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# A Study to Determine the Effect that a Local Recycling Program had on the Amount of Household Solid Waste that was Disposed of in the Carrollton, Virginia Area

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A Study To Determine The Effect That A Local  
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Carrollton, Virginia, Area

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A Research Paper Presented To The Graduate  
Faculty Of The Department Of Occupational And  
Technical Studies At Old Dominion University

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In Partial Fulfillment Of The Requirements For  
The Degree Master Of Science In Occupational And  
Technical Studies

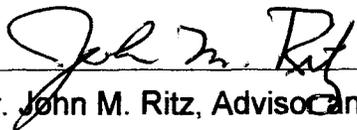
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BY  
DONALD AUBUCHON  
JULY, 1999

## SIGNATURE PAGE

This research paper was prepared by Donald Aubuchon under the direction of Dr. John M. Ritz in OTED 636, Problems in Occupational and Technical Studies. The report was submitted to the Graduate Program Director as partial fulfillment of the requirements for the Degree of Master of Science in Occupational and Technical Studies.

Approved By

  
\_\_\_\_\_  
Dr. John M. Ritz, Advisor and Graduate

Program Director

7-18-99  
Date

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Donald F. Aubuchon

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# CHAPTER I

## INTRODUCTION

The management of solid waste began when our society started to settle down into permanent communities almost 100 years ago. At that time the concern was one of how garbage looked, smelled, and attracted undesirable pests. It was not until many decades later that health concerns over garbage became apparent and the long-term health effects of garbage were addressed (Kimball, 1992, p. 4).

In 1991 the Environmental Protection Agency (EPA) adopted stringent new standards that might possibly reduce the number of current landfills by 70 percent and increase our nation's solid waste disposal problems. Recycling programs have shown the ability to reduce the amount of solid waste that is placed in our land-fills and provide our nation with a second source of materials to use in the production of products (Powelson, 1992, p. 6).

Materials such as papers, metals, motor oils, plastics, and glasses can be recycled from solid waste, therefore reducing the amount of pollution that is introduced into our environment. In order for recycling to work, the program must be well organized and provide for a method that allows recyclable materials to be sorted into containers. Most recycling programs either pick-up the materials from the curbside of the resident's home or provide access to a transfer station which will facilitate the recovery of materials (Kimball, 1992, p.

11).

Many different curbside recycling programs have been started in the past by small ambitious recycling organizations. These programs sometimes require the homeowner to separate the recyclables into three or more different containers. Other programs allow the homeowner to mix certain products together, but the high costs of collection containers, vehicles, maintenance, and fuel costs have proved to be cost prohibitive to the majority. Transfer stations tend to provide the most efficient and economical means for the collection of recyclable materials. A transfer station is usually located within the city limits and expensive fleets of vehicle are not needed.

Recycling programs do not tend to make a profit, therefore, they are operated to respond to consumer demand and not to the demand for profit. The process of recycling does, though, produce a need for a large workforce and creates an inexpensive source of raw materials for reuse in the industrial sector. Public pressure for recycling has led to legislation that prohibits certain types of household waste from being placed into public landfills (Powelson, 1992, p. 6). If our society chooses not to recycle, then the end results will be the depletion of our non-renewable resources and the continued problem of how to dispose of our solid waste safely.

## STATEMENT OF THE PROBLEM

The purpose of this study was to determine the effect that a local recycling program had on the amount of household solid waste that is disposed of in the Carrollton, Virginia, area.

## RESEARCH GOALS

The following research goals were established to provide guidelines to conduct research and answer the problem:

1. Identify the present amount of recycling that is being done in the Carrollton, Virginia, area.
2. Identify the current amount of household solid waste that is being produced in the Carrollton, Virginia, area.
3. Identify the specific types of solid waste that are being recycled in the Carrollton, Virginia, area.
4. Identify how successful the recycling program has been in the Carrollton, Virginia, area.

