

May 2, 2011



FIRST STEP
OSKALOOSA

SOLID WASTE RECOMMENDATIONS



"The first step with the last of the beautiful."

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EXECUTIVE SUMMARY

Over the course of this year, First Step Oskaloosa, a group of graduate students from the University of Iowa's School of Urban and Regional Planning, has conducted three main studies: *the Residential Solid Waste Collection Survey*, *the Community Comparison Analysis*, and *the Impact Analysis*. The conclusions from this research, in addition to conversations with local stakeholders and appropriate regional professionals, have led to a two-part recommendation by our group.

The first part of the recommendation addresses identified aesthetic and public health concerns. This recommendation is to review, clarify, and enforce the current Oskaloosa Code as it pertains to solid waste hauling. The first revision will require all single-family dwellings to enroll in solid waste hauling services from a licensed hauler. *The Residential Solid Waste Collection Survey* shows that eighty percent of respondents had curbside garbage pick-up. This indicates an opportunity for the other twenty percent to enroll and would require pick-up on a weekly basis. It is anticipated that there will be no negative impact on local jobs if this first part of the recommendation is implemented.

The second ordinance revision is to require residential use of garbage containers. If a dwelling has solid waste hauling, the code is specific about how often and to what degree solid waste is required to be picked up. The addition of mandating garbage container use would have positive implications for public health and the aesthetics in Oskaloosa by removing loose garbage bags from the curbs and long-term garbage storage on premises. Increasing licensing fees should also be investigated to offset ordinance enforcement efforts.

After a period of no more than two years, the ordinance enforcement phase should be reviewed to ensure efficacy. The best way to monitor this is for an ordinance enforcement officer to record any potential ordinance violations. Residential noncompliance with the ordinance revisions would indicate continued public health and aesthetic issues. Additionally, a survey should be conducted with questions similar to those asked in the *Residential Solid Waste Collection Survey*. The survey should measure perceptions of key concerns such as those involving public health, aesthetics, safety, environmental, consumer cost and road damage. If an identified positive change in those concerns is not realized, or levels of those concerns that do not have a baseline from the survey are unacceptable, the first part of the recommendation can be said to have failed.

In this event, a second recommendation is that the City of Oskaloosa pursue a single hauler contract system, to be determined by a bidding process on an as needed basis. A single hauler system would simplify ordinance enforcement by making it more difficult for residences to slip through the cracks. *The Residential Solid Waste Collection Survey* shows that 62 percent of respondents strongly or somewhat supported having a single hauler provide waste disposal services if fees were reduced. In addition to curbside garbage collection, it is also recommended that the city mandate curbside recycling; the survey reported that 57 percent of respondents stated availability of curbside recycling or being able to recycle was very or somewhat important. Additional services should be considered by the City at no extra charge. Services such as walk-up assistance for the elderly and disabled, yard waste collection, bulky item pick-up, and appliance disposal are all community indicated preferences.

While the survey concluded that people were satisfied with their current solid waste hauler and the majority of respondents were unconcerned with many issues facing the community regarding refuse trucks, a majority agreed that inexpensive and quality solid waste hauling is important. Most respondents supported either a single hauler contract or a municipal hauler given a reduction in costs. For more information regarding the survey see *the Residential Solid Waste Collection Survey* section in *the Final Recommendations* document.

Each of the following studies was a component utilized in determining the recommendation for the City of Oskaloosa. After surveying the perceptions regarding solid waste hauling practices, a number of additional questions were raised; mostly surrounding costs. Potential reduction of fees was studied to determine if this could be accomplished after the ordinance review and enforcement period.

State data utilized in the *Community Comparison Analysis* shows that most Iowa cities use city contracted models. However, after narrowing the data to communities similar to Oskaloosa, it was determined that of the three prevalent hauling systems (municipal, single contract, and multiple licenses), none were dominant. The expanded analysis showed that two similar communities switched hauler systems in the past four years. Both switched from multiple licensed haulers to a single hauler and reported residential waste hauling fee savings of approximately 25 to 50 percent.

Finally, the Impact Analysis concluded that garbage trucks contribute a disproportionate amount of wear and tear on roads and infrastructure as compared to personal automobiles. Reducing the number of trucks on the roads in Oskaloosa will produce a cost savings to the city of approximately \$700 per truck per year. Additionally, decreasing the number of trucks or limiting the time they spend on the streets will also reduce emissions and increase safety in the community. The dollar amounts indicated in this analysis are insufficient to suggest that an immediate change of waste hauler systems is necessary, but do point to externalities that should be a part of future waste hauling considerations.

Waste hauling is a public service that is meant to support the health, safety and well-being of a community. Different models of waste hauling agreements have different advantages. Oskaloosa's current model appears to generally satisfy its citizens. However, issues involving public health and aesthetics must be addressed. Ambiguities in the ordinance language allow residents to get overlooked and hinder enforcement efforts. If implementation of the first part of the recommendation fails to properly remedy the situation, the community should seriously consider implementing the second part of the recommendation: changing to a single hauler system.

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PROBLEM STATEMENT

The Oskaloosa City Manager and administration have been concerned about the lack of a uniform solid waste removal service. They were interested in reducing the amount of solid waste being produced. In addition, they wanted to explore alternatives with regard to solid waste services that may be provided under a single contract. The project also directed First Step Oskaloosa to speak to many residents. One of their main concerns was the aesthetics of the community. The use of a multiple hauler system has created undesirable curbside pick-up practices such as assorted trash receptacles and repetitive daily pick-up on the same streets. Additionally, concerns were voiced that because of the multitude of haulers, residents could slip through the cracks and not comply with City ordinance requiring curbside pick-up. The needs of the client and the assessed needs of the community directed the project to research, analyze, engage, and finally propose a strategy to explore options in dealing with solid waste in Oskaloosa. All the steps are present throughout this document.

Due to the structure of the current system it is difficult to accurately assess the true costs to the community or investigate potential diversion methods. This waste management research project was a necessary step in evaluating solid waste in Oskaloosa.

Throughout the past eight months, the current structure was evaluated:

- 1) To identify the needs of the Oskaloosa residents
- 2) Investigate available alternative options in surrounding communities
- 3) Recommend policy options for Oskaloosa

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COLLABORATION

While the project client is the City Manager of Oskaloosa, the team has worked closely with a variety of groups within the community. Groups such as the Oskaloosa Area Development Group (OADG) have a significant presence throughout the business community and have facilitated attempts to reach a large portion of the population. Also, the Clean and Green Committee is active in addressing the deficiencies in the current waste management system and are excited to develop solutions.

In addition to the City, the team has worked with County divisions; Mahaska County GIS assisted with data collection and Environmental Services provided insight to the techniques used to manage solid waste. Attempts were made to collect information from current solid waste haulers and the landfill to understand the services.

The team has also worked closely with many of the City's private entities and organizations including the Communication Research Institute, the *Oskaloosa Herald*, the Rotary Club, Mahaska Communication Group, and Musco Lighting.

We would like to specifically thank a few groups and individuals that assisted with our research throughout this process. Karen Hafner, an employee of OADG and a member of the Clean and Green Committee, was instrumental in assisting us with our survey. The Iowa City Solid Waste Division advised us about current trends and possible options for our project. Also, the Iowa Department of Natural Resources provided us with a vast amount of data and information without which our project and studies would not be complete.

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BACKGROUND

The following section details Oskaloosa's history, demographics, and other factors that may impact decisions about the community's solid waste hauling industry.

HISTORY

Oskaloosa was permanently settled in the early 1840's as a trading post by James Canefield, before Iowa became a state. An 1844 act of the territorial legislature organized Mahaska County and selected this site as the county seat. The County Commissioners chose the name Oskaloosa, a Creek Princess whose name means "last of the beautiful," over Mahaska, a suggested alternative. Within a year, contracts were issued to build a county courthouse, jail and other administrative structuresⁱ.

From its platting to incorporation in 1853, the population increased from less than fifty to almost a thousandⁱⁱ. Several newspapers, including the *Oskaloosa Herald*, founded in 1850, as well as wholesale establishments, churches and public schools sprung up in town. Oskaloosa continued to grow throughout the 1800's.

The town became known as a center of education. State funds issued in 1852 established a Normal School to train teachers for the region, one of only a few in the stateⁱⁱⁱ. Oskaloosa College was established in 1861 with affiliations to the Disciples of Christ Church^{iv}. It was financially unstable and went deeper in debt until 1880 when the Church opened a new college in Des Moines. Taking all but one of Oskaloosa's professors, that college would later become Drake University. Oskaloosa and Mahaska County rallied to raise enough money to pay down the college's debts and hire new teachers, but, 18 years later, the last class graduated^v. Additionally, Penn College opened its doors in 1872 after the merger of two Quaker groups, the Spring Creek Union College Association of Friends and the Iowa Yearly Meeting^{vi}. Now called William Penn University, there were over 1,600 students in 2010^{vii}.

Coal played a large part in Oskaloosa's early growth. Major coal mining began in earnest in 1873 when Iowa Central Coal Company absorbed the Hardin and Mahaska Coal Company. This was also around the time that Central Iowa Railroad built a depot in town. By 1885, there were 38 mines extracting more coal from Mahaska County than any other two Iowa counties combined^{viii}.

Later years saw growth in agricultural, retail and manufacturing sectors, especially in the brick and tile industry^{ix}.

Oskaloosa undertook many civic projects during the City Beautiful movement that lasted from the late 1800's through the 1920's. Several municipal buildings were constructed including the Mahaska County Court House (1886), the Carnegie Foundation funded Public Library (1903) and the original Community Stadium (1929). Teddy Roosevelt even dedicated the YMCA (1912) during a campaign stop^x.

More recent events include the cessation of bus service in 1952^{xi}, the opening of Penn Central Mall in 1985 and a visit by then candidate Barack Obama in 2007.

DEMOGRAPHICS

Year	Population
2010	11,463
2000	10,938
1990	10,600
1980	10,989
1970	11,224

Table 4.1: Oskaloosa population since 1970; Source: US Census Bureau

Table 4.1 shows US Census Bureau figures for the population of Oskaloosa since 1970. It indicates that the population has remained at around 11,000 people. However, the 2010 population is the highest since before 1970 and has trended up over the past 20 years. Many smaller Iowa communities have seen population stagnation or shrinkage.

The rest of the data comes from the 2000 census because full data from the 2010 census is not yet available on the city level.

The 2000 Census counted 10,938 citizens in Oskaloosa, 95.5% of them white. The largest minority population was Asian, at 1.3 % followed by African-American at 1.2%. The state population was 93.9% white and counted African Americans as the largest minority group with 2.1% of the population. Asians made up 1.3% of the population.

The median household income was \$34,490 in 1999 dollars compared with \$39,469 for Iowa. 10.6% of families and 13.7% of individuals fell below the poverty line compared with 6.0% and 9.1% for the state, respectively. This suggests that in 2000, Oskaloosa's citizens were somewhat less affluent than the average Iowan.

48.7% of the population was male and 51.3% female. The median age was 36.4 years compared to 36.6 years for the state. However, a breakdown of age cohorts shows that Oskaloosa had higher percentages of people 18-24 and 25-29 years than the State, but a larger percent of its population 70 years or older. This suggests that Oskaloosa was an older community with a bulge of young adults which brought down the median age. The higher percentage of 18-24 year olds is expected in community with a college. A more detailed breakdown of cohorts can be found in Appendix A.

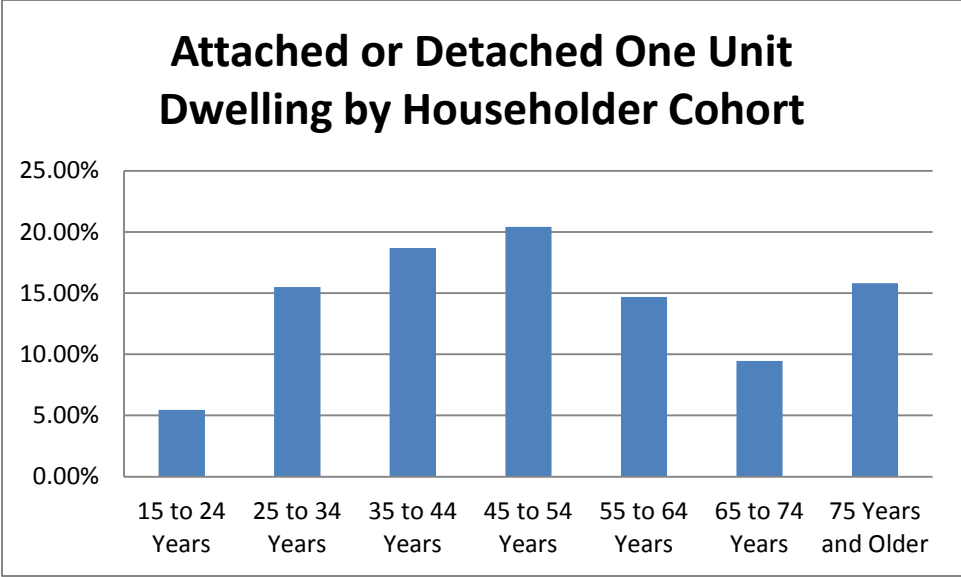


Figure 4.1: Age of individuals in single-unit dwellings; Source: US Census Bureau

In 2000, there were 3,619 single-unit detached or attached dwellings in Oskaloosa, 3,454 occupied. Figure 4.1 indicates that householders over 75 years made up more than 15% of the total, behind only 35-44 year olds and 45-54 year olds. However, people 75 years or older, made up only 10.81% of the population. This means that they were over represented as householders in these dwelling types.

ROAD NETWORK

In 2007, the road network in Oskaloosa was 72.7 miles^{xiii} in length. 20.72 miles^{xiii} was chip seal and the rest was rigid pavement.

The Public Works Department estimates that they average \$40,000 to \$50,000 annually in maintenance on rigid pavement compared to \$130,000 - \$150,000 for chip seal maintenance. Chip seal road surfaces incur more damaged by heavy trucks and require more frequent maintenance events compared to rigid pavements.

