ASSESSMENT OF EXISTING LITTER CONTROL AND BEAUTIFICATION EFFORTS IN IOWA, 2012

Prepared For

Keep Iowa Beautiful®

By

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A Division of ERG

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CHAPTER 1. SUMMARY AND CONCLUSIONS

INTRODUCTION

Keep Iowa Beautiful (KIB), the state affiliate of the Keep America Beautiful (KAB) organization, is working to improve the beauty of the state of Iowa by educating the public about litter and assisting local communities and organizations with cleanup and beautification projects. KIB has partnered with the Iowa Department of Transportation and the Iowa Department of Natural Resources on a comprehensive effort to better understand and positively impact the litter situation in Iowa.

This study is the second time KIB has gathered litter prevention, collection, and enforcement cost data. Similar cost of litter data were gathered and published[1] by KIB in 2002. The purpose of this study is to update the 2002 cost estimates to 2012 by surveying the same public sectors in Iowa. Using methodology similar to the earlier study allows a direct comparison of the cost to educate the public, manage the litter, and enforce anti-litter regulations on federal, state and local government lands in Iowa.

OBJECTIVES

The two main objectives of the study are (1) to determine the fiscal impact of litter across Iowa by gathering information on the annual cost of litter control and abatement efforts across Iowa and (2) to compare those costs to similar costs estimated in 2002.

CONCLUSIONS

The second objective of this study – to compare the 2012 cost estimate to the 2002 estimate – was done by adjusting the 2002 costs by an index to account for inflation. It is important to remove the influence of inflation on costs when comparing values over time. The CPI (Consumer Price Index) was applied to the 2002 costs to make this comparison. The 2002 costs were multiplied by a factor of 1.2762. The statewide estimated cost was based on the sum of individual factors (average per capita litter program costs developed from the returned surveys) multiplied by the relevant population.

As shown in Table 1-1, the estimated statewide costs for 2012 are about the same as the estimated costs from 2002 (adjusted to 2012 dollars).

[1] Assessment of Existing Litter Control and Beautification Efforts in Iowa. June 2002. http://www.keepiowabeautiful.com/research/research-and-special-studies

Table 1-1. Statewide Cost of Litter Prevention, Collection, and Enforcement Comparison, 2002 and 2012

Statewide Cost of Litter	2002 Estimated Annual Costs (2012 dollars)*	2012 Estimated Annual Costs (2012 dollars)
State Total	**$17,106,730**	**$17,533,640**

*2002 litter survey results expressed as 2012 dollars by multiplying 2002 estimated costs by CPI (Consumer Price Index) inflation value 1.2762. http://www.bls.gov/data/inflation_calculator.htm

For the most part, public sector entities have not identified the cost of litter as a separate budgetary item. This conclusion was also identified in the 2002 survey effort. As a result, most of the cost estimates used to build the statewide totals represents a baseline level of effort required to manage litter that most respondents were able to identify. To go beyond the baseline costs, additional data tracking efforts are required. For example, very few respondents track volunteer hours. The impact volunteers have on the cost of litter management is understated. A series of cost tracking templates could be developed for the different public sectors entities. This would highlight the cost of litter management and facilitate better cost estimates.

Some large cities reported non-city sponsored organizations taking the responsibility for cleanup campaigns. These organizations are often sponsored by downtown businesses to maintain the downtown areas. The costs of the cleanup campaigns by non-city organizations were not captured in this survey. Discussions with several of these organizations highlighted a need for guidance templates to capture the cost of litter through these efforts.

Another conclusion that can be drawn from the responses is that collected litter is commonly recycled. Several respondents credited the addition of a recycling program with reduced litter collection costs. Promotion of recycling efforts, correct placement of recycling bins, and proper signage not only increases the amount of material recycled but also reduces the amount of litter. Some public areas use the money received from recovered material, especially deposit containers, to fund community activities (e.g., July 4th fireworks). One respondent reported that the promotion of the proper containment of recyclable materials for the benefit of the community increased collected quantities (and therefore reduced litter).

Another common comment from respondents was that litter is less of an issue than before. Several respondents from smaller cities stated that residents have more pride in the cleanliness of their towns. Pride of ownership may not be as obvious in large-sized cities. One likely reason is that large-sized cities may experience increased litter from more non-residents such as commuters, people entering the city for products and services, and people traveling through the city on a daily basis that do not have a sense of ownership.

SURVEY METHODOLOGY AND RESULTS

For the litter control cost analysis, surveys were sent to public entities across Iowa including school districts, universities, federal, state, county and city staff as well as solid waste planning area commissions. A general survey format was developed first and then the survey forms were tailored specifically to apply to each surveyed organization. The survey forms were similar in style and format to the 2002 surveys. Although the 2002 surveys were all distributed by U.S. mail, the 2012 effort used three surveying techniques – U.S. mail, electronic mail, and telephone.

Table 1-2 shows the public sector entities surveyed, the number of surveys sent, and the survey tool. Numerous follow up emails and telephone calls were made to all sectors to encourage participation.

Examples of litter costs that were listed in the survey included picking up litter, cleaning up illegal dumping, operational/administrative costs for dealing with litter and law enforcement pertaining to litter. Some samples of costs that were not included in this study were routine solid waste collection, painting, mowing, general maintenance, spill cleanup, vegetation control, recycling costs, and hazardous waste removal. In addition to the costs of litter, the surveys asked participants to estimate the percentage of litter collected that is recycled.

Table 1-2. Public Entities Surveyed

Entities	Number Surveyed	Survey Tool
School Districts	348	e-mail
Cities	946	US Mail
County Facilities and Buildings	99	e-mail
County Owned Roads and Ditches	99	e-mail
County Conservation Land	99	e-mail
Solid Waste Planning Area Roads, Ditchesand Fence Lines	45	e-mail
Special Schools and Universities	5	Telephone
State Conservation Districts	6	e-mail
State Historical Sites	10	Telephone
Iowa State Fairgrounds	1	Telephone
State Parks, Preserves and Recreational Areas	65	e-mail
State Forests	10	e-mail
State Wildlife Management Areas	17	e-mail
National Guard Armories*	1	Telephone
Iowa Department of Transportation*	1	Telephone
Iowa Highway Patrol*	1	Telephone
National Fish and Wildlife Refuges	6	Telephone
National Parks	1	Telephone
Corps of Engineers	3	Telephone
Total Surveyed	1,763	

* One contact completed a survey for the total number of entities in this category.

Each survey had two information sections: a program information section and an annual budget information section. Also, space for comments was included at the end of each survey.

- The program information section contained questions about staff and hours used to deal with litter, staff hourly wages, the existence of a litter prevention program, and recycling program. Volunteer time for picking up litter was also included. Volunteer time, although not an actual expense, was valued at the minimum wage. Program costs did not include the purchase, operation, or maintenance of capital equipment used for litter collection, such as street sweepers or trucks to haul away collected litter.
- In the annual budget information section of the survey, information on the amount of money budgeted, spent and needed for litter prevention, collection and/or enforcement was requested. This part of the survey was where capital equipment and other costs would be included along with labor costs; however, most respondents did not have separate litter budgets and did not fill out this section of the survey.

As each of the surveys was returned, the data were recorded in Excel spreadsheets. Response rates from the various sectors varied. Some of the responses received were unusable in part or in total due to insufficient data. As an example, some surveys for county buildings and grounds were returned with zeroes or blanks for litter costs. Each county at a minimum has a county courthouse that requires litter removal from the grounds, so a blank or zero response was inaccurate and therefore was not included in the usable survey data. Each public sector surveyed was analyzed in terms of existence of a litter education program, a recycling program, monetary value of the litter control programs, litter control budget and actual amount spent.

The monetary value of each survey respondent's litter program was calculated by multiplying the number of litter control staff hours per week by their hourly wage(s) and adding the number of volunteer hours per week multiplied by the minimum wage ($7.25 per hour in Iowa). (Note that this number takes into account the value of volunteers' time but does not represent actual expenditures since volunteers are not paid.) The total weekly monetary value was multiplied by the number of weeks of operation to get an annual total. Weekly and annual totals were also expressed on one or more relevant per capita bases (e.g., for schools, per student and per resident; for tourist and recreational sites, per visitor; etc.). Finally, the sum of the dollar amounts reported by individual survey respondents was divided by the total population represented by the survey respondents to get a per capita average for the entire sector.

Typically, the costs to manage litter are included in the costs to manage other solid wastes. Therefore, most participants were not able to estimate annual litter budget expenses. As a result, the cost estimates presented in this study are based on program costs estimated from staff and volunteer requirements. Capital costs of litter programs are not included.

After all public sector entities had been analyzed individually, an estimate of the total dollars spent on litter in the state of Iowa was developed. The statewide amount was

estimated based on the average per capita program costs (described above) multiplied by the appropriate population. These estimated costs were summed to arrive at a total estimated cost of litter for Iowa.