## BACKGROUND AND SIGNIFICANCE

Recycling is a process which can help our society reuse portions of our solid waste, therefore, reducing the amount of waste that must be disposed of in our landfills. The recycling of everyday items such as newspapers, soda cans,

used motor oils, metals, plastics, and glasses has been very successful in many communities around the United States.

Mandatory goals for recycling in the state of Virginia were enacted in 1989. Virginia set their recycling goal at 25 percent by the year 1995. All state agencies and universities had to enact recycling programs by 1 July 1991. These programs required all state agencies and universities to buy recycled paper and paper products when possible (Kimball, 1992, p. 133). Regions for solid waste have been established and each region is responsible for developing and implementing its own solid waste reduction plan. Each region's plans must include a process that allows for the reduction of solid waste through recycling. Cities and counties are permitted to require the separation of solid waste and the collection of recyclable materials from residents and businesses within their jurisdiction. The Department of Economic Development has been assigned the task of encouraging and promoting the recycling industry within the state of Virginia. Also, no lead-acid batteries may be disposed of in a regional landfill and the sellers of batteries must post a sign that informs customers of state laws (Kimball, 1992, p. 133).

Our natural resources will not last us forever and our society must think ahead and plan for the future of our children and the future generations to come. The importance of recycling can be seen in many different areas. The first is the need for materials to produce everyday items such as paper, plastic, oil, and glass. The second is to preserve our soils and underground aquifers from

leachates that seep out of the boundaries of landfills.

## LIMITATIONS

The following limitations were outlined to keep this study manageable:

1. This study took place during the Spring of 1999.
2. This study focused on the Carrollton, Virginia, area.
3. This study addressed household solid waste.

## ASSUMPTIONS

The following assumptions were made in this study:

1. The recycling data from Isle of Wight County was accurate.
2. The data from Southeastern Public Service Authority (SPSA) was accurate.
3. The level of over-all garbage disposal for the year changed every year due to the population expansion of Isle of Wight County.
4. All local residents disposed of their solid waste in the Carrollton, Virginia area.
5. No residents from outside the Carrollton, Virginia, area disposed their household solid waste in the Carrollton, Virginia, area.

## PROCEDURES

Data for this research was collected from Isle of Wight County and SPSA. This information indicated the total amount of household solid waste that was disposed of every month in the Carrollton, Virginia, area. The data also showed the total amount of recycled household solid waste that was collected in the Carrollton, Virginia, area. Additional information was obtained through literature and interviews from officials that worked directly with the local recycling program in Isle of Wight County and SPSA. State laws and regulations were obtained from the Codes of Virginia: Title 2.1, and 10.1. Data that was collected will be used to answer the research goals.

## DEFINITION OF TERMS

The following definitions were used in this study and were important to understanding this report.

1. Aquifers- An underground layer of porous rock containing water (Webster's Dictionary, 1998 p. 29).
2. EPA- Environmental Protection Agency.
3. Landfill- A municipal site where solid waste is disposed.
4. MRF- Materials Recovery Facilities.
5. Non-renewable Resources- Refers to natural resources that can not be replaced in their original form (Kimball, 1992, p. 230).

6. Recycling- The process of returning materials back to the consumer in a useable form.
7. Solid Waste- A term used to describe waste such as garbage, refuse, sludge, or any other discarded solid materials (Kimball, 1992, p. 230).
8. SPSA- Southeastern Public Service Authority
9. Transfer Station- A facility where garbage is collected from smaller collectors and transported to a landfill in larger transporting units (Kimball, 1992, p. 232).

## OVERVIEW OF CHAPTERS

Chapter I provided an introduction explaining the history of solid waste and how recycling can help our society reduce that waste. It also introduced the reader to the problem of the study as well as why the study was important. Limitations were listed in order to provide boundaries for the study. Procedures were outlined to explain how the data was collected and assessed. Definitions were provided to help the reader to better understand any unfamiliar terminology.

Chapter II reviewed attainable literature which directly related to the study. Chapter III will cover the methods and procedures that were used to collect data. Chapter IV presented the reader with the data that was collected and Chapter V provided the reader with a summary, conclusion, and recommendations.

