APPENDIX D

THE STATE OF GARBAGE IN MISSOURI (1999)

1999

The State of Garbage in Missouri

Missouri Department of Natural Resources
Division of Environmental Quality
Solid Waste Management Program

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In the title of this publication, we recognize that "garbage" is only one fraction of the total waste stream. However, because the term is universally associated with solid waste, we allowed ourselves artistic license.

Introduction

This report examines the status of solid waste management in Missouri and presents a historical overview. It also serves as a snapshot of the current state of solid waste management in Missouri. Additionally, potential policy considerations regarding solid waste management practices in Missouri are described.

Information in this document is the most comprehensive examination of the management of solid waste in Missouri that has been compiled to date.

This report will serve both to inform interested parties and to stimulate discussion as Missouri's solid waste planning process moves into a period of increased coordination with local organizations around the state.

Currently, Missouri is managing its solid waste well. The Department of Natural Resources continually strives to stay abreast of changes in solid waste management issues brought about by public concerns, legislative trends, new technologies and changes in the economy.

One question drives our solid waste planning process: How can we help Missouri citizens, businesses and local governments improve solid waste management to better protect public health and the environment?

A Short History of Solid Waste in Missouri

First attempts at solid waste management began in 1955, when the state passed the County Option Dumping Ground Law. This attempt to regulate solid waste disposal statewide was ineffective because only 22 of Missouri's 114 counties exercised their option of adopting the law.

Solid waste management improved with the Solid Waste Disposal Act, enacted in 1965 as Public Law 89-272 by the U.S. Congress. The act funded a statewide survey of solid waste practices. This survey, conducted from 1968 through 1970 by the Missouri Division of Health, concluded that solid waste management in Missouri was largely unplanned and was causing serious threats to public health and the environment.

The survey located some 2,600 dumps and characterized 457 authorized land disposal sites. Ninety-seven percent of the authorized sites contributed to air, land or water pollution. Almost all sites allowed open burning of waste.

Primarily in response to the findings of the survey, the Missouri Solid Waste Management Law was passed in 1972. The law required local governments to plan and implement sound solid waste management practices. It also gave them the authority to enact ordinances, collect fees or taxes and enter into contracts necessary for carrying out these responsibilities. By giving the Department of Natural Resources the authority to establish criteria for land disposal, this law essentially outlawed open dumping of waste.

The result was a vast improvement in solid waste

management across the state. By 1975, more than 550 town-operated dumps were closed, replaced by 125 engineered landfills. By 1981, over 400 communities had implemented solid waste management plans addressing storage, collection, transportation and disposal of residential and commercial waste.

Callaway County 4th graders arrive for a day at Little Dixie Lake to study environmental exhibits and displays. They are getting ideas for their annual poster contest.

The next significant advance in solid waste management occurred in 1986 when Senate Bill 475 amended the Missouri Solid Waste Management Law. These new changes focused on improving resource recovery and solid waste disposal practices. The Environmental Improvement and Energy Resources Authority (EIERA) was required to carry out a study on the quantity of Missouri's solid waste, its composition, management practices and recovery potential. The result of EIERA's efforts was a seven volume report, *Statewide Resource Recovery Feasibility and Planning Study*, published in 1987.

The report included 18 recommended actions for the state of Missouri to increase resource conservation and recovery.

The Department of Economic Development was directed to encourage the development and expansion of businesses and industries that provide markets for recycled materials and energy recovered from solid waste.

The State of Missouri Office of Administration was directed to purchase more recycled products, to promote the recycling of paper, oil and other recovered materials. In capital improvement projects, the Office of Administration was directed to consider alternatives that use recycled materials for construction or that use solid waste for energy production.

Important changes in solid waste disposal included a requirement for all new and active landfills to provide a financial guarantee that all activities necessary to properly close the site would be completed. It required sanitary landfills to provide for monitoring and maintenance of the site for 20 years after closure.

Requirements were made for leachate collection systems, collection of groundwater monitoring data and for landfill operation by state-certified

technicians. To ensure that these new requirements were met, the bill enhanced the Department of Natural Resources' enforcement authority by instituting civil penalties for violations of the Solid Waste Management Law. The department was also empowered to suspend or revoke landfill permits and processing facility permits.

The Solid Waste Management Law was further amended in 1988. These amendments included requirements for infectious waste management and provided for denial of solid waste permits based on the violation history of the applicant. The amendments also defined and allowed less stringent requirements for utility waste landfills and required city or county ordinances to be consistent with their solid waste management plans.

Although the amendments in 1988 did not address waste reduction or recycling, interest in alternatives to disposal was growing. In 1989, then Governor John Ashcroft announced the Missouri Policy on Resource Recovery. This policy directed state and local government to apply the integrated waste management hierarchy to minimize the environmental impacts of solid waste management and to maximize waste prevention, resource recovery and recycling. A copy of the policy may be found in the Appendix. Following the hierarchy involves the following steps, using each alternative to the greatest extent possible before proceeding to the next:

- Reducing the amount of solid waste that is created
- Reusing, recycling or composting solid waste
- Recovering and using energy from solid waste
- Incinerate or disposing of waste in a sanitary landfill

In 1990, the next major revision of Missouri's Solid Waste Management Law (Senate Bill 530) recognized the importance of the hierarchy and incorporated many of its concepts. To focus the efforts of individuals, businesses, state and local government, a goal was set to divert 40 percent of the waste stream from landfill disposal.

"Solid waste education is primarily an effort to reduce waste through changing attitudes and behavior."

Educational and Informational Materials Developed by the Department

Waste Reduction

Materials Exchange Programs of Missouri Directory

Model Plan Guidelines for Comprehensive Solid Waste Management

Waste Reduction Tips for Businesses

Waste Reduction Tips for Households

Recycling

Missouri Buys Recycled Recycling Economics: Higher Costs are an Illusion

Show-Me State Sets Recycling Precedents

Three R's: Reduce, Reuse and Recycle

Buying Recycled Products: Consuming Wisely

How to Dispose of Christmas Trees

Total Recycling System, Fact Sheet

Composting

Circle Compost Bin

Homeowners' Composting Guide

Wood and Wire Stationary 3-Bin System

Wood and Wire Cage Type Composting Bin

Worm Composting System: Compost Bin Design

Educational Materials

Wild Wood Babes, Adventures in Waste Reduction

Wild Wood Babes, Learn About Reuse

Recycle with the Wild Wood Babes

3 Rs Coloring and activities books for children grades K-3

Quart Jar Worm Farm Design Sheet

Soft-Drink Bottle Hummingbird Feeder

Educational Videos

Talkin' Trash: The Buy-Recycled Loop
Includes Teachers Guide, Grades 4-8

Break It Down: The Compost Connection
Includes Teachers Guide, Grades 4-8

The law created 20 solid waste management districts across the state to foster regional city and county cooperation to help achieve this goal. Regional planning based on the hierarchy was seen as a critical mechanism for change. During the next several years, the districts played a significant role in the development of an infrastructure for recycling.

The revised law levied a landfill tonnage fee to create the Solid Waste Management Fund. It also designated the fund's distribution for resource recovery grants, reduction of illegal dumps and statewide education and training in solid waste management, among other incentives. Solid waste education is primarily an effort to reduce waste through changing attitudes and behavior.

The law also banned lead acid batteries, major appliances, waste oil, whole automobile tires and yard waste from landfill disposal.

In 1994, Missouri adopted new landfill regulations that required compliance with new federal Subtitle D standards for landfill location restriction, operating and design criteria, groundwater monitoring and corrective action, and closure and postclosure requirements, including financial assurance.

In 1995, the most recent major amendment to Missouri's solid waste management law significantly changed the permitting requirements and

process for solid waste facilities. It requires inspections during closure, post-closure and corrective action plans and changed many provisions of the waste tire law. The provisions include requiring financial assurance for some tire handlers, and revised the law relating to solid waste management plans. The provisions also revised the law relating to the Solid Waste Management Fund and the Solid Waste Advisory Board.

New regulations for permit-exempt and beneficial-use pilot project activities came into effect July 30, 1997. While the new regulations have expanded opportunities for waste reduction and diversion, the beneficial reuse of some types of solid waste may require more specialized testing, and permits from other programs within DNR or from other agencies.

Some waste types may require site-specific conditions that may prohibit their beneficial reuse. The department will need to provide guidance through technical bulletins or other publications, and streamline the approval process to make the new regulations more effective.

Fly ash, a waste generated in coal powerplants, is usually disposed of in landfills. The department worked with the electric power industry to develop a general set of testing standards and conditions under which fly ash could be used with minimal departmental oversight. These ground rules can subsequently be applied to almost any fly ash project, speeding the approval process and saving both taxpayers and industry money. This general approach will be useful for other beneficial reuse projects.

During the spring and summer of 1999, Governor Mel Carnahan signed into law two significant pieces of legislation affecting solid waste management. First, the state's 50-cent per tire fee, collected on each new tire sold in Missouri, was extended to January 1, 2004.

This will enable DNR to continue the cleanup of waste tire dumpsites and encourage the recycling of scrap tire materials. The second piece of legislation will allow concerned citizens to participate earlier and more often in the siting and permitting process for landfills. The process will create opportunities for open communication between the

department, the landfill permit applicant and the residents living near a proposed facility.

Summary

Since the mid-1950s, Missouri has made a transition from unhealthy open dumps to today's engineered, permitted and regulated landfill sites. Integrated solid waste management planning, which recognizes that some "wastes" may actually be resources, is widely practiced throughout the state.

Missouri set its goal to achieve a 40 percent reduction in waste generated for disposal by January 1998. See the chapter, *What's NOT in the Trash Can,* to read more about this goal.

Solid Waste Management Program displays explain the work of the program to citizens at an Earth Day celebration at Whiteman Air Force Base.

What's in the Trash Can?

To evaluate previous efforts and formulate future waste management strategies, a study of the composition and quantity of solid waste is essential. Each year the department estimates the quantity of waste generated and the amount landfilled. By 1998, Missourians were generating close to eight million tons of solid waste annually. The next chapter will discuss this evaluation further.

An understanding of the components of the waste stream enables decision makers to set priorities and focus resources.

One factor that must be considered is the source or type of generator of the waste stream. Although hard data has not been compiled, the chart below provides one estimate of the relative proportions of the major waste streams in Missouri. Two studies have been conducted which look at the municipal solid waste (MSW) stream's piece of the pie, which includes residential and commercial waste.

