Analysis of MSW Landfill Tipping Fees — 2020

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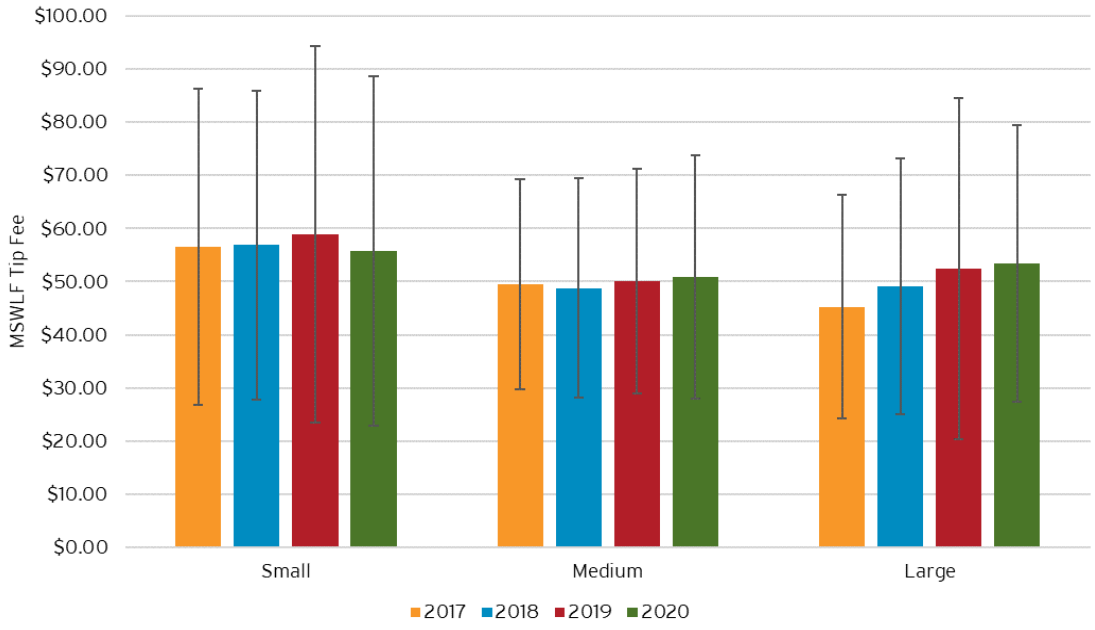
The Environmental Research & Education Foundation (EREF) maintains a database of Municipal Solid Waste (MSW) landfills across the United States (EREF, 2017). This database was used to draw a sample of active facilities for analysis of MSW landfill (MSWLF) tipping fees. Landfill owners were contacted and asked to provide gate rate information for MSW disposal, supplemented by current website information on fees. For the purpose of this report, the terms gate rate, tip fee, and tipping fee are used interchangeably to refer to the per-ton fee for hauled MSW loads.

In the 2020 study, MSW tip fee information was obtained from 439 landfills categorized as large, medium, or small based on accepted tonnage (Figure 1). Of the landfills providing gate rate information, approximately:

- 12% were large (i.e. accepting more than 390,000 tons/year),
- 46% were medium (i.e. accepting between 390,000 and 65,000 tons/year), and
- 42% were small (i.e. accepting less than 65,000 tons/year).

The small landfills reported an average of 26,480 tons/year, while medium landfills and large landfills accepted 166,516 tons/year and 809,455 tons/year, respectively.

Figure 1. Average MSW Landfill Tip Fees, by Size of Landfill (2017–2020)[a]



[a]Range shown is the standard deviation.

The average tip fee was calculated for small, medium, and large landfills based on the annual tonnage accepted. Since 2017, average tipping fee for small landfills continue to have greater fees than medium or large sized landfills (Figure 1). Small landfills had an average MSWLF tip fee of $55.72 in 2020 and medium and large landfills had fees of $50.87 and $53.43, respectively. Figure 1 also shows that there is a large variation in tip fees, with small landfills showing the greatest variation.

The fees for large landfills show an increasing trend since 2017. One explanation for the increase in large landfill tipping fees is due to limited competition in areas with larger landfills. Regions with larger landfills potentially need fewer landfills to manage any waste generated and are insulated from pricing competition. The ownership status (i.e. private vs. public) of larger landfills could also influence the tipping fee such that privately-owned landfills have a greater ability to increase prices and are not necessarily bound by local policies.