## CHAPTER II

### REVIEW OF LITERATURE

The purpose of this chapter was to review literature that related to the problem statement and objectives. This review included information that has been collected from articles, books, and documents obtained from Isle of Wight County and Southeastern Public Service Authority of Virginia. In this chapter, the reader will be provided with an overview of the Isle of Wight recycling program. The topics included in the review of literature are: the amount of recycling that is being done in Carrollton, Virginia; the current amount of household solid waste that is being produced in Carrollton, Virginia; specific types of solid waste that are being recycled in the Carrollton, Virginia; success of the recycling program in Carrollton, Virginia; and consequences of recycling.

#### Amount Of Solid Waste Being Recycled

Over the past few years the amount of solid waste that is been recycled on a national basis has increased tremendously. In the year 1994, a total of 209.1 million tons of paper, glass, metal, plastic, wood, and yard trimmings were recycled on a national scale. This figure is quite impressive, but it represents only a fraction of the total solid waste that could be recycled (Keep America Beautiful, Inc., 1996, p. 1-3). The amount of solid waste that is being recycled in Isle Wight can be divided in to two categories which are the following: curbside

recyclables and drop-off recyclables. Curbside collection during the year 1993 was estimated at 13,160 tons of material. This figure indicates a 140 percent increase over the previous year's total of 5,488 tons. Drop-off collections are estimated at 2,123 tons for the year 1993 (Environmental Impact Statement, 1995, p.1-18).

### **Current Amount of Solid Waste Being Produced**

In 1992, 1,038,130 tons of solid waste were generated in the Southeastern Public Service Authority service areas. Of that total amount, 909,952 tons or 88 percent was disposed of using the regional landfill, the Refuse Derived Fuel facility or through recycling operations. The remainder of solid waste which consisted of ash, construction waste, bulky waste, white goods, and water treatment plant residuals was disposed of at the Virginia Beach Mt. Trashmore II landfill and Portsmouth's Craney Island landfill (Southeastern Public Service Authority, 1995, pp.1-3).

### **Specific Types of Solid Waste that Can Be Recycled**

There is a large range of different materials that can be recycled from our society's solid waste. On a national scale, the following types can be recycled:

(1) Yard waste- It is estimated that our land fills contain 31.6 million tons of yard waste. This figure could be drastically reduced if home owners would compost

this waste in their back yards.

(2) Corrugated boxes- Estimates indicate that 23.1 million tons of corrugated boxes are placed into our national landfills every year. Future recycling methods should be able to reduce this amount by 66 percent by 1995.

(3) Newspaper- The national average amount of newspapers that are placed in our landfills is 13.3 tons every year. A 35 percent recovery rate was achieved in 1995.

(4) Glass- Estimates indicate that 11.3 tons of glass are placed into our landfills. Two and a half million tons are expected to be recovered in the future due to the increase of community based recycling programs.

(5) Rubber tires- An estimated 2.2 tons of tires enter our landfills. The majority of the tires will be shredded for use in either waste energy facilities or for use in making asphalt for our nation's highways.

(6) Aluminum cans- The national average of aluminum cans that are disposed of in our landfills is 1.4 tons. This amount has been reduced considerably in the last couple years due to the increase of community recycling programs

(Powelson, 1992, p. 30).

The local types of recyclable wastes are:

1. yard waste which accounts for 18 percent.
2. plastics which accounts for 8 percent.
3. glass which accounts for 7 percent.
4. aluminum accounts for 1 percent.

5. other metals account for 7 percent.
6. paper which accounts 37 percent of the total collected solid waste.

Of all these, recyclable paper is the largest contributor to the solid waste problem (Isle of Wight Refuse Report, 1998 p. 60).

## Success Of Recycling Programs

In the past, various programs for recycling solid waste have been set up in the form of youth groups, college groups, and a large number of public organizations. All these groups and organizations were influenced by the theory that they were working together to keep their communities free of pollution and refuse. These combined efforts along with the low value of recycling replaced a large portion of peddlers and collectors that use to haul away trash using pushcarts, wagons, and automobiles (Lipsett, 1974, p.17).

