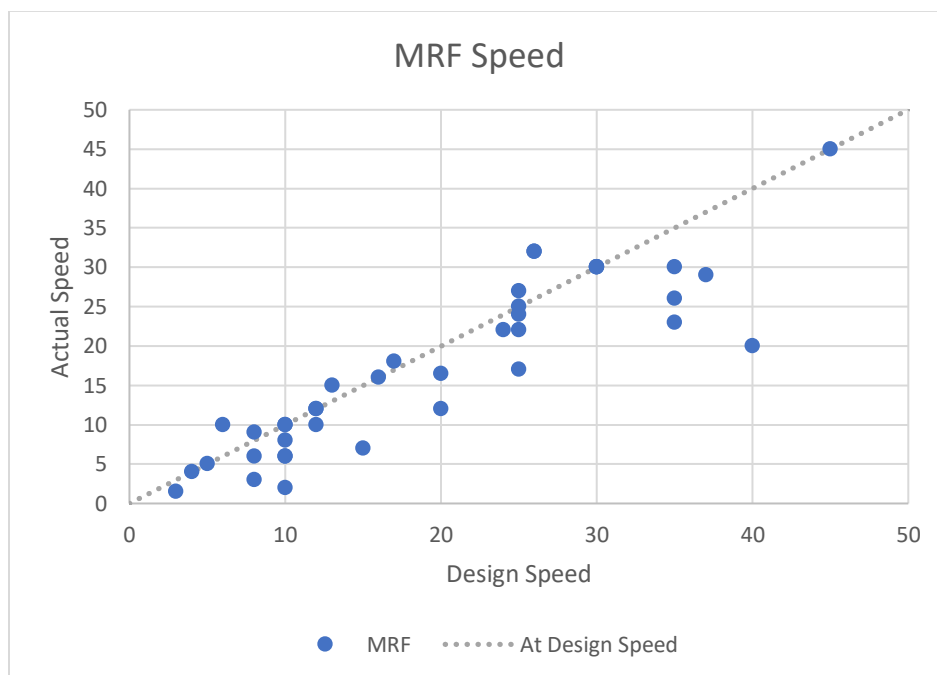
SERDC compared the reported tons disposed to the reported inbound tonnage and contamination rate to the total volume of material received and developed a calculated contamination rate, based on the total received and the amount disposed. In general, the comparison showed less material sent to disposal than the reported contamination level.



On average, there was a bit of discrepancy in the calculated contamination and reported percentage. Those MRFs with very low contamination tended to underreport while the others tended to overreport contamination rates. Possible causes include contamination leaving the MRFs in material bales, or simple miscalculation of inbound material mixture.

Processing Speed

Operating and design speeds of the MRF was reported from 42 of 61 MRFs. With only a few exceptions, the Southeastern MRFs are operating under or within design speed. There is significant process capacity available to support the expansion of material collection.