Surveys sent, surveys returned, and the population percentages represented by the returned surveys are summarized in Table 1-3. For public entities impacted by visitors (e.g., state parks and forests) or multiple use facilities (e.g. armories), the population represented by the responses was not calculated.

Litter program results for the various sectors on a per capita basis are also summarized in Table 1-3. The monetary amounts shown include staff hours at reported wage rates as well as volunteer hours valued at minimum wage rate. The highest litter program amounts shown in Table 1-3 are for schools on a per student basis and cities on a per resident basis. School buildings and grounds are often used for public events such as regional competitions or sporting events that can generate sizable quantities of litter not directly related to the size of the student body. Details for individual entities are available in Chapter 2 of this report.

Table 1-3. Cost of Litter Survey Summary, 2012

Public Sector Entity	Number of Surveys Sent	Number of Responses (1)	Statewide Population Base Represented by Responses (%)	Program Average Cost $/Year (2)	Population Base
School Districts	348	34	15%	$ 6.46	per student
				$ 1.00	per state resident
Cities	946	110	35%		
Population < 1,000		67	12%	$ 1.42	per city resident
1,000 < Population < 10,000		27	12%	$ 2.05	per city resident
Population > 10,000		16	63%	$ 2.65	per city resident
Counties	297	62			
County Facilities and Buildings		14	21%	$ 0.30	per county resident
County Owned Roads and Ditches		28	40%	$ 0.45	per county resident
County Conservation Land		20	30%	$ 0.34	per county resident
Solid Waste Planning Area Roads, Ditches and Fence Lines	45	13	26% (3)	$ 0.19	per county resident
Special Schools	2	2		$ 0.01	per state resident
Universities	3	3		$ 0.04	per state resident
State Conservation Districts	6	5		$ 0.01	per county resident
State Historical Sites	10	9		$ 0.35	per visitor
Iowa State Fairgrounds	1	1		$ 0.02	per visitor
State Parks, Preserves and Recreational Areas	65	8		$ 0.10	per visitor
State Forests	10	3		$ 0.37	per visitor
State Wildlife Management Areas	17	3		$ 0.07	per county resident
National Guard Armories (4)	1	1		$ 1.27	per visitor
				$ 0.07	per county resident
Iowa Department of Transportation (4)	1	1		$ 0.67	per state resident
Iowa Highway Patrol (4)	1	1		$ 0.03	per state resident
National Fish and Wildlife Refuges	6	4		$ 0.08	per visitor
National Parks	1	1		$ 0.55	per visitor
Corps of Engineers	3	2		$ 0.07	per visitor

(1) Responses include returned surveys or information from telephone contact.
(2) Includes staff hours at reported wage rates and volunteer hours valued at minimum wage rate.
(3) Additional 16 percent of population represented by surveys returned without data.
(4) One survey completed for the total number of entities in this category.

CHAPTER 2. ANALYSIS OF THE LITTER SURVEY DATA

INTRODUCTION

KIB is working to improve the beauty of the state of Iowa by educating the public about litter, assisting local communities and organizations with cleanup and beautification projects, and increasing public awareness of the costs of littering.

KIB contracted with Franklin Associates, A Division of ERG to survey public sector entities throughout Iowa on cost of litter control on federal, state and local government lands. This study is the second time KIB has gathered litter prevention, collection, and enforcement cost data. Similar cost of litter data were gathered and published by KIB in 2002.

The purpose of this study is to update the 2002 cost estimates to 2012 by surveying the same public sectors in Iowa. Using methodology similar to the earlier study allows a direct comparison of Iowa's cost of litter in 2002 and 2012.

OBJECTIVE

The two main objectives of the study are (1) to determine the fiscal impact of litter across Iowa by gathering information on the annual cost of litter control and abatement efforts across Iowa and (2) to compare those costs to similar costs estimated in 2002. Performing a survey of the public sector included sending surveys to school districts, universities, federal, state, county and city staff as well as solid waste planning area commissions.

SURVEY INSTRUMENT

Each of the public entities listed below was provided a survey designed specifically for them.

- School Districts
- Cities
- County Facilities and Buildings
- County Owned Roads and Ditches
- County Conservation Land
- Solid Waste Planning Area Roads, Ditches and Fence Lines
- Special Schools and Universities
- State Conservation District
- State Historical Sites
- Iowa State Fairgrounds
- State Parks, Preserves, and Recreational Areas
- State Forests
- State Wildlife Management Areas
- National Guard Armories
- Iowa Department of Transportation
- Iowa Highway Patrol
- National Fish and Wildlife Refuges
- National Parks
- Corps of Engineers

The survey forms were similar in style and format to the surveys distributed in 2002. Although the 2002 surveys were all distributed by U.S. mail, the 2012 effort used three surveying techniques – U.S. mail, electronic mail, and telephone.

Those receiving the survey by U.S. mail or electronic mail also received an introduction letter provided by Gerald Schnepf KIB Executive Director that explained the purpose of KIB and their goal for this project. It then introduced Franklin Associates and explained the company's role in the project, mainly the development of the survey followed by the compilation and analysis of the returned data. Overall, the letter urged the survey respondents to complete the survey to the best of their ability and contact KIB or Franklin Associates if they had questions. Franklin Associates and KIB both received a few calls and emails requesting aid on the survey. Those entities contacted initially by telephone were provided the introductory information verbally by Franklin Associates. Numerous reminder emails and follow up calls were made to encourage participation or to seek clarification of submitted data.

To help guide the respondents, the following information was included:

- What is Litter?
- Who is Being Surveyed?
- What are Examples of Litter Costs?
- What are Not Considered Litter Costs?

Litter is more than just plastic cups and napkins. It includes these items and other trash not in its proper place. Examples of litter are; bottles, cans, rubber and cloth, metal, plastic packaging, paper products and illegally dumped bulky items (i.e., furniture, appliances) or large quantities of trash. The survey respondents were also given a list of those being surveyed to demonstrate the comprehensive nature of the project.

Examples of litter costs that were listed in the survey included picking up litter, cleaning up illegal dumping, operational/administrative costs for dealing with litter and law enforcement pertaining to litter. Some samples of costs that not included in this study are routine solid waste collection, painting, mowing, general maintenance, spill cleanup, vegetation control, recycling costs and hazardous waste removal.

All surveys included a paragraph of general instructions as well as Franklin Associates' phone number in case the respondent had questions. Each of the surveys had two information sections: a program information section and an annual budget information section.

The program information section contained questions about staff and hours used to deal with litter, staff hourly wages, and the existence of litter prevention and recycling programs. Volunteer time for picking up litter was also included. Volunteer time, although not an actual expense, was valued at the minimum wage. Program costs did not include the purchase, operation, or maintenance of capital equipment used for litter collection, such as street sweepers or trucks to haul away collected litter.

In the annual budget information section of the survey, information on the amount of money budgeted, spent and needed for litter prevention, collection and/or enforcement was requested. This part of the survey was meant to capture capital equipment and other costs; however, due to the lack of responses to this section of the survey across the sectors, annual budget information was not included in the final analysis.[2]

SCHOOL DISTRICTS

Litter can be found in many places on the school grounds: outside of the buildings, in and around the school stadiums and gymnasiums after public or school events, or even in the hallways. Inside the buildings, a janitor or teacher usually cleans up the litter; while outside the buildings, janitorial staff is typically responsible. After school activities or public events on school property, the clean up may be performed by janitors, student volunteers, or community groups (such as 4-H clubs and scout troops). This survey was designed to sample how much money is being spent by Iowa's school districts on litter collection.

School District Objective

The objective of this survey is to estimate the average amount spent on litter collection on school grounds. The schools were asked for input for both school sponsored events and public use of school facilities.

School District Methodology

A survey was sent to the superintendent in each school district in Iowa. Of the 348 surveys sent, 34 surveys (10 percent) representing 15 percent of the state's students were returned.

Analysis was completed on the percent of students educated about litter, the litter control program information, litter collection budget information and actual amount spent on litter collection information. To calculate the percentage of students educated about litter, the total number of students was counted for each school district that indicated they did have a litter education program, then that student total was divided by the total number of students in the districts that replied to the survey.

To calculate the average monetary value of the litter programs from the survey's program section, for each school district, the number of staff hours per week was multiplied by the hourly wage, then added to the number of volunteer hours per week multiplied by the minimum wage. This total was divided by the number of students per school district or the population of the state depending on the basis (per student or per person). This calculation gave the per student cost for each school district. An average per capita cost was developed from the responding school districts. To get a yearly average, this number was multiplied by 40 weeks/school year.

[2] For comparison of the 2012 and 2002 cost data, any capital costs included in the 2002 estimate were removed for the analysis.