SOLID WASTE AND RECYCLING FACILITIES

Solid waste is hauled to the Mahaska County Sanitation Landfill located 5.4 miles from the Oskaloosa City Square Park. The landfill is operated by the Mahaska County Solid Waste Management Commission. As of 2008, the landfill was at 45% capacity which forecasts remaining use until approximately 2040^{xiv}. The landfill accepts solid waste and yard waste but not household hazardous waste. The landfill also reported a \$16.25 tipping fee per ton in a 2007; this was the lowest in a survey of 57 Iowa landfills^{xv}.

In 2008, KAL Services opened the Recycle Midwest's Oskaloosa Recycling Center. The 17,000 square foot distribution center collects recyclable material from Oskaloosa, Knoxville and Pella. A paper-fiber baler and compaction machine helps the center divert up to 3,600 tons of metals, plastics and fibers to processing centers a year^{xvi}.

CURRENT SOLID WASTE HAULING PRACTICES

Solid waste removal is regulated by Oskaloosa City Code 8.12.i-iii.

Residential garbage must be hauled by a licensed hauler at least once a week, from an easily accessible place. Residents are responsible for negotiating a contract for services with the licensed haulers. Garbage containers must be removed from the street by the resident within 24 hours of pick up. Residential recycling can be picked up by a licensed hauler from the curb, per an agreement between the resident and the hauler.

Waste hauling in Oskaloosa is currently by contract with private haulers for both residential and industrial/commercial/institutional (ICI). There were seven licensed waste haulers approved in FY 2009. These include:

- Cathy Fenton
- Kal Services, Inc
- Local Disposal, Inc
- Red Rock Rubbish
- Thomas Sanitation
- Van Egmond Sanitation
- Waste Management

Two of those (Kathy Fenton, Van Egmond) are located within Oskaloosa, while the rest are located in Pella, Des Moines, New Sharon and Beacon. Four haulers offer residential service; residential prices range from \$13 to \$18.80 a month. Four services offer residential curbside recycling pick-up. Two companies bundle garbage and recycling at no extra cost, while the others provide the service at additional cost. The haulers were contacted and asked about customers served, number of employees and routes, but not all chose to disclose this information^{xvii}.

Licensing fees are set by ordinance at \$100 and shall be resubmitted with each licensing renewal. The fee has not been altered since 1993.

ORDINANCE REVIEW

As defined by 8.12.090, waste storage containers are required by the City of Oskaloosa for all single family residences. These containers should be between 20 and 35 gallons with fly tight lids, leak-proof, with handles suitable for lifting. They should be stored on the person's property and taken to the curb for a period of no more than 24 hours when the waste is to be picked-up.

Section 8.12.140 states that a license is required by any individual wishing to collect solid waste materials. 8.12.150 goes on to say those who are licensed must maintain collection vehicles which are leak-proof, easily cleaned, and in good repair. Nothing should be spilled while transferring the waste from the curb to the truck.

Section 8.12.170 states "all solid wastes shall be collected from residential premises at least once per week. Recyclable materials shall be collected from residential premises at least semi-monthly."

A full version of the Oskaloosa Code, as it pertains to solid waste, can be viewed at the following website: http://library.municode.com/HTML/16543/level2/TIT8HESA_CH8.12SOWACO.html.

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IMPACT ANALYSIS

Different waste hauling systems impose different costs to the community. External costs are those that community members share. These include the cost of maintaining the road network due to the wear and tear caused by waste hauling trucks; the environmental and health costs associated with smog and greenhouse gas emissions from truck tailpipes; and the costs associated with the dangers of having large, collision prone trucks on the road network. Costs to the consumers are those charges that accrue directly to residents who use waste hauling services. A responsible waste hauling policy should be one that promotes efficiency and minimizes costs.

INFRASTRUCTURE

The City of Oskaloosa spends, on average, almost \$200,000 in materials and labor on road maintenance. Much of this maintenance budget directly results from vehicular road use. As such, additional traffic will cause added wear and tear^{xviii}.

Road wear is difficult to determine because most roadways consist of mixed traffic. By standardizing vehicle types to a single unit, aggregate damage can be calculated and vehicles and load types can be meaningfully compared. Most commonly in the US, axle/loads are standardized to the damage caused by one axle with an 18,000 pound load. This is called an Equivalent Single Axle Load (ESAL). Additionally, pavement wear is not a linear function of the vehicle's weight. Most of the literature suggests that there is a factor-of-four relationship between load and wear. This means that the same vehicle with twice the load weight will cause 16 times more damage^{xix}.

Garbage trucks are particularly harmful on pavement. This is due to their axle configuration, vehicular weight, load weight and operational behavior. ESALs for residential curbside solid waste hauling trucks have been estimated as high as 4.71 with a full load. Considering the average car has an ESAL of .0004, this means that one trip of a fully loaded garbage truck does the same amount of damage as 11,800 cars^{xx}. A University of Michigan Transportation Research Institute study suggests that frequent starting and stopping of garbage trucks could increase road wear by 50% to 100%^{xxi}.

The Minnesota Department of Transportation uses more conservative figures, stating that a garbage truck has an ESAL of 1.0, equal to 1,000 automobile trips^{xxii}. Assuming that a garbage truck drives the entire road network once a week, the annual equivalent of 52,000 automobile trips is attributable to that truck.

Unfortunately, translating the additional trips into a yearly dollar figure is extremely difficult to precisely determine. Road segments are designed to different specifications, including sub-grade, surface materials and thicknesses. These design specifications correspond to current and forecast loads over the intended life of the pavement.

Using a 2000 Federal Highway Administration report on road impacts associated with truck wear and tear, a ballpark cost estimate can be calculated. It is estimated that each additional solid waste hauling truck contributes \$723.32 worth of damage to the Oskaloosa road system every year. This estimate may be conservative due to the fact that a large percentage of the road network that

Oskaloosa maintains is chip seal, not rigid pavement. Chip seal is particularly susceptible to heavy truck load damage. Calculation details and assumptions are located in Appendix 2.

Examples from other cities suggest that removing excessive waste hauling vehicles from the road network can have significant cost savings. The Public Works Department of the City of Roseville, MN conducted a study in 2002 which suggested that switching from a multiple licensed hauler system to a single contracted hauler could save as much as \$40 per citizen per year in road maintenance costs^{xxiii}.

The City of Lee’s Summit, MO, a suburb of Kansas City, is in the process of evaluating its solid waste hauling policies as well. Their Department of the Environmental Services has estimated that by cutting the number of residential curbside haulers from five to one, they will save \$400,000^{xxiv} yearly.

Both cities are larger than Oskaloosa (34,000 and 84,000, respectively) and the road systems are different, but the fact remains that limiting the number of garbage trucks on the road limits the amount of damage.

ENVIRONMENTAL QUALITY

CO₂, particulate matter and other gasses emitted from internal combustion engines are known contributors to global warming. They also affect local and regional air quality which is not only aesthetically displeasing but can cause and exacerbate respiratory and cardiac ailments. Garbage trucks are substantial emitters because of the constant stopping and starting, idling time and heavy loads.

Refuse Truck Emission	Grams/Mile	Automobile Emission Type	Grams/Mile
HC^{xxv}	0.700	HC ^{xxvi}	0.083
NOX^{xxvii}	12.700	NOX ^{xxviii}	0.274
CO^{xxix}	3.200	CO ^{xxx}	3.560
PM^{xxxi}	0.650	PM ^{xxxii}	0.010
CO₂^{xxxiii}	1,544.479	CO ₂ ^{xxxiv}	320.000
Total	1,561.729	Total	323.927

Table 5.1: Emissions by Vehicle Type

Table 5.1 indicates that refuse trucks emit almost five times the amount of pollutants as an automobile. Assuming that a truck drives the entire roadway once a week, every week for a year, total emissions are the same as driving a car 18,226 miles. This is equivalent to driving from New York to Los Angeles more than seven times. Further discussion of emission estimates are discussed in Appendix 2.

Monetizing emissions is difficult because of the complexity with which pollutants interact with the environment. Because of the relatively rural setting of Oskaloosa and the character of its topology and meteorology, it is unlikely that emissions will build up locally. However, the marginal damage for carbon emissions is estimated at between \$16.75 and \$55.83 per short ton in 2010 dollars^{xxxv}. This would suggest that each additional solid waste truck causes between \$108 and \$360 in annual global environmental damage.

SAFETY

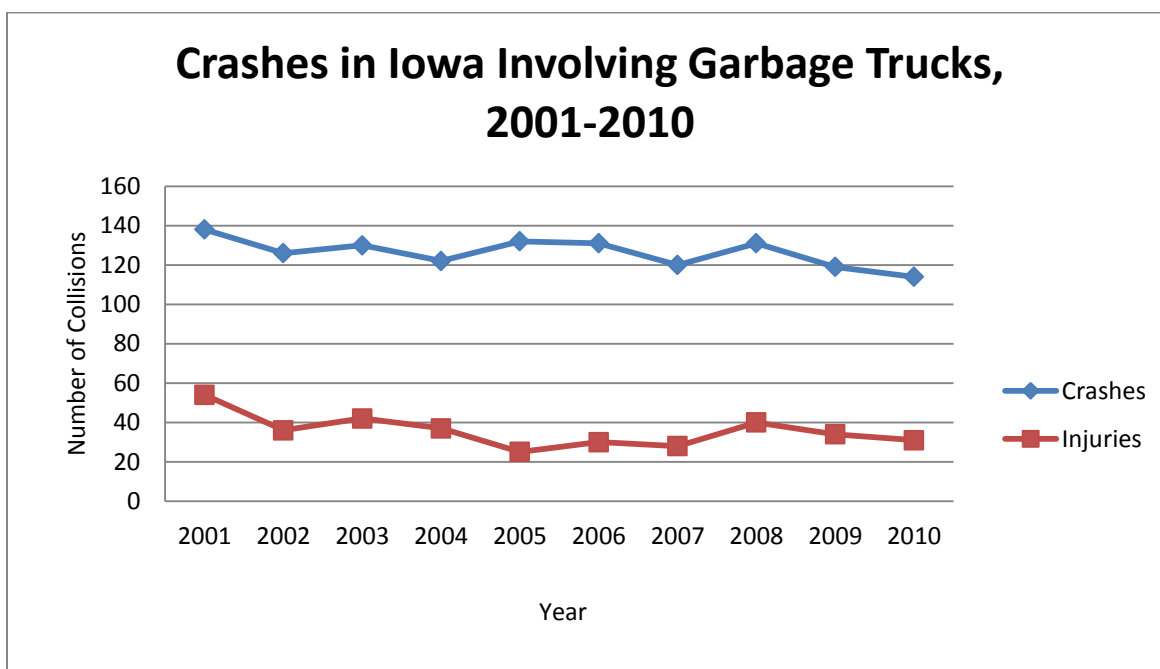


Figure 5.1: Garbage truck collisions in Iowa; Source: Iowa Department of Transportation

Garbage trucks also pose a safety risk to the community. As large vehicles on residential roads that frequently start and stop, there is the potential for collisions with pedestrians, property or other vehicles.

Figure 5.1 indicates that there were 1,263 collisions involving garbage trucks in Iowa from 2001 to 2010. That averages to 126 collisions per year. Those collisions resulted in 357 injuries, 15 deaths and approximately \$7.5 million in property damage. In November of 2008, a collision involving a garbage truck occurred in Oskaloosa, resulting in \$3,000 worth of damage to the car but no injuries. The cause of the crash was a refuse truck backing into a parked motor vehicle.

Table 5.2 shows state level property damage resulting from crashes involving garbage/refuse trucks from 2001 to 2010. The amounts are adjusted to current values using the Consumer Price Index Calculator available on the Bureau of Labor Statistics website.

Year	Damage Adjusted to 2010 Dollars
2001	\$804,291
2002	\$928,815
2003	\$1,029,746
2004	\$768,513
2005	\$724,819
2006	\$916,572
2007	\$719,634
2008	\$515,538
2009	\$717,148
2010	\$534,522
Average Annual Property Damage	\$765,960

Table 5.2: Statewide crash related damage; Source: Iowa Department of Transportation

Using statewide data from 2005-2008, a mathematical model was constructed to estimate the number of crashes and damage attributable to the waste hauling type. The model indicates that communities with city-contract hauling systems have slightly fewer garbage truck related collisions when controlling for tested variables. Additionally, the cost of damage associated with garbage truck related crashes is lower in cities with city-contract systems than individual contracts controlling for the same variables. A further discussion of the mathematical model and its components can be found in Appendix 3.

Solid waste hauling trucks pose a safety risk to road network users and their property. While collisions involving garbage trucks are likely unavoidable, additional garbage trucks create additional risk of collision. Ensuring that only the necessary number of trucks is on the roads minimizes the possibility of a collision.

COST TO THE CONSUMER

Non-external costs are those that are directly charged to the service user. In the case of solid waste hauling, this consists of the amount charged for trash and recycling pick-up.

It is expected that moving from multiple licensed haulers to a single contracted hauler using a competitive bid process will lower consumer costs of waste hauling. This is due to the fact that the hauler has guaranteed income, can maximize pick-up efficiency and can take advantage of economies of scale associated with a larger consumer base.

A 1978 study of waste hauling practices supports this expectation; it was found that contract hauling is 26% to 48% cheaper than multiple, licensed haulers with the same level of service^{xxxvi}.

Two Iowa communities have recently switched from multiple licensed haulers to a single contract. The City of Winterset saw estimated monthly average costs drop from \$22 for trash and recycling curbside pick-up to a contract mandated \$11.50. This change also saw an increase in provided services that included yard waste pick-up and limited bulky item removal^{xxxvii}.

The City of Johnston also switched from multiple haulers to a single contract. Costs dropped from \$12-\$14 a month to \$7. This includes garbage, recycling and bulk item removal^{xxxviii}.

