

**Ohio University (OU)  
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**The Plastics Waste Stream in Southern Ohio  
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Ohio University (OU)  
Voinovich School of Leadership and Public Affairs**

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IMAGINING THE OPPORTUNITIES, GATHERING YOUR IDEAS  
THE FACILITY AT PIKETON, OHIO

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Elissa Welch, OU Voinovich School<sup>1</sup>**

## **Introduction**

Circular economy solutions hold great promise for the region as waste stream protocols and markets continue to evolve. While much of the recent change has been driven by international market forces, the trickle-down effects are impacting local recycling systems across the United States, including Ohio. Apart from U.S. DOE-funded efforts in Southern Ohio, the Ohio University (OU) Voinovich School of Leadership and Public Affairs maintains a separate regional portfolio of waste- and recycling-related projects, primarily funded by grants from private foundations. Activities with partners across the region focus on policy, education, outreach, infrastructure, access, business support, and network development. Unbiased data is critical to the integrity of these projects and our approach to them.

The research presented here reflects our efforts to determine the market potential of the plastics waste stream in Southern Ohio for business ideation and economic development purposes. The report provides contextualized data for identifying traditional waste resources as potential inputs to future manufacturing efforts at the PORTS site in Piketon, Ohio. The findings of this process and relevant data are highlighted below.

## **Methodology**

The following activities were completed to gather data and assess information relating to the regional plastics waste stream.

### **1. Determine the geographically-relevant entities.**

The markets for recycling in the State of Ohio are complex and vary by Solid Waste Management Districts or Authorities (SWMDs),<sup>2</sup> Material Recycling Facilities (MRFs), commercial/retail recycling points, collection and processing channels, etc. In addition, materials move across county and state lines for processing. Keeping in mind reasonable costs for transportation of materials, Piketon, Ohio, was identified as the locus of activity for Southern Ohio. A 90-mile radius was implemented to determine the counties and associated SWMDs in Ohio of interest. As represented in Figure 1 below, 19 SWMDs in whole—or whose counties in substantive part—fall within the target area. (The Ohio EPA SWMD numerical identifier is included here for reference as well.) They include:

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<sup>1</sup> A special thanks to Adriana Offenberger, OU Voinovich School student researcher, for her support on this project.

<sup>2</sup> Solid Waste Management Districts (SWMDs) in Ohio are organized according to Ohio Revised Code. Each county in Ohio is required to be in a SWMD (or a waste authority) on its own or in conjunction with other counties. Ohio's 88 counties are organized into 52 SWMDs or authorities. More information can be found at: <https://epa.ohio.gov/dmwm/Home/SW-Mgmt-Planning2>. Note: In this report, we use the collective term "SWMDs" to refer to both districts and authorities.

- Adams-Clermont Joint SWMD (201)
- Allen-Champaign-Hardin-Madison-Shelby-Union Joint SWMD (North Central Ohio SWMD): (602)
- Athens-Hocking Joint SWMD (205)
- Brown Co. Solid Waste Authority (108)
- Butler Co. SWMD (109)
- Clark Co. SWMD (112)
- Clinton Co. SWMD (114)
- Coshocton-Fairfield-Licking-Perry Joint SWMD (416)
- Delaware-Knox-Marion-Morrow Joint SWMD (421)
- Fayette-Highland-Pickaway-Ross Joint SWMD (424)
- Franklin Co. SWMD (Solid Waste Authority of Central Ohio) (125)
- Gallia-Jackson-Meigs-Vinton Joint SWMD (427)
- Greene Co. SWMD (129)
- Guernsey-Monroe-Morgan-Muskingum-Noble-Washington Joint SWMD (SouthEastern Ohio SWMD) (630)
- Hamilton Co. SWMD (131)
- Lawrence-Scioto Joint SWMD (244)
- Montgomery Co. SWMD (157)
- Pike Co. SWMD (166)
- Warren Co. SWMD (183)

**FIGURE 1: MAP OF OHIO SOLID WASTE MANAGEMENT DISTRICTS WITHIN A 90-MILE RADIUS OF PIKETON, OHIO**



*Note: Distinct districts are shaded with different colors to represent single and multiple county district boundaries.*

When the research began, a 90-mile distance between Piketon, Ohio and the surrounding county seats based on actual road miles travelled was utilized. However, because of the diversity of collection sites and network of haulers within each county and corresponding SWMD—in addition to the broader discussion of the *potential* size of the plastics market—a 90-mile “as the crow flies” radius was used in the analysis presented here.