School District Results

In the 34 school districts that replied to the survey, only 5 percent provide anti-litter education (this compares to 24.6 percent in 2001). One school district mentioned that the anti-litter education is part of the environmental science curriculum. Almost 60 percent of the schools reported recycling some portion of the litter collected. The percent of litter recycled ranged from < 5 percent to 75 percent of the litter collected.

Table 2-1 displays the results for the program information on litter collection in school districts. The average dollars estimated by the school districts per year based on the program information portion of the survey were $6.46 per student and $1.00 per person. Based on a 40 week school year, this corresponds to 16 cents per student per week and less than 3 cents per person per week. Of the hours spent on litter programs, 83 percent was by school staff and 17 percent was by volunteers, such as a class or civic groups volunteering to pick up litter on the school grounds. Volunteer time was valued at the minimum wage.

Compared to adjusted 2002 estimates, per student cost of litter programs has decreased by $1.97. The per person rate has decreased by about 70 percent to $1.00 per person. The 2002 estimated costs were adjusted for inflation by the CPI index to allow for the side-by-side comparison.

Table 2-1. School Districts Cost of Litter, 2002 and 2012

	Average Cost	
	2002	2012
Staff Cost of Litter Collection ($2012/student/year)	na	$6.03
Volunteer Cost of Litter Collection ($2012/student/year)	na	$0.43
Total Cost of Litter Collection ($2012/student/year)	$8.13	$6.46
Total Cost of Litter Collection ($2012/state resident/year)*	$1.45	$1.00

na = not available

School Districts Observations

- Litter program covers school buildings and grounds, including gymnasiums and stadiums.
- Litter from school-sponsored events as well as public use of school facilities.
- Litter control primarily by janitorial staff, with some volunteer cleanup
- In school districts that responded to the survey, 5 percent of students are educated about litter.
- Average dollars reported spent on litter was $6.46 per student per year.

CITIES

The cities in this survey were asked to estimate the time and money spent on litter prevention, collection and enforcement on city properties. This would include city buildings and their grounds, city streets, as well as city parks, lakes and golf courses. Janitorial staff would likely clean the city buildings and grounds. A combination of staff and volunteers clean the parks, lakes and golf courses. Street sweepers are utilized to clean the litter from the streets. Also, larger cities have staff to enforce the cleaning of neglected property and illegal dumping on public property. This survey was designed to sample how much money is being spent by Iowa's cities on litter prevention, collection and enforcement. A survey was sent to each city in Iowa (946 total of which 110 were returned).

Cities Objective

The objective of this survey is to estimate the average amount spent on litter collection on city property. The cities were asked for input on city sponsored and non-city sponsored events on city property.

Cities Methodology

Of the 946 surveys sent to each Iowa city, 110 surveys (12 percent) representing 35 percent of the state's population were returned.

Analysis was completed on the percent of cities with litter prevention and recycling programs and the litter control program information. To calculate the percentage of cities with litter prevention and recycling programs, the total number of cities that indicated they did have a program was counted, then that city total was divided by the total number of cities which replied to the survey.

The average monetary value of the litter programs from the survey for each city was calculated by adding the number of staff hours per week multiplied by the hourly wage to the number of volunteer hours per week multiplied by the minimum wage and finally adding the number of staff hours per week spent on street sweeping multiplied by the hourly wage. Before these were added, each was divided by the population of the city and multiplied by 52 weeks for staff and volunteer costs. The street sweeping costs were developed using a range of weeks per year depending on the information provided by each city. The sum of the dollar amounts reported by cities was divided by the total population represented by the cities to get a per capita average for the entire sector. Since the cities in Iowa that returned the surveys range from a population of 32 people to over 200,000, the cities were split into three groups: population under 1,000; population between 1,000 and 10,000; and population above 10,000.

Cities Results

Of the 110 cities that participated in this survey, 23 (21 percent) have a litter prevention program as defined by KIB. These programs could include KIB membership,

producing and distributing educational posters, or supporting programs such as iLivehere[3] and Adopt-a-Spot[4]. Cleaniac is another program staffed with volunteers which organizes park and street cleanups.

Forty cities (36 percent) reported recycling some portion of the litter collected. The percent of litter recycled ranged from <5 percent to 100 percent of the litter collected.

The 2002 and 2012 results for the Iowa cities litter programs are shown in Table 2-2. These results are split into 3 sections: cities under 1,000 population (67 surveys completed), cities 1,000 to 10,000 population (27 surveys completed) and cities over 10,000 population (16 surveys completed). The 2002 estimated costs were adjusted for inflation by the CPI index to allow for the side-by-side comparison.

Table 2-2. Cities Cost of Litter, 2002 and 2012

	Average Cost ($2012/city resident/year)	
	2002	2012
Cities (1-1,000 population)	$1.90	$1.42
Cities (1,001-10,000 population)	$2.36	$2.05
Cities (over 10,000 population)	$2.04	$2.65

Cities with populations under 1,000. Of the 67 small-size cities that returned surveys, seven cities (10 percent) reported having an anti-litter program or public area cleanup adoption program.

About 30 percent of the small-size cities reported recycling some portion of the litter collected. The percent of litter recycled ranged from 5 percent to 90 percent of the litter collected.

Eighteen of the small-size cities responding (27 percent) reported time spent on street sweeping of litter. Street sweeping costs represent about 14 percent of the total cost of litter for small-size cities. The estimated staff costs represent 72 percent and the value of volunteers represents about 14 percent of the total cost.

The average estimated cost of litter per person per year in cities with populations under 1,000 was $1.42 in 2012. This compares to an adjusted 2002 cost of $1.90 per resident per year.

Cities with populations between 1,000 and 10,000. Of the 27 mid-size cities that returned surveys, three cities (10 percent) reported having an anti-litter program or public area cleanup adoption program.

[3] The purpose of iLivehere is to help communities become more responsible for their environment by providing information, resources such as cleanup up supplies, and activities like community cleanups.

[4] Adopt-a-spot is a program that encourages groups of volunteers to adopt a location such as a median or park throughout a city and enables those groups to help clean and beautify public spaces. Volunteers receive supplies to help maintain their adopted area, and promotional items such as t-shirts, buttons and signs for their adopted spot.

About 30 percent of the mid-size cities reported recycling some portion of the litter collected. The percent of litter recycled ranged from <5 percent to 100 percent of the litter collected.

Twenty-two of the mid-size cities responding (81 percent) reported time spent on street sweeping of litter. Street sweeping costs represent about 74 percent of the total cost of litter for mid-size cities. The estimated staff costs represent 25 percent and the value of volunteers represents about 1 percent of the total cost.

The average estimated cost of litter per person per year in cities with populations between 1,000 and 10,000 was $2.05 in 2012. This compares to an adjusted 2002 cost of $2.36 per resident per year.

Cities with populations over 10,000. Of the 16 large cities that returned surveys, 13 cities (over 80 percent) reported having an anti-litter program or public area cleanup adoption program. Some large cities reported non-city sponsored organizations taking the responsibility for cleanup campaigns. These organizations are often sponsored by downtown businesses to maintain the downtown areas.

Information from four cities with organized downtown cleanup efforts including Burlington, Davenport, Sioux City, and Des Moines is included in this section. The reported cleanup efforts varied from once a year Earth Day cleanup, to monthly cleanups during the warmer months, to daily year round cleanup.

In Burlington, the non-profit organization Downtown Partners works to preserve and revitalize the downtown area though beautification with cleanup campaigns, flower plantings, art work, and decorations. The Downtown Davenport Partnership, a division of Quad Cities Chamber, organizes annual downtown cleanup events using more than 150 volunteers to clean the streets in preparation for summer festivals. In Sioux City, the Environmental Advisory Board organizes volunteers for annual and ongoing cleanup efforts.

In Des Moines, the Downtown City Alliance contracts with Operation Downtown[5] for the Safe and Clean Ambassador Program. Ten full-time ambassadors control litter daily throughout the year. In 2012, 242 tons of litter were collected from downtown Des Moines. Although the Alliance provides recycling bins in the Farmer Market area, most of the litter collected is landfilled. In addition to collecting litter, ambassadors pressure wash sidewalks, control and remove weeds, remove graffiti, and maintain the downtown dog waste stations. The dog waste program, started in 2007, has grown from 4,800 waste bags to 19,000 bags per year in 2010.

[5] Operation Downtown is a Block-by-Block company providing safety, cleaning, hospitality, and outreach services. http://blockbyblock.com/

A fifth city, Bettendorf, organizes an annual downtown cleanup with city staff and volunteers. The 2012 Downtown Bettendorf Cleanup used 15 hours of staff time and 60 volunteer hours to clean the downtown streets.[6]

Of the 16 large-size cities responding to the survey, 11 percent reported recycling some portion of the litter collected. The percent of litter recycled ranged from 5 percent to 75 percent of the litter collected.

