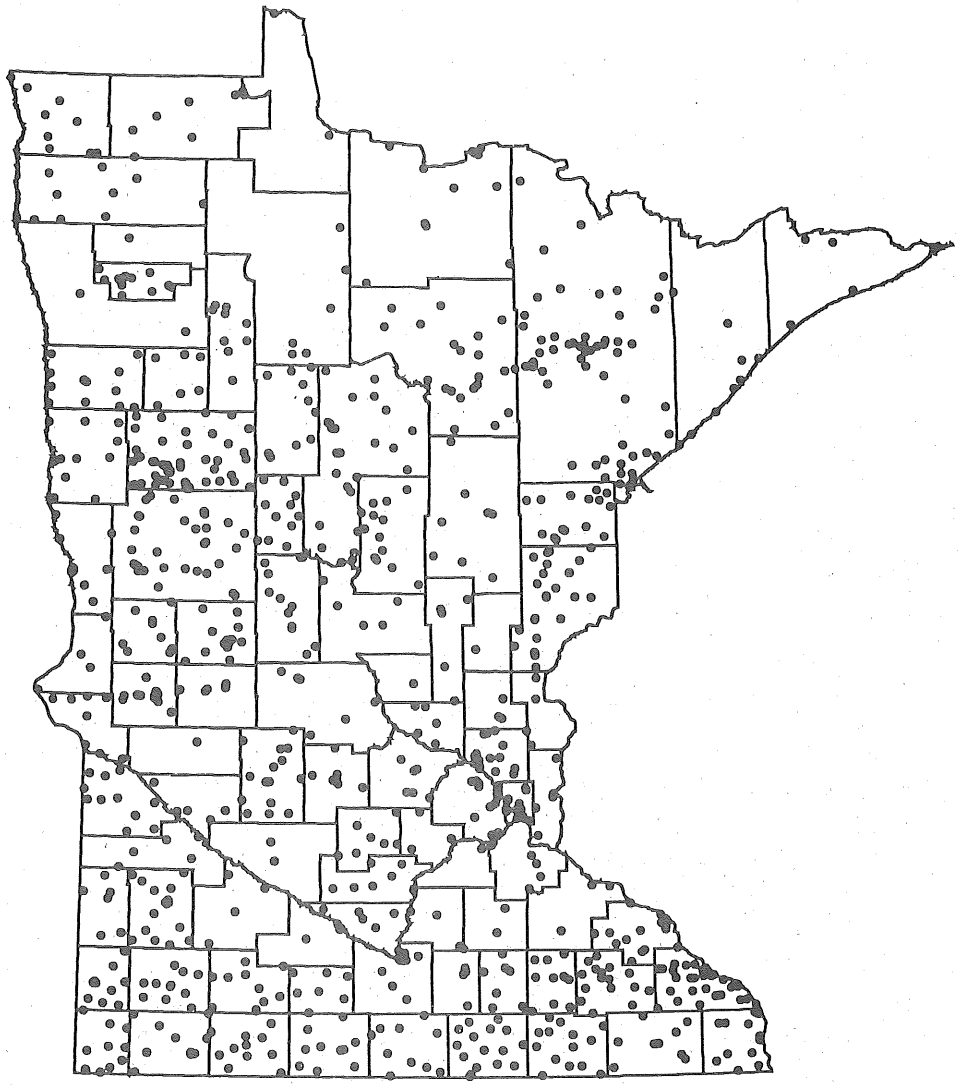

Recycling Facilities Report
and
1995 Minnesota Recycling Facility Census

Submitted to the Legislative Commission on Waste Management
on June 30, 1995

Prepared by the

Minnesota Pollution Control Agency

This report can be made available, upon request, in other formats, such as in large type, audio tape, or in Braille.
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Countless unnamed individuals that honestly and frankly voiced their opinion and perspective.

A hearty *"thank you"* to all the recyclers that took the time to complete the census form.

COST OF THE REPORT

As required by Minn. Stat. § 3.197, the estimated costs of the Recycling Facilities Report was $14,795 and a few gray hairs. State agency costs totaled $13,055. The Minnesota Pollution Control Agency estimates that $1,740 was spent by local governments to prepare the data necessary for the Recycling Facility Census.

TABLE OF CONTENTS

SECTION I

LEGISLATIVE CHARGE

By July 1, 1995, the Commissioner of the [Minnesota] Pollution Control Agency shall submit to the Legislative Commission on Waste Management a report that contains:

1) a description of the different types of recycling facilities and the number of each type that are currently in operation;
2) a survey of recycling facilities that indicates, for each facility, the type of facility, the extent to which materials delivered to the facility are not actually recycled and other information pertaining to the facility's performance;
3) a discussion of the issues affecting the performance of recycling facilities;
4) a comparison of the markets for commingled and source separated recyclables materials; and
5) recommendations regarding performance standards for recycling facilities, including whether different standards should apply to different types of facilities

In preparing the report, the commissioner shall consult with the Director [of the Minnesota Office of Environmental Assistance], counties and the recycling industry.

Minn. Chap. 585 Section 53 (Non-codified Laws from the 1994 Legislative Session).

SCOPE OF REPORT

This report is the result of concerns voiced to the Legislature from the recycling industry that certain recycling programs are not achieving acceptable recovery rates or are dumping recyclables.