Within the proximal 19 SWMDs of interest, there are MRFs and commercial and industrial entities that voluntarily report their recycling efforts to the Ohio EPA. The “Ohio Material Recovery Facilities and Commercial Recycling Annual Report” lists information from the commercial facilities that *voluntarily* complete the Ohio EPA’s MRF Recycling Survey. This report is updated by Ohio EPA each spring.<sup>3</sup>

Within our geographic area of interest, as of the 2018 report, within the 19 SWMDs (and included 44 counties) there exist a total of 397 facilities reporting, as follows:

- Residential facilities: 32
- Commercial facilities (all retail businesses, including grocery stores, malls, restaurants, banks, etc. and all institutions such as schools and hospitals): 354
- Industrial facilities (all businesses that are considered manufacturing facilities, energy power plants, etc.): 11

Again, it is important to note that completion of this survey is voluntary, and the information reported varies greatly across reporting entities because of how the recyclables are collected and processed (and sold to markets). Additionally, the published MRF reports contain a single “Plastic” column, as well as a “Commingled” column that may include plastics if the hauler reports a lump, non-disaggregated number. Because of the high number of reporting entities, we focused first on contacting the SWMDs directly to ascertain if more plastics-specific detail could be obtained.

## **2. Contact regional stakeholders to request plastics data.**

To contact each of the SWMDs to request the plastics data of interest, a standardized call script was created that briefly explained the Voinovich School and our project portfolio in waste issues. The interviewer also requested information from the SWMDs regarding their collection data for plastics separated by type (#1s- #7s and films) and by year for the past 5 years. The contact information for the SWMDs was researched online. This process was initiated with phone calls and emails to a listed SWMD representative and/or redirected to a secondary individual per the contact’s advisement.

Additional information about state reporting affected this interview process. For example, Ohio Administrative Code requires SWMDs to submit annual district reports (ADR) that detail the quantities of materials reduced/recycled based on the state’s solid waste management plan goals.<sup>4</sup> According to Ohio EPA, “SWMDs obtain data for the annual report by surveying communities, businesses, industries and other entities that recycle. Completing and returning these surveys is strictly voluntary. Consequently, obtaining accurate, complete data is often a challenge for the SWMDs.”<sup>5</sup> In addition, because the SWMDs have the option to either achieve a State Goal 1 pertaining to recycling infrastructure or a State Goal 2 to achieve waste reduction and recycling rates, some SWMDs do not allocate the same resources to the recycling rates portion of the ADR, opting for the infrastructure reporting instead. One contact we spoke with suggested that of the hundreds of requests for information sent out annually for recycling information from local businesses, the response rate back to the SWMD is approximately 20%. *As such, the reporting infrastructure for recycling information in Ohio is systematically incomplete as currently implemented.*

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<sup>3</sup> The Ohio EPA maintains several years of reports on their Solid Waste Management Planning page. For additional information, see: <https://epa.ohio.gov/dmwm/Home/SW-Mgmt-Planning2#114315356-data-reports-and-studies>.

<sup>4</sup> For additional information, see Ohio Administrative Code “3745-27-90 Standards for solid waste management districts,” <http://codes.ohio.gov/oac/3745-27-90>.