In 1989 the Virginia Legislature adopted mandatory recycling rates of 10 percent by the year 1991, 15 percent recycling rates by 1993, and 25 percent by the end of 1995. A local regional feasibility study addressed several recycling processes and alternatives that could be used to enable Isle of Wight and other bordering communities to meet these mandatory recycling rates. This feasibility study concluded the following:

No single recycling activity would achieve a 10 percent recycling rate by the year 1991, and that several recycling activities would have to be implemented together to reach the recycling goals (G.B.B., Inc., 1989).

The local community responded to this report by contracting Southeastern Public Service Authority to help implement a comprehensive recycling program that included a system for curbside collection, a solid waste drop-off center, a composting site, and a materials recovery facility. The success of this recycling can be seen in the decrease of solid waste that is placed in our regional landfill in Suffolk, Virginia (Southeastern Public Service Authority, 1995, p. 1-16).

## CONSEQUENCES OF RECYCLING

The consequences of recycling can be measured in three very evident ways. The first is that recycling helps to reduce the amount of solid waste that is placed into our landfills. This reduction helps to keep our nations wetlands and watersheds free of contaminate. The second is that recycling has the ability to provide business and industry with a second source of materials for production of consumer products. Products such as paper, plastic, and glass can be collected, processed and returned to the consumer in a usable state. The third is that recycling helps our nation to manage our non-renewable resources. Our natural resources are limited and will not last us forever. Recycling provides us with a means of reusing limited resources over and over again, therefore,

reducing the demand (Southeastern Public Service Authority, 1995, p. 1-4).

## SUMMARY

This review of literature indicated that there is a large amount of old and new information about global and national recycling programs. This information indicates that most recycling programs are successful in creating a secondary source of materials that can be used for the production of consumer goods or industrial needs. Recycling also has proven that it has helped our society to manage our landfills and protect our communities from health risks that have been associated with the disposal of solid wastes.

Local and state information has provided a limited, but useful, insight into the workings of the Isle of Wight recycling program. This information is limited due to the relatively new recycling program that is in effect in Isle of Wight.

The next chapter, Chapter III, will cover the methods and procedures that were used to collect data for this study. This chapter also covers instrument design and administration.

## CHAPTER III

### METHODS AND PROCEDURES

In order to carry out this study in an organized manner, the researcher used a descriptive research design. This study was designed to answer the following goals: (1) to identify the present amount of recycling that is being done in the Carrollton, Virginia, area, (2) to identify the current amount of household waste that is being produced in the Carrollton, Virginia, area, (3) to identify the specific types of garbage that are being recycled in the Carrollton, Virginia, area, and (4) to identify how successful the recycling program has been in the Carrollton, Virginia, area. In this chapter the population, instrument design, methods for collecting data and the procedures for analyzing data will be presented.

### POPULATION

The population of this study consists of one administrator who works for the Isle of Wight County public works, one administrator who works for SPSA, and one employee that works at the Carrollton, Virginia, recycling center. Each one of these participants have been working within the solid waste field for at least two years and have a good understanding of the recycling process.

## DESCRIPTION OF INSTRUMENT

An outline of interview questions was designed so that each individual would be asked the same questions. The interview was administered to the participants on May 15, 1999. The interview for this study consisted of a series of open and closed-ended questions. These interview questions were designed to answer the research goals of this research study. A copy of the interview questions is found in the Appendix.

## METHODS FOR COLLECTING DATA

The researcher visited each of the interview participant separately on May 15, 1999. Each participant was asked the pre-designed interview questions. Data about the county's solid waste program were also provided by each of the participants. This data indicated the specific amounts and types of solid waste that was collected in the local community. Data from previous years were also provided so that the researcher had solid waste data for more than one year. These data were then compiled and used to answer the research goals.