	Before			After		
	Licensing	Price	Tipping (\$/ton)	Licensing	Price	Tipping (\$/ton)
Johnston	\$10	\$12-\$14	\$31.00	\$0	\$7	\$32.00*
Winterset	\$50	\$22	\$22.50	\$0	\$11.50	\$22.50

Table 5.3: Hauling fees of comparable cities; *\$5 rebate for contract haulers that have 50% waste of last year; Source: Cities of Johnston and Winterset City managers

CONCLUSION

Garbage trucks are a necessary part of urban life. Refuse hauling will always be needed. However, since garbage trucks disproportionately contribute to infrastructure wear and tailpipe emissions and are a real safety concern, they should be limited to only the number needed to provide service. Additionally, a contracted, single hauler has been proven to reduce direct costs to the consumer by taking advantage of guaranteed income, efficient routes and economies of scale.

LOCAL BUSINESS CONCERNS

Waste hauling system change, by definition, will have an economic impact. It is difficult to identify every affected stakeholder, as well as estimate the magnitude of impacts on those parties. However, certain levels of effects and broad categories of stakeholders can be identified based upon the type of recommendations adopted. There are three emphasized parties within Oskaloosa; customers, solid waste haulers, and the City of Oskaloosa.

EXPECTED IMPACTS WITH ORDINANCE ENFORCEMENT

Changing and enforcing the current ordinance that requires everyone in the community to have a solid waste hauler is estimated to have the lowest level of impacts on stakeholders. Those that do not have service would be required purchase it; haulers could see an increase in revenues. In this scenario it would be expected that local jobs would be negatively affected.

EXPECTED IMPACTS WITH SINGLE HAULER

Moving to a single contracted hauler would have a larger impact on stakeholders than required curbside garbage pick-up and an ordinance change. The impacts on the city would be relatively minor, other than the associated costs for issuing, accepting, and managing a RFP (Request for Proposal). Consumers may see a reduction in prices; however the amount of this reduction is uncertain. The number of solid waste haulers would decrease to one and the solid waste hauling revenues from those companies that did not win the RFP would decrease. The company that won the RFP would likely see an increase in revenues. Each company would have an equal opportunity to win the bid.

A municipal hauler system would change how solid waste is currently collected the most. Impacts to the consumers would be the same as a single contracted hauler; however, all companies operating in Oskaloosa would see a decrease in revenue as they could no longer perform residential hauling. The City would have the responsibility of managing residential garbage collection.

CONCLUSION

The only way to ensure that there will be no impacts on consumers, businesses, and the city is to maintain the current system. If any of the recommendations are adopted, there will be impacts on stakeholders. A single hauler, especially a municipal hauler, would have greater effects on the community than changing the garbage collection ordinance. These impacts are important and should be recognized. The City may at some point deem it necessary to try and estimate potential impacts.

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RESIDENTIAL SOLID WASTE COLLECTION SURVEY

Information related to individual residential solid waste practices and the perceptions of the community about that system is a necessary component of this recommendation report. Therefore, a community-based survey was administered to the community. The following section presents the methods, findings, and conclusions from this survey.

SURVEY METHODS

The residential solid waste survey was administered from January 27, 2011 to January 31, 2011 in locations throughout Oskaloosa. Paper copies of the survey, one of which can be found in Appendix 4, were left at the following locations: the Oskaloosa Public Library, Oskaloosa City Hall, the Oskaloosa Senior Center, Tazos's Steakhouse, the Mahaska County YMCA, Communication Research Institute (CRI), Dr. Salami's Bar and Grill, Meals on Wheels delivery locations, and the Oskaloosa Area Chamber and Development Group offices. In addition to the paper version, a survey was available online at FirstStepOskaloosa.wordpress.com. Announcement of the survey was included in the *Oskaloosa Herald* on January 24, 2011, various community websites, and through mass emails with local employers such as Mahaska Communication Group, Clow Valve Company, and Musco Lighting.

A total of 195 responses (178 of which were from Oskaloosa residents; 119 from online sources) were returned for analysis. It is important to note that all findings are for respondents only. Oskaloosa residents who took the time to complete the survey may be those most likely to voice their opinions on this issue, thus it is believed that this sample could represent the vocal population within the community.

SURVEY RESULTS

GARBAGE COLLECTION

80% of respondents indicated that they had curbside garbage collection. Of those that have garbage collection, 13% also have curbside recycling collection. The low percentage of curbside recycling is due to the fact that 37% of respondents stated that their hauler did not offer that service and 37% stated that they take it on their own to a drop off site. No other reason received more than 10% of the responses. Survey takers were able to give multiple answers.

WASTE HAULER SATISFACTION

Survey respondents were asked to evaluate their current solid waste provider in seven different areas. Generally, people were satisfied with their current solid waste providers. 89% of people were at least “somewhat” satisfied with their waste service:

Satisfaction of Respondents Current Solid Waste Hauler					
	Percent of Responses (Respondents)				
	Very Satisfied	Somewhat Satisfied	Somewhat Unsatisfied	Very Unsatisfied	Don't Know
Prices (147)	59%	30%	4%	2%	5%
Quality of Service (149)	76%	21%	1%	1%	1%
Pick-up Times (150)	77%	20%	3%	0%	0%
Pick-up Frequency (149)	81%	16%	1%	1%	1%
Customer Service (150)	71%	20%	5%	1%	3%
Convenience (148)	76%	22%	1%	1%	1%
Overall (151)	72%	27%	0%	1%	0%

Table 7.1: Waste hauler satisfaction; Source: Residential Solid Waste Collection Survey

Comparing overall satisfaction to the number of times a person has changed waste haulers indicates that residents were currently satisfied with their providers, even if they had changed haulers multiple times.

Number of times changed waste haulers	Overall Satisfaction (Number of People)		
	Very Satisfied	Somewhat Satisfied	Total (151 Respondents)
0	96	33	129
1	3	3	6
2	2	1	3
Total (144 Respondents)	101	37	138

Table 7.2: Satisfaction and hauler changes; Source: Residential Solid Waste Collection Survey

IMPORTANCE OF GARBAGE COLLECTION

People were asked to rate the level of importance for several aspects of garbage collection. Every category was rated as at least “somewhat” important by around 50% of respondents. The most important features of garbage collection according to respondents were quality of service and inexpensive garbage collection. The least important features were being able to choose from several haulers and having the cost of recycling built into the base fee for garbage collection.

The most important issues (quality of service and inexpensive garbage collection) also received the highest percentage of responses for “very” important. Another consideration respondents felt strongly about was supporting small waste hauling businesses. 65% reported that they felt this issue was “very” or “somewhat” important.

The categories that received the highest responses for “very” unimportant were being able to choose from several garbage haulers and having the cost of recycling built into the bill for garbage collection.

Importance of Garbage Collection					
	Very Important	Somewhat Important	Somewhat Unimportant	Very Unimportant	Don't Know
Quality of service in garbage collection (171)	48%	40%	11%	1%	1%
Inexpensive garbage collection (166)	46%	36%	16%	1%	1%
Being able to recycle / availability of curbside recycling (163)	28%	29%	23%	17%	3%
Being able to choose from several garbage haulers for service (167)	22%	27%	26%	23%	2%
Having the cost of recycling built into the base fee you pay for garbage collection (164)	22%	26%	22%	21%	10%
Having many materials collected for recycling (166)	29%	29%	22%	14%	5%
Supporting free enterprise in garbage collection (165)	33%	26%	19%	16%	5%
Supporting small hauling businesses (169)	38%	27%	19%	12%	3%

Table 7.3: Importance of garbage collection; Source: Residential Solid Waste Collection Survey

CONCERNS ABOUT GARBAGE COLLECTION

When asked to rank garbage collection concerns, the most important were damage to streets caused by trucks and the safety surrounding refuse collection trucks. However, no category was rated as “very” or “somewhat” important by more than 50% of respondents.

The issue that received the highest percentage of responses for “very” important was damage to streets caused by refuse trucks. The issues that received the highest percentage of responses for “very” unimportant was noise from garbage trucks.

Concerns about Garbage Collection					
	Percent of Responses (Number of Respondents)				
	Very Important	Somewhat Important	Somewhat Unimportant	Very Unimportant	Don't Know
Too many trucks on the street collecting garbage (172)	12%	19%	24%	42%	2%
Noise from trucks collecting garbage (172)	3%	13%	32%	49%	2%
Air pollution from trucks collecting garbage (169)	8%	15%	33%	42%	2%
	Very Important	Somewhat Important	Somewhat Unimportant	Very Unimportant	Don't Know
Safety of trucks collecting garbage (171)	15%	27%	29%	27%	2%
Garbage cans on streets on multiple days of the week (171)	18%	16%	32%	33%	2%
Damage to streets caused by trucks collecting garbage (171)	19%	26%	27%	22%	5%
Other (6)	0%	0%	0%	0%	100%

Table 7.4: Concerns about garbage collection; Source: Residential Solid Waste Collection Survey

POTENTIAL SOLID WASTE HAULING SYSTEMS

Survey takers were asked whether they would support or oppose several waste hauling scenarios. Three scenarios were supported by at least 55% of the respondents. These were for multiple haulers, a single contract provider if it reduced fees or a municipal system if it reduced fees. The three scenarios that were opposed by more than half of the respondents were no collection policy, municipal hauling if it did not reduce fees and single contract provider if it did not reduce fees.

The single contract provider and municipal hauling scenarios, provided that they reduced fees, received the most responses for “strongly” support. The same scenarios, if they did not reduce fees, received the most responses for “strongly” oppose.

Potential Solid Waste Hauling Systems					
	Percent of Responses (Number of Respondents)				
	Strongly Support	Somewhat Support	Somewhat Oppose	Strongly Oppose	Don't Know
Single contract provider if it reduced fees (166)	26%	36%	10%	23%	5%
Single contract provider if it did not reduce fees (165)	7%	16%	29%	38%	10%
Municipal hauling if it reduced fees (164)	26%	31%	12%	24%	7%
Municipal hauling if it did not reduce fees(164)	5%	18%	27%	39%	10%
Keep individual contract multiple haulers (166)	25%	42%	11%	8%	14%
No required collection policy (164)	17%	18%	21%	26%	18%
Other (3)	0%	0%	0%	0%	100%

Table 7.5: Potential hauling systems; Source: *Residential Solid Waste Collection Survey*

POTENTIAL SOLID WASTE COST OPTIONS

Residents were asked whether they would support or oppose several garbage and recycling cost options. The option that received the most support was having the cost of recycling built into the base fee paid for garbage collection. The majority of respondents opposed a “pay as you throw” scenario. Pay as you throw is a hauling system where instead of a flat fee, the user is charged based upon the amount of garbage hauled away. Using the current licensing system to address concerns regarding refuse trucks was supported more than opposed. However, using Oskaloosa’s garbage hauler licensing system to address problems with refuse trucks received a response rate of around 20% in the “don’t know” category. This may be due to the unfamiliarity residents have for the current Oskaloosa hauler licensing system.

Support for or Opposition to Service Changes					
	Percent of Responses (Number of Respondents)				
	Strongly Support	Somewhat Support	Somewhat Oppose	Strongly Oppose	Don't Know
Having the cost of recycling built into the base fee you pay for garbage collection (all households pay) (169)	30%	32%	13%	19%	7%
A garbage fee structure where the first container of garbage set out for pick-up is part of the base fee and additional containers, if any, cost extra (Pay as you throw) (167)	11%	31%	22%	31%	5%
Using Oskaloosa's garbage hauler licensing system to address concerns created by the number of trucks on the street (170)	16%	28%	17%	19%	19%

Table 7.6: Service Charges; Source: Residential Solid Waste Collection Survey

REGRESSION ANALYSIS

The regression analysis used a mathematical model to determine relationships between key variables within the data. These relationships can provide valuable insights. For this analysis, five regressions were run. The variables were selected based on relevance to explaining the current waste hauling system.

From the analysis, specific groups of respondents can be identified as either supporting or not supporting different systems if all the other variables are held constant. Generally, female respondents were more likely to support moving to a single hauler system than men. Respondents younger than 34 years old and respondents between 45 and 54 were also more likely to support a change than those over the age of 65. Those that find inexpensive garbage and damage to streets caused by refuse trucks important would support a change to a single hauler more than those who found those issues unimportant. Additionally, people with curbside recycling collection are more likely to support a change than those that do not have that service.

Although there are groups that would tend to support a change more than others, there are also groups that are more likely to support keeping the current system. Respondents living in single family homes were more likely than those who do not to prefer the status quo as were respondents that had curbside pick-up compared with those that did not. Also, respondents living in households making \$60,000 or less were more likely than those in households making \$100,000 or more to oppose a change in hauling systems. Again, these comparisons are valid when holding all other variables constant.

The regression model tables are located in Appendix 5.

CONCLUSIONS

In general, people who completed the survey were satisfied with their current solid waste hauler. The majority of respondents were unconcerned with many issues facing the community regarding refuse trucks. However, almost everyone agreed that inexpensive and quality solid waste hauling was important. Keeping the current solid waste system in place was the most supported solid waste scenario. The majority of respondents also supported either a single contract or municipal hauler given reduced fees.

Additionally, those who thought that issues relating to garbage trucks are important, inexpensive garbage collection is important, and those that had recycling were more likely to support a single hauler that reduces fees when compared to those that find issues and inexpensive garbage collection unimportant and did not have recycling. Respondents who would be more likely to support keeping the current system were those that value having multiple haulers, those with garbage collection, and those in households making less than \$60,000 a year. While this does not represent the majority, it does identify the leanings of certain groups.

SURVEY LIMITATIONS

This survey is considered a perceptions survey and captures participant's general attitude toward waste hauling practices within Oskaloosa. While we were unable to capture the entire community's preferences, it is believed that survey respondents are those that may voice their opinions most vocally.

Many of the surveys were taken online, which could have increased the number of individuals responding from a segment of the population with internet access. Having a greater number of paper survey responses would have been ideal but the online responses were more cost effective and were promoted most successfully. The only concern is that those individuals without internet access may have been under-represented.

Additional graphical representation of the data is contained in Appendix 4.