Fourteen of the large-size cities responding (88 percent) reported time spent on street sweeping of litter. Street sweeping costs represent about 59 percent of the total cost of litter for large-size cities. The estimated staff costs represent 39 percent and the value of volunteers represents about 2 percent of the total cost.

The average estimated cost of litter per person per year in cities with populations over 10,000 was $2.65 in 2012. This compares to an adjusted 2002 cost of $2.04 per resident per year.

Cities Observations

- Includes city buildings and grounds, parks, lakes, golf courses, street sweeping, neglected property and illegal dumping on public property.
- Twenty-one percent of responding cities have a litter prevention program.
- Thirty-six percent of responding cities recycle some portion of the litter collected.
- Results indicate that the larger the population, the more staff hours spent on litter prevention, collection, and enforcement.
- The staff in larger cities spend more time filling out paperwork for cleanup of illegal dumping and enforcement of private property cleanup.
- Smaller cities appear to rely more on volunteers to clean up public property.
- The cost of street sweeping as a percent of the total cost of litter is a larger portion for both the medium and large size cities.
- Cities are able to estimate the cost of street sweeping more accurately then the other costs of litter control.
- Staff and volunteer time is difficult to estimate.
- Non-city organizations promote litter collection campaigns. The costs of these campaigns were not captured in this survey.

COUNTIES

Auditors, engineers and conservation officers were surveyed to estimate the time and money spent on litter prevention, collection and enforcement on county properties. These properties include county buildings and their grounds, county roads and ditches, as well as county conservation lands. Custodial staff and possibly some volunteers would likely clean up the county facilities and grounds. Volunteers play a small part in the collection of litter on county owned lands. Also, counties have staff that respond to any

[6] The City of Bettendorf also has an annual communitywide clean up (Extreme Cleanup) that, in 2012, used 30 staff hours and 298 volunteer hours.

illegal dumping on county property. This survey was designed to estimate the time and money spent on litter prevention, collection and enforcement by Iowa's counties. A survey was sent to the county auditor, engineer, and conservation officer for each county in Iowa (297 total of which 62 were returned).

Counties Objective

The objective of this survey is to estimate the average amount spent on litter prevention, collection, and enforcement on county facilities and their properties, roads and ditches and conservation lands.

Counties Methodology

Of the 297 surveys sent to each Iowa county, 62 surveys (21 percent) were returned. Three surveys were actually sent to each county: one to the auditor for county buildings and grounds (14 percent returned), one to the engineer for county owned roads and ditches (28 percent returned), and one to the conservation officer for county conservation lands (20 percent returned).

Analysis was completed on the litter control program information. The average monetary value of the litter programs from the survey's program section for each county was calculated by adding the number of staff hours per week multiplied by the hourly wage to the number of volunteer hours per week multiplied by the minimum wage. Before these were added, each was divided by the population of the county and multiplied by 52 weeks/yr. Ten months (43.3 weeks) were assumed for county conservation lands to account for the winter months. The sum of the dollar amounts reported by the county respondents was divided by the total population represented by the county respondents to get a per capita average for the entire sector.

Counties Results and Observations

The results for the Iowa counties litter programs are shown in Table 2-3. These results are split into 3 sections: county facilities and buildings; county owned roads and ditches; and county conservation land. The 2002 estimated costs were adjusted for inflation by the CPI index to allow for the side-by-side comparison shown.

Table 2-3. Counties Cost of Litter, 2002 and 2012

	Average Cost ($2012/county resident/year)		Range of Costs ($2012/county resident/year)	
	2002	2012	Low	High
County Facilities and Buildings	$0.24	$0.30	$0.07	$0.52
County Owned Roads and Ditches	$0.38	$0.45	$0.02	$1.72
County Conservation Land	$0.33	$0.34	$0.05	$0.91
Total Cost of Litter Prevention, Collection, Enforcement	$0.96	$1.09		

County Facilities and Buildings. Fourteen surveys representing 21 percent of the state's population were returned by the county auditors. At a minimum, all counties have a courthouse with grounds that need to be cleaned of litter. Three of the county auditors

reported litter prevention training for employees. The other 11 do not have a litter prevention program. Nine of the auditors reported that between 5 and 75 percent of the litter collected is recycled.

The range of the dollars per person per year estimated for facilities and buildings were $0.07 to $0.52. The average was $0.30 per person per year. This compares to the adjusted 2002 cost of $0.24 per person per year. Most of the time spent collecting litter was by county staff (87 percent), while the remaining 13 percent was collected by volunteers, such as school children and civic groups. Volunteer time was valued at the minimum wage.

County Owned Roads and Ditches. Twenty-eight surveys, representing 40 percent of the state's population, were returned by the county engineers. Four county engineers reported litter prevention programs such as anti-litter and anti-dumping signage and employee training. Eighteen of the 28 respondents (64 percent) reported litter recycling rates of 25 to 80 percent for the collected litter.

The range of litter costs shown in Table 2-3 for county owned roads and ditches is $0.02 to $1.72 per person per year. The average is $0.45 per person per year. This compares to the adjusted 2002 cost of $0.38. A large percentage (86 percent) of the time spent collecting litter was by staff, while the remainder was collected by volunteers. Some survey respondents noted that their primary litter collection cost was picking up large items, such as furniture, tires, and white goods, dumped in the road ditches. Dead deer were noted to be a big problem in some areas.

County Conservation Land. Twenty county conservation officers responded to the survey, representing 30 percent of the state's population. Two of the twenty responding counties have a litter prevention program. Litter prevention programs include "report littering" signage on park dumpsters, similar bumper sticker messaging on some park vehicles, and anti-litter messaging posted at main park gate kiosks. One county publicizes area cleanup efforts through the county website, e-blast announcements and Facebook postings. Eighteen respondents (90 percent) reported recycling a portion of the litter collected. The recycling rates ranged from <5 percent to 90 percent for the litter collected.

In these calculations, one year was assumed to be equivalent to 10 months, assuming 2 months of winter weather. Some respondents limited the litter collection to fewer months, while some collected litter all year round. The range of the dollars per person per year estimated in these 20 counties was $0.05 to $0.91. The average was $0.34 per person per year. This compares to the adjusted 2002 estimate of $0.33. Many of the respondents commented that all patrolling staff were to pick up litter where seen. A large percentage (89 percent) of the time spent collecting litter was by staff, while volunteers, such as community service workers, scout groups and school groups, collected the remainder. Illegal dumping of tires, junk cars and appliances were mentioned in surveys as being a problem.

Total Counties Costs. The total amount estimated in counties is $1.09 when the three averages above are totaled. This compares to the adjusted 2002 total cost of $0.96.

The facilities and buildings average is 28 percent of the total, while the roads and ditches are 41 percent, and the conservation lands are 31 percent. It seems intuitive that the facilities and buildings would average much less for litter collection than the roads and ditches and conservation lands, as there is less area to oversee and unlikely that any illegal dumping would occur there. From these results, it is probable that more illegal dumping and littering is done on county roads and ditches than on conservation lands.

SOLID WASTE PLANNING AREA ROADS, DITCHES AND FENCE LINES

The Iowa Solid Waste (SW) Planning Areas were surveyed to estimate the time and money spent on litter prevention, collection, and enforcement on their roads, ditches and fence lines. A survey was sent to 45 solid waste planning areas in Iowa, of which 13 (29 percent) were returned. Although minimal volunteer time is used in the collection of litter around the solid waste management facilities, two respondents actively support anti-litter volunteer programs across their planning areas. One of these also supports annual watershed cleanups.

Solid Waste Planning Area Objective

The objective of this survey is to estimate the average amount spent on litter prevention, collection, and enforcement on solid waste planning area roads, ditches and fence lines.

Solid Waste Planning Area Methodology

Of the 45 surveys sent, 13 surveys representing 40 percent of the state's population were returned. Four of the returned surveys did not contain any cost information; therefore 26 percent of the state's population is represented by the cost analysis.

Analysis was completed on the litter control program information. The average monetary value of the litter programs from the survey's program section for each solid waste planning area was calculated by adding the number of staff hours per week for littering and illegal dumping multiplied by the hourly wage to the number of volunteer hours per week multiplied by the minimum wage. Before these were added, each was divided by the population of the planning area and multiplied by 52 weeks/yr. The sum of the dollar amounts reported by the solid waste planning area respondents was divided by the total population represented by the survey respondents to get a per capita average for the entire sector.

The costs reported by the two solid waste planning areas that support volunteer cleanup efforts across their planning areas were not included in the cost analysis. Although these efforts represent real litter control costs, it was assumed that most planning areas do not have such active programs and the inclusion of those costs would skew the statewide estimate for this sector.

Solid Waste Planning Areas Results and Observations

The results for the Iowa solid waste planning areas litter programs are shown in Table 2-4.