## ANALYSIS OF DATA

Upon completion of the interview, the researcher compiled the data from the interview by analyzing and weighing answers to each of the questions. Similar responses were grouped together into four categories. The first category

answered the question pertaining to the present amount of recycling being performed. The second category answered the question pertaining to the current amount of solid waste that is being produced. The third category answered the question of specific types of materials that are being recycled. The fourth category answered the question about the success of the local recycling program.

## SUMMARY

In this chapter, the methods and procedures that were used to collect data for this survey were outlined. Interviews of the participants were conducted on May 15, 1999. These interviews and additional data were used to answer the research goals outlined in this paper.

## CHAPTER IV

### FINDINGS

The problem of this study was to determine the effect that a local recycling program had on the amount of household solid waste that is disposed of in the Carrollton, Virginia, area. Three interviews were used to attain the needed information. A list of eleven questions were asked in each interview. All three interviews were conducted on May 15, 1999.

### INTERVIEW RESULTS

Interview questions asked the following information: 1) what has been the reaction of the general public toward the new solid waste recycling center? 2) what is the current amount of recycling being performed at the present time? 3) what was the amount of recycling that was preformed last year? 4) what was the amount of solid waste that was produced in the Carrollton, Virginia, area? 5) what is the amount of recycling that has been done so far this year? 6) what types of solid wastes are being recycled at the present time? 7) are there any future plans to increase the types of solid waste that are recycled? 8) what kind of savings has the local recycling program produced? 9) what specific areas can be identified as contributing to the success of the recycling program? 10) what percentage of the total amount of solid waste is recycled? 11) what is the benefits from recycling in the Carrollton, Virginia, area?

The following narrative, data, and tables indicate the answers of the

participants that were interviewed. Each of the participants' replies are grouped together with the question they were asked.

## REACTIONS

Table 1 shows the question that was asked and the replies that each interviewee gave to question 1. The researcher found that respondent 1 (Isle of Wight) has found that the general public feels that the present recycling center is an improvement over what the county had before. Respondent 2 (Carrollton recycling center) has found that the general public feels that the money that was spent to construct and implement the recycling program was well spent. Respondent 3 (SPSA) indicates that the public likes having the ability to reduce the environmental impact that solid waste has.

<b>Table 1</b>	
<b>What has been the reaction of the general public toward the new solid waste recycling center?</b>	
Respondent 1	Overall they like it better than the old method of disposal which was unorganized and did not allow for any recycling.
Respondent 2	The public feels that it is worth the time and money that has been spent to setup and run the program. The county dump sites have been organized and recycling has been made easier.
Respondent 3	The public likes the ability to reduce the environmental impact that solid waste has on our county. The new site provides for the control of the types of solid waste that is disposed of in landfills.

## AMOUNTS

Table 2 shows the answers that were given to question 2. The researcher found that respondent 1 indicated that the county currently is recycling 19% of the solid waste collected. Respondent 2 indicated that the county is currently recycling 19% of the solid waste that is collected. Respondent 3 indicated that they are currently recycling 23% percent of the solid waste that they collect. The mean for the response to question 2 was 20.33%. The mode for question 2 was 19%.

<b>Table 2</b>	
<b>What is the current amount of recycling being preformed at the present time?</b>	
Respondent 1	Currently about 19% of the solid waste from this site is recycled in one form or another.
Respondent 2	Currently 19% of the solid waste collected is recycled.
Respondent 3	Currently SPSA is able to recycle about 23% by using a combination of waste-to-energy technology and recycling common household materials such as the following: glass, paper, yard-trimmings, metal, and plastics.

Table 3 shows the answers that were given in the interview to question 3, what was the amount of recycling that was performed last year? Respondent 1 indicated that 4,180 tons of solid waste was recycled year. Respondent 2 indicated that 4,180 tons of solid waste was recycled last year. Respondent 3 indicated that 5,060 tons of solid waste was recycled last year ( not including the waste-to-energy recycling). The mean for question 3 was 4,473.33 tons, and the

mode for question 3 was 4,180 tons.