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COMMUNITY COMPARISON ANALYSIS

A *Community Comparison Analysis* was found to be a key component of this study to determine the common practices of other communities. The purpose of this analysis is to compare solid waste and recycling practices for single family residences in Iowa communities. By using a comparison matrix, any patterns or trends in regional practices became evident and directed future, more detailed research opportunities. Conclusions can be used to help analyze and advise current waste and recycling hauling policy in Oskaloosa, Iowa.

In an effort to inform decision makers, it was determined that a variety of similar communities and hauling practices should be conducted. This provided a list of possible options, as well as established if any common practices existed. The study also identified communities whose waste and recycling collection provision should be studied more in-depth.

GARBAGE COLLECTION AND PROCESSING

All communities have some type of garbage collection and recycling services. Figure 8.1 shows the different waste hauling practices a community can have. Waste hauling is either done by licensed haulers who contract with individuals, single haulers that contract with the city or municipal crews.

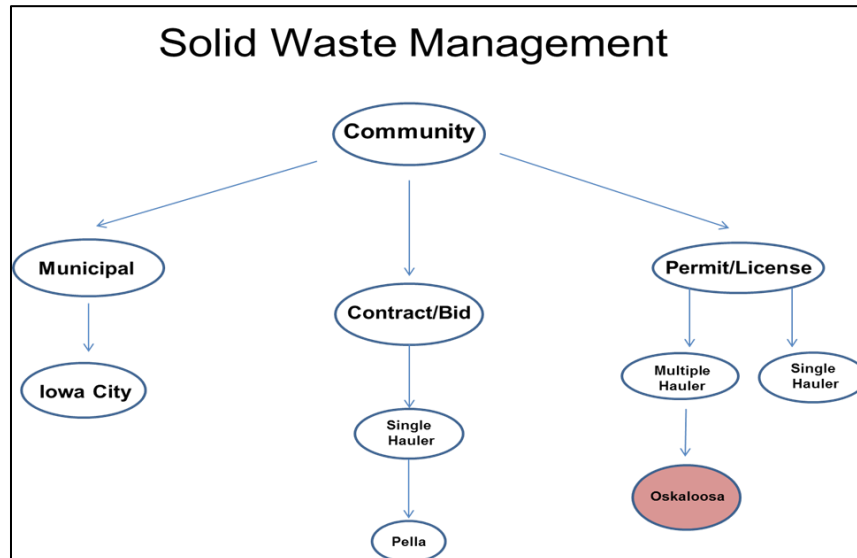


Figure 8.1: Available waste hauling options

In a municipal waste hauling system the city, instead of contracting with a hauler, provides the garbage collection and recycling services for the community. Iowa City has a municipal waste hauling system where residential garbage collection and recycling is provided by city crews; however, commercial waste hauling and recycling is contracted with City Carton.

In a contract/bid system the city receives bids from different haulers and, based upon the bid received and services desired, the city enters into an agreement with a single hauler to provide solid waste collection and recycling services. The City of Pella has a single private contract with Midwest Sanitation (Kal Services) for solid waste management and recycling.

In a permit/license system the city licenses private haulers to contract privately with individual households to provide garbage collection and recycling services. This is the system Oskaloosa is currently using.

Every three years, the Iowa Department of Natural Resources issues a survey to municipalities regarding waste and recycling hauling practices. The most recent round of surveys is ongoing. Using the data collected from 450 cities, a basic profile was established.

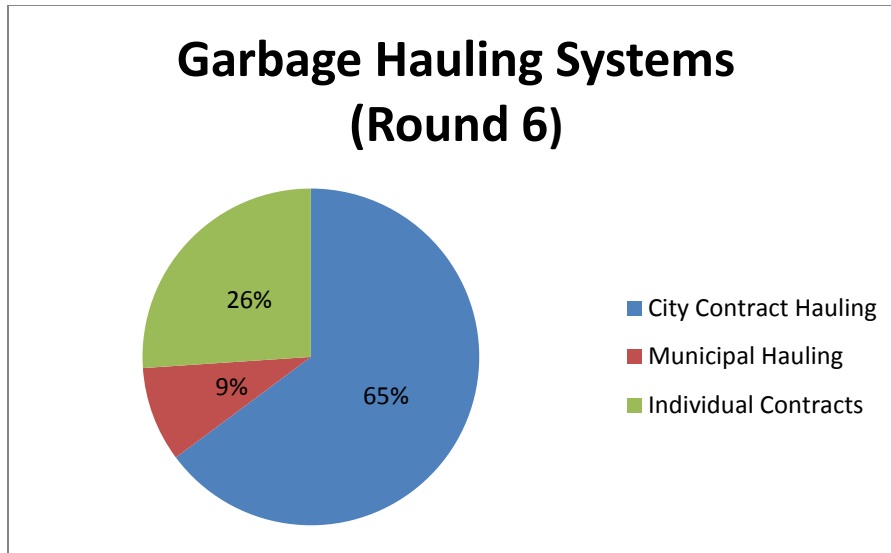


Figure 8.2: Responding Cities' Waste Hauling Practices; Source: Iowa Department of Natural Resources

Figure 8.2 suggests that residential curbside pick-up terms and fees are negotiated through the city for almost two thirds of the responding cities. Individually negotiated contracts with private haulers make up more than a fourth of the respondents. Municipal hauling makes up the smallest percentage of cities that responded.

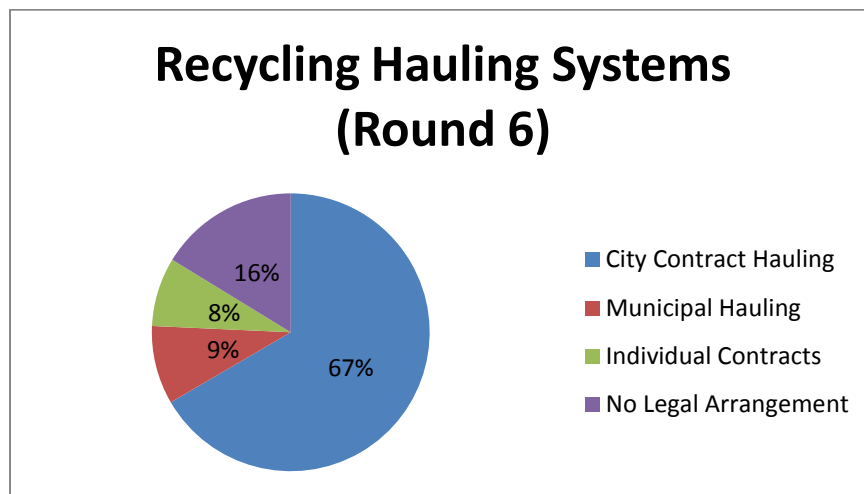


Figure 8.3: Responding Cities' Curbside Hauling Practices; Sources: Iowa Department of Natural Resources

Figure 8.3 suggests that, similar to waste hauling figures, two thirds of the responding communities negotiate directly with private haulers for curbside recycling pick-up. Eight percent have individual contracts and nine percent have municipal crews. Sixteen percent of responding communities have no legal arrangement. This means that there is no legal requirement for individuals to have curbside pick-up or there are not requirements of recycling haulers. In these communities it is likely that either recycling curbside pick-up is unavailable or that curbside service is negotiated through the individual.

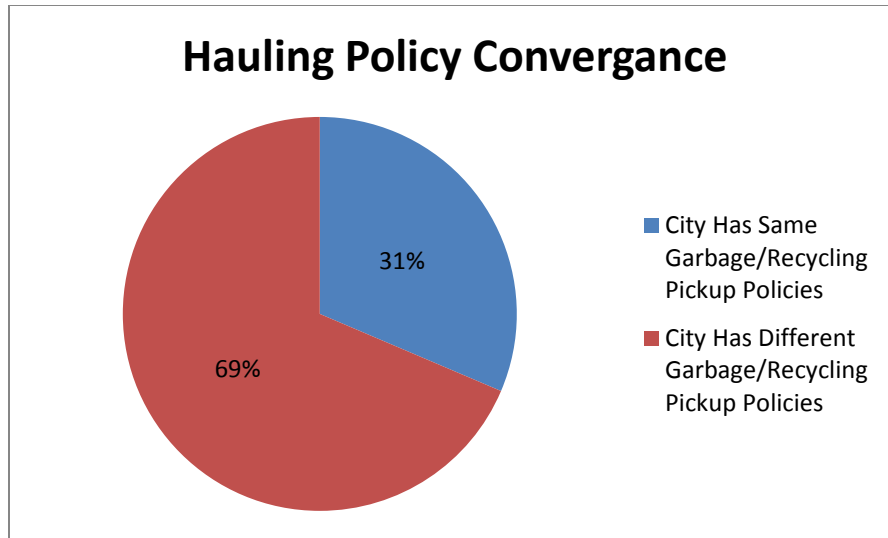


Figure 8.4: Comparison of Garbage and Recycling Hauling Policies; Source: Iowa Department of Natural Resources

Figure 8.4 suggests that more than two thirds of the responding cities have different garbage and recycling pick-up policies. This trend implies that one policy does not necessarily inform the other.

SELECTING COMMUNITIES FOR CASE STUDY

Using Table 8.1, three cities were selected for a case study analysis of qualitative data. Each city represents one of the waste hauling types. The cities selected were Ames for multiple contracted haulers, Pella for city contracted hauler and Perry for municipal crews.

A good representation of single private hauler is Pella. The City of Pella has a single private contract with Midwest Sanitation (Kal Services) for solid waste management and recycling. The rate is \$9.62. All the recycling material for Pella goes to Pella Corporation. Pella Corporation presently recycles sawdust, scrap lumber, aluminum, steel, glass, cardboard, office paper, plastic films, rigid plastics, newspapers, magazines, electronics, batteries, shop rags, paints, solvents, oil, coolant, steel and plastic drums. Pella Corporation also incinerates a portion of its solid waste for energy recovery. South Central Iowa Solid Waste Agency handles electronics recycling. Pella was also one of five midwest communities that planned electronic recycling drives in honor of Earth Day in 2010. This event was hosted by Pella Corporation, the City of Pella Public Works, Mahaska Communication Group, Vermeer Corporation, Precision Pulley and Idler, Van Gorp Corporation, Wal-Mart and Midwest Sanitation (Kal Services). This annual event encourages area residents and participating communities to safely recycle obsolete electronics, keeping them out of landfills.

A representative city with municipal hauling is Perry. The garbage rate is \$12. The city has garbage collection (both residential and commercial), curbside yard waste collection, annual tire collection, annual hazardous waste collection and bulky waste pick-up. Commercial and residential recycling is done at the City of Perry recycling center.

The City of Ames uses multiple licensed haulers. Ames does not provide garbage collection service; rather, it licenses independent haulers for the collection and disposal of garbage and refuse within

the city. It has 13 licensed haulers out of which two provide recycling services. The average garbage pick-up rate is \$21.50.

SELECTED COMMUNITY STUDY METHODOLOGY

ESRI ArcMap GIS software was used to select cities within 75 miles of Mahaska County, within Iowa's borders and whose populations were between 6,000 and 16,000. This resulted in a list of cities that were similar in region and size. Those cities in Linn, Johnson and Polk Counties as well as the City of Norwalk in Warren County were excluded because their proximity to large urban areas was thought to potentially affect waste disposal options. This gave a list of 14 cities out of which five had multiple licensed haulers, five had municipal hauling and four had single private contracts.

Pertinent information for this study was identified by examining existing literature. A comparison matrix was constructed showing waste hauling arrangements, recycling arrangements, recycling facility ownership and recycling cost-share agreements, where applicable. All data was collected by calling city clerks and city managers.

ANALYSIS

As Table 8.1 indicates, the comparison cities have three types of waste hauling practices. For communities with multiple haulers that provided information, the number of haulers range from four to seven. Five out of the fourteen selected cities use multiple licensed haulers. Four communities use single, licensed haulers and five have municipal garbage collection. This matrix suggests that communities similar in size and geographic region to Oskaloosa do not show a particular inclination for any one type of waste hauling policy.

	Solid Waste Collection Service Provider	Recycling Collection Service Provider	Recycling Process Arrangement	Revenue Share Arrangement
Independence	Multiple licensed haulers	Single private contract	No information	None
Boone	4 licensed haulers	Multiple licensed haulers	County owned facility	None
Nevada	5 licensed haulers	Multiple licensed haulers	Privately through haulers	None
Perry	Municipal	Municipal	City owned facility	Participating cities share
Grinnell	Municipal	Municipal	City owned facility	Participating cities share
Newton	Single licensed contract	Single licensed contract	Privately owned facility	None
Pella	Single licensed contract	Single licensed contract	Privately owned facility	None
Indianola	4 licensed haulers	1 licensed hauler	No information	None
Oskaloosa	7 licensed haulers	3 licensed haulers	Privately owned bailing facility	None
Washington	Single licensed contract	Single licensed contract	City/County owned facility	City/County share
Fairfield	Single licensed contract	Single licensed contract	Privately owned bailing facility	City/County subsidy for single stream pick-up
Mount Pleasant	Municipal	Municipal	Facility owned by solid waste commission	Revenues generated by solid waste commission used for facility O/M
Fort Madison	Municipal	Municipal	Facility owned by solid waste commission	Revenues generated by solid waste commission used for facility O/M
Keokuk	Municipal	Municipal	Facility owned by solid waste commission	Revenues generated by solid waste commission used for facility O/M

Table 8.1 Comparison City Matrix

RECYCLING COLLECTION AND PROCESSING

All communities that were analyzed have some form of curbside recycling pick-up. However, like waste hauling, there is variation in how pick-up occurs. Unlike the statewide data, recycling collection service is usually in the same manner as solid waste pick-up. This means, for example, that cities with single, contracted haulers for garbage collection will also have single, contracted haulers for recycling pick-up.

The only difference is in communities that use multiple garbage haulers. Independence has multiple, licensed garbage haulers, but a single, contracted recycling collector. Also, in many cities, not all licensed trash haulers collect recycling, meaning that the number of recycling collection operations is less than the number of trash haulers. Finally, Boone and Nevada do not keep track of the number recycling collection service providers.