<sup>5</sup> “2017 Reduction and Recycling Statistics. Guidance/Fact Sheet 1008.” Ohio Environmental Protection Agency (EPA) Division of Materials and Waste Management. December 2018. [https://epa.ohio.gov/portals/34/document/guidance/gd\\_1011.pdf](https://epa.ohio.gov/portals/34/document/guidance/gd_1011.pdf)

Of the SWMDs that were successfully contacted, the OU team was in some instances redirected to the waste haulers servicing the SWMD either independently (or later by our request), to obtain the level of detail in the plastics stream that we sought. SWMDs in general had aggregate numbers, but not always the details on the plastics processed by the haulers/recyclers in their area. This would be true especially if the stream was commingled (i.e., single-stream collection) in the reporting. The call back rate (and average “phone tag” time) was delayed in part by the fact that SWMDs are required to submit annual data via the ADR to the Ohio EPA as of June 1; therefore, many of the contacts were compiling 2018 annual data when we contacted them over the summer. Additionally, summer storms in some SWMDs created a layer of special circumstances that required their pressing attention.

### **3. Analyze available detailed data from the Ohio EPA.**

Given the differences in protocols across the SWMDs, haulers, and processors, and our attempt to obtain plastics-specific information, our methodology shifted. The OU team used the aforementioned “Ohio Material Recovery Facilities and Commercial Recycling Annual Report” listing of facilities from 2018 as a basis for a request to Ohio EPA for additional detail. (These MRF reports are collected by Ohio EPA in the spring each year via the voluntary process referenced above, and then aggregated and transmitted by Ohio EPA to the SWMDs for their annual reports.)

The OU team used a 2014-2018 dataset provided by Ohio EPA of this voluntarily reported information that had additional detail on plastics. Here, plastics information was broken down into the reportable categories<sup>6</sup>:

- PETE – also known as PET, or polyethylene terephthalate, a plastic widely used in food packaging, including plastic water bottles, and in fabrics like polyester
- HDPE – high-density polyethylene, the high-density version of polyethylene which is the world's most common plastic, and often seen in food packaging like milk jugs
- Film Plastic – commonly low-density polyethylene, used in plastic grocery bags and plastic wrap
- Mixed Plastic – in reporting may include any numbered plastic, including PETE and HDPE, *and/or* other resin types such as #3-#7
- Commingled – a reference to mixed material, single-stream collections where total volume or tonnage is reported

The data was sorted and cleaned to remove rows of data with incomplete county or SWMD identifiers that were not easily discernable to be corrected or attributed, and/or those that had no reported numbers across the full category set. Inherent challenges exist with using this data set as the full basis for plastics market potential, most notably because it is voluntary and inconsistently reported.

*Therefore, we make the assumption that this data underrepresents the total plastics waste stream processed in Southern Ohio.* However, for the sake of consistency, this is the data set utilized for the below tables and charts. We chose not to use the ADR data in addition to this dataset to minimize concerns of duplication.

*Note:* While we have within the dataset a column of data entitled “Commingled,” meaning reported in a single-stream of mixed products without separation or quantification by type, the variables inherent in the commingled data were too great to apply a proxy percentage for plastics, let alone types of plastics. Some of the SWMDs and haulers provided us information regarding their collected items, for example only #1s and #2s, or only plastic bottles and jugs. To best utilize the commingled information and be

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<sup>6</sup> The following resin definitions were adapted from the Plastics Industry Association (<https://www.thisisplastics.com/plastics-101/what-are-the-different-types-of-plastic/>).

able to extract out a relevant plastics number, individual haulers and MRFs should be contacted to determine the full mix of materials collected and processed. Similarly, “Mixed Plastics” varies by what the hauler collects and what the processor chooses to process based on the cost to process, the market for the materials, as well as how it is aggregated for sale. This is explored more in the Discussion below.

Table 1 presents the total tons of plastics voluntarily reported to the Ohio EPA by commercial businesses and MRFs. In general, a growth trend in reported plastics is seen from 2014-2018.