The Statewide Resource Recovery Feasibility and Planning Study completed in

Figure 1

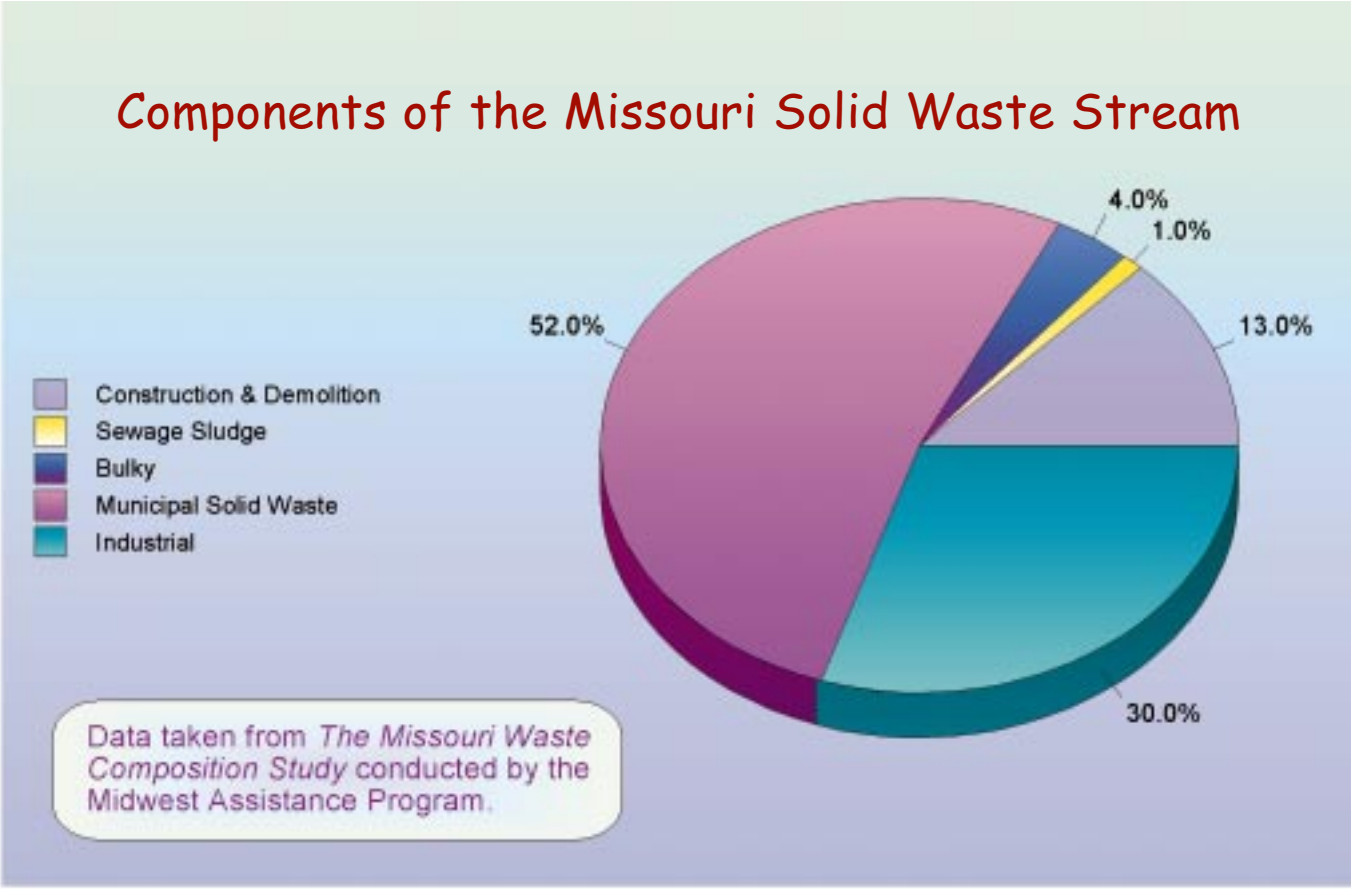


Table 1

Missouri Solid Waste Composition

MATERIAL CATEGORY	1987 EIERA Study	1996-7 M.A.P. Study
	Percent by Weight	Percent by Weight
Cardboard	15.3%	6.7%
Newsprint	6.6%	7.9%
Magazines	1.7%	3.7%
High Grade (office) Paper	3.0%	3.6%
Mixed Paper	12.7%	15.5%
PAPER TOTALS	**39.3%**	**37.3%**
Clear Glass	3.0%	3.2%
Brown or Amber Glass	0.8%	1.5%
Green Glass	0.7%	0.4%
Other Glass	N/A	0.6%
GLASS TOTALS	**4.5%**	**5.8%**
Aluminum Beverage Cans	1.0%	1.5%
Other Aluminum	0.5%	0.8%
Other Non-ferrous	0.1%	0.2%
Steel (Ferrous) Food Cans	2.0%	3.1%
Other Ferrous	3.4%	1.1%
Oil Filters	N/A	0.1%
METAL TOTALS	**7.0%**	**6.9%**
PET #1 (primarily plastic beverage containers)	0.3%	1.7%
HDPE # 2 (primarily plastic milk jugs)	0.4%	2.1%
Plastic Film or Wrap	N/A	3.7%
Other Plastic	7.0%	6.9%
PLASTIC TOTALS	**7.7%**	**14.4%**
Food Waste	8.3%	18.7%
Yard Waste	8.3%	N/A
Other Wood Waste	N/A	0.8%
Textiles	3.9%	4.0%
Diapers	1.5%	4.2%
Other Organics	12.2%	3.2%
ORGANIC TOTALS	**34.2%**	**30.8%**
Fines	2.9%	3.3%
Other Inorganics	3.4%	1.5%
INORGANIC TOTALS	**6.3%**	**4.8%**
TOTAL	***99.0%**	**100.0%**

* does not sum to 100 percent due to rounding

Source: Statewide Resource Recovery Feasibility and Planning Study, Volume II Solid Waste Characterization Report, December 1987, Environmental Improvement and Energy Resources Authority; and The Missouri Waste Composition Study, 1997, Midwest Assistance Program

Recyclables are hand sorted at Civic Recycling in Columbia.

1987 by EIERA included an examination of the municipal solid waste streams at four landfills. A summary of the results of this study are shown in Table 1. This data contributed to the development of recommendations in the study.

The percentage of yard waste, coupled with the fact that this material could be easily source separated, indicated the potential for diverting this material from landfills. The high percentage of cardboard revealed that the commercial sector could play an important role in waste diversion. The data from this study also became an important component of the *1991 Model Plan Guidelines for Comprehensive Solid Waste Management*, developed by the department's Solid Waste Management Program.

During 1996 and 1997, the Missouri Waste Composition Study was conducted by the Midwest Assistance Program (MAP). This study, funded through a statewide DNR project grant, focused on the composition of and changes in the MSW stream. Samples of MSW were taken from waste haulers at landfills or transfer stations in 19 of the 20 Missouri Solid Waste Management Districts. Although the methodology used was somewhat different than that employed by the 1987 EIERA study, the results from each can be compared Table 1.

The MSW portion of the total waste stream usually gets the most attention. However, industrial process waste and wastes generated by construction and demolition activities together make up approximately 43 percent of the total waste stream. These types of waste have great potential for reduction, reuse and recycling.

The 1987 Statewide Resource Recovery Feasibility and Planning Study quantified the amount of industrial waste generated in the state using a statistical model based on employment data. This study did not attempt to determine the composition of the industrial waste stream. More data will be available when a current study by MAP, funded by a DNR project grant, is completed. In the MAP study, industrial, construction and demolition wastes will be examined at landfills to better understand the types of waste and their relative quantities.

What are some insights that can be gained by studying the waste stream?

The Missouri Waste Composition Study was able to draw several conclusions, summarized here:

1. The Missouri MSW stream has changed significantly over the past 10 years.

Two seasonal waste sorts at four Missouri landfills indicate a significant increase in plastics. This increase is due in large part to containers and packaging, especially plastic materials PET and HDPE. There has also been a large increase in food wastes, increasing from 8.3 percent in 1987 to 18.7 percent in 1996.

On the positive side, there was a dramatic decrease in the amount of other organics such as yard waste in the MSW stream. The amount of these carbon-based materials fell from more than 21 percent in 1987 to 3.2 percent in 1990, thanks largely to the yard waste ban in 1990's Senate Bill 530.

2. There is very little volume change in the MSW stream from one season to the next.

With the possible exception of the holiday season, it appears that the composition of the MSW stream remains constant throughout the year.

3. There are some local factors that affect changes in the MSW stream throughout Missouri.

On the whole, the composition of the MSW stream remains fairly constant from one area of the state to another. However, there are some local factors that seem to affect it. Metropolitan areas tend to have a much higher percentage of newsprint and "other organics." Tourist areas have higher concentrations of glass, aluminum beverage cans and plastics.

4. Recycling programs that provide economic incentives have a definite effect on the MSW stream.

Recycling programs vary greatly from one area to another, and the effects on those waste streams also vary. However, some communities have been particularly successful. For example, the City of Maryville diverts approximately 12 percent of its total waste stream through recycling alone. A probable reason for this success is that the city-owned landfill does not charge haulers to accept recyclable materials.

The City of Chillicothe has had similar success by using a unit-based pricing system, offering curbside recycling as an incentive to reduce disposal costs.

The City of Columbia uniquely offers yet another method intended to encourage recycling, a beverage container deposit ordinance.

Considerably less glass, PET and aluminum can be found in Columbia's waste stream as a result of this law, designed to encourage the return of used beverage containers.

5. There are economic opportunities available in recycling a portion of the MSW stream.

Approximately 37 percent of the materials in the MSW stream are economically feasible to recycle. Recycling all these materials would generate an estimated $137 million per year. However, the actual benefit would exceed $160 million per year, since $36 million would be avoided in landfill tipping fees (figures based on the 1997 market).

Other benefits of an increase in recycling include conserving natural resources, reducing the energy costs in the production of goods, extending the life span of landfills, and providing employment opportunities in the recovered materials industry.

What's NOT in the Trash Can?

Missouri Waste Reduction Efforts

To evaluate Missouri's progress in reducing waste, the department's Solid Waste Management Program strives to obtain the most accurate data on waste reduction possible. The method for tracking waste reduction has evolved over time, but the program's current method of tracking still uses 1990 as the base year for measurement. In accordance with the goal set in 1990, DNR estimated Missouri's waste disposal for base year 1990. The base year estimate concluded that 6.8 million tons of solid waste was sent to landfills for disposal in 1990. That is 2,660 pounds per person per year, or 7.3 pounds per person per day.