<b>Table 3</b>	
<b>What was the amount of recycling that was performed last year?</b>	
Respondent 1	4,180 tons
Respondent 2	4,180 tons
Respondent 3	5060 tons

Table 4 shows the answers that were given in the interview to question 4. The researcher found that responder 1 indicated that 22,000 ton of solid waste was produced in the Carrollton, Virginia, area last year. Respondent 2 indicated that 22,000 tons of solid waste was produced last year. Respondent 3 indicated that 22,000 tons of solid waste was produced in the area last year. This data indicates a mean of 22,000 and a mode of 22,000.

<b>Table 4</b>	
<b>What was the amount of solid waste that was produced in Carrollton, Virginia, area last year?</b>	
Respondent 1	22,000 tons
Respondent 2	22,000 tons
Respondent 3	22,000 tons

Table 5 shows the answers that were given in the interview to question 5. Respondent 1 indicated that 3,000 tons of solid waste has been recycled this year so far in the Carrollton, Virginia, area. Respondent 2 indicated that 2,000 tons of solid waste has been recycled in the area to date. Respondent 3

indicated that 2,500 tons of materials have be recycled so far this year. This data indicates a mean of 2,500 tons. There is no mode indicated for this question.

<b>Table 5</b>	
<b>What is the amount of recycling that has been done so far this year?</b>	
Respondent 1	3,000 tons
Respondent 2	2,000 tons
Respondent 3	2,500 tons

## TYPES OF RECYCLED SOLID WASTE

Table 6 shows the answers that were given to question 6. The researcher found that respondent 1 indicated that the following items are recycled: paper, glass, wood, metals, household appliances, tires, boats, oil, batteries, and chemicals. This data indicates that there are 13 different items recycled. Respondent 2 indicated that the following items are recycled: paper, glass, wood, metals, household appliances, tires, boats, oil, batteries, and chemicals. This data indicates that there are 13 different items recycled. Respondent 3 indicated that the following items are recycled: paper, glass, wood, metals, household appliances, tires, oil, batteries, and chemicals. This information indicates that there are 12 different items recycled. The mean for this question is 12.67 items. The mode for this question is 13 items.

<b>Table 6</b>	
<b>What types of solid wastes are being recycled at the present time?</b>	
Respondent 1	paper, glass, plastic, wood, yard trimmings, metal, household appliances, tires, boats, oil, batteries, chemicals (13 items)
Respondent 2	paper, glass, plastic, wood, yard trimmings, metal, household appliances, tires, boats, oil, batteries, chemicals (13 items)
Respondent 3	paper, glass, plastic, wood, yard trimmings, metal, household appliances, tires, oil, batteries, chemicals. (12 items)

Table 7 shows the answers that were given to question 7. The researcher found that respondent 1 indicated that as the public comes up with new ideas, the county will look into how these ideas can be implemented. Respondent 2 indicated that the county is always looking for ways to increase recycling capacities. Respondent 3 indicated that as new technology is invented that additional wastes will be added to the list.

<b>Table 7</b>	
<b>Are there any plans to increase the types of solid wastes that are recycled?</b>	
Respondent 1	As the public comes up with new ideas on recycling, the county will look into how to accomplish these ideas.
Respondent 2	We are always looking for ways to increase our recycling capacities all the time.
Respondent 3	As new technology is invented, additional wastes will be recycled.

## SUCCESSSES OF RECYCLING

Table 8 shows the answers that were given to question 8. Respondent 1 indicated that the savings that the local recycling program has produced are the following: 1) decrease of solid waste that is placed in our landfills, 2) protection of our wetlands and aquifers, 3) provides a small amount of income for the county. Respondent 2 indicated that the savings could be measured by the decrease of man hours that are needed to transport solid waste and by the decrease of solid waste that is placed into our landfills. Respondent 3 indicated that savings could be measured by the reduction of needed land for landfills.