**TABLE 1: TOTAL PLASTICS VOLUNTARILY REPORTED 2014-2018 IN SWMDS WITHIN THE 90-MILE AREA OF INTEREST (INCLUDES PETE, HDPE, FILM PLASTICS & MIXED PLASTICS) (TONS)**

	2014	2015	2016	2017	2018
Adams-Clermont Joint SWMD	530.67	510.19	559.34	662.69	710.86
Allen-Champaign-Hardin-Madison-Shelby-Union Joint SWMD (North Central SWMD)	304.64	374.87	584.53	675.24	844.69
Athens-Hocking Joint SWMD	20.72	89.98	38.53	94.34	104.92
Brown Co. Solid Waste Authority	9.80	0.68	0.56	20.99	53.51
Butler Co. SWMD	1484.96	1536.12	1730.76	1894.97	1926.07
Clark Co. SWMD	145.81	179.48	462.96	455.99	495.35
Clinton Co. SWMD	69.20	26.66	71.55	121.66	205.39
Coshocton-Fairfield-Licking-Perry Joint SWMD	359.48	361.97	369.81	507.54	800.00
Delaware-Knox-Marion-Morrow Joint SWMD	823.78	966.12	869.19	760.90	1404.83
Fayette-Highland-Pickaway-Ross Joint SWMD	288.16	473.19	554.56	623.54	669.97
Franklin Co. SWMD (Solid Waste Authority of Central Ohio)	6317.32	6454.68	5856.99	5519.02	13623.88
Gallia-Jackson-Meigs-Vinton Joint SWMD	79.03	115.94	121.03	123.74	109.65
Greene Co. SMWD	476.60	603.81	1147.22	1217.27	1221.14
Guernsey-Monroe-Morgan-Muskingum-Noble-Washington Joint SWMD (Southeast Ohio SWMD)	47.38	156.06	109.70	257.91	319.99
Hamilton Co. SWMD	4602.37	4628.87	5432.86	5353.75	5664.25
Lawrence-Scioto Joint SWMD	432.18	501.82	504.88	528.68	475.05
Montgomery Co. SWMD	5771.83	6197.64	8939.70	9194.95	9997.44
Pike Co. SWMD	8.29	14.10	19.44	17.38	29.53
Warren Co. SWMD	1076.97	1115.93	1388.65	1528.25	1469.82

Table 2 presents the total tons of mixed plastics voluntarily reported to the Ohio EPA by commercial businesses and MRFs. In general, a growth trend is seen in mixed plastics from 2014-2017, with a spike in 2017 and subsequent decline in 2018.

<b>TABLE 2: MIXED PLASTICS VOLUNTARILY REPORTED 2014-2018 IN SWMDS WITHIN THE 90-MILE AREA OF INTEREST (TONS)</b>					
	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
Adams-Clermont Joint SWMD	210.46	148.43	188.79	662.69	203.59
Allen-Champaign-Hardin-Madison-Shelby-Union Joint SWMD (North Central SWMD)	94.49	143.53	253.06	675.24	270.15
Athens-Hocking Joint SWMD	5.16	38.26	38.53	94.34	45.54
Brown Co. Solid Waste Authority	9.80	0.16	0.13	20.99	32.78
Butler Co. SWMD	488.39	398.70	510.92	1894.97	548.89
Clark Co. SWMD	95.88	71.34	140.51	455.99	161.34
Clinton Co. SWMD	30.86	8.98	37.70	121.66	70.86
Coshocton-Fairfield-Licking-Perry Joint SWMD	118.02	150.61	157.48	507.54	352.84
Delaware-Knox-Marion-Morrow Joint SWMD	181.96	281.59	231.17	760.90	666.30
Fayette-Highland-Pickaway-Ross Joint SWMD	83.82	148.01	227.87	623.54	189.55
Gallia-Jackson-Meigs-Vinton Joint SWMD	15.30	39.95	55.10	123.74	29.47
Greene Co. SMWD	164.39	172.08	327.16	1217.27	342.83
Guernsey-Monroe-Morgan-Muskingum-Noble-Washington Joint SWMD (Southeast Ohio SWMD)	22.94	111.32	86.73	257.91	96.93
Hamilton Co. SWMD	1408.64	1180.60	1786.11	5353.75	1627.60
Lawrence-Scioto Joint SWMD	91.81	127.21	171.02	528.68	97.59
Montgomery Co. SWMD	1462.14	1460.68	2140.78	9194.95	3055.00
Pike Co. SWMD	1.11	4.93	19.44	17.38	12.54
SWACO	1501.82	1718.89	1376.29	5519.02	5751.34
Warren Co. SWMD	342.51	295.85	418.70	1528.25	400.06

Table 3 presents the Commingled Recyclables from commercial businesses and MRFS over time for supplemental purposes only. As discussed above, “commingled” can be used as a catch-all for reporting in reference to single stream recycling. This dataset varies greatly as entities reporting and protocols evolve balancing other quantities reported in detail in other categories.