Half of the communities send recyclables to municipally owned and operated recycling centers. Most of the communities that allow multiple, licensed recycling collection service providers either do not keep track of where the recycling is processed, or it is processed at private facilities. All five of the communities that use city crews to collect recycling take it to a municipally owned processing center. One out of the five cities that use single, contracted recycling collectors takes it to a municipal center.

Seven out of the fourteen communities have a cost share agreement of some kind with the recycling center or collector to which its recycling goes. None of the multiple hauler cities receive recycling revenue and only one of the four single, licensed contracted recycling collector cities has such an agreement. All of the cities with municipally collected recycling service receive a share of the recycling revenue, even if that comes in the form of lower operation and maintenance costs for the local solid waste authority.

CONCLUSION

Waste hauling and recycling collection can be one of three types: multiple, licensed haulers; single, contracted haulers; or municipal. While there are state level trends for curbside pick-up, no type is dominant among selected communities. Of these communities, those that do not use municipal recycling collectors are more likely to have recycling go to privately owned facilities and are less likely to have a revenue sharing agreement.

Oskaloosa's solid waste hauling and recycling practices are not unusual when compared to the other, similar communities. Additionally, their use of a private facility for recycling processing and the lack of a revenue sharing agreement are typical.

WASTE HAULING PRACTICE CHANGES

Using Iowa DNR community survey data from 2005 to 2010, communities that have changed their hauling practices were selected for more in depth study.

The municipal survey results show that only five communities changed their solid waste management system over the past five years. Three of these communities (Doon, Winterset and Johnston) changed from a license to single contract/bid system. The other two communities, Swea City and Centralia, changed from a contract to a license system.

CITY OF WINTERSET

The City of Winterset is the county seat of Madison County and has a population of 4,768. They entered into contract with McCoy Sanitation Corp on January 21, 2008 which expires on March 31, 2013 for the collection and disposal of residential waste. The contract provided an initial monthly customer fee of \$10.65 per occupied residential unit through March 31, 2009. Table 8.2 below shows a tabulation of the bids submitted by the different haulers.

CITY OF WINTERSET GARBAGE CONTRACT BID TABULATION Bids Opened: December 10, 2007 1:00 PM			
Bidder:	BASE BID solid waste, recycling, yard waste, bulky item	ALTERNATE BID 1 solid waste, recycling	ALTERNATE BID 2 solid waste, recycling, yard waste
McCoy Sanitation Corp.	10.65	10.15	10.45
Wiegert Disposal Inc.	11.27	11.27	11.27
Waste Management of Iowa	12.51	11.47	12.21
Waste Connections of Iowa Inc.	16.00 plus \$2.00 per bag/sticker for yard waste	16.00	16.00 plus \$2.00 per bag/sticker for yard waste

Table 8.2: City of Winterset garbage contract bid; Source: City of Winterset

The contract was adjusted beginning April 1, 2009 because McCoy Sanitation determined the diesel fuel price would exceed \$2.75 per gallon making the CPI-U (Consumer Price Index for Urban Earners) adjustment for the year 3.84 percent (0.41 cents) per occupied residential unit higher than anticipated, for a total billing amount of \$11.06. This charge includes costs for garbage collection, curbside recycling, one bulky item per week, and yard waste collection twice a month. Some additional services that the contractor provides include services to elderly/disabled (collecting the waste from near the residents dwelling during the regular scheduled pick-up at no additional charge), Christmas tree pick-up in January, and appliance pick-up from all residential units within the City limits.

According to the City administrator, Mark Nitchals, there were a number of reasons for changing from a license to a contract system. Cost savings to the residents was a key concern. Previously there were four licensed haulers working in Winterset, each of whom was charged a \$50 licensing fee yearly. One of the haulers, Waste Management was charging over \$22 per month in 2008 for garbage and curbside collection of recyclables. The other haulers charged between \$20 and \$25. In 2009, the city contract service started at \$11.06 per month and provided more services. So for about half the charge, more services were provided.

Another reason for city contract service was to implement a yard waste burning ban. In order to provide the residents with an alternative to burning yard waste, the contract offered curbside yard waste collection at no extra cost.

There were also instances where residents had no garbage service and instead of properly disposing of their refuse at the landfill they were throwing it in public trash cans located on the downtown square, were storing it in their garage, or the bed of a pickup truck.

The intention was also to encourage recycling as much as possible. Instead of letting haulers charge \$1 or \$2 extra for recycling, they introduced a plan for the community that offered garbage collection, recycling and yard waste pick-up all at the same cost.

The City did a survey before the idea was proposed at a public meeting which did not receive the best return but the majority of the community was in favor of the new system. There was some opposition to the idea due to the lack of support for having a municipality compete with private companies. However the proposal was accepted and introduced in 2009.

CITY OF JOHNSTON

The City of Johnston, a community in Polk County, Iowa that has a population of 8,649, entered into a contract on June 5th, 2006 with Artistic Waste Services, Incorporated to provide solid waste collection and disposal services for the residents within the City. The contract is for an initial term of three years; however, it is subject to an extension of up to two additional two years.

Like the City of Winterset, the City of Johnston also provides special collection services at the same rate for elderly and disabled residents, appliance collection, bulky waste collection, recycling, and yard waste collection services for the residents of the city. Table 8.3 shows the unit prices for the services provided under the contract. The annual costs increase or decrease based on the U.S. Department of Labor Consumer Price Index for Urban Earners (CPI-U) and annual adjustments to the disposal service charge equivalent to the percentage increase in the tipping fee charges by the Metro Waste Authority are applied.

Solid Waste Collection		
30-40 gallon container	60-70 gallon container	90-105 gallon container
\$3.92 collection service	\$3.82 collection service	\$3.89 collection service
\$.83 cart supply	\$.90 cart supply	\$.90 cart supply
\$1.51 disposal service	\$2.01 disposal service	\$2.09 disposal service
\$6.26 total cost	\$6.73 total cost	\$6.88 total cost

Table 8.3: City of Johnston rates; Source: City of Johnston

According to the City Administrator Jim Sanders (like the City of Winterset) the City of Johnston introduced the contract/bid system because it would result in significant savings for the citizens. The City of Johnston had four licensed haulers, each of whom was charged a \$10 licensing fee yearly. They were charging \$12-14 per month. However, in 2006 when the contract service started fees were reduced to \$6-7 per month.

Some of the other reasons were that the system would reduce the number of trucks driving on the road every week and would also benefit the city's aesthetics.

There was a lot of opposition from the haulers who were losing business. There was some reaction from the residents who thought that the government was meddling and taking away their freedom to choose between different haulers. However in spite of the opposition, the majority of the community was in favor of this change and the system was introduced as of August 7, 2006.

CONCLUSION

The expanded analysis showed that communities that changed from a license to a contract/bid system have seen significant savings for citizens.

DISCUSSION

The initial goal of this project was to investigate the needs of Oskaloosa residents regarding solid waste hauling practices and identify any available alternatives. Once those needs and options had been recognized, the next goal was to make recommendations to the City. The group has undertaken a variety of studies to determine what form of solid waste hauling is most suitable for the City of Oskaloosa. Oskaloosa residents' ideas and concerns were taken into account through the administration of the *Residential Solid Waste Collection Survey* (Appendix 2); solid waste hauling in Iowa municipalities' within the region and of similar size were considered in the *Community Comparison Analysis*; as were the effects of different solid waste hauling methods on costs to consumers, the city budget, the environment, and public safety in the *Impact Analysis*. In addition to hearing residents' concerns through the administration of the survey, opinions were voiced and noted at a variety of public outreach gatherings. Specific concerns included aesthetic issues in Oskaloosa, elderly individuals' ability to move trash containers, and lack of recycling options.

The need to capture Oskaloosa residents' perceptions of the waste hauling practices in the community was important in the study; the information gathered led to additional questions which were examined through further research. While support for keeping the current system with no changes remained high, the survey suggested that switching to a single hauler contract system was also a popular option among participants given 'lower fees'. 'Lower fees' was presented as an undefined term, thus it was necessary to research if switching to a single hauler contract system would lower costs.

Costs come in a variety of forms: environmental impacts, safety impacts, monetary impacts, etc. It is difficult to weigh each type of impact against another. Studies have shown that switching from multiple haulers to a single hauler contract system can lower fees to the end user. One way to justify this is through economies of scale. The more individual customers a hauler serves, the more efficiently the customers can be served; this will lower the hauler's costs. This may result in savings to the end user by switching from a multiple licensed hauler system to a single hauler contract system. Supporting studies had components focusing on the cost savings to the consumer. The *Community Comparison Analysis* identified a savings of approximately 25-50 percent in two similarly sized cities in Iowa that have recently switched to single hauler contract systems while offering more services. It should be noted these are the only recent Iowa cities to have undergone a change to city contract solid waste practices. However, the circumstances in these communities may be dissimilar from Oskaloosa. Additionally, the *Impact Analysis* highlighted potential savings to residents through less spending on road maintenance. This is an important savings as many survey participants indicated a strong concern regarding damage to city streets by the current volume of garbage trucks.

Safety was also regarded as a concern in the survey by many respondents. Through research, it was determined that fewer garbage trucks on city streets will decrease the likelihood of garbage truck related crashes.

Another concern to note is the lack of curbside recycling participation in the City of Oskaloosa. The survey reported that of those that have curbside garbage collection, approximately 13 percent of

respondents have curbside recycling; however, nearly 60 percent rated the availability of curbside recycling as 'essential' or 'very important' in an alternative system. Two of the hauling systems that were analyzed (single hauler contract and municipal hauler) could offer or require curbside recycling as a convenient option for their constituents along with other services. In the current system, additional licensing requirements would be necessary to assure residential recycling services.

After all these studies were complete, one additional concern came to light: the impact a single hauler may have on the local job economy. Steps can be taken to avoid negative impacts before switching to a single hauler becomes necessary. First, the Oskaloosa Code will need to be reviewed in detail as it pertains to solid waste hauling. When referring to an individual with solid waste hauling service, the code is specific and clear. However, the code lacks strength when referring to individuals that do not have solid waste hauling service. According to the *Residential Solid Waste Collection Survey*, only 80 percent of Oskaloosa residents currently have garbage hauling services. The first revision to the Oskaloosa Code that should be considered is a mandated curbside solid waste pick-up for all single family dwellings. This would need to be strictly enforced. This will ensure individuals' waste is being collected on a weekly basis and will have an overall positive effect on the community's public health and aesthetics.

The second potential review to the Oskaloosa Code should be an emphasis for residents to utilize already required trash containers. This will improve the aesthetics in the community and will also increase uniformity of curbside practices. Additionally, it will decrease the chance of waste spilling from loose garbage bags.

Revising and enforcing the Oskaloosa Code will likely have no negative impact on jobs in Oskaloosa. Use of this as an initial recommendation will alleviate many of the concerns Oskaloosa residents expressed regarding current solid waste hauling services.

RECOMMENDATION

Based on the findings from the *Residential Solid Waste Collection Survey, Community Comparison Analysis, and Impact Analysis*, the recommendation comes in two parts in order to minimize the economic impacts on the city.

ORDINANCE ENFORCEMENT

The first part of this recommendation is to review, strengthen, and enforce the Oskaloosa Code as it applies to solid waste hauling. Currently, section 8.12.170 states “all solid wastes shall be collected from residential premises at least once per week.” Recyclable materials shall be collected from residential premises at least semi-monthly.

The two revisions that should be made to the Oskaloosa Code are as follows:

1. Require all single family dwellings to enroll in solid waste hauling services
2. Required use of trash containers

According to the *Residential Solid Waste Collection Survey*, only 80 percent of Oskaloosa residents currently have solid waste hauling services. The code is stronger for those residents that are enrolled in waste hauling services; having all residents enrolled should improve aesthetics and public health.

Requiring the use of trash containers will also increase aesthetics and decrease the chance of loose or spilled waste throughout the city. Currently, residents are required to own trash containers but are not required to utilize them.

Enforcement of the clarified ordinance should not take additional manpower or resources; enforcement should be conducted in the same manner as all code enforcement. However, if additional resources are deemed necessary they should come from the general fund. They could potentially be offset by an increase in waste hauler licensing fees or additional appropriate sources.

PERFORMANCE MEASUREMENT

After a period of no more than two years, the ordinance enforcement phase should be reviewed to ensure efficacy. The best way to monitor this is for an ordinance enforcement officer to record any potential violations. Residential noncompliance with the ordinance revisions would indicate continued public health and aesthetic issues. Additionally, a survey should be conducted with questions similar to those asked in the *Residential Solid Waste Collection Survey*, which would serve as a baseline. The survey should measure perceptions of key concerns such as those involving public health, aesthetics, safety, environmental, consumer cost and road damage. The City should identify an acceptable number of residential solid waste related ordinance complaints as well as targeted positive perception level changes. If these indicators are not realized the first part of the recommendation can be said to have failed.

SINGLE HAULER

If enforcing the City ordinance does not improve the aforementioned issues, we advise that the City of Oskaloosa change to a citywide single hauler contract system to be determined by a bidding

process on an annual basis. This recommendation should affect all single family homes in Oskaloosa. In addition to curbside garbage collection, we also recommend that the City mandate curbside recycling. For cost containment purposes, each hauler should submit a bid to the City. Inclusion of additional services should be considered for the following:

- Elderly and disabled resident walk-up service
- Bulky item pick-up
- Yard waste removal
- Appliance collection

These are common elements of single hauler contracts in surrounding communities. Johnston and Winterset are evidence that changing from a multiple to a single contract hauling system in Iowa can increase services without an increase in user fees.

COMMUNITY INPUT

During the course of this project, several opportunities for public input or outreach were conducted. After the scope of the project was identified, the team spent time interviewing and contacting stakeholders deemed important by the client. Contact was made with the Oskaloosa Area Chamber and Development Group, specifically the Clean and Green Committee. Interviews were conducted with representatives of several local institutions. These include Musco Lighting, Mahaska Communication Group, Mahaska Health Partnership and the Midwest Sanitation Recycling Center.

During this period, contact was made with licensed haulers. The hope was to collect data on prices, routing and customers served. The haulers that responded were reluctant to provide this information; they cited both a proprietary interest in their businesses' practices and a past instance where such information was shared and used in a manner some of the haulers found inappropriate.