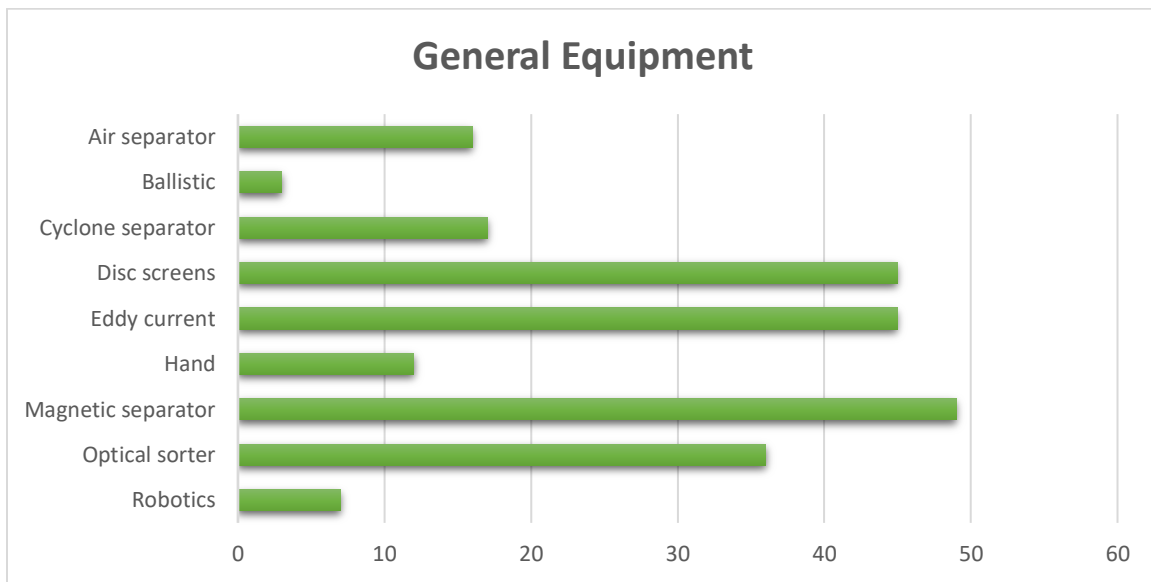
Recycling Separation Equipment

At a glance

- Disc screens, magnetic and eddy current separators are widespread.
- The larger capacity MRFs have invested in optical sorters and trommel screens.
- Robotics and ballistic sorters are beginning to be deployed.
- 33, of the 61 reporting, indicated that there will be improvements made to the facility in the next 3 to 5 years.

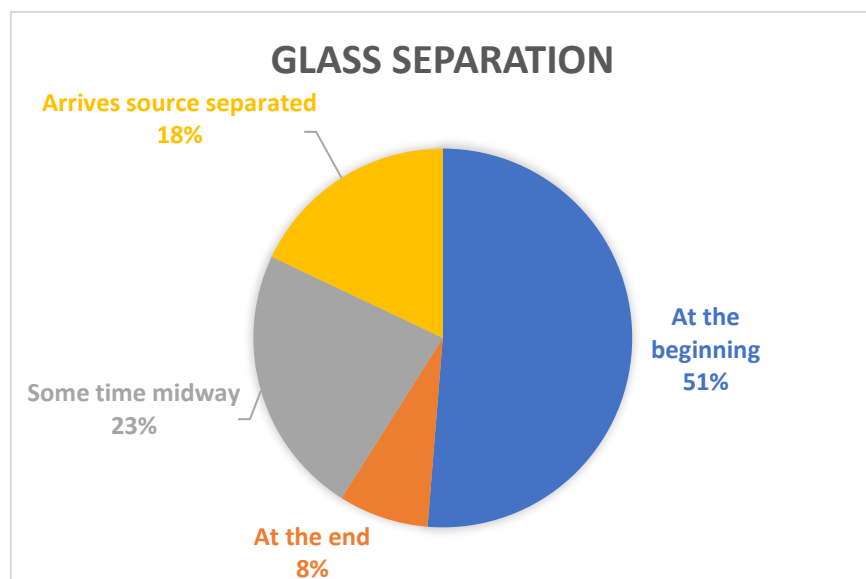
Robot sorters have been installed in seven (7) reported operations. It is expected that this number will rise quickly; nine (9) facilities report plans for the addition of robotics.

One dozen of the respondents are still relying upon manual sorting.



