

An Analysis of Illegal Dumpsites in Rural Pennsylvania

November 2009

Rural Pennsylvania counties have more illegal dumpsites, which typically have more trash, than urban counties, according to data collected by PA CleanWays and analyzed by the Center for Rural Pennsylvania.

Methods

The Center for Rural Pennsylvania analyzed data on illegal dumpsites collected by PA CleanWays. PA CleanWays is a nonprofit organization focused on eliminating illegal dumping and littering in Pennsylvania.

Data Collection

From 2005 to 2009, PA CleanWays collected data on illegal dumpsites in 37 of Pennsylvania's 67 counties (See Figure 1). PA CleanWays defines an illegal dumpsite as an area of concentrated trash, which may contain isolated or solitary items, such as one or two appliances or tires, or just yard waste or scattered trash. Sites with scattered trash, however, must contain more than what is considered roadside litter (bottles, fast food wrappers, etc.), and must appear to have new trash thrown in occasionally.

To collect data on illegal dumpsites, PA CleanWays staff work with municipal and county officials and other community leaders to identify known dumpsites. Staff then drive the roadways of the counties looking for unreported dumpsites.

When a potential dumpsite is identified, staff visit the site for verification. Once verified, staff collect information on the site location, which includes details of the area, terrain, contents of the dumpsite, and amount of trash (measured in tons).

Staff only report on illegal dumpsites that are visible from the public right-of-way. Surveys are conducted in the fall or early spring when ground foliage is at a minimum. No surveys are conducted when significant snow cover or foliage blocks views of the sites.

Data Analysis

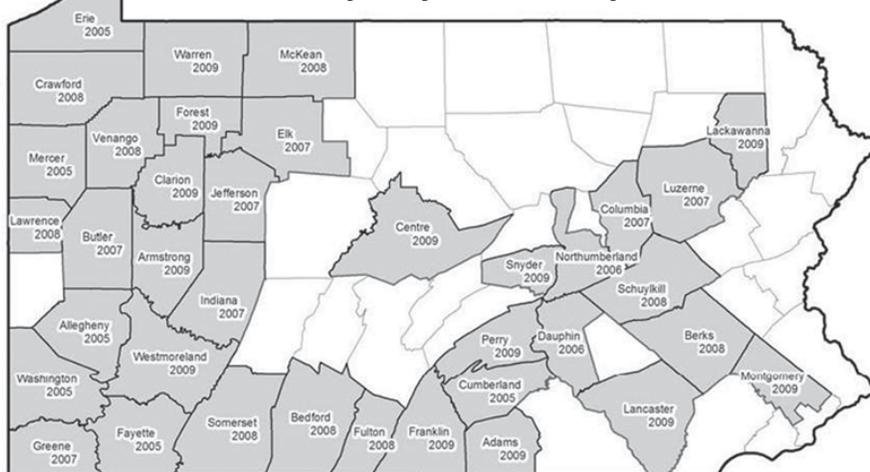
The Center Rural Pennsylvania linked the dumpsites data with municipal level data from the U.S. Census Bureau and the Governor's Center for Local Government Services (GCLGS). Data on curbside recycling came from the Pennsylvania Department of Environmental Protection.

The Center's analysis looked at the distribution of illegal dumpsites; the characteristics of these dumpsites; the differences between municipalities with and without dumpsites; and whether the availability of

municipal trash collection and/or recycling services affect the number of illegal dumpsites.

The Center defined a municipality as rural when the population density within the municipality was less than 274 persons per square mile or the municipality's total population was less than 2,500, unless more than 50 percent of the population lived in an urbanized area, as defined by the U.S. Census Bureau. All other municipalities were considered urban. Among the 1,571 municipalities surveyed, 65 percent were rural and 35 percent were urban.

Figure 1: Pennsylvania Counties Surveyed by PA CleanWays



Why PA CleanWays Collects Data on Illegal Dumpsites

PA CleanWays collects data on illegal dumpsites to: determine the scope of the problem; prioritize sites for cleanup and abatement; develop plans and strategies for cleanups; and provide a benchmark to measure the progress of cleanups. This information is to be used to highlight the need for proper waste disposal, recycling and alternatives to dumping and littering. For more information, visit www.pacleanways.org.