In late January of 2011 the *Residential Solid Waste Collection Survey* was conducted. The purpose of the study was to collect some user end practices as well as perception data. 195 responses were recorded. In order to kick off the survey process, the group spoke to the Rotary Club on January 25th. Questions were asked and answered and focused primarily on recycling.

The group made two community-wide presentations during the bimonthly Eggs and Issues assembly at Smokey Row. The first was on January 8th, 2011 and focused on acquainting the public with the project.

The second appearance was on March 26th, 2011. The group presented findings from the survey, the community comparison and the cost analysis. Questions were taken by group members and public input was solicited from participants to determine what type of waste hauling system would be supported. The questions centered on two main points: the impacts going to a single hauler would have on local haulers and issues related to recycling.

Participants were asked to vote via stickers on what type of waste hauling policy they would support in Oskaloosa and what waste hauling services they support most. There was an even split among the participants; half supported remaining with multiple, licensed haulers and half with moving to city contracted service. City contracted service support was mostly for a single hauler, although one individual voted for a franchise system. Unfortunately, participation was low, with only eight voters.

The group used several means to push out information about the project to the public. Several interviews were conducted through the Communication Research Institute and the *Oskaloosa Herald*. Additionally, the group prepared an article outlining the project's objectives as well as advertising the survey. The article was published in the OACDG newsletter *The Communicator*.

The group built two online, public facing platforms for pushing out information about the project. The first was a Facebook page and the second was a website located at FirstStepOskaloosa.WordPress.com. Information gathered from the survey and the Eggs and Issues sessions were used to direct future research. Specifically, the community's concerns with road

safety, infrastructure wear and local job impacts associated with changing waste hauling systems were important for future investigations.

APPENDIX 1: BACKGROUND

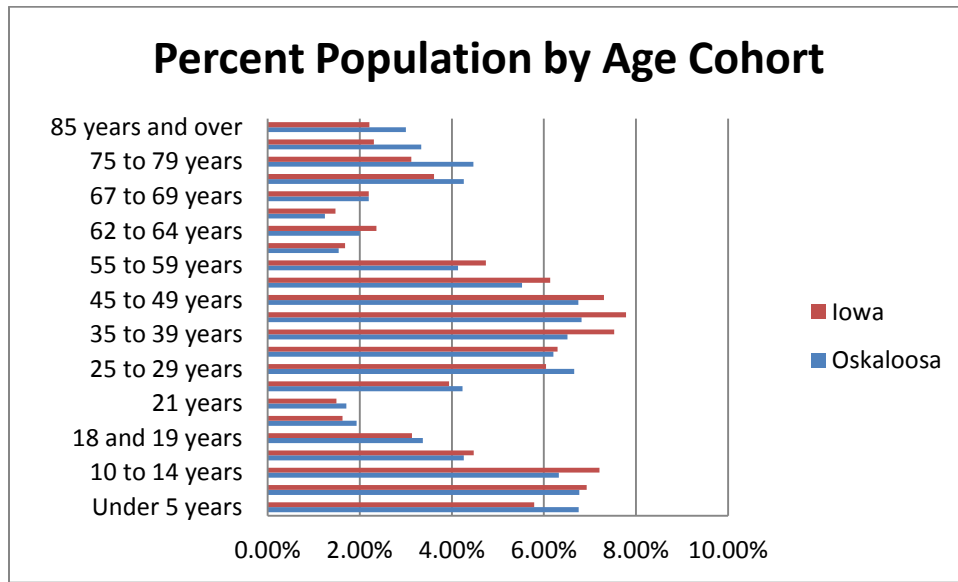


Figure 4.2: Cohort Percentage, Iowa and Oskaloosa; Source: US Census Bureau

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APPENDIX 2: *IMPACT ANALYSIS*

Road Wear Cost Calculation

Assuming that a standard refuse hauler is a three axle, single unit truck with a Gross Vehicle Weight of 64,000 lbs.^{xxxix}, the Federal Highway Administration estimates for the damage done is 12.03 cents/mile^{xl} and that it drives all 72.7 miles of the Oskaloosa road network every week for an entire year, the cost is:

$$72.7 \text{ miles/week} \times .1203 \text{ dollars/mile} \times 52 \text{ weeks} = \$454.78$$

Because the cost/mile figure is in 2000 dollars, they had to be adjusted to 2010 dollars for meaningful analysis. Using the Bureau of Labor Statistics producer price index for highway and road construction producer price index^{xli}, the adjustment is 1.59 meaning that road wear costs in 2010 dollars are:

$$\$454.78 \times 1.59 = \$723.32$$

Wear costs would be lower for trucks with lower Gross Vehicle Weights or that did not drive the entire road network once a week, every week of the year. However, these calculations give a fair estimate of an upper range or costs, based on the assumptions made.

Truck Emissions Calculations Methodology

Without knowing the age and size of each vehicle, it is impossible to know the exact emissions output per truck. However, by compiling previous research, it is possible to estimate the emissions output of an average refuse truck. The average truck profile is of a Class 8a Heavy Duty truck that is around 7 years old^{xlii}. It is believed that the trucks servicing Oskaloosa could be older, up to 10 years old. This is because the average age includes semi-trucks along with refuse trucks which can bring down the average age of vehicles due to the large amount of use/wear semi-trucks endure.

Because of the current waste hauling system, refuse trucks do not service optimal routes. That is, they often skip houses and may travel long distances to between pick-up areas. Therefore this analysis assumed that truck routes traveled at 19 mph on an arterial roadway. This is similar to the commonly used West Virginia Route.

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APPENDIX 3: SAFETY REGRESSION ANALYSIS

This report provides an analysis of the crash data involving garbage trucks and waste hauling systems, demographic data and road miles per city for the State of Iowa from 2005-2008.

In order to estimate the impact of hauling type on garbage truck related crashes, interaction terms using dummy variables of the three types of waste hauling systems (city contract hauling, municipal hauling and individual contract hauling) were created and run in a regression model. The crash data is used as a dependent variable with the three different waste hauling systems as the predictor variables.

We first ran an analysis with crash data as a dependent variable, municipal hauling and city contract hauling as the predictor variables. For this analysis we get a R^2 value of 0.021 as shown in Table 5.4 which implies that 2.1 percent of the crashes in Iowa involving garbage trucks are explained by the variables used for this regression. The remaining 98 percent of variation in crashes is explained by other variables outside the scope of our study such as population or road miles per city. Some portion of the 98 percent could be random error.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.146	.021	.019	3.032

Table 5.4: Model Summary

Table 5.5 shows the individual contribution of variables to the regression model.

Model	Unstandardized		Standardized		
	B	Std. Error	Beta	t	Sig
Constant	.668	.209		3.202	.001
City Contract	-.480	.242	-.074	-	.048
Municipal Hauling	.932	.368	.095	1.981	.012

Table 5.5

Here individual contract hauling is the system that is taken as the base case.

The coefficients of city contract are negative which implies that they make a negative contribution to crashes. The municipal system has a positive coefficient which implies that it makes a positive contribution to crashes. However the lower absolute values of the variables standardized coefficients show that the predictors are not very important.

To examine the impact a regions waste hauling system has on the property damage resulting from crashes involving garbage trucks, a regression was run using cost of property damage adjusted to 2010 dollars as a dependent variable and the three waste hauling systems as the predictor variables. For this regression analysis there was an R^2 value of 0.018 as shown in Table 5.6, which implies that 1.8 percent of variations of property damage of Iowa resulting from garbage truck related crashes are explained by the variables. The remaining 99.2 percent of variation in property

damage are explained by other variables outside the scope of our study. Some portion of this could be random error.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.135a	.018	.016	17773.002

Table 5.6: Model Summary

Model		Coefficients				Sig.
		Unstandardized Coefficients		Standardized Coefficients Beta	t	
		B	Std. Error			
1	(Constant)	4267.064	1223.544		3.487	.001
	City Contract	-3601.528	1420.674	-.095	-2.535	.011
	Municipal Hauling	3425.381	2157.743	.060	1.587	.113

a. Dependent Variable: Property damage adjusted to inflation

Table 5.7

Here, an individual contract system is taken as the base case.

This regression analysis gave similar results; the coefficient for city contract was negative which implies that it makes a negative contribution to crashes. The municipal system had a positive coefficient which implies that it makes a positive contribution to property damage resulting from crashes involving garbage trucks.

If we use a crash per road mile variable as the dependent variable or property damage per road mile or crash per population and create a regression model separately each of them gives the same results. Therefore it is concluded from these mathematical models that of the three systems of hauling the city contract system is the safest in terms of crashes related to garbage trucks and also least expensive in terms of causing property damage resulting from garbage truck related crashes for the years 2005-2008.

Table 5.8, 5.9 and 5.10 show these results.

Table 5.8

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.088 ^a	.008	.005	.00000

a. Predictors: (Constant), Municipal Hauling, City Contract

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.000	2	.000	3.528	.030 ^a
	Residual	.000	914	.000		
	Total	.000	916			

a. Predictors: (Constant), Municipal Hauling, City Contract

b. Dependent Variable: Crash per Road Mile

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.874E-8	.000		3.611	.000
	City Contract	-6.413E-8	.000	-.096	-2.533	.011
	Municipal Hauling	-2.074E-8	.000	-.020	-.539	.590

a. Dependent Variable: Crash per Road Mile

Table 5.9

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.077 ^a	.006	.004	.00025

a. Predictors: (Constant), Municipal Hauling, City Contract

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.000	2	.000	2.736	.065 ^a
	Residual	.000	914	.000		
	Total	.000	916			

a. Predictors: (Constant), Municipal Hauling, City Contract

b. Dependent Variable: Crash per Population

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.133E-5	.000		3.002	.003
	City Contract	-6.498E-6	.000	-.012	-.327	.744
	Municipal Hauling	5.614E-5	.000	.070	1.862	.063

a. Dependent Variable: Crash per Population

Table 5.10

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.105 ^a	.011	.009	.00163

a. Predictors: (Constant), Municipal Hauling, City Contract

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.000	2	.000	5.130	.006 ^a
	Residual	.002	914	.000		
	Total	.002	916			

a. Predictors: (Constant), Municipal Hauling, City Contract

b. Dependent Variable: Cost per Mile

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.000	.000		4.078	.000
	City Contract	.000	.000	-.117	-3.108	.002
	Municipal Hauling	.000	.000	-.032	-.843	.400

a. Dependent Variable: Cost per Mile

APPENDIX 4: SURVEY GRAPHICS

Some questions from our survey were modeled after, or taken from, 3 other community surveys. They are the “Broomfield Garbage & Recycling Survey” that was completed for the City of Broomfield, CO; the ‘Lake Elmo Residential Trash Survey’ from Lake Elmo, MN; and the ‘Nether Providence Recycling and Trash Collection Survey’ from Nether Providence, PA.