<b>TABLE 3: COMMINGLED RECYCLABLES VOLUNTARILY REPORTED 2014-2018 IN SWMDS WITHIN THE 90-MILE AREA OF INTEREST (TONS)</b>					
	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
Adams-Clermont Joint SWMD	0.80	0.08	1.38	0.89	0.12
Allen-Champaign-Hardin-Madison-Shelby-Union Joint SWMD (North Central SWMD)	1320.62	560.63	0.04	11.83	37.96
Athens-Hocking Joint SWMD	0.00	0.00	0.00	0.00	0.00
Brown Co. Solid Waste Authority	0.00	0.00	0.00	0.00	0.00
Butler Co. SWMD	1.57	0.08	2.99	1.81	6.05
Clark Co. SWMD	1629.47	483.82	0.04	0.04	0.01
Clinton Co. SWMD	0.00	0.00	0.00	0.00	0.00
Coshocton-Fairfield-Licking-Perry Joint SWMD	858.49	0.12	4.33	534.80	446.19
Delaware-Knox-Marion-Morrow Joint SWMD	19.48	0.19	2.80	27.79	458.56
Fayette-Highland-Pickaway-Ross Joint SWMD	15.76	0.04	0.08	2698.68	3145.97
Franklin Co. SWMD (Solid Waste Authority of Central Ohio)	7922.28	0.23	47.23	98.34	7393.64
Gallia-Jackson-Meigs-Vinton Joint SWMD	0.00	0.00	0.00	378.28	1907.88
Greene Co. SMWD	3391.69	1663.08	2.72	3.48	13.21
Guernsey-Monroe-Morgan-Muskingum-Noble-Washington Joint SWMD (Southeast Ohio SWMD)	153.06	2351.11	1160.46	1475.46	3152.27
Hamilton Co. SWMD	221.80	0.12	8.20	56.19	125.75
Lawrence-Scioto Joint SWMD	0.00	0.00	0.00	0.00	0.00
Montgomery Co. SWMD	5402.26	2802.72	2.80	8.68	10.39
Pike Co. SWMD	0.00	0.00	0.00	0.66	1.95
Warren Co. SWMD	1392.44	791.15	2.72	6.08	3.46



Table 4 presents the total tons of plastics by type voluntarily reported to the Ohio EPA by commercial businesses and MRFs. Of important note, in 2017, all plastics reported to Ohio EPA were characterized as mixed plastics, with no differentiation by PETE, HDPE, or film plastic. However, the growth trends over time suggest that they were categorized as mixed, not that those plastics types were not collected.

<b>TABLE 4: PLASTICS BY TYPE VOLUNTARILY REPORTED 2014-2018 (TONS)</b>					
	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
PETE	9949.92	10872.56	13218.46	0.00	13958.00
HDPE	5750.72	6213.93	7320.48	0.00	7031.38
Film Plastic	819.04	720.50	55.83	0.00	5181.79
Mixed Plastic	6329.49	6501.13	8167.49	29558.81	13955.20
<b>Total</b>	<b>22849.18</b>	<b>24308.12</b>	<b>28762.26</b>	<b>29558.81</b>	<b>40126.36</b>

Table 5 provides an additional level of detail for 2018 by resin type.