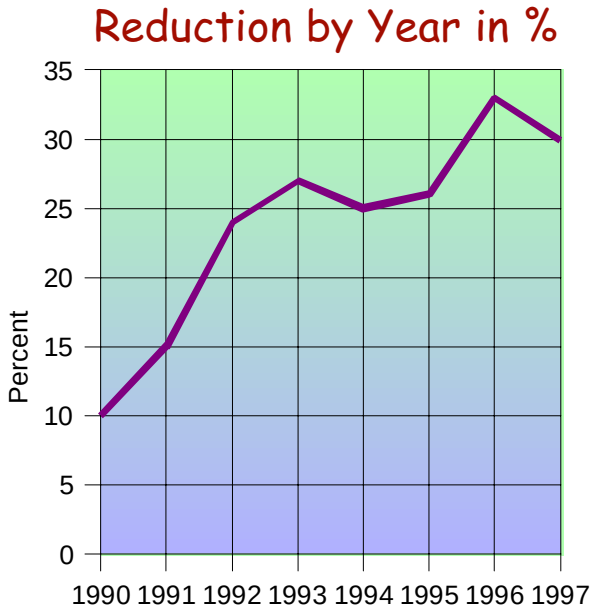
Since October 1990, Missouri waste disposal facilities have been required by law to report the amount of waste they receive on a quarterly basis. These tonnage reports include in-state waste disposal and waste that is

Table 2

Annual Waste Generation, Disposal & Diversion

Figures in Tons	1990	1991	1992	1993	1994	1995	1996	1997
Solid Waste Generated in Missouri	7,540,000	7,581,535	7,634,992	7,699,664	7,763,482	7,660,801	7,896,025	7,941,025
Solid Waste Landfill Disposal	6,800,000	6,442,395	5,797,644	5,623,663	5,852,177	5,701,225	5,330,733	5,528,563
Annual Per Capita Disposal	1.33	1.25	1.12	1.07	1.10	1.07	0.99	1.02
Solid Waste Diverted	754,000	1,139,140	1,837,348	2,076,001	1,911,305	1,959,576	2,565,292	2,412,462
Percent of Solid Waste Diverted	10%	15%	24%	27%	25%	26%	33%	30%

Figure 2



exported out of state through transfer stations.

Waste hauled across state lines without going through a transfer station is estimated by phone survey of landfills in the states bordering Missouri. The department's Solid Waste Management Program uses disposal totals calculated from the sum of the tonnage report and the export survey.

To control for population changes, census projections from the Office of Administration, Division of Budget and Planning, were used to determine per person disposal rates for each year. This calculation yielded the yearly total solid waste disposal adjusted for population shown in Table 2. These numbers include industrial and commercial waste disposal.

The latest survey conducted by the department's Solid Waste Management Program indicates that the amount of solid waste going to landfills in 1997 was reduced by 30 percent since 1990. Waste reduction percentages for all years from 1990 through 1997 are noted in Figure 2.

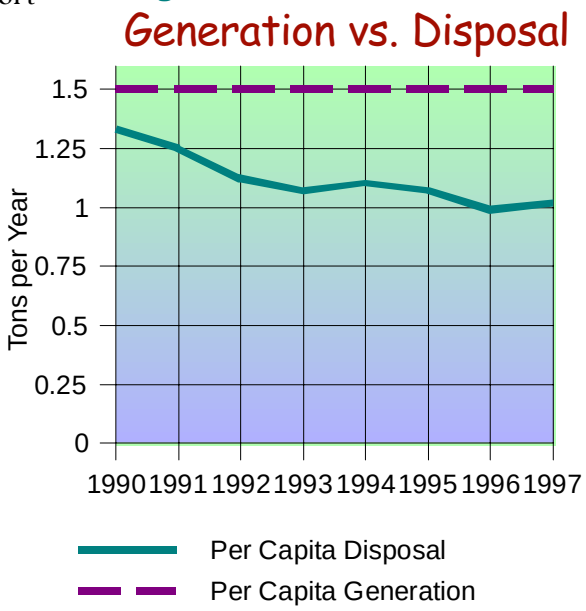
Historically this number has fluctuated due to a variety of factors, including enactment of legislation, market demand for recovered material, landfill closures and import/export trends. The 1997 reduction estimate shows a 3 percent drop from the 33 percent figure calculated for 1996. However, per-capita disposal is shown to have decreased significantly since 1990 in Figure 3.

In 1990, per person solid waste disposal was 2,660 pounds per year. By the end of calendar year 1997, per person solid waste disposal was 2,040 pounds per year, a reduction of 620 pounds per person per year.

Factors that have had an effect on the waste reduction rate include a robust period of economic activity and the constant per-capita generation rate. A constant generation rate was decided on in 1990 as a standard to measure annual reduction progress. While this has been useful for purposes of calculating reduction rates, it is presumable that the generation rate fluctuates with the prevailing economic climate.

Although the 40 percent waste reduction goal has not yet been

Figure 3



achieved, Missouri's goal to maximize waste reduction is ongoing. DNR promotes an integrated approach to solid waste management using a combination of alternatives.

These alternatives are discussed in the following chapter.

Bales of corrugated recycled cardboard being prepared for shipping.

Drop-off collection center in Kirkwood.

Integrated Solid Waste Management

While the focus from the 1950's to the late 1980's was on safe collection and disposal, the 1990's has seen a shift to reducing the amount of waste generated and using alternatives to disposal.

As discussed in the chapter *A Short History of Solid Waste*, a policy of applying the integrated waste management hierarchy was adopted in 1989 and influenced the legislation passed in 1990. This approach would enable Missourians to

- minimize the amount of solid waste that requires disposal,
- reduce environmental and public health threats,
- increase the manufacture and use of products made from recycled materials, and
- preserve our natural resources.

Integrated waste management means managing waste by a combination of methods that include waste reduction, materials reuse, recycling, composting, incineration with

energy recovery and landfilling. These alternatives are arranged in a hierarchy that maximizes waste reduction and resource recovery and uses incineration and landfilling only as needed for those wastes that cannot be feasibly recovered.

Efforts to prevent the generation of waste should precede other waste management options that deal with the waste after it is generated, as in recycling. The underlying thought is that **solid waste that is not produced does not require management**.

The next level of the hierarchy includes reuse, recycling and composting. These techniques require a greater input of resources to implement, but have the potential to divert large amounts of waste from disposal. Through these techniques, waste materials can potentially go through several cycles of use.

Energy recovery, the next level of the hierarchy, also uses waste as a resource, but essentially the material can only be used once. Finally, the residual waste stream must be properly managed through incineration or landfilling at a permitted facility.

Modern sanitary landfills are designed to help protect Missouri's groundwater.

To assist cities, counties and solid waste management districts in planning local solid waste systems that use the integrated approach, the department developed and distributed the *Model Plan Guidelines for Comprehensive Solid Waste Management* in 1991.

The *Model Plan* guides planners through a process which emphasizes public participation in setting goals for diverting waste and the use of proper disposal methods. This guidance includes

- methods for evaluating the types and amounts of waste generated,
- options for managing recyclables and yard waste,
- local recycling market development,
- management of materials banned from disposal, such as used oil and major appliances,
- options for financing new services, and
- the Missouri statutory and regulatory framework for solid waste planning.

During 1993 and 1994, plans were submitted by each of the 20 solid waste management districts, guided by the *Model Plan*. In 1996, to assess the progress in developing integrated solid waste management systems in each district, the program worked with the districts to create a survey.

The districts then inventoried each of their member cities and counties about the services available and needed for managing solid waste. Each survey, usually referred to as the assessment inventory, addressed solid waste collection, recycling, yard waste management, and services for banned items.

Several goals were accomplished by the inventories.

- Lists were compiled of available services to answer citizen inquiries,
- gaps in services for some areas were indicated,
- achievements since the passage of SB 530 were highlighted and
- information was made available to help develop targets for grant funding and to assist planning efforts at both the state and local level.

The districts were required to revise the inventories in 1998, which will continue to help in planning local and state programs.

With the information from the 600 communities surveyed in the 1996 assessment inventories and other departmental sources, the following sections discuss each waste management alternative and information that is available about the current use of each method.

Recycling collection center in Columbia

Waste Reduction

Waste reduction, or prevention, may include changing a product design, making consumer goods repairable and more durable, and/or changing processing methods and consumer behavior and buying habits.

Waste reduction can be measured by examining our waste generation rates. Factors which contribute to our generation rate include excessive packaging, the elimination of most refillable containers, tax incentives favoring virgin materials, a throwaway approach to goods consumption and a scarcity of goods that can be repaired instead of having to be discarded. To reduce the amount of waste generated, programs must be developed and implemented that will cause changes in consumer habits and business practices.

Public information campaigns and educational programs can encourage purchasing products with the least amount of packaging necessary for safe product delivery, repairing durable goods instead of replacing them and bulk purchasing.

It is difficult to quantify the amount of waste reduction

being practiced today. There are programs implemented by the department and the solid waste management districts which, when successful, do result in a reduction in the generation of waste. One particularly effective technique which increases waste reduction, as well as reuse, recycling and composting, is unit-based pricing.

This technique, also called "pay-as-you-throw," refers to a solid waste collection system that bases the collection fee on the amount of waste set out for disposal. Each customer has an economic incentive to reduce their generation of waste or divert more materials to recycling and composting operations. According to a recent survey by the Midwest Assistance Program, in 1995 five communities in Missouri were using unit-based pricing for residential waste disposal.

The department promotes this technique through the distribution of guidance materials, sponsoring workshops and providing grant funding for local implementation. To date, two statewide waste recovery and recycling grants have funded "pay-as-you-throw" projects.

Reuse

This method of waste management involves reuse of potential waste materials. Examples of reuse are a family that saves margarine tubs to store leftover food, uses old clothes as batting to stuff handmade Christmas toys, donates used consumer goods to charity or buys beverages in returnable bottles.

Another type of reuse takes place in thrift shops and secondhand furniture stores. Reuse keeps materials out of the waste stream with very little environmental impact since no re-manufacturing is involved.

Many consumer goods, such as clothes, toys, appliances and housewares can be easily reused. This is done by finding a new purpose for the item in the home, or by selling or donating items in the community. Businesses and government offices often practice reuse, but may find that they have more discards than they can reuse internally.

Missouri has several materials exchange programs that accept potential waste materials (old computers, production scrap, carpet samples, overruns) from businesses, industry and households for reuse in other businesses, non-profits or in classrooms. Since these programs do not have any requirement to report information to DNR, it is difficult to maintain a comprehensive list. The following list represents the material exchange programs which are known by the department:

- *The Surplus Exchange* - Kansas City
- *The Learning Exchange* - Kansas City
- *Refunction Junction* - Joplin
- *Computers to Crayons* - St. Joseph
- *ETC.* - Springfield
- *Corporate Closet* - Jefferson City
- *Resource Recovery Project* - St. Charles
- *St. Louis Teacher's Recycle Center* - St. Louis

Industrial process wastes may also be suitable for reuse. A materials exchange program can be used to link business, office and industrial wastes with entities that can reuse them.