**All graphics from the Residential Solid Waste Collection Survey*

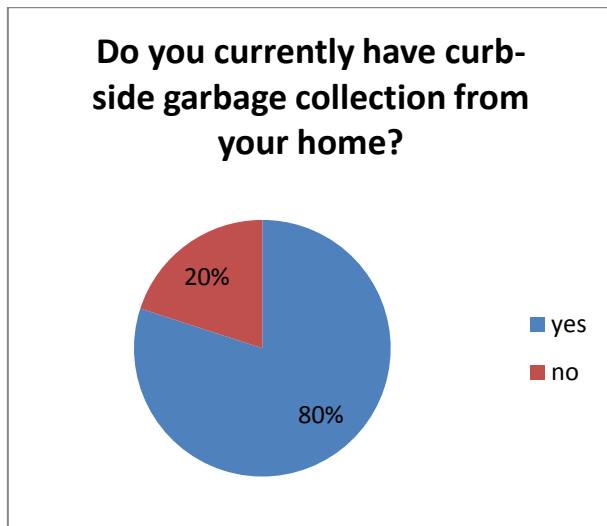


Figure 7.1: Percent with curbside recycling

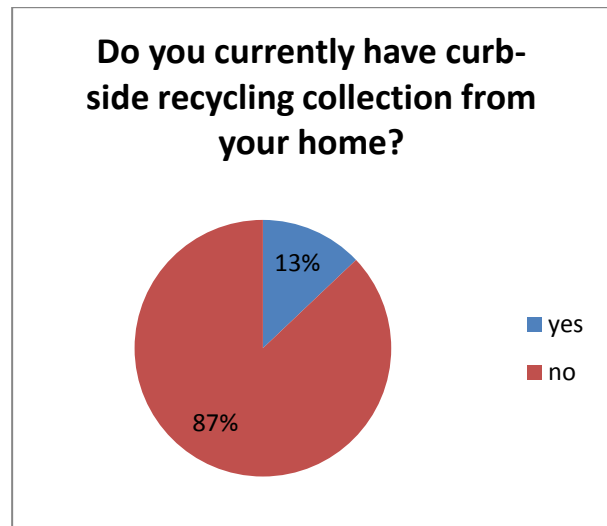


Figure 7.2: Percent with curbside garbage collection

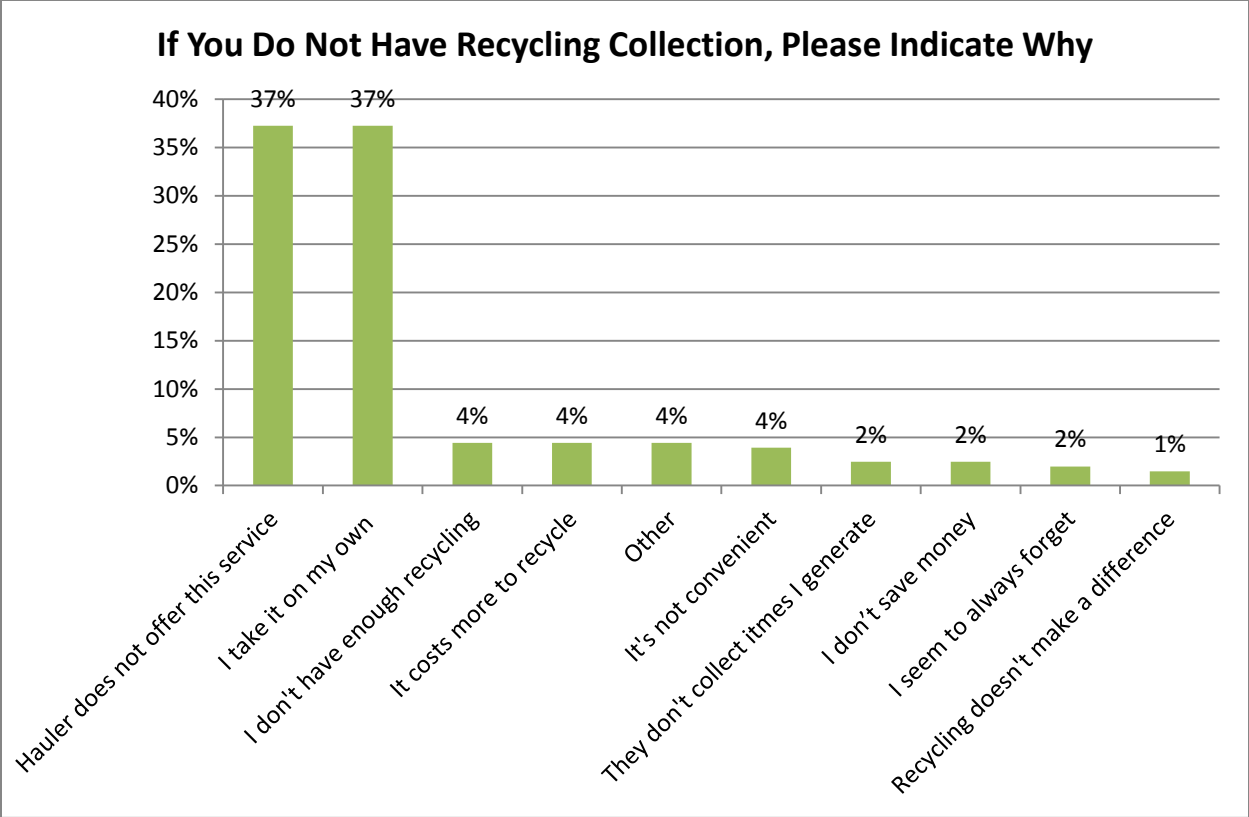


Figure 7.3: Reasons for not carrying curbside recycling

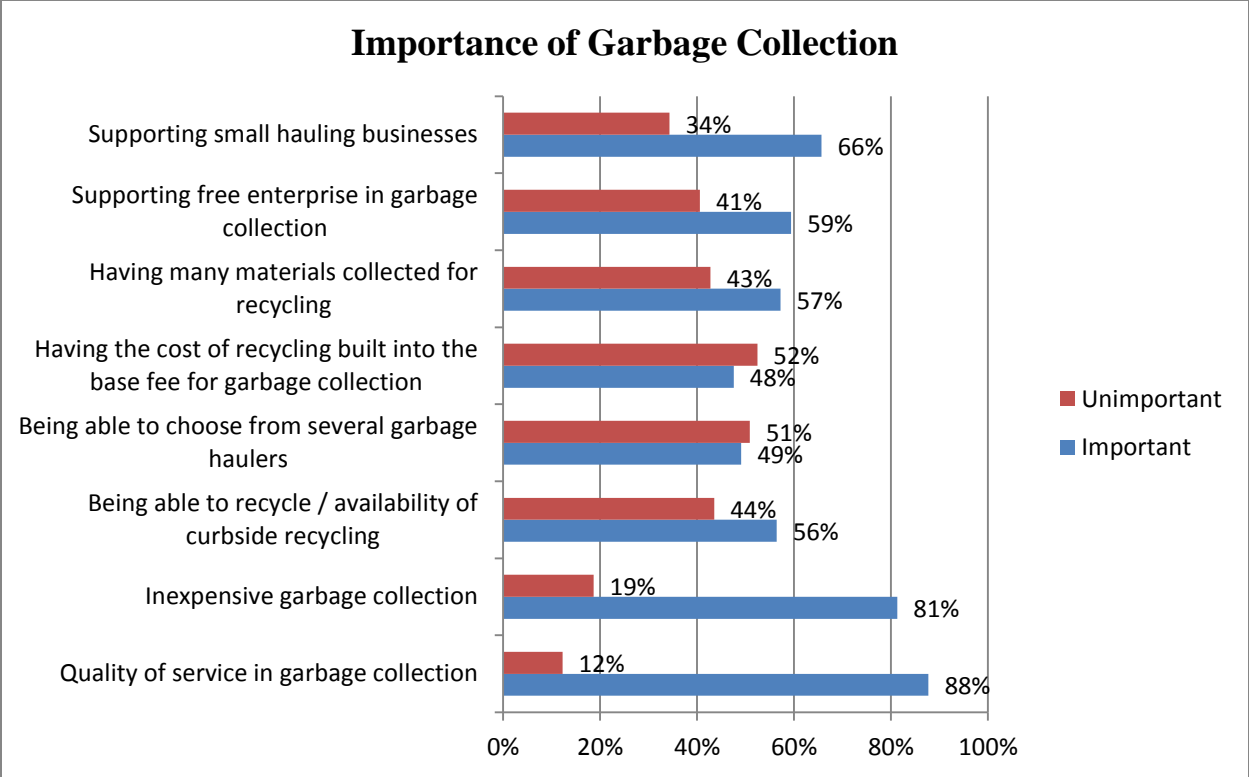


Figure 7.4: Support for garbage collection services

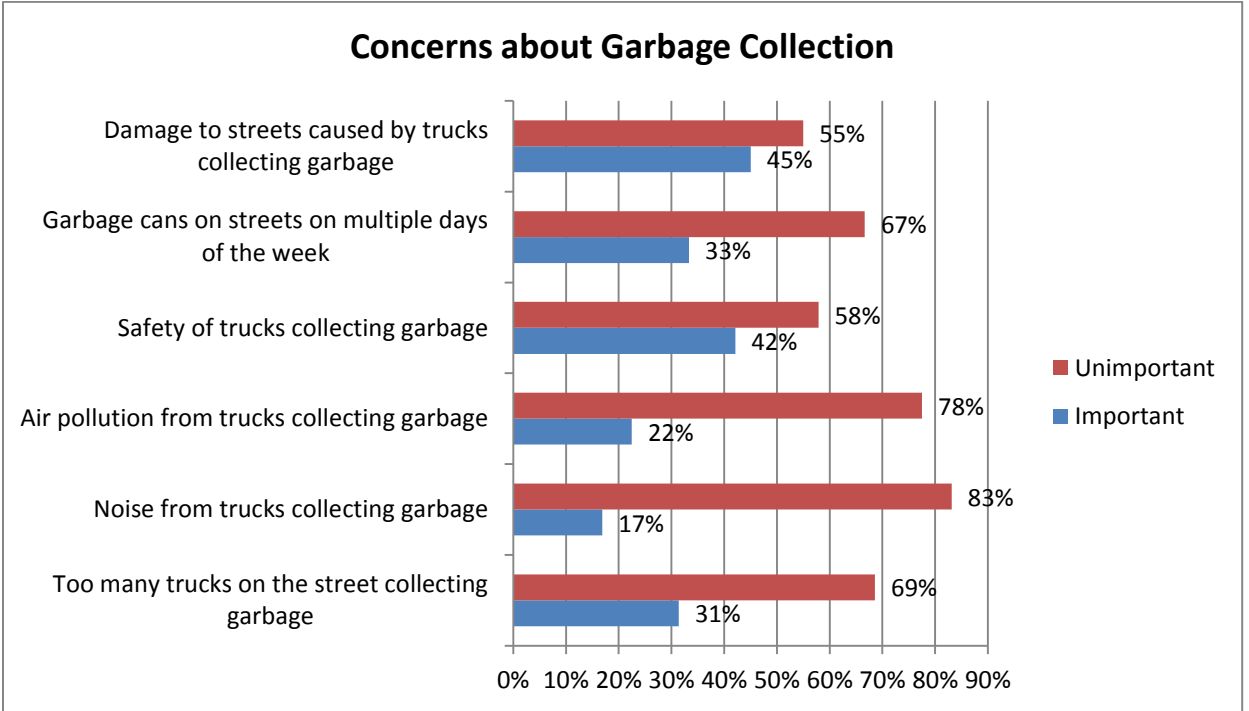


Figure 7.5: Concerns about garbage hauling and level of importance

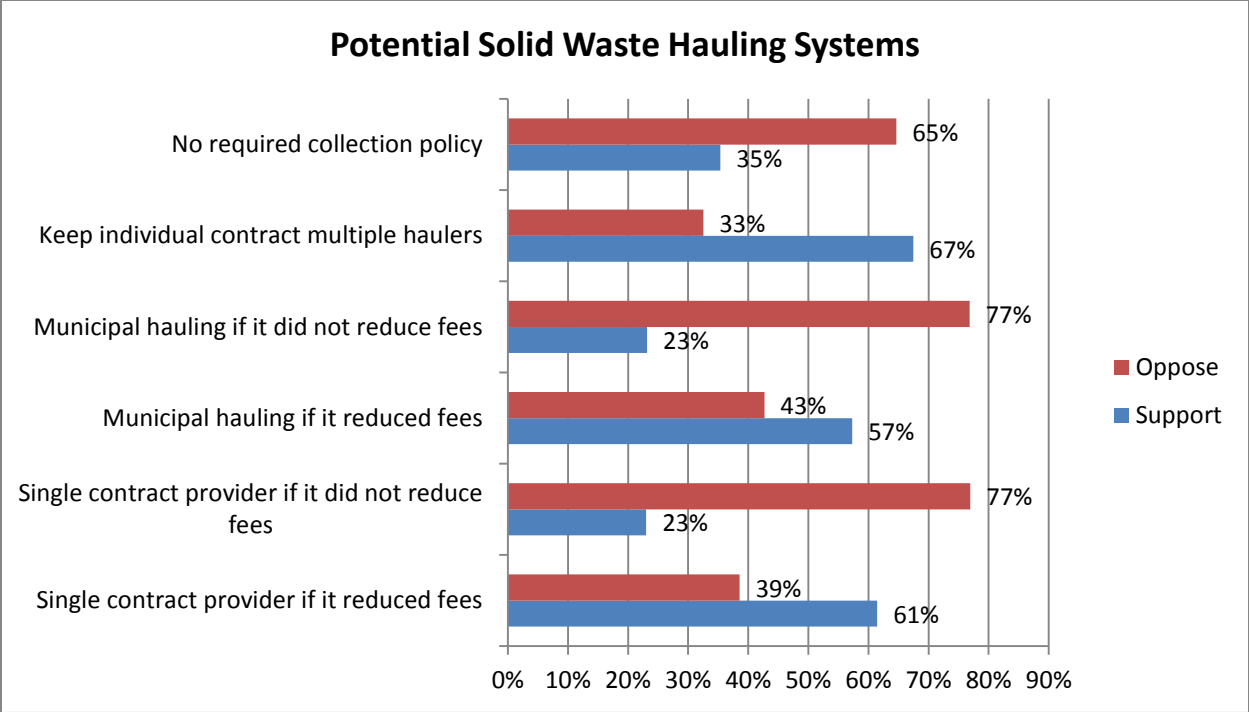


Figure 7.6: Support for potential waste hauling systems

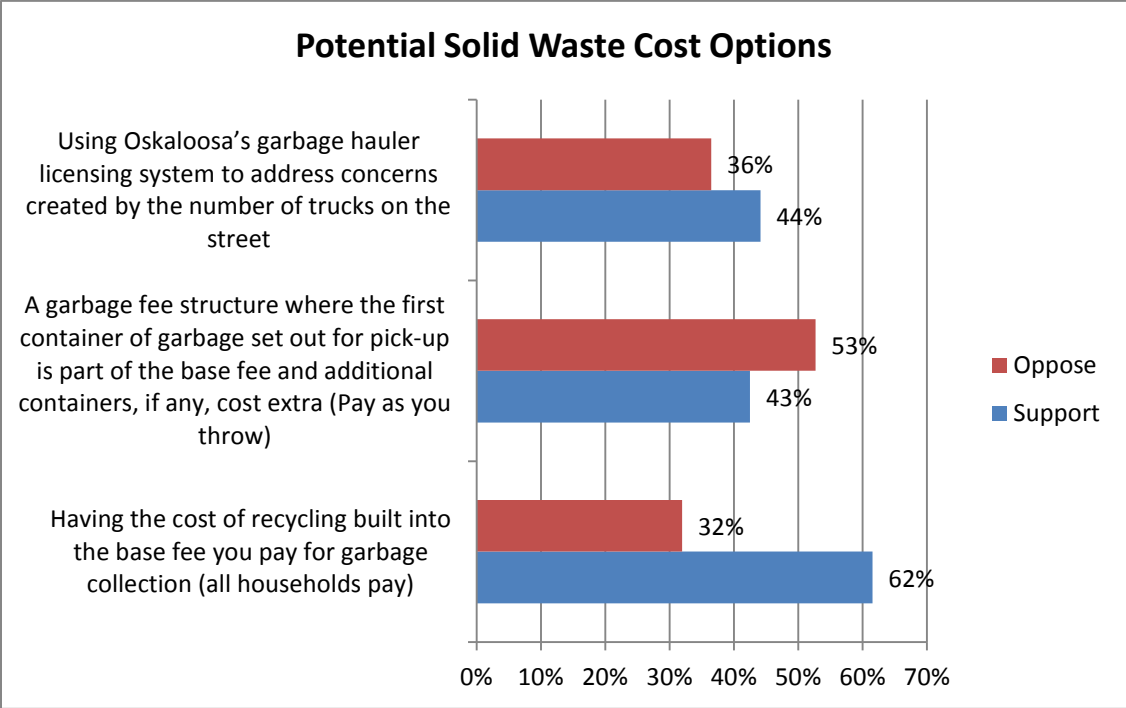


Figure 7.7: Support for potential costing options

Oskaloosa Waste Collection Survey

"The First Step with the Last of the Beautiful"

We are a group of University of Iowa graduate students in Urban and Regional Planning tasked by the City of Oskaloosa to analyze the solid waste hauling in the city. We would like to base our analysis on residents' input; all information provided in this survey will remain anonymous and is being collected for the purpose of our research only. If you would like any additional information, you can contact us at FirstStepOskaloosa@gmail.com, or you can visit us at FirstStepOskaloosa.wordpress.com and our **Facebook** page by searching for First Step Oskaloosa.