<b>TABLE 5: PLASTICS BY TYPE VOLUNTARILY REPORTED IN SWMDS WITHIN THE 90-MILE AREA OF INTEREST, DETAIL FOR 2018 (TONS)</b>					
	<b>PETE</b>	<b>HDPE</b>	<b>Film Plastic</b>	<b>Mixed Plastic</b>	<b>Total</b>
Adams-Clermont Joint SWMD	258.31	129.76	119.20	203.59	710.86
Allen-Champaign-Hardin-Madison-Shelby-Union Joint SWMD (North Central SWMD)	263.97	148.23	162.35	270.15	844.69
Athens-Hocking Joint SWMD	0.83	0.80	57.75	45.54	104.92
Brown Co. Solid Waste Authority	0.27	0.13	20.33	32.78	53.51
Butler Co. SWMD	785.43	393.93	197.82	548.89	1926.07
Clark Co. SWMD	168.19	96.08	69.75	161.34	495.35
Clinton Co. SWMD	64.20	36.61	33.73	70.86	205.39
Coshocton-Fairfield-Licking-Perry Joint SWMD	230.88	99.68	116.61	352.84	800.00
Delaware-Knox-Marion-Morrow Joint SWMD	438.80	199.74	99.99	666.30	1404.83
Fayette-Highland-Pickaway-Ross Joint SWMD	258.91	122.25	99.26	189.55	669.97
Franklin Co. SWMD (Solid Waste Authority of Central Ohio)	3512.11	1481.88	2878.56	5751.34	13623.88
Gallia-Jackson-Meigs-Vinton Joint SWMD	24.92	10.98	44.27	29.47	109.65
Greene Co. SMWD	486.78	277.45	114.07	342.83	1221.14
Guernsey-Monroe-Morgan-Muskingum-Noble-Washington Joint SWMD (Southeast Ohio SWMD)	97.56	43.65	81.85	96.93	319.99
Hamilton Co. SWMD	2301.80	1163.04	571.81	1627.60	5664.25
Lawrence-Scioto Joint SWMD	202.98	101.97	72.51	97.59	475.05
Montgomery Co. SWMD	4228.29	2401.25	312.89	3055.00	9997.44
Pike Co. SWMD	0.30	0.20	16.49	12.54	29.53
Warren Co. SWMD	633.47	323.74	112.55	400.06	1469.82

## Discussion

In reviewing the data, in general we note an increase in the total plastics reported as might be expected from 2014-2018. This may speak to the stable markets for the “desirable” (i.e., money making) PETE and HDPE resin types, despite the export market challenges over the past 18 months. Unfortunately, the Mixed Plastics category experienced a reporting spike in 2017 (all plastics was characterized as mixed), so it is difficult to determine if that category in fact was elevated in 2017, or if it is solely attributable to the categorization. Discussions with our contacts via several interviews substantiate this growth and conclude that a plastic most likely has a market if it is collected by a hauler. Conversely, non-valuable plastics are not collected and processed on a broad scale.

One interviewee’s assessment of a mixed plastic stream indicated that as much as two-thirds of mixed could be PETE and HDPE in scenarios where plastics #1-#7 were collected. Because of this, processors often find value in separating out the #1s and #2s for separate baled sale to generate a higher market value. One contact noted that only bottles and jugs are valuable to collect and process due to costs. Some processors, however, choose to bale #1s-#7s without separation, instead choosing to take a lower cost from their plastics buyer. This depends on the markets available and the scale of product available.

The commingled recyclables numbers reported would have a similar variance; contacting individual MRFs and haulers may yield additional detail not available in the voluntary Ohio EPA dataset. If a SWMD has conducted a waste characterization study (e.g., Hamilton Co., Montgomery Co., SWACO), an additional layer of detail may be available. Yet the results of these studies are not necessarily transferrable outside of the SMWD due to the high degree of variability for population, demographics, infrastructure, culture, markets, etc. The Ohio EPA also commissioned a statewide waste characterization update that was released in 2019 that highlighted market potential for recyclables.<sup>7</sup>

Numerous individuals we spoke with also acknowledged that specific data on numbered plastics is lacking at the state level, and in general is not reported in detail to the Ohio EPA. This may in part be influenced by the nature of the contractual language between the specific SWMD and the recycling hauler (i.e., if the contract does not require reporting separated materials by weight, it may be reported as commingled). While mandatory, standardized, reporting has been much discussed at the state level, it has not been implemented to date.

Finally, all processors must decide how to handle the unsolicited plastic waste that enters their systems and if those constituents are in enough abundance to bale and sell—or if the value is so low that they will be landfilled instead. This “waste” plastic may be a resource for #3-#7 inputs for circular economy business input models in Southern Ohio and elsewhere. Contamination in the plastics waste stream also creates challenges within the system.