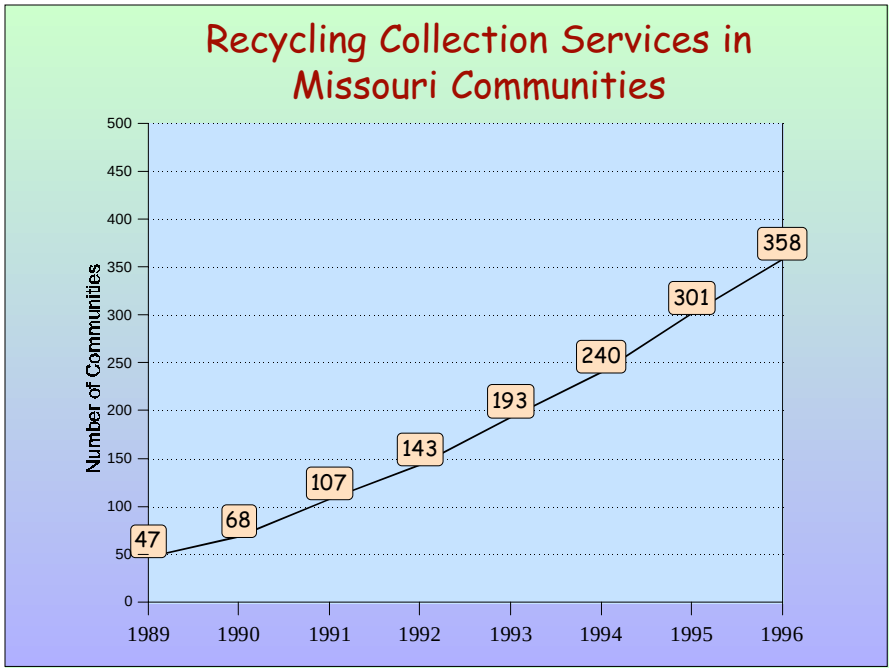
Missouri participates in the Industrial Materials Exchange Service that is sponsored by the Illinois Environmental Protection Agency and the Illinois State Chamber of Commerce. This service attempts to match companies having materials for which they no longer have use with companies seeking raw materials. A typical edition of their directory will list inorganic chemicals, plastic, rubber, textiles, wood, paper and metals. The Environmental Improvement and Energy Resources Authority (EIERA) distributes the directory in Missouri.

Reuse of items at work and at home is actively promoted by the department through informational materials, public displays, solid waste planning guidance and other outreach activities. Grants at the state or solid waste district level may be available to fund certain reuse activities.

Recycling

Although waste reduction is at the top of the hierarchy model, today's products, lifestyles and business practices will continue to cause a great deal of material to be generated at home, work or leisure. Recycling is the waste management option that generally diverts the greatest amount of material from the waste stream. The development of a viable recycling infrastructure across the state involves a combination of collection, processing, marketing and sales of recycled products. The benefits of recycling can go beyond the environmental impact to an

Figure 4



economic one that includes the creation of new businesses and jobs.

In some parts of the country, landfill costs have risen to such high levels that recycling is a cost effective management alternative. In Missouri, as in its neighboring states, landfill costs have not risen as significantly, making it more critical to use careful planning to create sustainable programs. For some materials, both the distance to markets and fluctuations of the markets make recycling a risky venture. However, we have made progress and continue to increase recycling opportunities across the state. The number of communities with access to recycling services has risen from 47 in 1989 to 358 in 1996 as seen in Figure 4. These programs made a substantial contribution to the 1997 diversion rate of 30 percent, discussed in Chapter 4.

This progress has been achieved by efforts at all levels - individual citizens, local and state government, solid waste districts, large and small businesses, public institutions and not-for-profit entities. As described in Chapter 2, legislation and policy has enabled the department to promote and support recycling by

- the creation of solid waste management districts to help cities and counties work cooperatively in the development of local recycling services,
- requiring that solid waste district plans address recycling services for both rural and urban communities,
- creating and distributing planning guidance and informational and educational materials that relate to recycling,
- minimizing regulatory requirements for recycling facilities,
- providing grant funds to assist in developing the infrastructure for collection and processing of recyclables and organics,
- developing markets for recyclables to help develop a sustainable infrastructure, and
- providing technical assistance to public and private sectors.

Recycling Collection Services

A major determining factor in the success of a recycling program is the type of collection provided to the public sector. Two types of collection are curbside and drop-off. Of the 600 communities surveyed, 358 communities that have recycling services, 198 include

The 1999 annual Missouri Recycling Association Conference was held in St. Louis.

curbside collection. The curbside service is operated by the municipality in 32 cities. Another 94 communities contract with private haulers to provide curbside service. The remaining communities are served by 194 private haulers, nine non-profits, and one solid waste management district.

Drop-off services also range from public to private. Of the 253 communities with drop-off recycling, 102 are operated by municipalities and 13 by counties. In 35 cities, the local government contracts with a private business to operate the service. Drop-off collection sites are also provided by 174 private businesses, 51 non-profits and one district.

Many of the recycling services in Missouri manage source separated recyclables. Over half of the curbside programs use a type of commingled collection, in which several types of recyclables may be placed in the same bin or bag for pick up. Since these commingled recyclables are kept separate from mixed solid wastes, they can be easily sorted at a recycling center for processing and transport.

In Missouri, a facility which accepts recyclables that are mixed with other solid wastes at the point of generation requires a solid waste processing permit. Recyclables separated at a facility usually have some contamination making them more difficult to market, especially in competition with clean, source-separated recyclables.

The City of St. Peters obtained a permit to operate this type of facility, usually called a materials recovery facility. They keep contamination to a minimum by requiring that recyclables be placed in plastic bags, provided by the city, prior to being collected with mixed wastes. At the material recovery facility the bags of recyclables are separated from the mixed wastes before entering the sort line.

Recognition of the importance of government leadership in promoting recycling led to the establishment of the State Recycling Program in 1989. This program is administered by the Office of Administration (OA). Program oversight is the responsibility of the OA state recycling coordinator.

The 1989 legislation required each executive agency of state government to develop a plan for recycling that would include collection of paper and other recyclables generated in state offices. Since the legislation

Aluminum can crushing and bailing at a recycling facility.

did not provide funding or staff for each agency's efforts, an interagency committee was formed.

By working with the committee, the state recycling coordinator can more easily disseminate information about the collection program, track the program's progress, conduct special events and receive input from the various agencies.

Paper products make up the most significant fraction of recyclables generated in government offices. From 1992 through fiscal year 1997, 2,026 tons of office paper was collected in the central Missouri state offices. The reporting for fiscal year 1998 included the accomplishments of state offices throughout the state, resulting in a total of 1,581 tons of recovered materials. This figure included cardboard, aluminum cans, newsprint, telephone books, scrap metals and toner cartridges.

Additionally, over 76,000 gallons of motor oil and other automotive fluids were recovered. Several agencies recycled tires, batteries, fluorescent bulbs, pallets and video cassette tapes. Food waste composting has been implemented in one of the DNR office buildings. The Department of Transportation received the 1998 OA Annual Recycling Award for initiating procedures to recycle lead paint waste removed during bridge repainting operations.

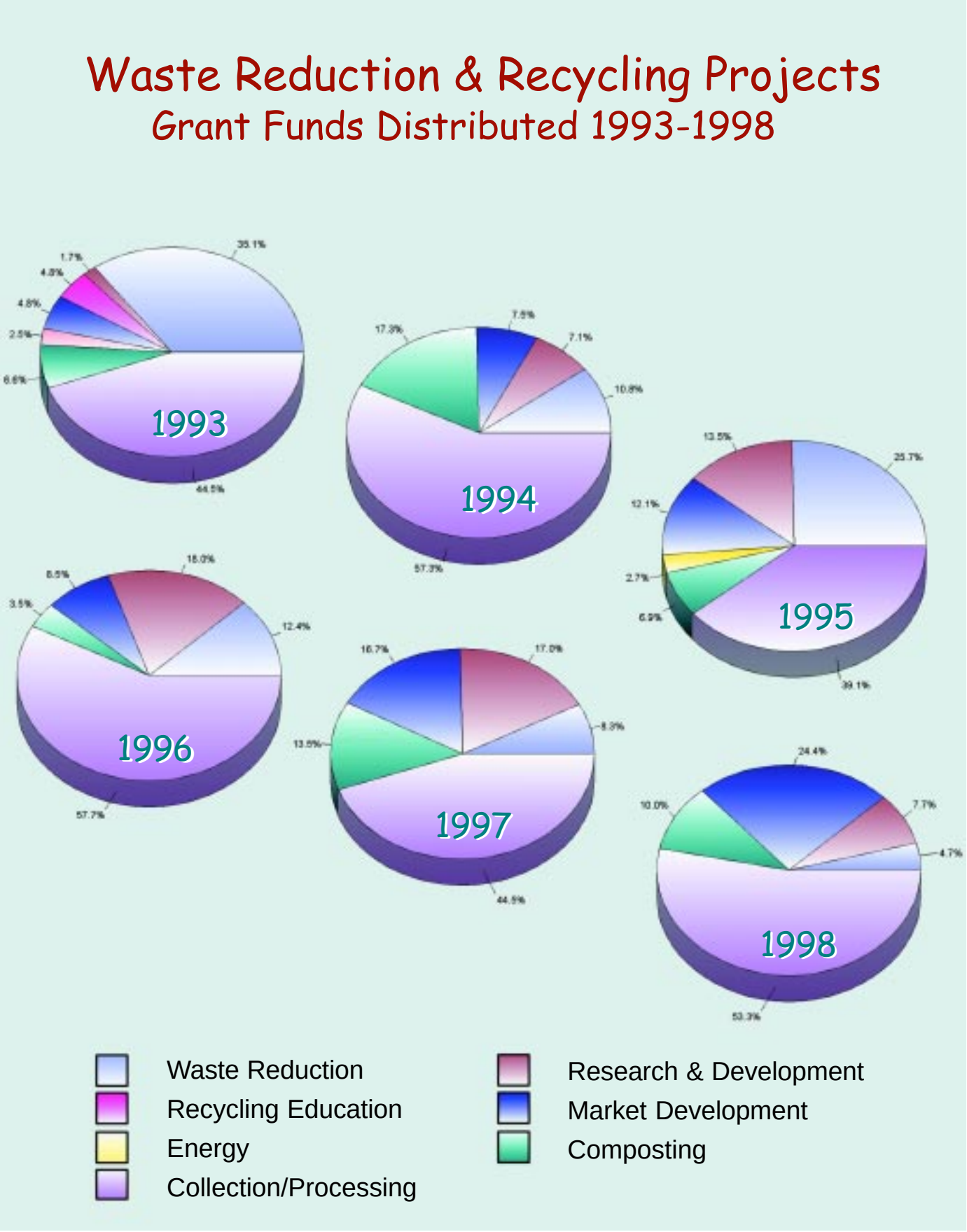
The OA, in cooperation with the EIERA, produces an annual report providing more detail on the progress of this collection program.