Eight of the respondents (62%) reported litter prevention programs. These programs include funding educational coordinators and anti-litter educational campaigns. One planning area launched KIB's "Littering is Wrong, Too" campaign locally with billboard, radio and TV ads. The costs of the launch were not included in the cost analysis. Similar to the volunteer cleanup support costs mentioned above, inclusion of these program launch costs would skew the statewide cost average.

Only two of the respondents reported recycling a portion of the litter collected. The recycling rates for these two ranged from 5 percent to 10 percent for the litter collected.

The range of the dollars per person per year estimated in for the nine solid waste planning areas reporting cost data were $0.01 to $0.56. The average cost was $0.19 per person per year. This compares to the adjusted 2002 cost of $0.14. The 2002 estimated costs were adjusted for inflation by the CPI index to allow for the side-by-side comparison.

Most of the time spent preventing and collecting litter and enforcing the covered load policy was by staff (>99 percent), while volunteers, such as community service workers, accounted for <1 percent of the costs. Volunteer time was valued at the minimum wage. Of the total cost, about 10 percent is used to collect illegally dumped items along the roads and ditches.

One possible reason for the wide range of dollars per person for this entity is each solid waste planning area has differing lengths of road that they are responsible for servicing. For example, one respondent stated the road he services is about ½ mile, while another respondent must clean over 10 miles of road leading to the landfill. The same is true about the miles of fence lines, which must also be cleaned sporadically.

Table 2-4. Solid Waste Planning Area Roads, Ditches and Fence Lines Cost of Litter, 2002 and 2012

	Average Cost ($2012/county resident/year)		Range of Costs ($2012/county resident/year)	
	2002	2012	Low	High
Cost of Litter Collection	$0.14	$0.19	$0.01	$0.56

Two planning areas responded that they have a litter fence (in addition to the landfill perimeter fence) that has reduced the cost of litter collection. The fence capital costs were not included in this cost analysis. Additional capital equipment costs such as trucks, loaders, magnets, etc. used to manage litter were also excluded.

SPECIAL SCHOOLS AND UNIVERSITIES

The Iowa School for the Deaf, Iowa Braille and Sight Saving School and the three Iowa state universities were surveyed to estimate the time and money spent on litter collection on their campuses. Each of the special schools and the three state owned universities in Iowa (University of Northern Iowa, Iowa State University and University of Iowa) were contacted by telephone. The two schools and all three universities completed the cost of litter surveys.

Special Schools and Universities Objective

The objective of this survey is to estimate the average amount spent on litter collection on special schools and university campuses. The schools were asked for input on school sponsored events at arenas or stadiums, as well as inside and outside the buildings on school property.

Special Schools and Universities Methodology

The three state universities were surveyed in 2002; however, this was the first time the two special schools were surveyed. Due to the large difference in enrollment size, the special schools were analyzed separately from the larger universities.

The average monetary value of the litter programs from the survey's program section for each school and university was calculated by adding the number of staff hours per week for littering multiplied by the hourly wage to the number of volunteer hours per week multiplied by the minimum wage. Before these were added, each was divided by the bases (the student body population or the state population) and multiplied by 52 weeks/yr. The sum of the dollar amounts reported by the respondents was divided by the total state population as well as the student body population represented by the survey respondents to get a per capita average.

The published 2002 total cost estimate for state universities includes contracted costs for litter collected after university events. For 2012, only one of the universities provided the contracted cost of litter collection. It was determined that these costs could not be estimated for the 2012 analysis. For the side-by-side comparison of the adjusted 2002 costs and the 2012 costs, the contracted cost of litter collection was excluded.

Special Schools and Universities Results and Observations

The results for the Iowa special schools and universities litter programs are shown in Table 2-5. Only one of the five schools currently has a litter prevention program. This program introduces KIB to new university students during the orientation process.

All five schools recycle a portion of the collected litter. The recycling rates were reported to be between 5 percent and 75 percent for the litter collected.

One of the special schools and two of the universities reported using volunteers to collect litter. Iowa State University has an Adopt a Campus Program developed to help keep the Iowa State campus free from litter. Members of the community, students,

faculty, and staff are encouraged to adopt an area of campus and provide the volunteer time needed to keep the area clean of litter.

The special school average cost estimated for litter per state resident per year is $0.01. Since this is the first time these schools were surveyed, an historical cost comparison cannot be made. The university average cost of litter is $1.83 per student per year and $0.04 per state resident. This compares to the adjusted 2002 costs of $4.91 and $0.03. The 2002 estimated costs were adjusted for inflation by the CPI index to allow for the side-by-side comparison. A review of the survey data shows that both of the universities responding in 2002 estimated staff hours at two times the 2012 estimates.

Table 2-5. Special Schools and Universities Cost of Litter, 2002 and 2012

	Average Cost	
	2002	2012
Iowa School for the Deaf and Iowa Braille and Sight Saving School		
Total Cost of Litter Collection ($2012/state resident/year)	na	$0.01
Universities		
Staff Cost of Litter Collection ($2012/student/year)	na	$1.82
Volunteer Cost of Litter Collection ($2012/student/year)	na	$0.01
Total Cost of Litter Collection ($2012/student/year)*	$4.91	$1.83
Total Cost of Litter Collection ($2012/state resident/year)*	$0.03	$0.04

na = not available
*2002 cost of collection excluding contracted special event costs.

STATE CONSERVATION DISTRICTS

The state conservation district supervisors in the six districts of Iowa were surveyed to estimate the time and money spent on litter enforcement on state lands. These properties include state fish and wildlife lands. These officers' jobs comprise citing for litter violations if the violator is caught in the act, as well as investigating illegal dumping for possible evidence to identify the violator and prosecuting that violator if possible. Five of the district supervisors responded to the survey request (83 percent).

State Conservation Districts Objective

The objective of this survey is to estimate the average amount spent on litter enforcement in the state conservation officers' jurisdiction.

State Conservation Districts Methodology

Analysis was completed on the litter control program information only. The average monetary value of the litter programs from the survey's program section for each district was calculated by adding the number of staff hours per week multiplied by the hourly wage and multiplied by 52 weeks/yr. The sum of the dollar amounts reported by

the district supervisors was divided by the statewide population to get a per capita average.

State Conservation Districts Results and Observations

The average cost of litter enforcement in the state conservation districts is shown in Table 2-6. Only one district reported a litter prevention program. The program is a group of volunteers that serve on the Illegal Dumping Task Force whose goal is to put an end to illegal dumping in their area.

The number of enforcement violations reported by the district supervisors was between 8 and 12 violations per year per district. The average cost of litter enforcement by state conservation officers is estimated to be $0.01 per person per year. This compares to a similar cost in 2002. The 2002 estimated costs were adjusted for inflation by the CPI index to allow for the side-by-side comparison.

Table 2-6. State Conservation Districts Cost of Litter, 2002 and 2012

	Average Cost ($2012/state resident/year)	
	2002	2012
Staff Cost of Litter Enforcement	$0.01	$0.01

STATE HISTORICAL SITES

The state historical sites in Iowa were surveyed to estimate the time and money spent on litter prevention, collection and enforcement at their site. The 10 historical sites in Iowa were contacted by phone; nine sites completed the survey. One national site (Herbert Hoover National Historical Site) was added to this category from the National Parks category. The managers and staff of these historical sites deal mostly with the collection of litter.

State Historical Sites Objective

The objective of this survey is to estimate the average amount spent on litter collection at Historical Sites.

State Historical Sites Methodology

Of the 10 state historic sites, 9 surveys (90 percent) were completed. Analysis was completed on the litter control program information. The average monetary value of the litter programs from the survey's program section for each historic site was calculated by adding the number of staff hours per week for collection multiplied by the hourly wage to the number of volunteer hours per week multiplied by the minimum wage. Before these were added, each was divided by the number of visitors to the site and was multiplied by 52 weeks. The sum of the dollar amounts reported by the respondents was divided by the total number of visitors represented by the survey respondents to get a per capita average for the entire sector.

State Historical Sites Results and Observations

The results for the state historical sites litter programs are shown in Table 2-7. None of the sites responded that they currently have a litter prevention program. The percentage of the litter that is recycled was not estimated by any of the respondents.

The average dollars estimated on litter per visitor per year is $0.35. Of this amount, 10 percent is for collection of litter using volunteers. Three of the sites reported 1 or 2 organized collection events per year. The remaining 90 percent is for the staff time collecting litter. The sizes of these sites vary greatly—one has no grounds at all, while one includes trails. The 2012 total cost of $0.350 compares to the 2002 adjusted cost of $0.438. The 2002 estimated costs were adjusted for inflation by the CPI index to allow for the side-by-side comparison.