1. Do you currently have curbside garbage collection from your home? Yes / No *(Circle One; if no, skip question 4,5)*
2. Do you currently have curbside recycling collection from your home? Yes / No *(Circle One; if yes, skip question 3)*
3. If you do not have curbside recycling, please indicate why. *(Circle all that apply)*
 - a. Hauler does not offer this service
 - f. It costs more to recycle
 - b. They don't collect items I generate
 - g. I don't save money
 - c. I don't have enough recycling to need it
 - h. I seem to always forget
 - d. It's not convenient/takes more time
 - i. I take it on my own to the drop off
 - e. Recycling doesn't make a difference
 - j. Other: _____
4. How many times have you changed solid waste hauling services in the last 24 months? _____ times
5. On a scale of 1 to 5, how satisfied are you with your solid waste hauler across the following items?

	Very Satisfied	Somewhat Satisfied	Somewhat Dissatisfied	Very Dissatisfied	Don't Know
Prices	1	2	3	4	5
Quality of Service	1	2	3	4	5
Pickup Times	1	2	3	4	5
Pickup Frequency	1	2	3	4	5
Customer Service	1	2	3	4	5
Convenience	1	2	3	4	5
Overall	1	2	3	4	5

6. On a scale of 1 to 5, please rate the following items based on their level of importance to you.

	Essential	Very Important	Somewhat Important	Not at all Important	Don't Know
Quality of service in garbage collection	1	2	3	4	5
Inexpensive garbage collection	1	2	3	4	5
Being able to recycle / availability of curbside recycling	1	2	3	4	5
Being able to choose from several garbage haulers for service	1	2	3	4	5
Having the cost of recycling built into the base fee you pay for garbage collection	1	2	3	4	5
Having many materials collected for recycling	1	2	3	4	5
Supporting free enterprise in garbage collection	1	2	3	4	5
Supporting small hauling businesses	1	2	3	4	5

7. Please rate how important each of the following concerns are to you in Oskaloosa.

	Major concern	Moderate concern	Minor concern	Not at all concern	Don't Know
Too many trucks on the street collecting garbage	1	2	3	4	5
Noise from trucks collecting garbage	1	2	3	4	5
Air pollution from trucks collecting garbage	1	2	3	4	5
Safety of trucks collecting garbage	1	2	3	4	5
Garbage cans on streets on multiple days of the week	1	2	3	4	5
Damage to streets caused by trucks collecting garbage	1	2	3	4	5
Other: _____	1	2	3	4	5

8. Please rate the extent of which you would support changes in waste (garbage and recycling) collection policies for Oskaloosa?

	Strongly support	Somewhat support	Somewhat oppose	Strongly oppose	Don't Know
Single contract provider if it reduced fees	1	2	3	4	5
Single contract provider if it did not reduce fees	1	2	3	4	5
Municipal hauling if it reduced fees	1	2	3	4	5
Municipal hauling if it did not reduce fees	1	2	3	4	5
Keep individual contract multiple haulers	1	2	3	4	5
No required collection policy	1	2	3	4	5
Other:	1	2	3	4	5

9. To what extent would you support or oppose each of the following for Oskaloosa?

	Strongly support	Somewhat support	Somewhat oppose	Strongly oppose	Don't Know
Having the cost of recycling built into the base fee you pay for garbage collection (all households pay)	1	2	3	4	5
A garbage fee structure where the first container of garbage set out for pick-up is part of the base fee and additional containers, if any, cost extra (Pay as you throw)	1	2	3	4	5
Using Oskaloosa's garbage hauler licensing system to address concerns created by the number of trucks on the street	1	2	3	4	5

10. Are you..... male / female? (Circle One)

11. Do you live in Oskaloosa? Yes / No (Circle One)

12. How long have you lived in Oskaloosa? (Circle One)

- a. N/A
- b. 0-1 years
- c. 2-5 years
- d. 6-10 years
- e. 11-20 years
- f. 20+ years

13. What is your age?

- a. 17 and below
- b. 18 to 24
- c. 25 to 34
- d. 35 to 44
- e. 45 to 54
- f. 55 to 64
- g. 65 and over

14. How many people do you have in your household?

- a. 1-2
- b. 3-4
- c. 5-6
- d. 7+

15. Where do you live? (Circle One)

- a. Single Family House
- b. Apartment (includes dorms)
- c. Townhouse
- d. Mobile Home
- e. Duplex
- f. Other: _____

16. Please indicate your approximate household income: (Circle One)

- a. Less Than \$10,000
- b. \$10,000 to \$19,999
- c. \$20,000 to \$29,999
- d. \$30,000 to \$39,999
- e. \$40,000 to \$49,000
- f. \$50,000 to \$74,999
- g. \$75,000 to \$99,999
- h. \$100,000+

APPENDIX 5: SURVEY REGRESSION

The first regression attempted to determine the relationships between the support or opposition for a single contracted hauler system if it reduced fees (dependent variable) and other key variables (independent variables). The independent variables consisted of demographics information, ability to choose haulers, air pollution concerns, safety concerns, damage to streets concerns, and the importance of inexpensive garbage collection. The second regression used the same independent variables, but used keeping the solid waste hauling system the same as the dependent variable and no demographics data were included.

The third and fourth regressions used the same dependent variables as the first and second regressions (respectively) but used the number of people who have garbage collection and the number of people who have recycling collection as independent variables. The third regression also includes demographics data as independent variables. The fifth regression used the same dependent variables as the fourth regression and the independent variables used were demographics data.

REGRESSION RESULTS

To be included in these results, variables from each regression must have a significance value less than 0.1. A number less than this means that we can be 90% certain that the relationship between the independent and dependent variables is in fact the true relationship of our data. A 0.1 threshold is used because it is social-characteristics data.

Regression Number	Dependent Variable	Independent Variables
1	Single Contract Hauler if Reduced Fees	Gender, Residency Length, Age, HH Size, Housing Type, Income, Importance of Choosing Haulers, Concern for Air Pollution, Concern for Truck Safety, Concern for Damage to Streets, and Importance of Inexpensive Garbage Collection.
2	Keep the Current System	Importance of Choosing Haulers, Concern for Air Pollution, Concern for Truck Safety, Concern for Damage to Streets, and Importance of Inexpensive Garbage Collection.
3	Single Contract Hauler if Reduced Fees	Gender, Residency Length, Age, HH Size, Housing Type, Income, Garbage Collection, Recycling Collection
4	Keep the Current System	Garbage Collection, Recycling

5*	Keep the Current System	Collection Gender, Residency Length, Age, HH Size, Housing Type, Income
----	-------------------------	---

Regression Number	Question Number	B	Std. Error	Wald	Df	Sig.	Exp(B)
1	10_1	<u>-1.909</u>	0.694	7.572	1	<u>.006</u>	.148
1	13_1	<u>3.163</u>	1.244	6.470	1	<u>0.011</u>	23.645
1	13_5	<u>3.698</u>	1.190	9.661	1	<u>.002</u>	40.381
1	15_1	<u>-2.990</u>	1.492	4.019	1	<u>0.045</u>	0.50
1	16_1	<u>-2.553</u>	1.268	4.057	1	<u>0.044</u>	0.78
1	16_4	<u>-2.837</u>	1.438	3.890	1	<u>0.049</u>	0.59
1	16_5	<u>-3.094</u>	1.217	6.468	1	<u>0.011</u>	0.45
1	16_6	<u>-2.352</u>	1.064	4.889	1	<u>0.027</u>	0.95
1	6_4	<u>-2.035</u>	0.770	6.980	1	<u>0.008</u>	0.131
1	7_3	<u>1.727</u>	0.989	3.051	1	<u>0.081</u>	5.624
1	6_2	<u>2.966</u>	1.016	8.515	1	<u>0.004</u>	19.414
2	6_4	<u>1.664</u>	0.580	8.235	1	<u>0.004</u>	5.279
2	7_6	<u>-1.124</u>	0.559	4.037	1	<u>0.045</u>	0.325
3	2_1	<u>1.532</u>	0.853	3.227	1	<u>0.072</u>	4.626
4	1_1	<u>1.435</u>	0.547	6.879	1	<u>0.009</u>	4.200
5*	16_1	<u>2.549</u>	1.078	5.590	1	<u>0.018</u>	12.788
5*	16_4	<u>2.532</u>	1.270	3.974	1	<u>0.046</u>	12.583
5*	16_5	<u>2.513</u>	1.035	5.888	1	<u>0.015</u>	12.338

***It should be noted that in regression five there was a quasi-complete separation in the data. Therefore, the validity of the regression is uncertain and should not be used.**

Regression Reference	
Question Number	Question
1_1	Do you have curbside garbage collection? (<i>Reference: those that do not have it</i>) (<i>Comparing data: those that have it</i>)
2_!	Do you have curbside recycling collection? (<i>Reference: those that do not have it</i>) (<i>Comparing data: those that have it</i>)
6_2	On a scale of 1 to 5, please rate the following items based on the level of importance to you. (Inexpensive Garbage Collection) (<i>Reference: those that find it unimportant</i>) (<i>Comparing data: those that find it important</i>)
6_4	On a scale of 1 to 5, please rate the following items based on the level of importance to you. (Being Able to Choose

	From Several Haulers) (<i>Reference: those that find it unimportant</i>) (<i>Comparing data: those that find it important</i>)
7_3	Please rate how important each of the following concerns are to you in Oskaloosa. (Air Pollution from Refuse Trucks) (<i>Reference: those that find it unimportant</i>) (<i>Comparing data: those that find it important</i>)
7_6	Please rate how important each of the following concerns are to you in Oskaloosa. (Damage to Streets from Refuse Trucks) (<i>Reference: those that find it unimportant</i>) (<i>Comparing data: those that find it important</i>)
10_1	Are you.... (Male or Female) (<i>Reference: female</i>)(<i>Comparing data: male</i>)
13_1	What is your age (below 34) (<i>Reference: above 65 years old</i>) (<i>Comparing data: people below 34 years old</i>)
13_5	What is your age (45 to 54) (<i>Reference: above 65 years old</i>) (<i>Comparing data: people 45 to 54</i>)
15_1	Where do you live? (single family home) (<i>Reference: not a single family home</i>) (<i>Comparing data: a single family home</i>)
16_1	Household Income (Less than \$30,000) (<i>Reference: \$100k plus</i>) (<i>Comparing data: Household income less than \$30,000</i>)
16_4	Household Income (\$30,000 to \$39,999) (<i>Reference: \$100k plus</i>) (<i>Comparing data: Household income \$30,000 to \$39,999</i>)
16_5	Household Income (\$40,000 to \$49,999) (<i>Reference: \$100k plus</i>) (<i>Comparing data: \$40,000 to \$49,999</i>)
16_6	Household Income (\$50,000 to \$59,999) (<i>Reference: 100k plus</i>) (<i>Comparing data: \$50,000 to \$59,999</i>)

Regressions use the last category as the reference category. Therefore, for the dependent variable oppose would be the reference category. For question number 7_6, the reference category is unimportant and the test category is important. The key items to focus on are significance and Beta. The beta is negative for question 7_6, regression number 2. This can be interpreted as **“people who consider damage to streets important are more likely to not support keeping the current waste hauling system than those who consider damage to streets unimportant”**. A positive beta would have meant that people who consider damage to streets important are more likely to **support** keeping the current waste hauling system than those who consider damage to streets unimportant. The magnitude of the beta indicates the strength of how likely the test group is to agree or disagree. Again, it should be noted that the above statement about data relationships only applies to the people that took the survey.

Findings also indicate that those who think it is important to be able to choose between haulers would support keeping the current waste hauling system when compared to those who do not think choosing between haulers is important. While not surprising, this is one definable relationship within the data. Individuals who have curbside recycling are more likely to support changing to a single hauler if it reduced fees than those that do not have curbside recycling.

APPENDIX 6: SURVEY RESPONDENT DEMOGRAPHICS

The following tables illustrate the respondent demographics for the Oskaloosa Garbage and Recycling Survey.

Respondent Gender			
Percent of Respondents (Number of Respondents)			
	Male	Female	Total
Gender of Respondents (174)	48%	52%	100%

Respondent Length of Residency							
Percent of Respondents (Number of Respondents)							
	N/A	0 - 1 years	2 - 5 years	6 - 10 years	11 - 20 years	20+ years	Total
Length of Residency (176)	2%	5%	16%	11%	15%	51%	100%

Respondent Age									
Percent of Respondents (Number of Respondents)									
	17 and below	18 to 24	25 to 34	35 to 44	45 to 54	55 to 64	55 to 64	65 and over	Total
Age (174)	0%	5%	14%	13%	23%	0%	23%	21%	100%

Respondent Household Size					
Percent of Respondents (Number of Respondents)					
	1 to 2	3 to 4	5 to 6	7+	Total
Household Size (175)	70%	23%	6%	1%	100%

Respondent Housing Type								
Percent of Respondents (Number of Respondents)								
	Single Family House	Apartment (dorm)	Townhome	Mobile home	Duplex	Other	Barn	Total
Housing Type (176)	88%	10%	0%	1%	2%	0%	0%	100%

Respondent Household Income

	Percent of Respondents (Number of Respondents)								
	Less than \$10,000	\$10,000 to 19,999	\$20,000 to 29,999	\$30,000 to 39,999	\$40,000 to 49,999	\$50,000 to 74,999	\$75,000 to 99,999	\$100,000 plus	Total
Income (151)	6%	9%	6%	11%	15%	21%	17%	15%	100%

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