Recycling Market Development

The Solid Waste Management Fund has contributed to the development of all components of the total recycling process. Figure 5 provides a breakdown of the types of recycling project grants that have been awarded through the Waste Reduction and Recycling Projects. Additionally, a portion of the Fund is set aside each year specifically for market development, administered by EIERA's Market Development Program, in cooperation with DNR and the Department of Economic Development.

The Market Development Program has used these funds to provide direct financial assistance and technical assistance to manufacturers of recycled products, to research and track recycling markets and to promote purchasing of recycled products. Part of this effort resulted in the Missouri Buys Recycled Initiative, a partnership between the public and private sectors to encourage businesses to buy products such as asphalt, office and computer paper, furniture

Figure 5


Waste Reduction & Recycling Projects
Grant Funds Distributed 1993-1998
1993
35.1%
1.7%
4.8%
4.8%
2.5%
6.6%
44.5%
1994
7.5%
7.1%
10.8%
17.3%
57.3%
1995
13.5%
25.7%
12.1%
2.7%
6.9%
39.1%
1996
18.0%
8.5%
3.5%
12.4%
57.7%
1997
16.7%
17.0%
8.3%
13.5%
44.5%
1998
24.4%
10.0%
7.7%
4.7%
53.3%
Waste Reduction
Recycling Education
Energy
Collection/Processing
Research & Development
Market Development
Composting

and plastic lumber made from recycled materials.

Procurement of recycled products by state government agencies has also been an integral part of supporting market development. Since 1990, purchases of recycled paper products have grown from a little over $2 million to more than $7.9 million in fiscal year 1997. While this exceeded the 40 percent statutory goal for paper products, other factors have limited improvements in other recycled product purchases reported for the last two years.

Changes in purchasing policies and procedures have made it more difficult to capture the total amount spent on these items. Many products produced using recycled materials do not compete in price with products manufactured from virgin materials, which are produced at greater economies of scale and may benefit from government subsidies.

The OA state recycling coordinator is committed to improving the tracking of recycled content purchases, and increasing both the amount and diversity of these purchases.

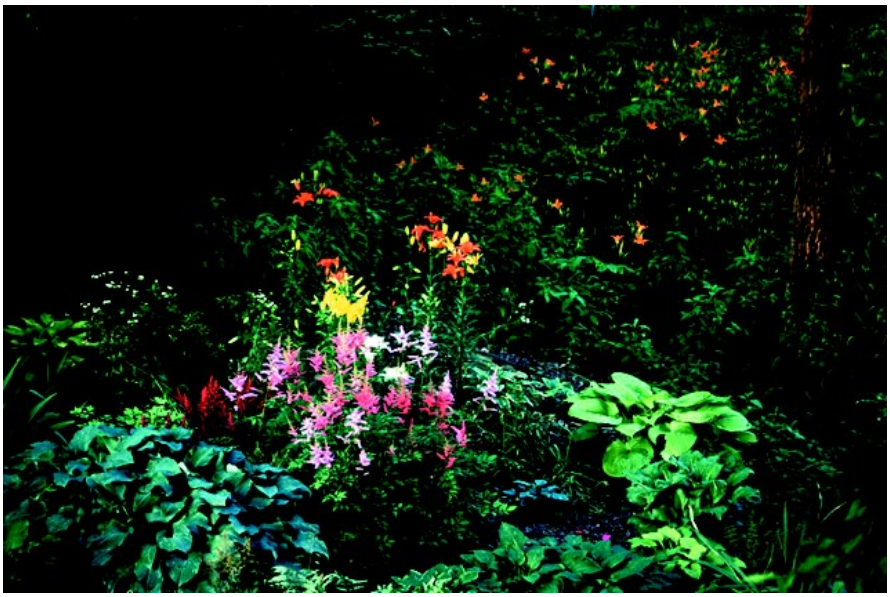
To encourage and support using recycled content newsprint in publishing Missouri newspapers, legislation established a recycled content usage goal in 1990. Beginning with a goal to use 10 percent recycled content newsprint in 1993, the percentage gradually increases to 50 percent in the year 2000.

The most recent reports from newspapers across the state showed that they had achieved the target for 1998, using an average of 40 percent recycled content newsprint. Several major Missouri newspapers reported recycled content usage of over 50 percent. In 1998 alone, the combined efforts of Missouri publishers resulted in diverting nearly 77,000 tons of paper from disposal.

Composting

Composting is the process of decomposing organic wastes such as grass, sawdust, wood chips and vegetable waste by microorganisms. The materials are broken down into simpler and more stable compounds such as water and carbon dioxide. The process occurs naturally and can be accelerated by mechanical digestion, by grinding wastes into smaller particles, and by maintaining optimum temperatures, oxygen levels, nutrients and moisture in the compost.

As a waste management alternative, composting may be done on site by the homeowner or by a municipality, county or region at a central facility. Composting makes a valuable product from a potential waste. With the appropriate department permits, composting may also be used as a volume reduction technique for solid waste.



Yard Waste

In Missouri, the majority of composting activities address yard waste, which is banned from disposal in landfills. Many of the same policies used to promote recycling are employed in promoting composting and mulching techniques. The solid waste management districts reported that citizens of 271 communities had access to yard waste management options in 1996 as seen in Figure 6. Although the 1992 yard waste disposal ban stimulated growth in composting programs, in many parts of the state, open burning is the current management method for yard wastes.

In 230 communities, yard waste is collected curbside. In two counties and 78 cities this service is provided by the local government. In 79 communities, the local government contracts with private haulers for service. The remaining communities are served by 71 private haulers. Drop-off yard waste services are operated by 120 cities and 26 counties. Four communities contract for drop-off service. In addition to the contracted services, there are 15 private drop-off facilities.

To minimize the need for centralized composting, back yard composting has been promoted by the department and many local programs.

Other Organics

Composting can also be utilized to manage other organic components of the waste stream. Homeowners, businesses and institutions are encouraged to use on-site composting to manage the food wastes they generate. The department also encourages large scale composting of food wastes, paper, biosolids and some animal wastes. Recent changes to the regulations for solid waste processing facilities

Photo by Dennis Hansen

This covered compost bin shows that waste management alternatives don't have to be unattractive.

Figure 6

provide some permit exemptions for composting these materials.

There has been minimal interest in Missouri for biosolids composting (composting sewage sludge or co-composting sewage sludge with other organics). This management option is being considered as land available for direct application decreases. The department's Water Pollution Control Program designates application rates and site specifications.

If proper design and operation standards are followed, biosolids can be co-composted with yard waste and other organic waste streams to create a usable soil amendment. The City of Nixa in southwest Missouri recently began co-composting biosolids with their yard waste. If successful, this operation could lead other communities in the same direction.

Although there has been some interest in food waste composting, the majority of implemented programs have been small-scale, such as the placement of worm bins in schools or offices. One solid waste processing permit has been issued for a composting operation for fruit and vegetable wastes, but the facility has not yet been constructed.

A small number of facilities that compost the entire solid waste stream are in operation in the United States. This process, generally called municipal solid waste

A method of composting called vermi-composting uses a type of earthworm. The worms process food wastes and produce castings, a valuable soil enhancing by-product.

Photo courtesy of Union Electric

This Union Electric Power Plant uses scrap tire chips as part of its fuel, replacing a portion of coal burned.

composting, requires a processing facility permit in Missouri. To date, no permit applications have been received for this type of facility.

Design and operation costs for municipal solid waste composting facilities may require higher tipping fees than currently charged at Missouri landfills. In some cases, problems occur in marketing the compost produced at these facilities due to contaminants, such as glass, plastic or metals. This compost may also contain concentrations of heavy metals and other substances since household hazardous waste is a fraction of the municipal solid waste stream.

Energy Recovery

Energy recovery, sometimes called waste-to-energy follows waste reduction, reuse, recycling and composting in the hierarchy of waste management options. Increases in landfilling costs, coupled with higher costs for fossil fuels, have made energy recovery from solid waste more feasible in some parts of the country. In addition to producing energy, waste-to-energy plants reduce the volume of waste left for disposal.

Missouri has no permitted public incinerators that use mixed waste from residential and commercial sources for fuel. A number of universities and small communities have used pelletized paper waste in their boilers to produce heat. Waste tires provide another potential energy source as well.

Waste Disposal

When alternatives that divert solid waste from disposal are maximized, the remaining fraction of the waste stream requires proper management. The following sections look at disposal methods and how they are utilized in Missouri.

Incineration without Energy Recovery

In some parts of the country, incineration has been used to reduce the volume and putrescibility of the waste stream, but energy is not recovered in the process. This type of incineration usually takes place in older burn units that were designed and built prior to the energy shortages in the 1970s and environmental concerns. Incineration is less desirable than energy recovery because the potential energy resources of the incinerated material are lost.

Concerns about incineration as a waste management tool usually focus on potential air emissions, high startup and operating costs, proper disposal

of the incinerator residue and the composition and consistency of the incoming waste stream.

Landfills

In Missouri, engineered landfills are the final resting place for approximately 70 percent of the solid waste generated. Solid waste landfill types in Missouri include sanitary, demolition, special waste and utility waste.

Sanitary landfills are permitted to accept solid wastes resulting from industrial, commercial, agricultural and residential activities. Laws and regulations further define waste types that may be accepted, as well as those that may not, such as regulated hazardous wastes.

Demolition landfills may accept only those wastes listed in the regulations, generally including solid wastes generated by construction, remodeling, repairing or demolishing buildings, streets, bridges and other structures.

Special waste landfills typically are located on the site of a manufacturing operation to manage a uniform waste stream generated in the manufacturing process.