Table 2-7. State Historical Sites Cost of Litter, 2002 and 2012

	Average Cost ($2012/visitor/year)	
	2002	2012
Staff Cost of Litter Collection	$0.434	$0.315
Volunteer Cost of Litter Collection	$0.004	$0.035
Total Cost of Litter Collection	$0.438	$0.350

The size of sites vary greatly. Some sites do not include exterior grounds.

IOWA STATE FAIRGROUNDS

The state fairgrounds in Iowa was surveyed to estimate the time and money spent on litter prevention and collection on its grounds. The state fairgrounds manager in Des Moines completed the survey.

Iowa State Fairgrounds Objective

The objective of this survey is to estimate the average amount spent on litter prevention and collection on the Iowa state fairgrounds.

Iowa State Fairgrounds Methodology

Analysis was performed on the litter control program information. The monetary value of the litter program from the survey's program section was calculated by multiplying the number of staff hours per week for prevention and collection by the hourly wage. The total was multiplied by 52 weeks, as the respondent commented that the grounds are cleaned year round.

During the 10 day state fair, high school students clean litter from the fairgrounds during the day. Another group of volunteers clean the grandstand area each night after the performances. Additionally, 150 contract workers clean the entire fairgrounds overnight of litter. Volunteer and contract time was valued at minimum wage.

Iowa State Fairgrounds Results and Observations

The results for the state fairgrounds litter programs are shown in Table 2-8. The average cost of litter prevention and collection is estimated at $0.019 per visitor per year. This compares to the 2002 total cost of $0.006. The 2002 estimated costs were adjusted for inflation by the CPI index to allow for the side-by-side comparison. The difference between 2002 and 2012 is the additional cost of volunteers and contract workers included in the 2012 estimate. Volunteer time accounts for over 50 percent of the total cost.

The fair manager reported that their litter prevention program includes signage such as trash can wraps, signs for cigarette butts, and signs for recyclables. A decrease in the amount of litter was observed after KIB assisted staff with proper recyclable materials bin replacement. In addition to better placement of recycling bins, the switch from opaque bins to clear plastic bag containers also decreased the amount of litter at the fairgrounds. Information on the amount of litter recycled was not available.

Table 2-8. Iowa State Fairgrounds Cost of Litter, 2002 and 2012

	Average Cost ($2012/visitor/year)	
	2002	2012
Staff Cost of Litter Collection	$0.006	$0.005
Contract Worker Cost of Litter Collection	na	$0.005
Volunteer Cost of Litter Collection	na	$0.010
Total Cost of Litter Collection	$0.006	$0.019

na = not available

STATE PARKS, PRESERVES AND RECREATIONAL AREAS

The state parks in Iowa were surveyed to estimate the time and money spent on litter prevention, collection and enforcement in the parks. Of the 65 state park surveys sent, eight were completed.

State Parks, Preserves and Recreational Areas Objective

The objective of this survey is to estimate the average amount spent on litter collection and enforcement in state parks in Iowa.

State Parks, Preserves and Recreational Areas Methodology

Analysis was completed on the litter control program information. The average monetary value of the litter programs from the survey's program section was calculated by adding the number of staff hours per week multiplied by the hourly wage to the number of volunteer hours per week multiplied by the minimum wage multiplied by 52 weeks. These amounts for staff and volunteers were added then divided by the number of visitors to the parks.

State Parks, Preserves and Recreational Areas Results and Observations

The results for the state parks litter programs are shown in Table 2-9. Three of the eight respondents reported prevention programs. Six of the eight sites reported recycling between <5 and 50 percent of the litter collected.

The average cost estimated for litter per visitor per year is $0.10. Volunteer time comprises 10 percent of this amount, while staff time makes up the remaining 90 percent. Volunteer time was valued at the minimum wage. Of the total staff amount, five percent is for litter prevention, 47 percent is collection, and 48 percent is for enforcement of the litter laws.

The 2012 total cost of $0.10 per visitor per year is very close to the 2002 adjusted cost of $0.09. The 2002 estimated costs were adjusted for inflation by the CPI index to allow for the side-by-side comparison.

Table 2-9. State Parks, Preserves and Recreational Areas Cost of Litter, 2002 and 2012

	Average Cost ($2012/visitor/year)	
	2002	2012
Staff Cost of Litter Prevention, Collection, and Enforcement	$0.07	$0.09
Volunteer Cost of Litter Collection	$0.02	$0.01
Total Cost of Litter Prevention, Collection, and Enforcement	$0.09	$0.10

STATE FORESTS

The state forests in Iowa were surveyed to estimate the time and money spent on litter prevention, collection and enforcement at their sites. Surveys were sent to 10 state forests. Surveys were completed for three state forests.

State Forests Objective

The objective of this survey is to estimate the average amount spent on litter prevention, collection and enforcement at state forests.

State Forests Methodology

Analysis was completed on the litter control program information. The average monetary value of the litter programs from the survey's program section for each state forest was calculated by adding the number of staff hours per week for collection multiplied by the hourly wage to the number of volunteer hours per week multiplied by the minimum wage. Before these were added, each was divided by the number of visitors to the site and multiplied by 34.7 weeks (8 month per year). The sum of the dollar amounts reported by the respondents was divided by the total number of visitors to get a per capita average for the entire sector.

State Forests Results and Observations

The results for the state forests litter programs are shown in Table 2-10. Because of the small number of sites, all data points from respondents were included in this analysis. None of the sites responded that they currently have a litter prevention program. The three sites reported recycling between 10 and 60 percent of the litter collected.

Only one of the state forests included staff time for prevention and enforcement and volunteer time; the other two only included staff time for collection of litter. Most litter was reported as illegal dumping of large items such as tires, furniture, appliances, and construction and demolition debris.

The average cost estimated for litter per visitor per year is $0.37. This compares to an adjusted 2002 cost of $0.11 per visitor per year. The 2002 estimated costs were adjusted for inflation by the CPI index to allow for the side-by-side comparison. The difference between 2002 and 2012 was a decrease in the estimated visitors in 2012, which increased the per visitor cost.

Table 2-10. State Forests Cost of Litter, 2002 and 2012

State Forest	Average Cost ($2012/visitor/year)	
	2002	2012
Loess Hills State Forest Cost of Litter Prevention, Collection, and Enforcement	$0.05	$0.62
Shimek State Forest Cost of Litter Collection	$0.15	$0.29
Stephens State Forest Cost of Litter Collection	$0.14	$0.21
Total Cost of Litter Prevention, Collection, and Enforcement	$0.11	$0.37

STATE WILDLIFE MANAGEMENT AREAS

The state wildlife units in Iowa were surveyed to estimate the time and money spent on litter prevention, collection and enforcement at their sites. A survey was sent to the 17 wildlife units in Iowa, of which only three (18 percent) were returned.

State Wildlife Management Areas Objective

The objective of this survey is to estimate the average amount spent on litter prevention, collection and enforcement on state public lands.

State Wildlife Management Areas Methodology

Analysis was completed on the litter control program information. The average monetary value of the litter programs from the survey's program section for each wildlife unit was calculated by adding the number of staff hours per week for collection multiplied by the hourly wage to the number of volunteer hours per week multiplied by the minimum wage. Before these were added, each was divided by the basis (population of the counties where the unit is located) and was multiplied by 52 weeks. The sum of the dollar amounts reported by State Wildlife Unit respondents was divided by the total

county population represented by the survey respondents to get a per capita average for the entire sector.

State Wildlife Management Areas Results and Observations

The results for the state wildlife units litter programs are shown in Table 2-11. Only one of the responding units currently has a litter prevention program. Two of the respondents reported recycling between 10 and 30 percent of the litter collected.

All three sites reported staff time for litter collection, one reported staff time for litter prevention, and one reported staff time for enforcement. The one prevention program is limited to printing and placement of no littering or dumping signs. Most litter was reported as illegal dumping of large items such as tires, furniture, appliances, and construction and demolition debris.

The average cost estimated for litter per person per year is $0.071. Of this amount, 3 percent is for collection of litter by volunteers. Volunteer time was valued at the minimum wage. One site reported 2 organized litter collection events in 2012. The remaining 97 percent is for the staff time collecting litter.

Table 2-11. State Wildlife Management Areas Cost of Litter, 2002 and 2012

	Average Cost ($2012/county resident/year)	
	2002	2012
Staff Cost of Litter Prevention, Collection, and Enforcement	$0.033	$0.069
Volunteer Cost of Litter Collection	$0.001	$0.002
Total Cost of Litter Collection and Enforcement	$0.034	$0.071

The 2012 annual cost of $0.071 compares to $0.034 in 2002. The 2002 estimated costs were adjusted for inflation by the CPI index to allow for the side-by-side comparison. The reason for the increase is unknown. One possible explanation is the lower response rate in 2012. In 2002, data were obtained from 12 sites (compared to 3 in 2012).