Data Limitations

Data only includes illegal dumpsites visible from the public right-of-way: In its data collection, PA CleanWays only included dumpsites that could be seen from the roadway. It did not survey dumpsites on private roadways and/or farms. As a result, the total number of dumpsites is likely to be underestimated. However, with more than 4,000 sites, the survey is the most comprehensive in the state and provides useful information about the dumpsites and their characteristics.

No neighborhood data analyzed: This analysis examined dumpsites at the municipal level only. However, the location and characteristics of illegal dumpsites may vary by neighborhood in large municipalities.

Survey years do not match Census or GCLGS data: The survey data were collected from 2005 to 2009. The data from the Census Bureau is primarily from Census 2000 and the GCLGS data is from 2006 and 2009. This mix-and-match of data was unavoidable because of the lack of more current municipal data.

Survey does not include all municipalities: The survey included 1,556 municipalities, or 61 percent of

Pennsylvania's 2,563 municipalities. As a result, the data are not inclusive of all of rural and urban Pennsylvania. Caution should be used when applying the results statewide.

Some GCLGS financial data is missing: In 2006, not all municipalities reported their financial data to GCLGS. Thirty-three municipalities with dumpsites did not report their data. Collectively, these non-reporting municipalities had 434 dumpsites that totaled 1,253 tons.

Findings

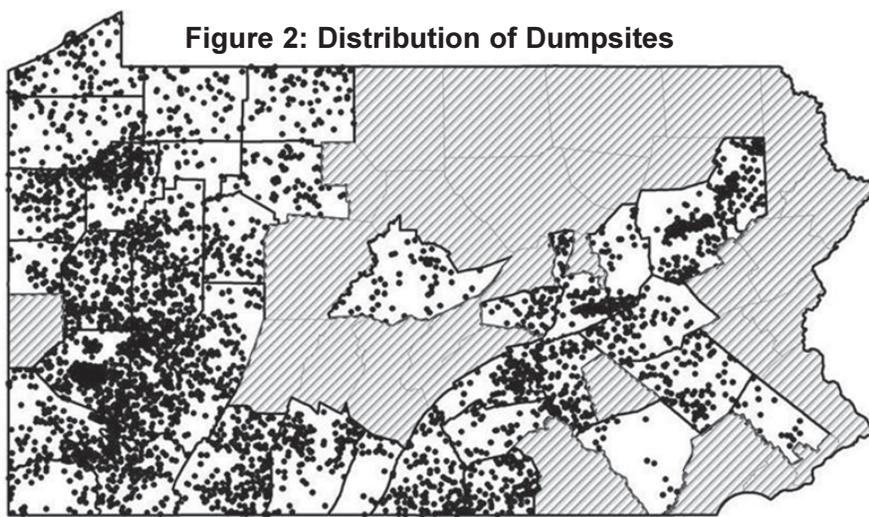
Distribution of illegal dumpsites

- Seventy-two percent of the 4,157 illegal dumpsites were located in a rural municipality and 28 percent were in an urban municipality (See Figure 2).
- Dumpsites located in rural municipalities contained a total of 11,219 tons of trash, or 77 percent of the total 14,494 tons. Urban municipalities had 3,275 tons of trash or 23 percent of the total.
- The majority of rural and urban municipalities (81 percent) had two or more dumpsites. The average rural municipality had 4.8 dumpsites and the average urban municipality had 6.4 dumpsites.
- The average rural illegal dumpsite had 3.8 tons of trash, while the average urban dumpsite had 2.8 tons. However, these averages are skewed by very large dumpsites. For example, in rural municipalities, 50 percent of the trash was in just 4 percent of the dumpsites. In urban municipalities, 50 percent of the trash was in 8 percent of the dumpsites.
- Townships of the second class had the most dumpsites and the most tons of trash (79 percent of dumpsites and 81 percent of the total tonnage). Boroughs, cities, and townships of the first class collectively had 21 percent of the dumpsites and 19 percent

of the total tonnage. However, when examining the average tonnage per site, there was no statistical difference among the types of municipalities.