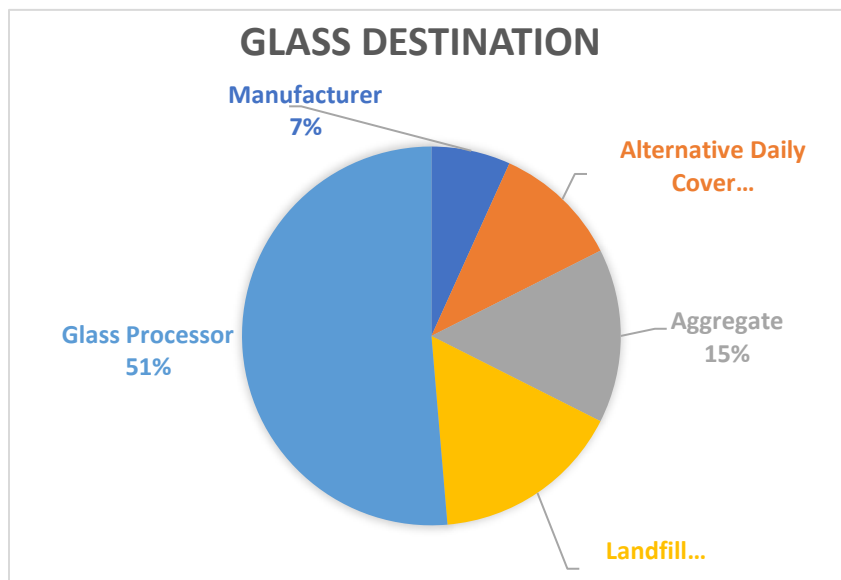
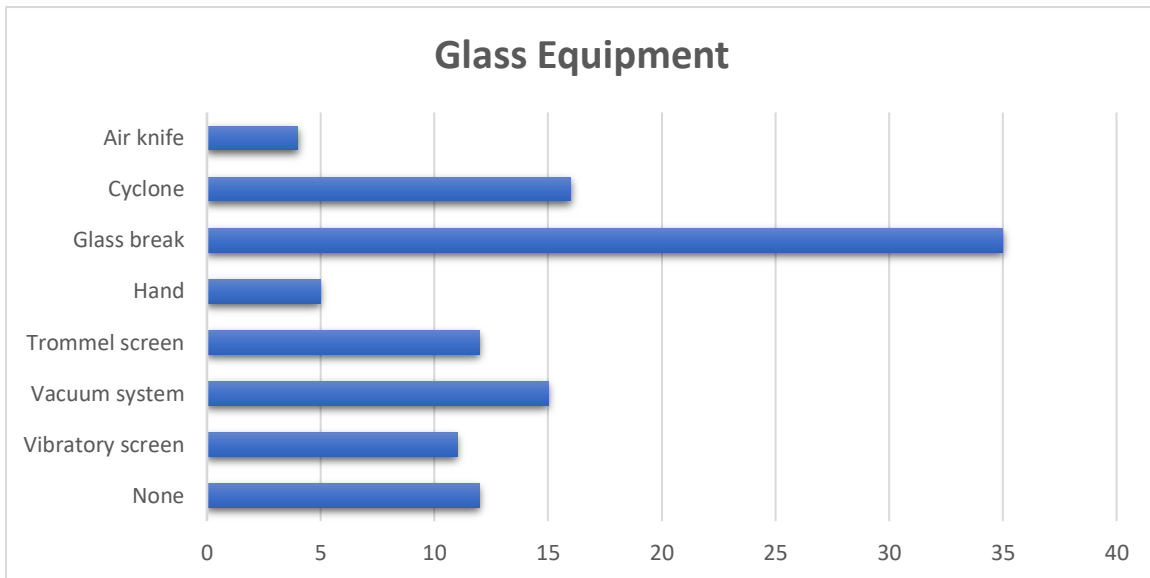
Glass Separation

Seven (7) MRFs reported accepting source separated glass only. Of the 32 remaining responses, most MRFs (20) remove glass early in the sort process. Only three reported using a sort at the end of the line.



Glass Sorting Equipment

Thirty-eight (38) MRFs reported having installed glass specific equipment as identified below in the graph. Glass breakers were most commonly used.



Glass Destination

Of the 50 MRFs that reported accepting glass, 38 ship to a glass processor for further cleaning for use in the container and/or insulation industries. Five (5) MRFs ship directly to these end users. Twenty (20) send glass to landfills for alternate daily cover or for disposal. Eleven (11) MRFs send glass for use as aggregate material. Multiple end uses were identified within each of the specified categories for a total greater than the overall facility response rate.