NATIONAL GUARD ARMORIES

The National Guard armories in Iowa were surveyed to estimate the time and money spent on litter collection at the armories and at the Camp Dodge Training Site. One Army National Guard contact completed the survey for all armories and the training site. The survey was completed for the 47 armories and 1 training site in Iowa. The respondent estimated that each armory has 1,000 visitors per year, while the training site had 80,000 civilian visitors in 2012.

National Guard Armories Objective

The objective of this survey is to estimate the average amount spent on litter collection and enforcement from public use at National Guard armories in Iowa.

National Guard Armories Methodology

One survey was completed for the 47 National Guard armories and the one training camp. Analysis was completed on the litter control program information. The average monetary value of the litter programs was calculated from the number of staff hours per week for collection multiplied by the hourly wage and 52 weeks. No volunteers are used by the National Guard for litter collection. The dollar amount for staff was divided by the bases (number of visitors to the armories and training camp or the population of the county where the armory or training camp is located) and an average was taken of all the armories and training camp.

National Guard Armories Results and Observations

The results for the Army National Guard armories litter programs are shown in Table 2-12. The average cost estimated for litter per visitor per year is $1.27. If the average is taken on a county population basis, the cost estimated for litter per person is $0.07. These results include only staff time for collection of litter. No hours are spent on prevention or enforcement by the National Guard. None of the armories currently have a litter prevention program. The percentage of litter recycled at the individual facilities is unknown. No enforcement costs were estimated for the armories.

Compared to the adjusted 2002 cost estimate, the 2012 cost per visitor has decreased by about 50 percent. This is due to a doubling of number of visitors from 2002 to 2012 with minimal increase in the cost for litter collection. The 2002 estimated costs were adjusted for inflation by the CPI index to allow for the side-by-side comparison.

Table 2-12. National Guard Armories Cost of Litter, 2002 and 2012

	2002	2012
Cost of Litter Collection ($2012/visitor/year)	$3.00	$1.27
Cost of Litter Collection ($2012/county resident/year)	$0.08	$0.07

IOWA DEPARTMENT OF TRANSPORTATION

The Iowa Department of Transportation (IDOT) was surveyed to estimate the time and money spent on litter collection along the state and interstate highways. One contact at IDOT completed the survey for all the highways in the state. The results include staff time, equipment costs and Adopt-a-Highway (AAH) volunteer time. Equipment costs include highway signs, orange vests for volunteers, collection bags and other miscellaneous equipment. The AAH groups help keep approximately 32 percent of the state's roadways litter-free.

Iowa Department of Transportation Objective

The objective of this survey is to estimate the average amount spent on litter collection by the Department of Transportation in Iowa.

Iowa Department of Transportation Methodology

IDOT provided staff hours and quantities collected by IDOT and AAH volunteers for 2006 through 2012. Staff and equipment costs were estimated from 2002 adjusted for inflation. Similar to 2002, volunteer hours were estimated at 10 people per AAH group collecting litter for 8 hours each year. The average number of volunteers per AAH group is not tracked. The number of AAH groups (1,274) in 2012 was obtained from the IDOT website.

The department costs per year for AAH litter removal and DOT litter removal (including overhead) were added for the total DOT staff and equipment costs. The number of AAH groups was multiplied by the number of members in each group and the number of hours supplied per year. This total of volunteer hours per year was then multiplied by the minimum wage to result in a total AAH volunteer value per year. The sum of the dollar amounts was divided by the total state population represented by the survey respondent to get a per capita average for the entire sector.

Iowa Department of Transportation Results and Observations

The results for the Iowa Department of Transportation litter program are shown in Table 2-13. The average cost estimated for litter per resident per year is $0.67. This compares to $0.80 per person per year in 2002. The 2002 estimated costs were adjusted for inflation by the CPI index to allow for the side-by-side comparison.

Thirty-six percent of the 2012 dollar amount is allocated to the AAH volunteer time. Volunteer time was valued at the minimum wage. The remaining 64 percent is allocated to IDOT staff time and equipment. Metal is the only type of litter reported recycled by IDOT.

Table 2-13. Iowa Department of Transportation Cost of Litter, 2002 and 2012

	Average Cost ($2012/state resident/year)	
	2002	2012
Staff Cost of Litter Collection	$0.37	$0.43
Volunteer Cost of Litter Collection	$0.43	$0.24
Total Cost of Litter Collection	$0.80	$0.67
Total Cost of Litter Collection ($2012/total cubic yard collected)	$373	$337

The total cost for litter collection expressed as cost per quantity collected is $337 per cubic yard litter which is similar to the adjusted 2002 estimate of $373 per cubic yard. Figure 2-1 shows the quantity of litter collected by IDOT and AAH groups from 2006 to 2012. The IDOT collected litter shows some variation over time with an upward trend. The AAH collected litter has remained consistent since 2008.

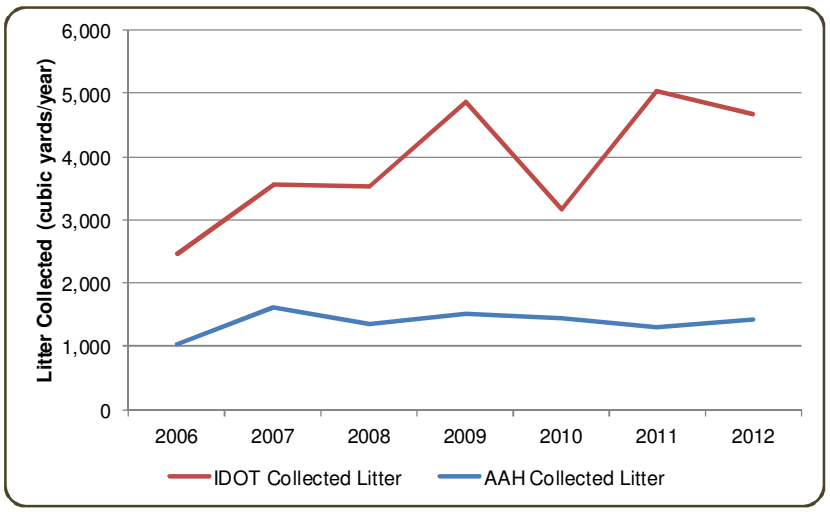

Figure 2-1. Litter Collection IDOT and AAH Volunteers

IOWA HIGHWAY PATROL

The Iowa Highway Patrol was surveyed to estimate the time and money spent on litter prevention and enforcement along the state and interstate highways. One contact provided information for the entire state.

Iowa Highway Patrol Objective

The objective of this survey is to estimate the average amount spent on litter prevention and enforcement by the Highway Patrol in Iowa.

Iowa Highway Patrol Methodology

All information collected from the Highway Patrol was provided by one contact. The results only include staff time for enforcement of litter laws. Although litter prevention is part of the educational programs provided by the highway patrol, no estimates for this cost were provided. In 2002, 1 percent of the educational time was estimated to be about litter.

The dollar amount per year for litter enforcement was divided by the state population resulting in a per person basis for Iowa. The contact provided an estimate of the number of enforcement stops made in 2012. The cost per stop was estimated from the cost per stop in 2002 adjusted upward to account for inflation. These data were multiplied to find the dollar amount per year for litter enforcement, which was divided by the state population resulting in a per person basis for Iowa.

Iowa Highway Patrol Results and Observations

The results for the Iowa Highway Patrol litter enforcement program are shown in Table 2-14. The average cost is $0.028 per person per year. This compares to an estimated cost of $0.033 in 2002. The 2002 estimated costs were adjusted for inflation by the CPI index to allow for the side-by-side comparison.

Table 2-14. Iowa Highway Patrol Cost of Litter, 2002 and 2012

Enforcement Action	2002	2012
Number of Citations	68	93
Number of Warnings	136	89
Total Actions	204	182
Total Cost of Litter Enforcement ($2012)	$95,547	$85,243
Total Cost of Litter Enforcement ($2012/state resident)	$0.033	$0.028

NATIONAL FISH AND WILDLIFE REFUGES

The National Fish and Wildlife refuges in Iowa were surveyed to estimate the time and money spent on litter prevention, collection and enforcement on their lands. Four of the 6 national fish and wildlife refuges in Iowa contacted responded to the survey. The managers and staff of these refuges are in charge of prevention, collection and enforcement of litter programs.

National Fish and Wildlife Refuges Objective

The objective of this survey is to estimate the average amount spent on litter prevention, collection and enforcement on National Fish and Wildlife Refuge lands.

National Fish and Wildlife Refuges Methodology

Analysis was completed on the litter control program information. The average monetary value of the litter programs from the survey's program section for each refuge was calculated by adding the number of staff hours per week for prevention, collection and enforcement multiplied by the hourly wage to the number of volunteer hours per week multiplied by the minimum wage. Before these were added, each was divided by the bases (number of visitors to the refuge) and the smaller refuges were multiplied by 34.7 weeks/yr (8 months), while the larger refuges reported their data pertained to all 52 weeks. The sum of the dollar amounts reported by the National Fish and Wildlife Refuges' respondents was divided by the total number of visitors represented by the survey respondents to get a per capita average for the entire sector.