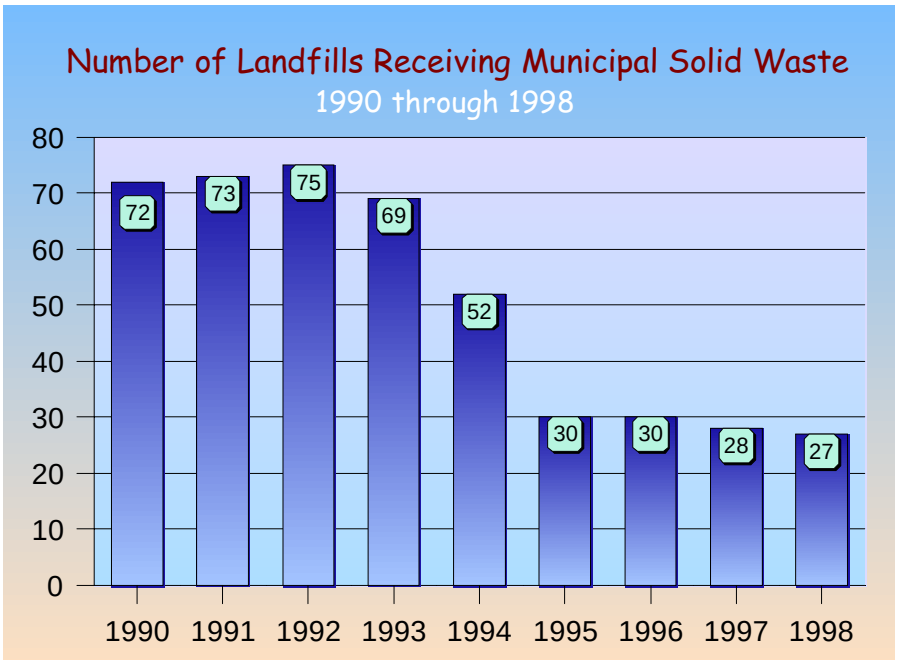
Utility waste landfills are used for ash and other wastes generated primarily from the combustion of coal at power plants.

Sanitary Landfills

The number of permitted sanitary landfills has steadily declined since 1992 as seen in Figure 7. Changes in federal regulations, commonly referred to as Subtitle D, prompted the rapid decline seen in 1994 and 1995. These regulations greatly reduce the possibility that landfills will become sources of pollution. At the same time, the new design and operational requirements prompted many landfills to re-evaluate the costs of doing business. In Missouri, this resulted in the closing of many small, often publicly owned landfills.

The majority of sanitary landfills currently operating in the state are privately owned. Pages 38 and 39 in the Appendix provide a map and a list of the sanitary landfills that are currently active. Although annual tonnages for each facility can fluctuate due to changes in waste flows and contractual agreements, they are provided to give a picture of the relative sizes of the each landfill's waste handling activities.

Figure 7



Demolition Landfills

Currently, there are four permitted demolition landfills in Missouri. They are listed in Table 4 in the Appendix. Relative to sanitary landfills, demolition landfills handle a small amount of the state's solid waste. The landfill at A.P. Green Refractories accepts only the off-specification wastes generated in the plant's manufacture of refractory brick. The three remaining demolition landfills were constructed to accept construction and demolition wastes from local businesses and the general public.

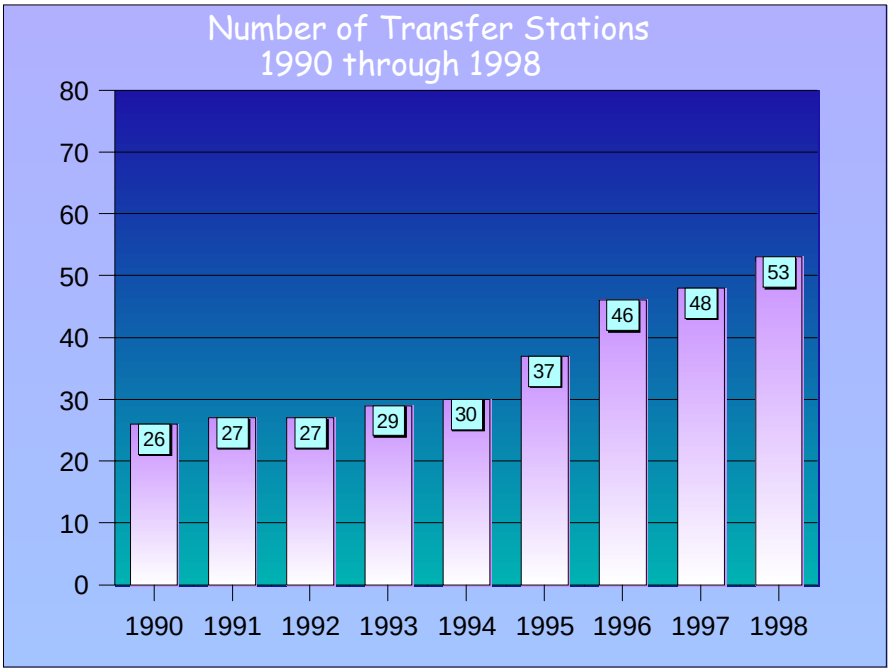
Transfer Stations

As the number of landfills declined, the number of transfer stations rose, as shown in Figure 8. Transfer stations are facilities where several solid waste collection vehicles (packer trucks) unload their refuse, which is then loaded onto a larger vehicle for hauling.

In Missouri, these facilities require a solid waste processing permit. With landfills fewer and farther apart, transfer of the waste to larger trucks designed for more efficient operation over long hauls reduces costs. Transfer stations may also have a positive impact on landfill operation. Less traffic in and out of the facility and reduced on site congestion of collection vehicles can be expected.

Table 7 in the Appendix lists the permitted transfer stations currently operating in Missouri. The majority of the 47 facilities are privately owned. Cities or counties own 14 of the facilities.

Figure 8



Solid Waste Collection

What about the trip to the landfill? In Missouri, the type of service varies from municipal waste collection to free market private hauling services. Information on the services for residential solid waste collection in 515 communities is available from the 1996 assessment inventories.

Of these, 50 cities operate the solid waste collection routes. Another 270 communities provide service through contracts with private haulers. In the remaining 124 communities, services are provided by private haulers. This includes 58 cities which are each served by one hauler and 26 that are served by two haulers. The remaining 40 communities are served by three or more private haulers.

Missouri's Next Step

The progress that has been made in Missouri has been accomplished through hard work and commitment from citizens, state and local government, solid waste management districts and the solid waste industry. Sound planning for solid waste management systems is essential to continued environmental protection through appropriate solid waste management. The department recognizes the importance of planning and has begun the process of developing a comprehensive statewide solid waste management plan.

The state's solid waste plan will be developed in cooperation with local governments, regional planning commissions, solid waste management districts and appropriate state agencies. The process will use stakeholder groups comprised of individuals from these areas, as well as several other sectors with a strong interest in solid waste issues:

- business and industry
- citizens and non-profit groups
- educational, medical and other large institutions.

The plan process will include several steps:

First, an exami nation of the current situation in solid waste management to determine where we are. This document, *The State of Garbage in Missouri*, will serve as a significant component of this step in the planning process by documenting existing conditions. The results of the waste characterization studies described earlier in this document are also key planning components. Additionally, a study of industrial, construction and demolition waste is currently underway and, when completed, will be a component of this step.

A public opinion survey is scheduled to be conducted in the fall of 1999 to lend insight to the views Missouri citizens have regarding solid waste issues. As well, the plan will be comprised of a number of components which are integral to clearly and accurately depicting the complete picture of solid waste management in Missouri. These include several social, economic, physical and demographic characteristics of the state.

The second major plan component will entail creating goals and objectives for the future of solid waste management in Missouri. The department will work with the groups previously mentioned, which include state and local government, businesses and non-profits, to determine where we would like to be in the next century. Goals will be developed that address each level of the integrated waste management hierarchy that has guided local and regional planning. Such goals may include waste reduction targets for specific types of waste generators, further improvements in disposal practices, or ways to reduce illegal dumping.

The third plan component will involve evaluating the best strategy for achieving the desired goals. This strategy may include adopting new policies, increasing financial and other incentives, or other recommendations for action. In this step of the planning process, the financial and resource costs will be considered for various options. This plan component will explain how state efforts can be coordinated with city, county and solid waste district efforts.

Ultimately, this plan component will describe roles and responsibilities for citizens, government and business that will be needed for the plan to succeed.

The statewide planning process will be an important focus of the department's Solid Waste Management Program for the next several years. The approach of a new millennium has induced a frenzy of short-term planning efforts to avoid problems that may occur when the year 2000 begins. Protecting the environment for future generations requires long-range planning. The Solid Waste Management Program will be entering the new millennium focusing on developing and implementing a statewide solid waste management plan to effectively guide solid waste management decisions that will protect Missouri's environment for future generations.

Playground surfaced with rubber chips made from waste tires.

Appendix

CHAPTER 260

Missouri Solid Waste Management Law
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Missouri Policy on Resource Recovery

STATEMENT

It is the policy of the State of Missouri to integrate appropriate resource-recovery philosophies and practices into all relevant activities in order to minimize the amount of solid waste that requires disposal, reduce environmental and public health threats, increase the manufacture and use of products made from recycled materials and preserve our natural resources.

GOALS

The goals of the policy are as follows:

To incorporate solid waste reduction, recycling and resource recovery into the solid waste management activities of state and local governments, industries and citizens.

To apply an integrated waste management hierarchy when managing local and regional solid-waste streams to minimize possible environmental impacts associated with any one technology and to achieve the maximum feasible use of waste reduction, recycling and resource recovery. This hierarchy is as follows

First - reduce the amount of solid waste created

Second - reuse, recycle and compost

Third - recover and use energy from solid waste

Fourth - incinerate or dispose of in a sanitary landfill

To facilitate the use of recycled materials by Missouri manufacturers and encourage the development of markets for recycled materials by incorporating solid waste reduction, recycling and resource recovery concepts into programs involving procurement, industrial development, capital works and other appropriate areas.

To coordinate technical and financial assistance for solid waste reduction, recycling and resource recovery in accordance with state and local solid waste management plans.

OBJECTIVES FOR STATE GOVERNMENT

State government shall assure that the implementation of state, regional and local solid waste management systems and plans support the Missouri Policy on Resource Recovery, the Missouri Solid Waste Management Law and Rules and Missouri Resource Recovery Feasibility and Planning Study.

State government shall coordinate financial assistance to promote programs for waste reduction, resource recovery, market development for recovered materials, recycled materials procurement and solid waste management programs that are in accordance with the Missouri Policy on Resource Recovery, the Missouri Solid Waste Management Law and Rules and Missouri Resource Recovery Feasibility and Planning Study.

State government shall provide a clearinghouse of consumer information regarding the need to support resource recovery; to utilize and develop new resource recovery programs around existing enterprises; to promote the development of markets for recovered materials; to request and purchase recycled products; and to participate in resource conservation activities and other relevant issues.