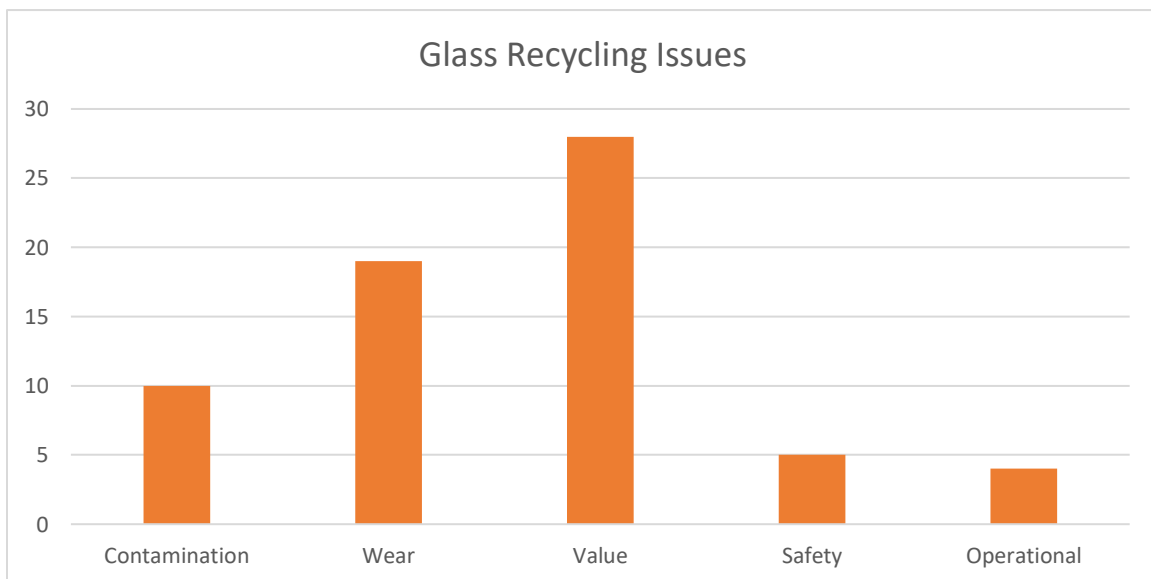
MRFs send glass for use as aggregate material. Multiple end uses were identified within each of the specified categories for a total greater than the overall facility response rate.

The size of the MRF impacts the destination of the material. Medium sized MRFs (20,000 to 60,000 TPY) were most likely to send glass to a processor for preparation to be used in manufacturing.

	Small	Medium	Large
Manufacturer	3	2	0
Alternative Daily Cover	0	1	7
Aggregate	5	2	4
Landfill	7	1	4
Glass Processor	9	16	13

Glass Recycling Concerns

Many respondents gave multiple answers for issues with glass processing. The primary concern was the value received for glass material. Several commented that they were disinclined to invest in glass cleaning equipment as they expected it to have a negative value after the upgrade. Wear on equipment was frequently reported as a concern.

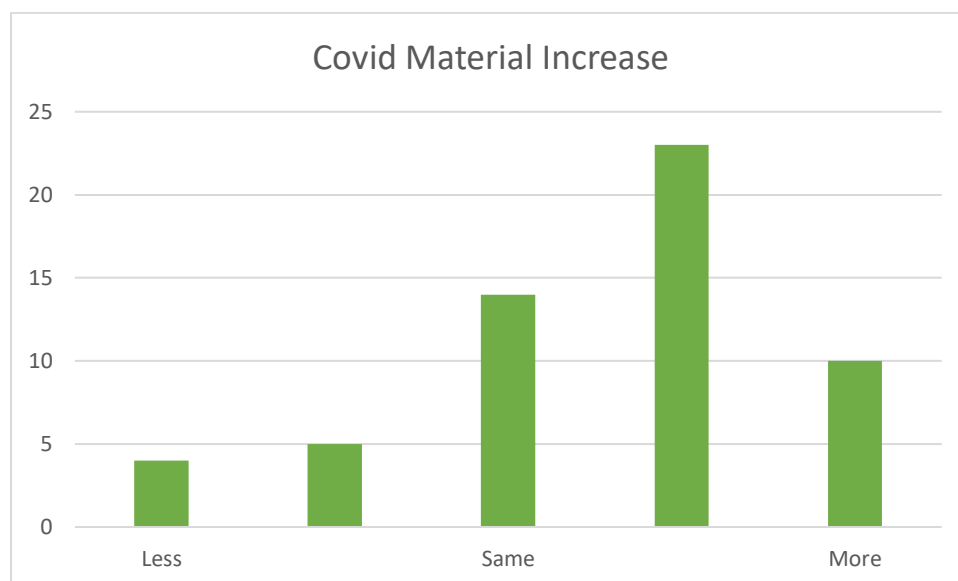


The survey asked if there are any specific market concerns for any materials. Many respondents identified mixed paper and plastics 3 -7 as problematic.