Characteristics of Dumpsites

- Dumpsites were classified as being either active or inactive. Active sites (used within the past six months) were more numerous (78 percent of all sites) and contained more trash (average of 3.9 tons) than inactive sites, (22 percent and 2.0 tons, respectively).
- There were more active



One Dot = One Illegal Dumpsite

Figure 3: Trash Items in Dumpsites by Rural and Urban Municipalities

	Rural Municipalities (n=2,971 Dumpsites)	Urban Municipalities (n=1,187 Dumpsites)
Tires	66%	73%
Household Trash	65%	70%
Recyclables	58%	53%
Construction & Demolition Waste	48%	70%
Bagged Trash	46%	55%
Yard Waste	35%	56%
Furniture & Mattresses	37%	41%
Vehicle Parts	30%	29%
Appliances	31%	25%
Electronic & Televisions	27%	26%
Clean fill	20%	35%
Hazardous Waste	19%	21%
Batteries	2%	3%

Note: Totals do not add up to 100% due to multiple items being in a dumpsite

urban dumpsites than rural dumpsites (85 percent and 75 percent, respectively). However, active rural sites had, on average, more trash (4.3 tons) than urban sites (2.9 tons).

- Forty-three percent of rural and 30 percent of urban dumpsites are in or near (within 100 feet) waterways. Rural dumpsites that are in or near a waterway have more tons of trash, on average, than similarly located urban dumpsites (3.5 tons and 2.1 tons, respectively).

- The typical rural dumpsite is located along a county or municipally maintained roadway (75 percent) on terrain that is either flat or gently sloping (56 percent). The same is generally true for the typical urban dumpsite (71 percent along a county or municipal roadway and 60 percent on flat or gently sloping terrain).

- Figure 3 shows the items typically found in rural and urban dumpsites. Rural dumpsites have an average of five items and urban sites have an average of six items. In both rural and urban dumpsites, the tonnage increases as the number of items increases.

- Illegally dumped tires are a problem in both rural and urban municipalities. Approximately 68 percent of all dumpsites had tires, estimated to number about 114,700 in these dumpsites. Sixty-one percent of the dumpsites with tires had between one and 10 tires, 17 percent had between 11 and 20 tires, and 22 percent had more than 20.

Difference Between Municipalities With and Without Dumpsites

- In the 37 counties surveyed, there were a total of 1,021 rural municipalities and 550 urban municipalities. Sixty percent, or 616, of the rural municipalities

had illegal dumpsites and 40 percent, or 405, did not. Among urban municipalities, 33 percent, or 183, had illegal dumpsites and 67 percent, or 367, did not.

- Figure 4 on Page 4 compares rural and urban municipalities with and without illegal dumpsites. Rural municipalities with illegal dumpsites have populations that are significantly larger and more dispersed than rural municipalities without dumpsites. Rural municipalities with these dumpsites have higher housing values, higher total revenues, more municipal road miles and more employees than rural municipalities without dumpsites. This pattern is somewhat similar for urban municipalities with and without dumpsites.

- The data (See Figure 4 on Page 4) suggest that those who dump trash illegally target municipalities with low population densities. The number of persons per square mile appears to play a significant role in whether a municipality has a dumpsite or not. The lower the number of persons there are per square mile, the more likely there is a dumpsite. This pattern is evident among both rural and urban municipalities.

Does Availability of Trash Collection and Curbside Recycling Affect Dumping?

- The majority of rural municipalities (68 percent) in the counties surveyed did not have trash collection or curbside recycling. Sixteen percent of rural municipalities had trash collection only and 10 percent had curbside recycling only. The remaining 6 percent of rural municipalities had both trash collection and curbside recycling available.

- Urban municipalities were almost the mirror opposite of rural municipalities as 64 percent had both trash collection and curbside recycling, 16 percent had trash collection only, 12 percent had curbside recycling only, and 8 percent had neither trash collection nor curbside recycling.