State government shall update the state's solid waste management plan so it addresses the state resource recovery policy.

State government shall assure that the implementation of state and local solid-waste management systems and plans are based upon the integrated solid-waste management hierarchy.

OBJECTIVES FOR LOCAL GOVERNMENT

To promote waste reduction, market development for recovered materials and resource recovery, local governments, industries and citizens shall coordinate and implement economically feasible policies for integrated waste-management systems, and shall increase procurement of products made from recycled materials.

Local and regional solid-waste management shall be mutually supportive and consistent with the Missouri Policy on Resource Recovery, Missouri Solid Waste Management Law and Rules and the Missouri Resource Recovery Feasibility and Planning Study.

Local solid-waste management plans shall implement solid-waste management systems based upon the integrated solid-waste management hierarchy, protect the public health and the environment and meet the residential, commercial, industrial and agricultural needs of the region.

OBJECTIVES FOR LEGISLATIVE ACTION

The state legislature shall appropriate funds to fully implement the Missouri Solid Waste Management Law, especially those areas that implement the state's resource-recovery policy.

The state legislature also shall promote legislation consistent with the state resource-recovery policy.

Figure 9

Sanitary Landfills
A
B
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Active Sanitary Landfills, December 1998
(Facilities are identified by number in Table 3)
Solid Waste Management Region Boundaries

Table 3

Sanitary Landfills

No.	Facility Name	Owner	City [1]	Annual Tonnage [2]
1	Backridge Sanitary Landfill	Browning-Ferris Industries	LaGrange	99,528
2	Black Oak Recycling and Disposal Facility	Waste Management of Missouri, Inc.	Hartville	259,037
3	Bridgeton (West Lake Sanitary Landfill Inc.)	Allied Waste Industries, Inc.	Bridgeton	890,868
4	Butler County Sanitary Landfill	Allied Waste Industries, Inc.	Poplar Bluff	126,927
5	Central Missouri Landfill, Inc.	Central Missouri Landfill, Inc.	Sedalia	82,124
6	City of Columbia Sanitary Landfill	City of Columbia	Columbia	127,834
7	Courtney Ridge Recycling and Disposal Facility	Waste Management of Missouri, Inc.	Sugar Creek	406,276
8	Ellis Scott Sanitary Landfill	Allied Waste Industries of Missouri	Clinton	31,556
9	Fred Weber Inc. Sanitary Landfill	Fred Weber Inc.	Maryland Heights	338,752
10	Fulton Sanitary Landfill	City of Fulton	Fulton	10,047
11	Jefferson City Sanitary Landfill	Allied Waste Industries, Inc.	Jefferson City	183,999
12	Lamar Sanitary Landfill	Browning-Ferris Industries	Lamar	164,630
13	Lee's Summit Sanitary Landfill	City of Lee's Summit	Lee's Summit	75,955
14	Lemons Landfill Corporations, Inc. SLF	Allied Waste Systems, Inc.	Dexter	196,688
15	Maryville Sanitary Landfill	City of Maryville	Maryville	10,722
16	Moberly Municipal Sanitary Landfill	City of Moberly	Moberly	11,884
17	Northside Sanitary Landfill	Northside Sanitary Landfill	Washington	29,037
18	Rye Creek Sanitary Landfill	Rye Creek Corporation	Kirksville	23,329
19	Show Me Regional Sanitary Landfill	Allied Waste Industries, Inc.	Warrensburg	70,760
20	Southeast Sanitary Landfill	Allied Waste Systems, Inc.	Kansas City	317,097
21	Springfield Sanitary Landfill	City of Springfield	Springfield	96,295
22	St. Joseph City Sanitary Landfill	City of St. Joseph	St. Joseph	109,235
23	Struckhoff Sanitary Landfill	Struckhoff Sanitary Landfill	Washington	19,564
24	Superior Maple Hill	Teter Sanitary Landfill	Macon	101,303
25	Superior Oak Ridge Landfill	Superior Service, Inc.	Valley Park	242,202
26	Sutton & Sons	Cardinal Waste, Inc.	Bowling Green	31,430

[1] City in which the facility is located, or which is nearest to the facility location.

[2] This number represents the tons reported on tonnage fee reports submitted to the department during the most recent 12 month period for which data is available: the 4th quarter of 1997, and the first three quarters of 1998.

Figure 10

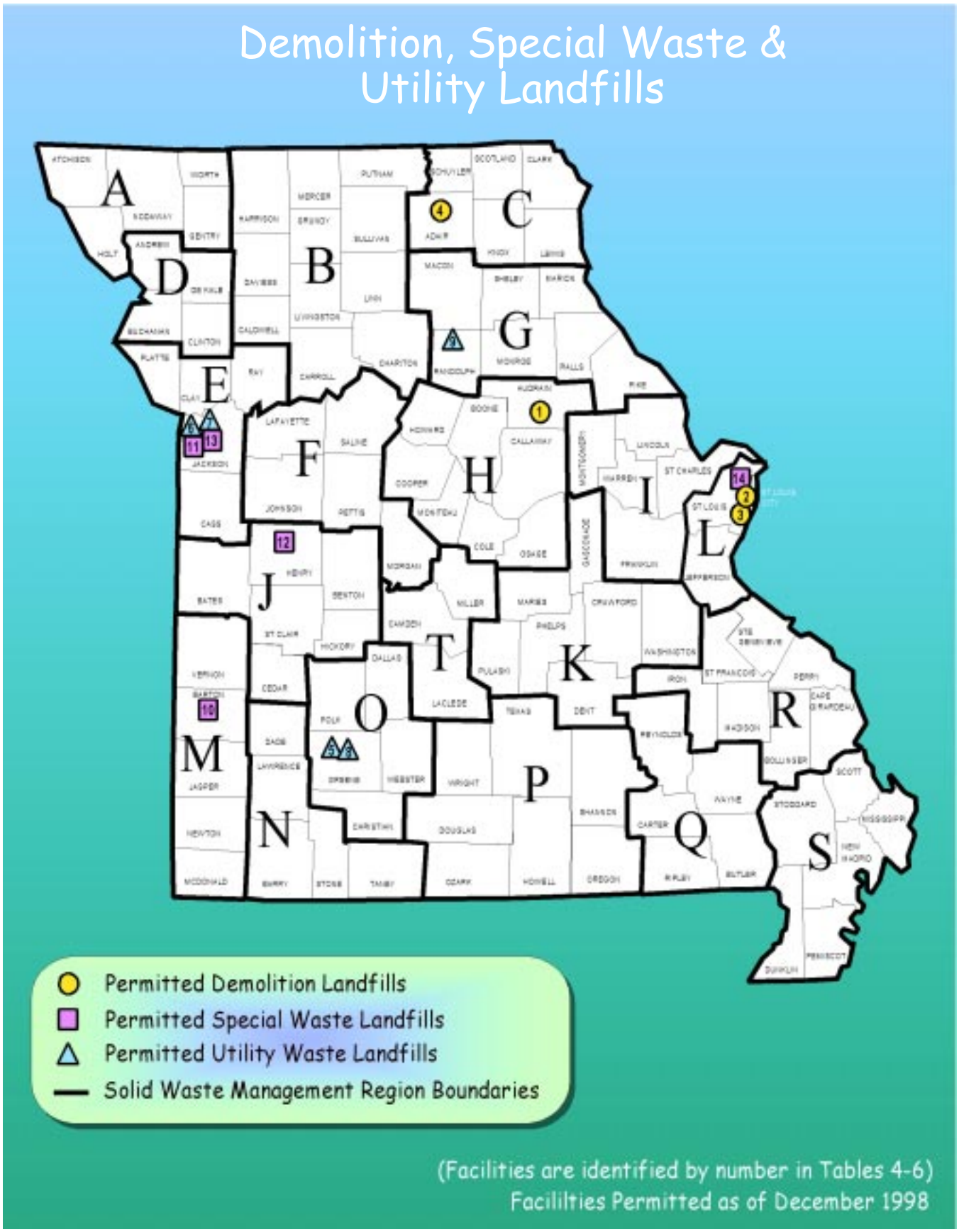
Demolition, Special Waste &
Utility Landfills
Permitted Demolition Landfills
Permitted Special Waste Landfills
Permitted Utility Waste Landfills
Solid Waste Management Region Boundaries
(Facilities are identified by number in Tables 4-6)
Facililties Permitted as of December 1998

Table 4

Demolition Landfills

No.	Facility Name	Owner	City[1]	Annual Tonnage[2]
1	A.P. Green Demolition Landfill	A.P. Green Refractories	Mexico	5,014
2	Peerless Landfill Inc.	Peerless Landfill Inc.	Valley Park	146,138
3	Rock Hill Demolition Landfill	Rock Hill Quarries Co.	St. Louis	123,993
4	Rye Creek Demolition Landfill	Rye Creek Corporation	Kirksville	3,546

[1] City in which the facility is located, or which is nearest to the facility location.

[2] This number represents the tons reported on tonnage fee reports submitted to the department during the most recent 12 month period for which data is available: the 4th quarter of 1997, and the first three quarters of 1998.

Table 5

Utility Waste Landfills

No.	Facility Name	Type of Owner	City[1]
5	James River Power Station Utility Waste	Public	Springfield
6	KCP&L Co. Montrose Fly Ash	Private	Clinton
7	Sibley Generator Station	Private	Sibley
8	Southwest Generator Station	Public	Springfield
9	Thomas Hill Energy Center	Private	Thomas Hill

[1] City in which the facility is located, or which is nearest to the facility location.

Table 6

Special Waste Landfills

No.	Facility Name	Type of Owner	City[1]
10	3M Co.'s Nevada Plant Special Waste	Private	Nevada
11	Amoco Oil Dirt Land Treatment Facility	Private	Sugar Creek
12	Henry County Water Co. Sludge Disposal Pit	Private	Clinton
13	K.C. Recycling	Private	Kansas City
14	Prospect Hill Reclamation Project	Private	St. Louis

[1] City in which the facility is located, or which is nearest to the facility location.