Summary of 2020 MSW Landfill Tip Fees. MSWLF tip fee data were compiled by geographic region and state and basic statistical data were computed (Table 1). For 2020, the national MSW landfill tip fee average was $53.72/ton. Regional MSW tip fees ranged from $39.66/ton in the South Central region to $72.03/ton in the Pacific (Table 2). Ninety- seven percent of landfills that provided 2019 gate rates also provided data in 2020 and an additional 47 landfills provided data in 2020.

The standard deviation for each state and region is also provided in Table 1. Similar to Figure 1, which shows large variations based on landfill size, each region and many individual states show a large variation in tip fees. To begin isolating factors contributing to this variability, EREF conducted a sensitivity analysis seen later in this report.

Based on previous EREF analysis (2019), the national average tip fee decreased 3.0% from 2019 to 2020, decreasing from $55.36 per ton to $53.72 (Table 2). Average regional tip fees increased in two regions: the Northeast, where tip fees increased by +3.25% (+$2.16); the Southeast, where tip fees increased by +2.2% (+$1.01). Tip fees decreased in: the Pacific (-1.4%, -$1.00), the Mountains/Plains (-5.7%, -$2.88), South Central (-3.1%, -$1.26) and Midwest (-2.1%, -$1.02) regions.

The five-year trends in average tip fee (Figure 2) suggest a long-term increase in the national average MSW tip fee despite slight drops in 2018 and 2020. The average year-over-year increase was 2.8% from 2016 through 2020 (Table 3). Tip fees in the Northeast and Pacific remain notably higher than the rest of the U.S., with the Pacific region having the highest tip fees for the third year in a row.

The Midwest and Mountains/Plains regions have converged at $47 with less than one-dollar difference between them. The Southeast and South Central continued to be the least expensive regions for MSW landfill disposal, however, the Southeast Region has been steadily rising for four years (Figure 2).

States with active MSW waste-to-energy (WTE) facilities continue to have higher tipping fees than those without ($p<0.05$). The average MSWLF tip fee was $58.90/ton for states with WTE in 2020. In states without WTE, the average MSW tip fee was $50.73/ton. Nationally, landfilling was 16% more expensive in WTE states, equivalent to $8.17/ton higher. Comparatively, in 2019 tip fees in states with WTE were 12% higher (+$6.34/ton) than states without WTE. This is the third year that the relationship between WTE use and landfill tip fees could suggest when market conditions are suitable for the use of WTE for MSW management (EREF, 2019).

Table 1. Tip Fees by State/Region (2020)[a,b]

Region/State	Average Tipping Fee[c,d]
Pacific	$72.03 (± 51.22)
Alaska	*$142.33 (± 69.52)*
Arizona	*$44.89 (± 10.9)*
California	*$58.48 (± 24.78)*
Hawaii	*$114.33 (± 4.04)*
Idaho	*$59.02 (± 63.48)*
Nevada	*$39.9 (± 19.52)*
Oregon	*$71.53 (± 18.67)*
Washington	*$95.99 (± 37.94)*
Northeast	$68.69 (± 20.46)
Connecticut	*N.A.*
Delaware	*$85 (± 0)*
Maine	*$75.21 (± 16.51)*
Maryland	*$66.73 (± 15.65)*
Massachusetts	*N.R.*
New Hampshire	*$74.34 (± 8)*
New Jersey	*$78.8 (± 11.69)*
New York	*$71.71 (± 29.68)*
Pennsylvania	*$73.45 (± 15.23)*
Rhode Island	*$115 (N.R.)*
Vermont	*$101.95 (N.R.)*
Virginia	*$53.43 (± 14.97)*
West Virginia	*$54.66 (± 15.14)*
Mountains/Plains	$47.83 (± 24.54)
Colorado	*$58.42 (± 41.3)*
Montana	*$32.06 (± 14.2)*
North Dakota	*$48 (± 13.24)*
South Dakota	*$51.22 (± 9.96)*
Utah	*$33.8 (± 7.62)*
Wyoming	*$57.64 (± 23.66)*
Midwest	$47.85 (± 20.3)
Illinois	*$51.71 (± 26.37)*
Indiana	*$36.27 (± 16.71)*
Iowa	*$47.07 (± 17.68)*
Kansas	*$42.79 (± 13.25)*
Michigan	*$42.77 (± 11.56)*
Minnesota	*$57.78 (± 18.8)*
Missouri	*$67.91 (± 37.17)*
Nebraska	*$41.47 (± 15.75)*
Ohio	*$45.39 (± 10.8)*
Wisconsin	*$61 (± 33.91)*
Southeast	$46.26 (± 15.87)
Alabama	*$32.93 (± 9.59)*
Florida	*$56.51 (± 20.71)*
Georgia	*$47.88 (± 13.83)*
Kentucky	*$36.32 (± 9.6)*
Mississippi	*$30.36 (± 11.5)*
North Carolina	*$45.97 (± 11.21)*
South Carolina	*$45.91 (± 8.61)*
Tennessee	*$51.53 (± 15.22)*
South Central	$39.66 (± 11.93)
Arkansas	*$30.53 (± 8.17)*
Louisiana	*$37.53 (± 10.42)*
New Mexico	*$38.2 (± 9.48)*
Oklahoma	*$44.76 (± 17.01)*
Texas	*$42.22 (± 10.68)*
National Average	**$53.72 (± 29.62)**