- The analysis looked at rural municipalities with and without dumpsites and the availability of trash collection and curbside recycling. It found no statistically significant relationship between rural municipalities with and without dumpsites and those with and without trash/recycling collection.

Discussion

Illegal dumping is largely occurring in rural townships: According to the data, 70 percent of all dumpsites and 75 percent of the total trash tonnage

Figure 4: Comparison of Rural and Urban Municipalities with and without Dumpsites

	Rural Municipalities			Urban Municipalities		
	No Dumpsites (n=405)	Dumpsites (n=616)	Significant Difference*	No Dumpsites (n=367)	Dumpsites (n=183)	Significant Difference*
POPULATION¹						
Avg. # Persons, 2008	1,188	2,281	Yes	6,285	14,074	Yes
% Change in Population, 2000-08	-0.4%	2.9%	Yes	-0.4%	0.0%	Yes
DENSITY¹						
Population per Square Mile, 2000	136	73	Yes	1,515	983	Yes
RACE/ETHNICITY¹						
# Non-White, 2000	2.2%	2.1%	No	8.5%	14.0%	No
# Persons of Hispanic/Latino Origin, 2000	0.8%	0.7%	No	2.3%	2.8%	No
HOUSING VALUES/INCOME¹						
Avg. Housing Values, 2000	\$98,719	\$103,595	Yes	\$132,002	\$114,368	No
Per Capita Income, 2000	\$17,600	\$17,980	No	\$22,978	\$21,263	No
Poverty Rate, 2000	9.4%	8.9%	No	9.7%	10.9%	No
MUNICIPAL REVENUES²						
Avg. Revenue per Municipality, 2006	\$556,061	\$789,910	Yes	\$5,393,536	\$11,005,280	Yes
Revenues per capita, 2006	\$456	\$347	No	\$849	\$893	No
Taxes per capita, 2006	\$162	\$145	No	\$333	\$352	No
ROAD MILES³						
Avg. # Road Miles Per Municipality	12.0	32.8	Yes	22.8	53.6	Yes
EMPLOYEES²						
Avg. # Employees Per Municipality, 2008	2.5	3.7	Yes	26.4	69.5	Yes
LAND USE²						
% With Comprehensive Plans	52.6%	53.2%	No	82.3%	91.8%	Yes
% With Zoning Ordinance	68.9%	65.3%	No	96.5%	98.4%	No

Yes = Significant at 0.05; 1. U.S. Census Bureau; 2. Governor's Center for Local Government Services; 3. Pennsylvania Department of Transportation.

were along roadways in rural townships. Low population density is one potential reason why illegal dumping is happening in these municipalities. According to Census data, in 2008, the typical rural township with a dumpsite had a population density of less than 74 persons per square mile. In comparison, the average rural borough had a population density of 281 persons per square mile, and the average urban township had more than 511 persons per square mile.

The lack of a statistical smoking gun could mean that stopping illegal dumping will require a more nuanced and multi-pronged approach.

Tires are a significant problem in dumpsites: Rural and urban municipalities had a combined number of 114,700 illegally dumped tires. This is enough tires for 28,675 cars. Sixty-six percent of rural dumpsites and 73 percent of urban sites had illegally dumped tires, which pose any number of health and safety risks for these municipalities.

Dumpsites are contagious as one dumpsite can lead to many:

Among municipalities with illegal dumpsites, only 22 percent have just one dumpsite. The average rural municipality had almost five dumpsites and the average urban municipality had more than six. The multiplicity of dumpsites could suggest that once a municipality has been targeted for illegal dumping, it will continue to be a target. One strategy for deterring this would be to clean up a dumpsite as soon as possible.

Among rural municipalities, the availability of trash collection and/or curbside recycling is not a strong predictor of dumpsites:

There were no significant differences among rural municipalities that had and did not have dumpsites and had and did not have trash collection and/or curbside recycling. This suggests that rural trash and recycling services will not automatically reduce the number of dumpsites.

The lack of a statistical smoking

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