Figure 11

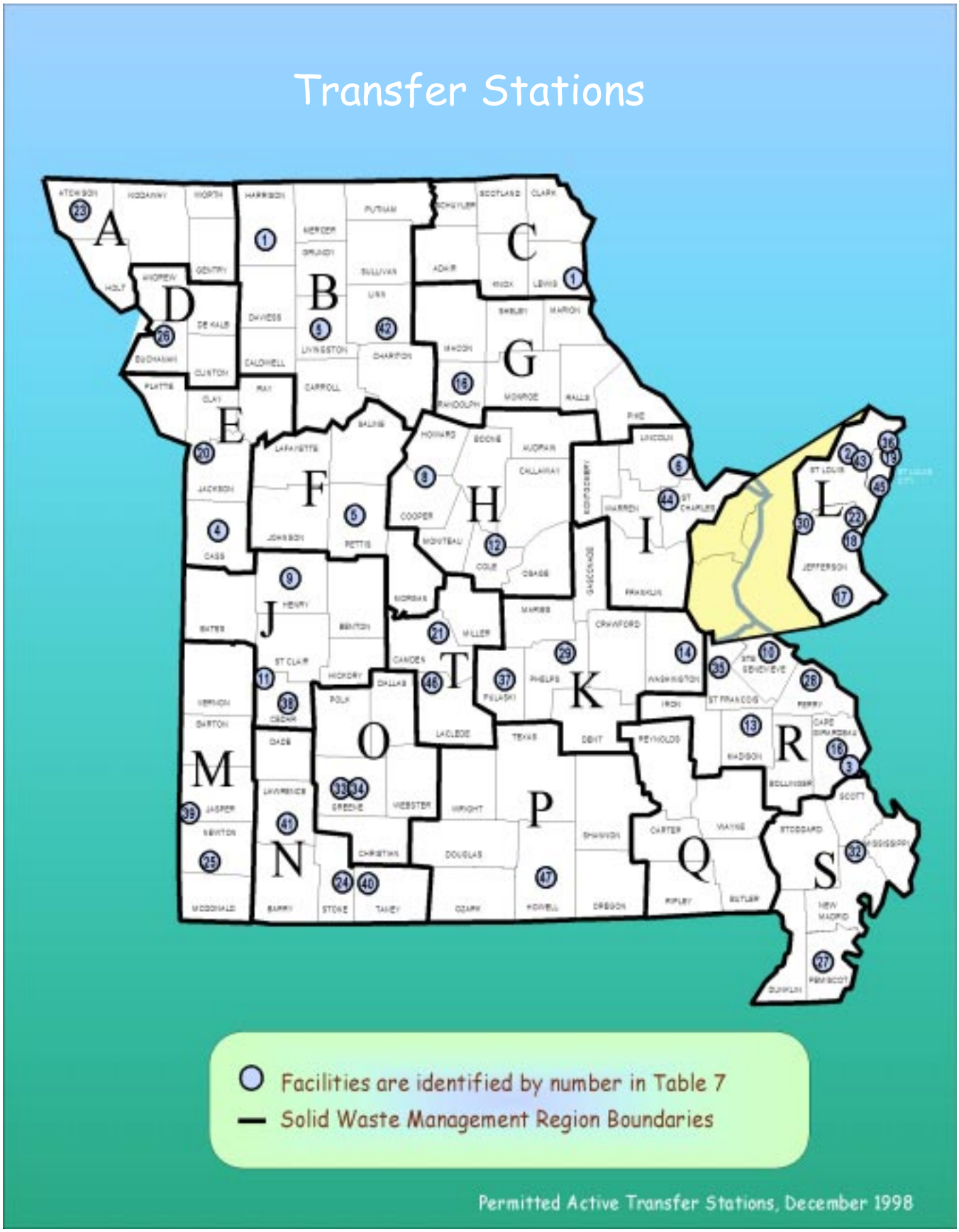
Transfer Stations
Facilities are identified by number in Table 7
Solid Waste Management Region Boundaries
Permitted Active Transfer Stations, December 1998

Table 7

Transfer Stations			
No.	Facility Name	Owner	City[1]
1	Bethany T. S.	Superior of Missouri, Inc.	Bethany
2	BFI T. S. & Recycling Facility	Waste Systems of North America, Inc.	St. Louis
3	Cape Girardeau Waste T. S.	City of Cape Girardeau	Cape Girardeau
4	Cass County Solid Waste T. S.	Allied Wastes Industries, Inc.	Harrisonville
5	Chillicothe T. S.	City of Chillicothe	Chillicothe
6	Christian Disposal, Inc. T. S.	Christian Disposal, Inc.	Winfield
7	City of Mexico T. S.	Superior Services, Inc.	Mexico
8	City of Boonville	City of Boonville T. S.	Boonville
9	Clinton Municipal T. S.	City of Clinton	Clinton
10	CWI of Missouri	CWI, Inc.	Ste. Genevieve
11	El Dorado Springs Solid Waste T. S.	Waste Management of Missouri, Inc.	El Dorado Springs
12	Environmental Sanitation	Allied Waste Management Inc. (Laidlaw)	Jefferson City
13	Fredericktown T. S.	City of Fredericktown	Fredericktown
14	Gilliam T. S.	CWI, Inc.	Jackson
15	J.T. Brown Ent. Processing Facility	Sutton & Sons Recycling & Transfer	Hannibal
16	Jackson Solid Waste T. S.	Lemons Waste Systems, Inc.	Dexter
17	Jefferson County T. S.	Environmental Industries / Waste Mgmt.	Maryland Heights
18	Kraemer Hauling T. S.	Kraemer Hauling T. S.	Kimmswick
19	Laidlaw Waste Systems North T. S.	Allied Waste Industries, Inc	Bridgeton
20	Longview of Kansas City T. S.	USA Waste	Kansas City
21	M.S., Inc. T. S.	Allied Waste Industries	Osage Beach
22	Meramec T. S.	Meramec Hauling	Arnold
23	Midwest Disposal and Recycling Inc. Transfer Station	Midwest Disposal & Recycling, Inc.	Rock Port
24	Missouri Disposal, Inc., T. S.	American Disp. Services of Missouri, Inc.	Reeds Springs
25	Neosho T. S.	City of Neosho	Joplin
26	Norris & Son Inc. T. S.	Norris & Son T. S.	St. Joseph
27	Pemiscot County T. S.	Pemiscot County	Caruthersville
28	Perry County T. S.	Perry County	Perryville
29	Phelps County T. S.	Phelps County Landfill Board	Rolla
30	Reliable Disposal, Inc.	Mr. and Mrs. Bobby and Betty Osmer	Pacific
31	Scotland County T. S.	Scotland County Commission	Memphis
32	Sonny's Solid Waste Services Inc.T.S.	Sonny's Solid Waste Service T.S.	Sikeston
33	Springfield City Refuse T. S.	Waste Management of MO, Inc.	Springfield
34	Springfield Relay Systems T. S.	Browning-Ferris Industries	Springfield
35	St. Francois Co. T. S.	St. Francois Co. T. S.	Park Hills
36	St. Louis Solid Waste Processing Facility	Waste Management of Missouri, Inc.	St. Louis
37	St. Robert T. S.	City of St. Robert	St. Robert
38	Stockton Lake T. S.	Stockton Lake T. S.	Stockton
39	Sunray Services Inc. Transfer & Recycling Center	Sunray Services, Inc.	Joplin
40	Taney County T. S.	Taney County Commission	Kirbyville
41	Tate's Transfer Systems, Inc.	American Disposal Services	Reeds Spring
42	Teter T. S.	Teter SLF & Hauling Refuse, Inc.	Macon
43	University City Refuse T. S.	City of University City	University City
44	Waste Mgmt. of St. Louis Recycling & Transfer Facility	Pezold Hauling	Foristell
45	Waste Mgmt. of MO, Inc.- South City Transfer Facility	Allied Waste Industries, Inc	Westchester
46	Waste Mgmt. of the Ozarks Recycling & T. S.	Waste Management of the Ozarks	Lebanon
47	West Plains Solid Waste T. S.	City of West Plains	West Plains

[1] City in which the facility is located, or which is nearest to the facility location.

Solid Waste Management Program Staff

Jim Hull, Director

Marlene Kirchner, Program Executive Assistant
Dinah Eddy, Program Receptionist

Planning & Grants

John Balkenbush, Chief

Glenda Crymes
Katy D'Agostino
Betty Finders
Connie Grellner
Dennis Hansen
Rob Hargis
Debbie Kruckemeyer
Richard Mansur
Beth Marsala
David Stock
Phil Tremblay
Kim Tschirgi
Bruce Tylke

Engineering

Jim Bell, Chief

Michele Boussad
John Cramer
Frank Dolan
Carlton Flowers
Karl Finke
Charlene Fitch
Betty Frisbee
David Johnson
Kevin Johnson
Celine Koier
Shirley Oehring
Tom Roscetti
Russ Seedyk
Scott Waltrip
Steve Wyatt
Brad Zimmerman

Enforcement

Ed Galbraith, Chief

Richard Allen
Janice Bexten
Laurie Bobbitt
Jody Clark
Alicia Davenport
Tom DeHaven
Dan Fester
Stuart Harlan
Grady Martin
Kirk Mitchell
Mike Potter

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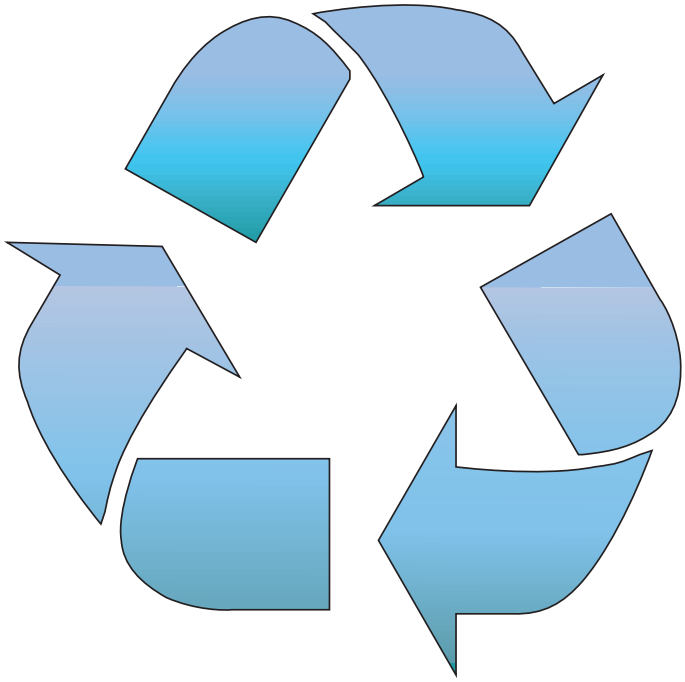
Missouri Department of Natural Resources
Division of Environmental Quality
Solid Waste Management Program



1738 East Elm Street
Jefferson City, MO 65101
1(800) 361-4827 or 1(573) 751-5401

email: swmp@mail.dnr.state.mo.us
web: http://www.dnr.state.mo.us/deq/swmp/homeswmp.htm

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