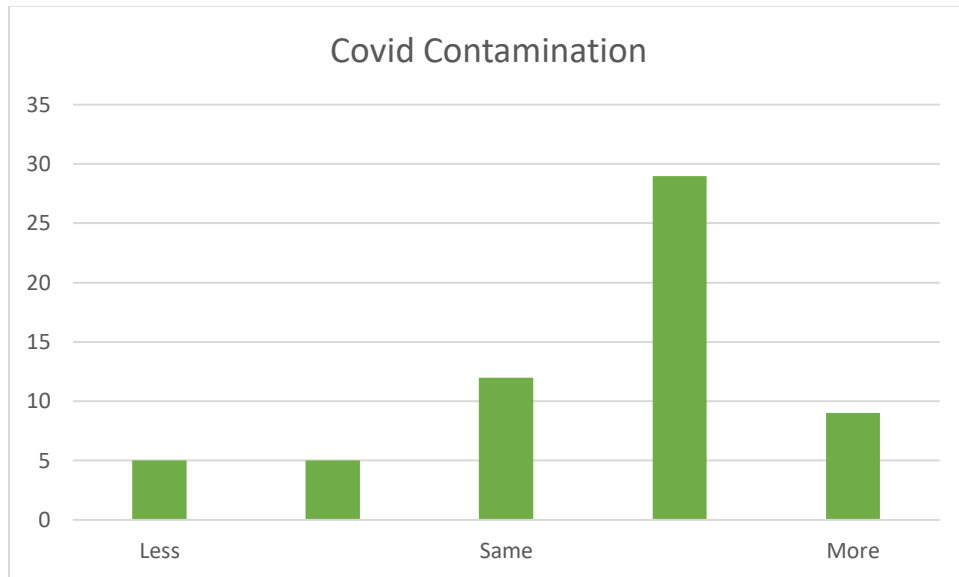
Plastic 3 - 7	13
Mixed Paper	11
General Market Value	7
Glass	5
OCC	3
Film	2

Covid-19 Impacts

Fifty-six (56) MRFs in the region reported whether the pandemic has led to more material collected for processing. Thirty-three (33) reported more or slightly more, fourteen (14) are receiving about the same and nine (9) indicated less material on their tip floor.



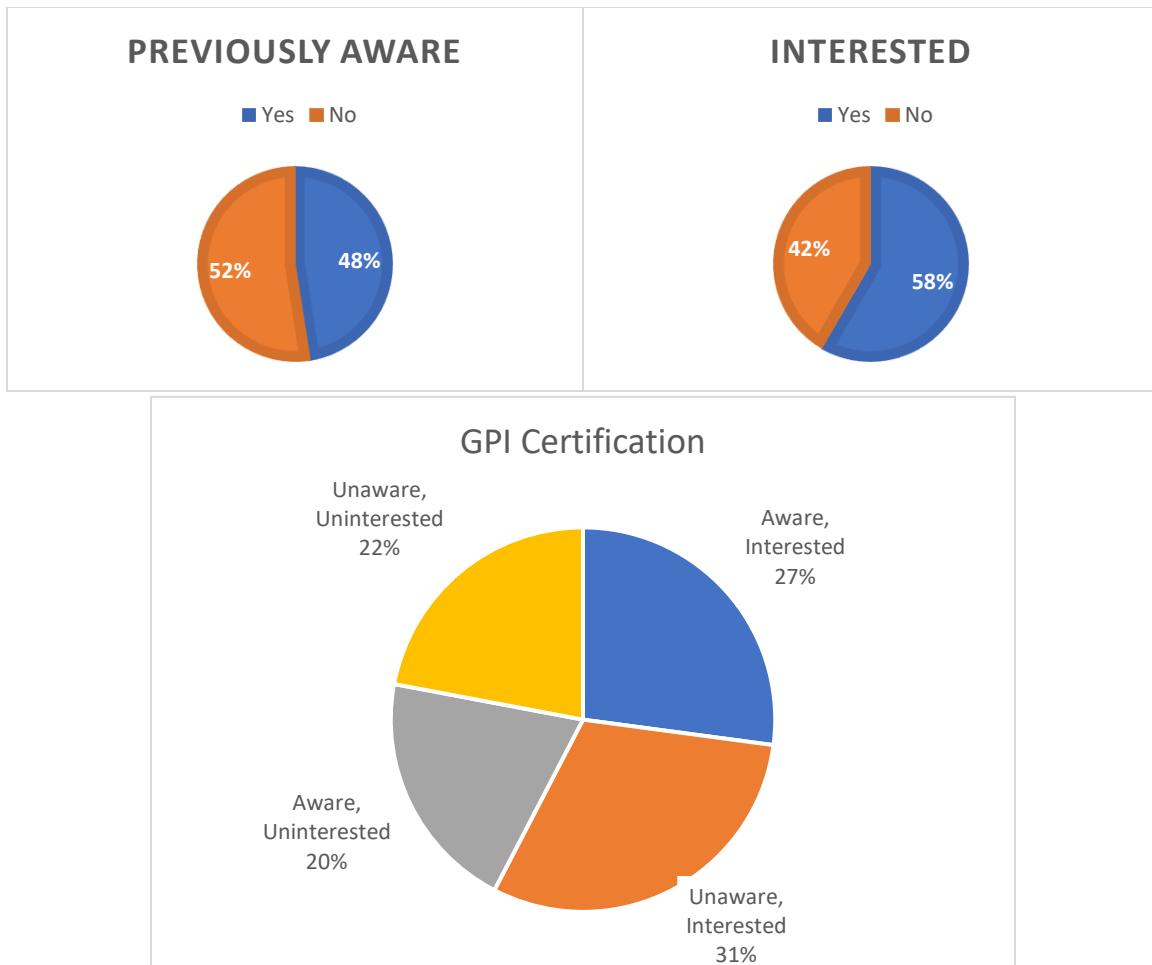
The Covid-19 pandemic has also led to an increase in the level of inbound contamination with 27 of 60 respondents reporting an increase since the beginning of the shutdown.