[a]N.A. – not applicable, no landfills actively accepting MSW were identified in state.

[b]N.R. – not reported, response rate did not meet threshold for publication.

[c]Regional and national averages computed on a facility-basis, and therefore do not equal the average of the individual state average reported herein.

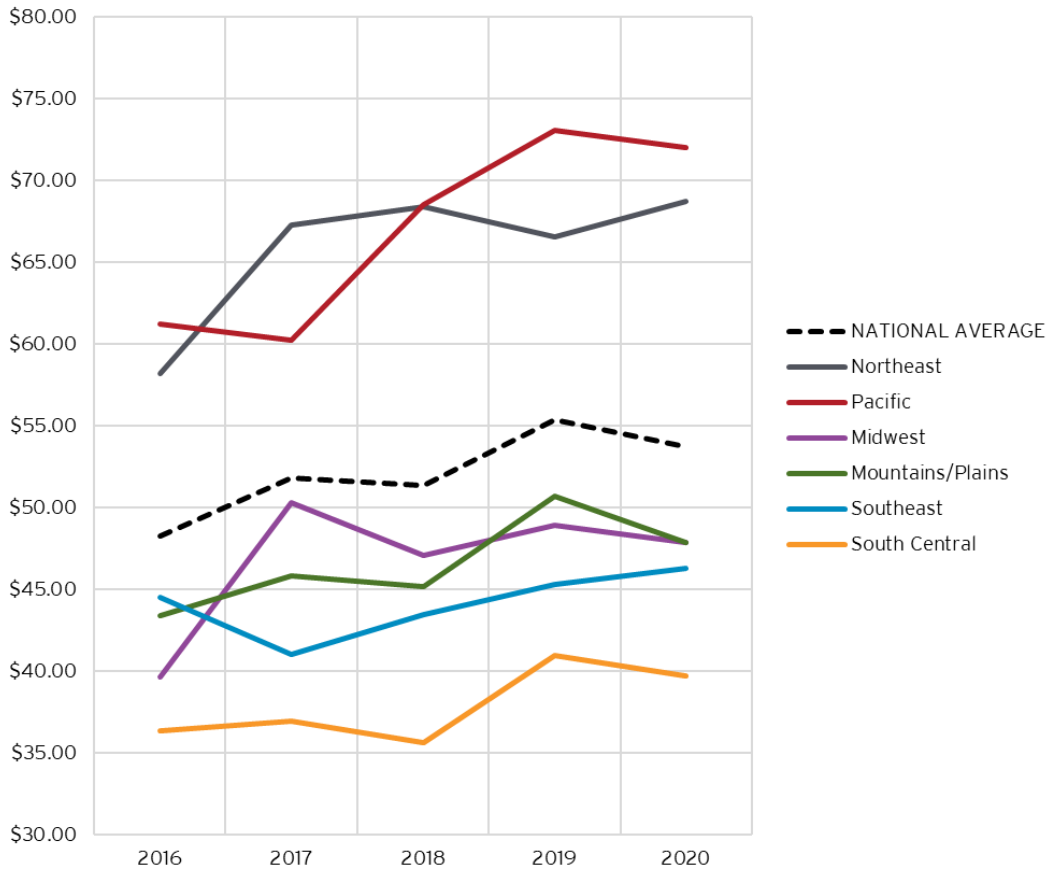
[d]Standard deviation shown in parentheses.