<b>Table 8</b>	
<b>What kind of savings has the local recycling program produced?</b>	
<b>Respondent 1</b>	Saving can best be measured by the decrease of solid waste that is placed in our landfills. Savings can also be measured by the protection of our wetlands and aquifers. Recycling also provides a small amount of income for the county.
<b>Respondent 2</b>	Savings can be measured by the decrease of man hours needed to transport solid waste. It can also be measured by the decrease of solid waste that is placed in our landfills.
<b>Respondent 3</b>	Saving can be measured by reducing the need for additional landfills.

Table 9 shows the reply of the interviewees to question 9. The researcher found that respondent 1 indicated that the following areas could be identified as contributing to the success of the county's recycling program: 1) less hazards are being placed into our landfills, 2) The local recycling program allows the county to reduce the number of outside residents that dump in our

area, and 3) reduces the amount of solid waste. Respondent 2 indicated that the convenience and easier methods for separating recyclables has contributed to the success of the recycling program. Respondent 3 indicated that the following items contribute to the success: 1) less solid waste is placed into landfills, 2) wear on county's equipment and resources is reduced, and 3) more natural resources for business and industry are provided.

<b>Table 9</b>	
<b>What specific areas could be identified as contributing to the success of the Carrollton, Virginia, recycling program?</b>	
Respondent 1	Less hazardous wastes are being placed into our landfills. Our recycling program also allows us to control the people that dump at our facilities thereby reducing the amount of solid waste for the area.
Respondent 2	The fact that the new program allows the residents a convenient and easier method for separating their recyclables.
Respondent 3	Less solid waste is place into the landfills and wear on the counties equipment and resources is reduced. More natural resources for business and industry are provided.

Table 10 shows the answer that the interviewees gave for question 10. Interview results for respondent one indicates that 19% of the total amount of solid waste in recycled. Respondent 2 indicated that 19% of the total amount of solid waste is recycled. Respondent 3 indicated that 23% of the solid waste is recycled. This data indicates a mean of 20.33% and a mode of 19%.

<b>Table 10</b>	
<b>What percentage of the total amount of solid waste is recycled?</b>	
Respondent 1	19%
Respondent 2	19%
Respondent 3	23%

Table 11 shows the answers that were given to question 11. The researcher found that respondent 1 identified the following items as benefits of recycling: 1) decreases the amount of solid waste that is placed in landfills, 2) responds to the demand for environmental conservation, and 3) helps to protect watersheds and surrounding land. Respondent 2 indicated the benefits were the following: 1) recycling provides the county with a means of reducing the amount of solid waste that is placed into landfills, and 2) it provides for a method of protecting our environment for future generations. Respondent 3 identified the following items as benefits of recycling: 1) recycling helps to reduce the amount of solid waste that must be disposed of in an organized manner, and 2) recycling allows certain materials to be collected and reused.

<b>Table 11</b>	
<b>What is the benefits from recycling?</b>	
Respondent 1	Decreases the amount of solid waste that in placed in landfills. Responds to the demand for environmental conservation. Helps to protect the county's watersheds and surrounding land.

<b>Table 11 Continued</b>	
<b>What is the benefits from recycling?</b>	
<b>Respondent 2</b>	Recycling provides the county with a means of reducing the solid waste that is placed in landfills. It provides for a method of protecting our environment for future generations.
<b>Respondent 3</b>	Recycling helps to reduce the amount of solid waste that must be disposed of in an organized manner. Recycling allows certain materials to be collect and reused.

## SUMMARY

The findings of this study document the responses of the participants that were involved in the interviewing process which was conducted on May 15, 1999. Three individuals were interview, one from SPSA, one from Isle of Wight County Public Works, and one from the recycling collection center. Information from these interview was used to make conclusions in Chapter V.

## CHAPTER V

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this chapter was to provide the summary, conclusions, and recommendations of this research topic.

#### SUMMARY

This study was conducted to determine the effect that a local recycling program had on the amount of household solid waste that is disposed of in the Carrollton, Virginia, area. The research study interviewed three participants, one from SPSA, one from Isle of Wight County Public Works, and one from the recycling collection center. Each participant was asked the same eleven questions.