Only two reported any permanent cessation of collection programs, though 22 experienced temporary program suspensions early in the pandemic adjustments.

GRC Glass Certification Program

The Glass Recycling Coalition recently developed a MRF certification program for MRFs. Survey respondents were asked if they had heard of this certification and are were interested in learning more about it?





Report prepared by the Southeast Recycling Development Council for the Glass Packaging Institute and the North American of Insulation Manufacturers Association. The SERDC team was led by Will Sagar, Jen Dabbs, and Liz Stanbrough.

¹SERDC Demand Impact Study 2016 <https://www.serd.org/maps>



Appendix

MRF Survey

The Southeast Recycling Development Council (SERDC, www.serdc.org) is a non-profit organization working with eleven southeastern states on sustainable materials management within the region. SERDC is partnering with the Glass Packaging Institute (GPI) and the North American Insulation Manufacturers Association (NAIMA) to assess the flow of recycled glass products through Material Recycling Facilities (MRFs) in the region and has developed this survey to gather relevant information.

Individual responses will remain confidential. Only aggregated responses and publicly available information will be reported to convey the results of the study. If you have questions or concerns about the survey or particular questions, contact Will Sagar at 828-507-0123 or will.sagar@serdc.org to discuss.

Contact Information

In case we need to get in touch to clarify or confirm any responses, please provide information for the best point of contact.

1. Name

2. Email Address

3. Phone Number



4. Company

5. Address

6. City/Town, State, Zip

7. County

General
MRF
Questions

We understand some of these responses may be sensitive, and would like to reiterate that all individual responses will be held completely confidential.

8. How many towns or counties does the MRF serve? Please specify both if possible.

9. What is the total population served by the MRF? Specify in individuals or households if known.

10. How many workers (full-time equivalent) were employed at the beginning of 2020?

11. What kinds of materials are accepted for recovery? Select all that apply.

Check all that apply.

- ☐ Mixed paper
- ☐ OCC
- ☐ Cartons
- ☐ Plastics #1 & #2
- ☐ Thermaforms
- ☐ Plastic #5
- ☐ Plastics #3-#7 or "all" plastics
- ☐ Film plastic
- ☐ Aluminum
- ☐ Steel
- ☐ Aerosols
- ☐ Glass
- ☐ Source-separated glass only

Other: ☐ _____

12. How is material collected in the source communities? (Check all that apply)

Check all that apply.

- ☐ Single stream
- ☐ Dual stream
- ☐ Single or dual + glass separate
- ☐ Source separated at drop-off/convenience center

Other: ☐ _____

13. If glass is mixed with other materials when received, is an upcharge applied?

Mark only one oval.

- ☐ Yes
- ☐ No
- ☐ Other:

Total Volume &
Contamination

We understand some of these responses may be sensitive, and would like to reiterate that all individual responses will be held completely confidential.