Table 2. Tip Fees by Region

Region	Average Tipping Fee		
	2019[a]	2020	Difference
Pacific (AK, AZ, CA, HI, ID, OR, WA)	$73.03	$72.03	-$1.00
Northeast (CT, DE, ME, MD, MA, NH, NJ, NY, PA, RI, VT, VA, WV)	$66.53	$68.69	+$2.16
Mountains/Plains (CO, MT, ND, SD, UT, WY)	$50.71	$47.83	-$2.88
Midwest (IL, IN, IA, KS, MI, MN, MO, NE, OH, WI)	$48.87	$47.85	-$1.02
Southeast (AL, FL, GA, KY, MS, NC, SC, TN)	$45.25	$46.26	+$1.01
South Central (AR, LA, NM, OK, TX)	$40.92	$39.66	-$1.26
National Average	**$55.36**	**$53.72**	**-$1.64**

[a]From EREF, 2019 rev. ed.

Figure 2. Regional Tip Fee Trends (2016 - 2020)[a,b]



[a]Regions, and the states contained therein, are denoted in Table 1.

[b]Values for all regions and years are provided in the Table 3.

Table 3. Tip Fees (2016–2020)

Region	Average Tipping Fee[a]					Average Year-over-Year Change ('16-'20)
	2016	2017	2018	2019	2020	
Pacific (AK, AZ, CA, HI, ID, OR, WA)	$61.20	$60.20	$68.54	$73.03	$72.03	+4.4%
Northeast (CT, DE, ME, MD, MA, NH, NJ, NY, PA, RI, VT, VA, WV)	$58.20	$67.27	$68.41	$66.53	$68.69	+4.4%
Mountains/Plains (CO, MT, ND, SD, UT, WY)	$43.48	$45.84	$45.12	$50.71	$47.83	+2.7%
Midwest (IL, IN, IA, KS, MI, MN, MO, NE, OH, WI)	$39.64	$50.27	$47.08	$48.87	$47.85	+5.6%
Southeast (AL, FL, GA, KY, MS, NC, SC, TN)	$44.46	$41.01	$43.43	$45.25	$46.26	+1.1%
South Central (AR, LA, NM, OK, TX)	$36.34	$36.94	$35.61	$40.92	$39.66	+2.5%
National Average	$48.27	$51.82	$51.37	$55.36	$53.72	+2.82%

[a]The corresponding n-values for each year are as follows: 2016, n=117; 2017, n=400; 2018, n=297; 2019 n=392; 2020; n=439.

Exploring Methodology Impacts when Estimating National Average Tip Fee

EREF's national average tip fees are calculated as an average of all observations (n= 437 for 2020). However, the amount of MSW landfilled in each state varies due to factors such as total waste generation, fraction recovered for recycling and/or composting, and interstate transport (i.e. import and export of MSW). To account for these differences, a weighted-average national tip fee was also calculated for 2020 based on the relative amount of MSW disposed of via landfilling in each state and the average tip fee for each state (EREF, 2017). Results indicate a tonnage-weighted average tip fee of $53.85 for 2020, which is

$0.13 higher than the unweighted national average of $53.72/ton MSW. The continued increase in the weighted average relative to the national average suggests that tip fees in landfills receiving a greater relative fraction of MSW had lower tip fees in 2020 (Table 4).

Table 4. Summary of Average and Weighted-Average Tip Fee

	National Average[a]	Ton-Weighted Average	Difference (%)
2019	$55.36	$52.08	5.9%
2020	$53.72	$53.85	0.2%
Difference (%)	-2.6%	3.3%	

[a]Calculated as an unweighted average of all observations (n=437 for 2020; n=392 for 2019).

Construction & Demolition Waste Pricing at MSW Landfills

In addition to collecting MSW tip fee data, information gathered for 2020 included tip fee for construction & demolition (C&D) wastes deposited in MSW landfills. Although MSW landfills primarily receive MSW, the majority of states allow these landfills to accept non-MSW wastes such as construction, demolition, ash, or liquid wastes. Of the non-MSW wastes accepted at MSW landfills in the U.S., construction and demolition wastes are most common. C&D waste is accepted at MSW landfills in 41 states and comprises roughly 12% of the landfilled stream on average (EREF, 2019).