While the discussion has focused on post-consumer plastics stream, many wholesale buyers of plastics may find a match for inputs in pre-consumer waste streams. To accommodate this, platforms like the Ohio Materials Marketplace (a collaboration between Ohio EPA and the U.S. Business Council for Sustainable Development) or the Ohio Byproducts Synergy Network address this waste resource input for business networks. Opportunities for pre-consumer industrial plastics as a waste input would need further exploration.

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<sup>7</sup> For the full report, see “Economic Impact Potential of Recycling in Ohio,” at <https://epa.ohio.gov/ocapp/recycling#164969085-ohio-waste-characterization-study>.

In reference to a final challenge of note, the OU team had conversations that indicated that the industry data we sought was proprietary, as were the markets and supply chain channels for materials flowing to larger processing centers and buyers either in or out of state. One contact also noted hesitation to provide the requested detail, wary of an “exposé” of the recycling industry, despite the project team’s assurances to the contrary. The value of plastics—the stream currently collected and the undervalued stream collected or wasted—is evident to the state’s economy as a whole. The Solid Waste Authority of Central Ohio (SWACO) commissioned a study, finalized in 2018, “The Economic Impacts of Central Ohio’s Recycling, Reuse and Remanufacturing Industry.”<sup>8</sup> This study serves as a resource in addressing the scope of the recycling industry and the businesses within the state’s recycling supply chains.

## **Conclusions**

Of the dataset and findings within this review, several conclusions are offered.

- As discussed above, the recycling reporting in Ohio is mostly voluntary, and therefore has the potential to greatly underrepresent the quantity and composition of the materials recovered through recycling. A more thorough accounting of recyclables collected and processed in the state could inform valuable investment opportunities. This is especially true for determining the relevant composition of commingled recyclables and mixed plastics—a deeper dive into these categories with a specific market position or need could generate valuable discussion with specific market players.
- Further compounding the issue, incomplete data is a theme not only at the state level, but at a global scale as well. “To avoid a data deluge and to make sure that R&D insights have tangible outputs, industry will need to invest further in methods of accurately capturing, reproducing and harmonizing data.”<sup>9</sup>
- The numbers voluntarily reported to the Ohio EPA also underrepresent the quantity of recyclables available for recovery which are not currently diverted and are landfilled. This is due to a variety of factors as discussed above including markets and infrastructure, but also technologies and culture-related contamination. Solid waste characterization studies help determine this potential.
- Certain plastic types (i.e., PETE and HDPE) have the strongest existing markets for collection and processing; however, the potential for other plastics types is strong if the value is demonstrated. Of specific interest is film plastics, as suggested by numerous sources including the Closed Loop Fund<sup>10</sup> and the Flexible Film Recycling Group<sup>11</sup>. Similarly, in their 2016 report, “The New Plastics Economy,” the Ellen MacArthur Foundation estimates that “95% of plastic packaging material value, or USD 80–120 billion annually, is lost to the economy after a short first use” with only 14% of plastic packaging *collected* for recycling.<sup>12</sup>
- Additional domestic market demand and outlets encourage continued collection and new opportunities for plastics.

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<sup>8</sup> For the full report, see: <https://www.swaco.org/DocumentCenter/View/1076/Economic-Impacts-of-Central-Ohios-Recycling-Industry-June-2018>.

<sup>9</sup> McMellon, Phoebe. 2019. “Renewable Plastics are a Huge Untapped Opportunity.” See: <https://www.industryweek.com/technology-and-iiot/renewable-plastics-are-huge-untapped-opportunity>.

<sup>10</sup> For the full report, “Film Recycling Investment Report,” see: <https://www.closedlooppartners.com/research/plastic-film-recycling/>.

<sup>11</sup> See: <https://plastics.americanchemistry.com/Product-Groups-and-Stats/FFRG/>.

<sup>12</sup> For the full report, “The New Plastics Economy – Rethinking the Future of Plastics,” see: <http://www.ellenmacarthurfoundation.org/publications>.