14. How many tons of material does your MRF receive annually?

15. What is the percent of inbound contamination on average?

16. How many tons of contamination are sent directly to landfill?

17. What is the worst kind of contamination that appears in inbound material? In other words, if you could effectively eliminate one contaminant at the source, what would it be?

18. Has film & bag contamination seemed to improve or worsen in the last year?
Choose 3 if no change has been apparent.

Mark only one oval.

	1	2	3	4	5	
Much Worse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Greatly Improved

Processing
Equipment

We understand some of these responses may be sensitive, and would like to reiterate that all individual responses will be held completely confidential.

19. When is glass separated in the sorting process?

Check all that apply.

- ☐ Arrives source separated
☐ At the beginning
☐ Some time midway
☐ At the end

Other: ☐ _____

20. What types of equipment are used to sort all inbound material at your facility?

(check all that apply)

Check all that apply.

- ☐ Optical sorter
- ☐ Robotics
- ☐ Disc screens
- ☐ Trommel screen
- ☐ Eddy current
- ☐ Magnetic separator
- ☐ Cyclone separator
- ☐ Air separator
- ☐ All of the above

Other: ☐ _____

21. What types of equipment are used to clean glass in particular?

Check all that apply.

- ☐ Hand separation
- ☐ Vacuum system
- ☐ Trommel screen
- ☐ Glass break
- ☐ Vibratory screen
- ☐ Optical sorter
- ☐ Cyclone

Other: ☐ _____

Facilities

We understand some of these responses may be sensitive, and would like to reiterate that all individual responses will be held completely confidential.

22. What is the design speed of the MRF?

23. What is the actual speed of the MRF?

24. What year were major facility upgrades most recently completed?

25. What year were glass processing upgrades most recently completed?

26. Please describe any facility upgrades anticipated in the next 3-5 years.

Markets
and End-
Use

If glass is not accepted, answer only the last question of this section.

We understand some of these responses may be sensitive, and would like to reiterate that all individual responses will be held completely confidential.

27. How many tons of clean glass leaves the MRF annually?

28. What percent of non-glass residue and fines are in the final recycled glass product? Please answer with % non-glass, % fines.

29. What end-use destinations receive the bulk of recycled glass from your facility?

Check all that apply.

- ☐ Glass Processor
- ☐ Container Manufacturer
- ☐ Fiberglass Manufacturer
- ☐ Alternative Daily Cover
- ☐ Aggregate
- ☐ Landfill

Other: ☐ _____

30. What are the primary issues or concerns your facility has with glass processing?

31. Are there specific market concerns for any materials? E.g. OCC or mixed paper, cartons/food containers, mixed plastics, metals, etc.

Covid-
19
Impact

We understand some of these responses may be sensitive, and would like to reiterate that all individual responses will be held completely confidential.

32. Have any communities suspended their collection programs as a result of coronavirus complications?

Mark only one oval.

- ☐ Yes, permanently
- ☐ Yes, temporarily
- ☐ No

33. Of the communities that have continued collection, has there been any significant change in the volume of inbound material? Choose 3 for no change.

Mark only one oval.

	1	2	3	4	5	
Significantly decreased	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Significantly increased

34. Has there been any significant change in the contamination level of inbound material? Choose 3 for no change.

Mark only one oval.

	1	2	3	4	5	
Significantly decreased	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Significantly increased

Glass

Recycling

Coalition

Certification

The Glass Recycling Coalition's free MRF certification program (<https://www.glassrecycles.org/mrfglasscertification>) recognizes facilities with the equipment and operational procedures needed to process recovered glass to produce more marketable and higher quality glass. The glass certification is judged on current infrastructure and glass purity and is effective for three years. Certified MRFs will have a competitive advantage in the marketplace, as well as receive public recognition from GRC through traditional and social media.

35. Were you previously aware of this program?

Mark only one oval.

- ☐ Yes
- ☐ No



36. Are you interested in learning more about certification?

Mark only one oval.

☐ Yes

☐ No

37. Final comments or questions

Please scan the completed survey and email back to jen.dabbs@serdc.org.

Completed surveys can be mailed to:

SERDC
638 Spartanburg Hwy.
Suite 70, #152
Hendersonville, NC 28792