The goals were to determine whether a recycling program had an effect on the amount of solid waste that was disposed of in the Carrollton, Virginia, area. The goals were as follows:

1. Identify the present amount of recycling that is being done in the Carrollton, Virginia, area.
2. Identify the current amount of recycling that is being done in the Carrollton, Virginia, area.
3. Identify the specific types of household solid waste that are being recycled in the Carrollton, Virginia, Area.
4. Identify how successful the recycling program has been in the

Carrollton, Virginia, area.

The significance of this study was that recycling has the ability to help our society reuse portions of our solid waste, therefore, reducing the amount solid waste that is disposed of in our landfills. The recycling of everyday items such as paper, soda cans, used motor oils, metals, plastics, and glasses has been very successful in many communities around the United States.

The researcher choose the Carrollton, Virginia, area for this research because of the solid waste problems that the area has had in the past . The population that was used for this study consisted of one administrator who works for the Isle of Wight County public works, one administrator that works for SPSA, and one employee that works at the Carrollton, Virginia, recycling center. Each one of these participants have been working in the solid waste field for a least two years and have a good understanding of the recycling process.

## CONCLUSIONS

The goals of this research were to answer the following questions:

1. Identify the present amount of recycling that is being done in the Carrollton, Virginia area. Research results indicate that in 1998 approximately 5,000 tons of solid were recycled. Research results indicate that an average of 2,500 tons of solid waste has been recycled so far as of June, 1999.

2. Identify the amount of household solid waste that is being produced in the Carrollton, Virginia, area. Research results indicate that 22,000 tons of solid waste was produced in the area in 1998.
3. Identify the specific types of solid waste that are being recycled in the Carrollton, Virginia, area. Research results indicate that the following types of solid wastes are being recycled at the present time: paper, glass, plastic, wood, yard trimmings, metal, household appliances, tires, boats, oil, batteries, and chemicals.
4. Identify how successful the recycling program has been in the Carrollton, Virginia, area. Research results indicate that the success can be measured in the following ways:
  1. Protection of the counties wetlands and aquifers.
  2. Small amount of income due to recyclable materials.
  3. Decreased man hours needed to transport solid waste.
  4. Reduced need for addition land for landfills.
  5. Less hazardous materials are being placed into our landfills.
  6. The fact that the new program allows residents a convenient and easier method for separating their recyclables.

## RECOMMENDATIONS

Based on the results of the research, the recycling program in Carrollton, Virginia, is performing a valuable and useful service to the local community. The only suggestion that this researcher could make would be to introduce a community awareness program. This program could be used to better educate the public on topics related to recycling. The following list of topics could be covered:

1. The long-term benefits of recycling.
2. New methods of recycling.
3. New solid wastes that can be recycled.
4. General information about the hazards of common household chemicals.

## REFERENCES

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## Appendix

### Recycling Interview Questions

**INTERVIEW QUESTIONS FOR THE PARTICIPANTS INVOLVED IN  
RECYCLING RESEARCH**

Purpose of Interview: The purpose of these interviews is to collect information about the solid waste recycling program located in the Carrollton, Virginia, area. All information will be kept confidential and will not be passed on to any other individuals or organizations without the approval of all participants.

Questions:

1. What has been the reaction of the general public toward the new solid waste recycling center?

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2. What is the current amount of recycling being performed at the present time?

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3. What was the amount of recycling that was performed last year?

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4. What was the amount of solid waste that was produced in the Carrollton, Virginia, area last year?

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5. What is the amount of recycling that has been done so far this year?
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6. What types of solid wastes are being recycled at the present time?
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7. Are there any future plans to increase the types of solid waste that are recycled in the Carrollton, Virginia, area?
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8. What kind of savings has the local recycling program produced?
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9. What specific areas could be identified as contributing to the success of the Carrollton, Virginia, recycling program?
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10. What percentage of the total amount of solid waste is recycled?
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11. What is the benefits from recycling in the Carrollton, Virginia, area?
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