National Fish and Wildlife Refuges Results and Observations

The results for the national fish and wildlife refuges litter programs are shown in Table 2-15. None of the refuges responded that they have a litter prevention program. Three reported recycling between 25 and 40 percent of the litter collected.

Table 2-15. National Fish and Wildlife Refuges Cost of Litter, 2002 and 2012

	Average Cost ($2012/visitor/year)	
	2002	2012
Staff Cost of Litter Prevention, Collection, and Enforcement	na	$0.06
Volunteer Cost of Litter Collection	na	$0.02
Total Cost of Litter Prevention, Collection, and Enforcement	$0.06	$0.08

na = not available

The average cost estimated for litter per visitor per year is $0.08. This compares to $0.06 estimated in 2002. The 2002 estimated costs were adjusted for inflation by the CPI index to allow for the side-by-side comparison.

One site reported that 75 percent of litter is from illegal dumping (tires, furniture, appliances); 25 percent is cans, bottles, and general trash. Another site reported that a large portion of their litter comes from seasonal flooding.

NATIONAL PARKS

The National parks in Iowa were surveyed to estimate the time and money spent on litter collection and enforcement on their lands. The only national park in Iowa is Effigy Mounds. The Herbert Hoover National Historic Site (part of the National Park Service) was included with the historic sites.

National Parks Objective

The objective of this survey is to estimate the average amount spent on litter collection and enforcement on National Park lands in Iowa.

National Parks Methodology

Analysis was performed on the litter control program information provided by Effigy Mounds National Park. The monetary value of the litter programs from the park's program section was calculated by adding the number of staff hours per week for collection and enforcement multiplied by the hourly wage to the number of volunteer hours per week multiplied by the minimum wage. No hours were reported for litter prevention. These costs were divided by the basis (number of visitors to the park) and multiplied by 52 weeks.

National Parks Results and Observations

The results for the national parks litter programs are shown in Table 2-16. Effigy Mounds responded that they do not have a litter prevention program. They recycle about 25 percent of the litter collected.

The average cost estimated for litter per visitor per year is $0.55. This compares to the 2002 cost of $1.22 per visitor. The 2002 estimated costs were adjusted for inflation by the CPI index to allow for the side-by-side comparison.

The volunteer cost only accounts for 3 percent of the total cost. Volunteer time was valued at the minimum wage rate. The staff time utilized for collection accounts for 42 percent of the $0.55, while the staff time utilized for enforcement accounts for 55 percent of the average dollars per visitor per year.

Table 2-16. National Parks Cost of Litter, 2002 and 2012

	Average Cost ($2012/visitor/year)	
Effigy Mounds	2002	2012
Staff Cost of Litter Collection and Enforcement	$1.20	$0.53
Volunteer Cost of Litter Collection	$0.02	$0.02
Total Cost of Litter Collection and Enforcement	$1.22	$0.55

CORPS OF ENGINEERS

The Corps of Engineers were surveyed to estimate the time and money spent on litter prevention, collection and enforcement on the recreational facilities in Iowa. These facilities include lakes, reservoirs, dams and other recreational areas. Two of the Corps of Engineer districts that control the Iowa recreational areas responded to the survey. Both of these districts noted that contractors are paid to collect litter in these areas.

Corps of Engineers Objective

The objective of this survey is to estimate the average amount spent on litter prevention, collection and enforcement on recreational facilities overseen by the Corps of Engineers.

Corps of Engineers Methodology

Of the 3 Corps of Engineers districts, two surveys (67 percent) were competed. Analysis was completed on the litter control program information, as well as the annual budget information. This is due to the fact that the Corps of Engineers contracts out the litter collection of the lands in their jurisdiction. The average monetary value of the litter programs from the survey's program section for each recreational facility was calculated by adding the number of staff hours per week for prevention and enforcement multiplied by the hourly wage to the number of volunteer hours per week multiplied by the minimum wage. Before these were added, each was divided by the basis (number of visitors to the recreational facility) and multiplied by 52 weeks. The contractor dollars spent was calculated by dividing the spent amount by the number of visitors. These amounts were then summed to arrive at the total dollars spent per visitor per year.

Corps of Engineers Results and Observations

The results for the recreational facilities litter programs maintained by the Corps of Engineers are shown in Table 2-17. The 2002 estimated costs were adjusted for inflation by the CPI index to allow for the side-by-side comparison.

One site reported environmental educational programs that include an anti-litter message. The programs are given by staff off-site in the community and on-site to facility visitors. They also have signs and bulletin board anti-litter reminders. In contrast, the second site had no prevention programs except for a small number of reminder signs.

Table 2-17. Corps of Engineers Cost of Litter, 2002 and 2012

	Average Cost ($2012/visitor/year)	
	2002	2012
Contracted Cost of Litter Collection	$0.04	$0.04
Volunteer Cost of Litter Collection	$0.001	$0.03
Total Cost of Litter Collection	$0.04	$0.07

The average cost estimated for litter per visitor per year is $0.07 in 2012 compared to the adjusted 2002 cost of $0.04. In 2012, 54 percent of the cost of litter is contracted out for litter collection. Volunteer time comprised about 45 percent, while the staff time (prevention and enforcement) required less than 1 percent of the dollars.

The cost of volunteer litter collection was higher in 2012. One district reported eight litter collection events in 2012 with 150 to 200 volunteers participating in each event. These volunteer costs were not incurred in 2002. Volunteers also clean remote campgrounds of litter in both districts in exchange for free camping privileges. Similar to other volunteers, volunteer time in remote campgrounds was valued at minimum wage.

Both sites reported no litter violations were issued in 2012; illegal dumping occurred less than 10 times, but responsible parties could not be identified.

STATEWIDE ESTIMATED COST OF LITTER

Table 2-18 displays the statewide cost estimates for each of the entities surveyed. The statewide estimated cost was based on the sum of individual factors (average per capita litter program costs developed from the returned surveys) multiplied by the relevant population.

The total annual estimated cost of litter in the State of Iowa was $17.5 million in 2012. This compares to an adjusted 2002 statewide cost of litter of $17.1 million. The 2002 estimated costs were adjusted for inflation by the CPI index to allow for the side-by-side comparison. The difference between the two estimates is less than three percent.

Table 2-18. Iowa Statewide Cost Estimates for all Entities Surveyed

Entity Name	2002 Estimated Annual Costs (2012 dollars)*	2012 Estimated Annual Costs (2012 dollars)
School Districts	$4,257,400	$3,078,320
Cities		
Population under 1,000	$472,700	$331,120
Population between 1,000 & 10,000	$1,636,980	$1,428,050
Population over 10,000	$2,702,860	$3,993,550
Counties	$2,800,880	$3,338,070
Solid Waste Planning Area Roads, Ditches and Fence Lines	$410,810	$590,160
Special Schools and Universities	$285,230	$141,200
State Conservation Districts	$30,600	$32,820
State Historical Sites	$84,100	$88,770
Iowa State Fairgrounds	$11,610	$45,560
State Parks, Preserves and Recreational Areas	$1,277,990	$1,339,930
State Forests	$10,720	$24,170
State Wildlife Management Areas	$102,730	$218,100
National Guard Armories	$158,250	$209,280
Iowa Department of Transportation	$2,351,650	$2,056,740
Iowa Highway Patrol	$95,550	$85,240
National Fish and Wildlife Refuges	$100,560	$147,540
National Parks	$96,990	$46,670
Corps of Engineers	$219,120	$338,350
State Total	**$17,106,730**	**$17,533,640**

*2002 litter survey results expressed as 2012 dollars by multiplying 2002 estimated costs by CPI (Consumer Price Index) inflation value 1.2762. http://www.bls.gov/data/inflation_calculator.htm

In 2012, $17.0 million (97 percent) was spent on litter at Iowa public facilities (including school districts, cities, counties, and various state entities), while over $523,000 was spent on litter at national facilities (national fish and wildlife refuges, national parks, and corps of engineers). The annual cost estimate for cities with populations over 10,000 comprises 23 percent of the statewide cost estimate. The counties and school districts comprise 18 and 19 percent of the statewide cost estimates,

respectively. The Iowa Department of Transportation costs accounts for 12 percent of the statewide cost. Collectively these four public sector entities account for over 70 percent of the statewide costs of litter.

It was obvious from the survey responses that litter costs are typically not identified as a budgetary cost category. Most respondents, especially on the local level, had no measurement tools and relied on best estimate responses. Although it was found that counties typically identify illegal dumping as a separate cost, other litter costs are combined in general building maintenance, grounds keeping, and solid waste collection costs.