Of the 437 landfills providing MSW tip fee data, 277 also had a posted gate rate for C&D materials disposed of at the landfill. The national average tip fee for C&D waste in 2020 was not statistically different ($p>0.05$) from the MSW tip fee at $52.67/ton C&D compared to $53.72 for MSW (Table 5). Although over half of landfills (58%) set the same tip fee for MSW and C&D materials while C&D tip fees were priced lower than MSW at 23% of sites. At the remaining 19% of MSW landfills, the cost to dispose of a ton of C&D material was higher than for MSW (Table 5).

Table 5. Construction & Demolition vs MSW Tip Fee Comparison

	2020[b]	% of Total
National Average C&D Tip Fee[a]	$52.67 (± $30.39)	
National Average MSW Tip Fee	$53.72 (± $29.62)	
# Sites where C&D and MSW priced the same	162	58%
# Sites where C&D priced lower than MSW	65	23%
# Sites where C&D priced higher than MSW	53	19%

[a]For C&D disposed of at MSW landfills.

[b]Standard deviation shown in parentheses.

Assessing Tip Fee Variability Across States: Case Study of Population Variation and Tip Fees in North Carolina

In analyzing tip fees, the question arises as to how much variability exists in areas with similar policies but that have different geographic and demographic characteristics. A sensitivity analysis allows for the variability in tip fee outcomes to be assessed under such conditions. Factors that could contribute to variability in tip fees include: population density, availability of remaining airspace or landfill life, competition between multiple landfills in the same area, landfill ownership by private or public entities, and interstate transport of waste. EREF plans to evaluate some of these factors beginning with this assessment of population and tip fees.

To assess the relationship between population and tip fees, North Carolina was selected as a case study because it is a geographically diverse state with large metropolitan areas, mid- to small-sized cities, and less populated rural areas. The state population is growing and as of 2019 it was home to just under 10.5 million people (3% of the U.S. population).

EREF evaluated the relationship between population and tip fees using U.S. Census defined metropolitan and micropolitan statistical areas (US Census Bureau, 2020). Metropolitan statistical areas consist of a county or counties with at least one urban area and a population of at least 50,000. Micropolitan statistical areas consist of a county or counties with at least one urban area and a population of at least 10,000 but less than 50,000. Any individual county that was not included in these two designations was termed uncharacterized. North Carolina has 15 metropolitan statistical areas, 22 micropolitan statistical areas, and 31 uncharacterized areas.

Tip fees from North Carolina landfills (n=37) were averaged across these categories (Table 6). Both metropolitan and micropolitan areas were below the national average of $53.72. Micropolitan and uncharacterized area average tip fees were above the North Carolina state average of $45.97. Across the entire state tip fees varied widely with a lowest fee of $26.33 and highest of $86.74.

In North Carolina, metropolitan areas had significantly lower tip fees ($p<0.05$) than either micropolitan or non-centralized (uncharacterized) areas. These areas had a smaller variability in fees, ranging from $31.50 to $48.00 and had a $4.15 deviation from the mean. Uncharacterized areas had the greatest variability with

fees ranging between $37.50 and $86.74. Despite these differences a regression analysis on all tip fees collected showed a limited relationship between tip fees and population density suggesting that the wide variation in fees are not necessarily associated with population density. An additional regression analysis of tip fees based on population alone showed no relationship between tip fees and total population. These mixed results suggest that greater population density and the associated increase in waste generation has a minor impact on tip fees and factors such as interstate transport, local regulations and policies, and public/private status of the landfill might have greater influence.

Table 6. North Carolina Tip Fee by Population Classification[a]

Population Area	Number of Areas	Average Tip Fee	Total Land Area	Total Population	Average Population[b]	Population Density (person/sq mi)[c]
Metropolitan	15	$37.99 (± $4.15)	21,865	8,085,811	539,054 (± 570,650)	325 (± 164)
Micropolitan	22	$46.61 (± $7.50)	12,134	1,394,593	63,391 (± 23,471)	129 (± 52)
Uncharacterized	31	$57.77 (± $16.28)	14,624	1,007,680	32,506 (± 32,374)	67 (± 43)
North Carolina	-	$45.97 (± $11.21)	48,623	10,488,084	-	-

[a]Standard deviation shown in parentheses.

[b]Calculated from 2019 population estimates from https://data.census.gov/cedsci/; where Average Population = Total Population ÷ Number of Areas.

[c]Calculated from TIGERweb U.S. geographic information (https://tigerweb.geo.census.gov/) and 2019 population estimates; where Population Density = Total Population ÷ Total Land Area.

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