Throughout the research period for this report, Minnesota Pollution Control Agency (MPCA) staff were struck with the willingness of industry experts to explain their perspective and to discuss their current operations. Recyclers openly presented their successes and failures. Issues relating to markets for materials, not surprisingly, proved the most sensitive to discuss. Overall, the cooperation by program coordinators and contact with facilities proved invaluable in development of the report.

The MPCA received no funds or additional staff to develop the report and achieve the objectives of the study. To maximize the impact of this project, several specific decisions were made. First, the issues presented in the report are limited to only these items established in the legislative charge. Brief and concise analysis that focused on the primary "driving" issues has been developed. A census was selected because existing databases developed by Minnesota Office of Environmental Assistance (OEA), MPCA and counties provide a good count of how many facilities exist in each county, but contain limited locational and operational information. The MPCA believes that given the time frames and resources available for development of this report, a short-run, comprehensive survey of all facilities being operated would provide the most useful data on the recycling system. The 1995 Recycling Facility Census undertaken by the MPCA required a significant investment of effort to accurately collect specific information not available from other sources.

To get the widest perspective, many of the questions posed in the Census and at the RAM Recycling Roundtables require an opinion-based answer. The MPCA has attempted to gain a better understanding from a wide variety of recyclers and current operating systems to guide future policy direction. Suspicions of certain programs dumping recyclables were heard statewide, yet very few cases of the disposal of recyclables were confirmed.

As a result of this report, MPCA will monitor more closely several individual facilities to assure compliance with existing laws or permitting conditions.

SECTION II

EXECUTIVE SUMMARY

The Waste Management Act has resulted in curbside service to 75% of the state's residents, provided commercial recycling in most areas, developed almost one thousand recycling centers and allows Minnesota to claim one of the nation's best recycling rates. These monumental changes have had an impact on programs and facilities of all sizes. However, the costs of recycling are under the scrutiny of the public and policy makers. Overall, recycling still enjoys tremendous support as demonstrated by the breadth of materials accepted and record number of tons collected and marketed.

The past year, which was the research period of this report, has been marked by increased charges in the recycling industry. Market prices and demand in almost all material markets have hit historic highs. Fundamental changes in the solid waste hauling system in the state has dropped tip fees and reduced the financial incentive for recycling. The MPCA has reduced administrative reporting requirements in the permit-by-rule program for recycling. Each of these actions directly impacts the performance of recycling systems.

This report presents the 1995 Recycling Facility Census (Section IV), a first of its kind of a survey of all recycling facilities that accept materials separated from mixed wastes directly from citizens or companies.

This report also researched several policy questions (Section III) that were asked by the Legislature.

MPCA found that generators have the greatest influence and control to prevent on-going bumping operations. Contract provisions with field inspections will not only educate the generator on the recycling process, but provide effective oversight. Specific conditions or practices that may result in the dumping of recyclables include: oversupply or under-capacity, rejected loads, illegal dumping, abandoned or contaminated materials, fluctuating market prices and demand, collection of materials that are not "truly" recycled and on-going dumping operations.

Although the total amount of source separated materials that is disposed has not been calculated, the limited number of examples discovered over the past year indicates that a minimal amount of materials has been lost to the landfill. The cases almost always are isolated to an individual facility or to a short-term operating problem. The disposal of rejects is the primary means by which most materials are lost to the recycling process. The leading source being commercial commingled collections.

The MPCA has limited our determination of the performance of an individual recycling facility as the annual reject rate. This performance indicator is directly correlated to the primary objective of landfill abatement and is relatively easy to calculate. Based solely on annual reject rates from a facility, source segregated systems should be a higher preference for implementation. National and state studies, as well as field data, establish the expected reject rate for source segregated facilities to be 1-3% and commingled facilities to be 7-21%.

Market information and insights proved difficult to obtain. Many facility operators and end users were willing to contribute to research efforts on markets, but the information overall resulted in inconclusive or conflicting findings. Clearly though, factors such as the quality, volume or materials and frequency of delivery have more impact on market price than the type of collection system. All materials, whether

collected in a source segregated or commingled system must meet the same standards set by the purchasing market.

The recommendations that result from this report follow.

RECOMMENDATIONS

Issues affecting performance

1) MPCA should directly notify all recycling, resource recovery and disposal facilities, that the disposal of source separated recyclable materials is prohibited by law (Minn. Stat. § 115A.95) unless the OEA Director determines that no other person is willing to accept the materials.

2) MPCA should evaluate solid waste permits for any solid waste facility that receives recyclables to assure that safeguards against the dumping of source separated recyclables exist when permits are issued or amended. The highest priority and most thorough review should be given to transfer station operations that have recycling operations associated with the operation of the facility.

3) The Legislature should provide for a definition in Minn. Stat. § 115A.03 for the terms source separated, source segregated and commingled recyclables. This will help with solid waste assessment fee collections by eliminating confusion as to what materials are exempt from the fee.

4) Before selecting a service provider, public entities and commercial establishments should issue requests for proposals (RFPs) or invitations to bid on recycling services which include:
   A. a requirement that the service identify the primary and secondary recycling facilities used;
   B. an estimate, by the bidder, of what the annual reject rate by primary, secondary and overall system operations is expected over the contract period; and
   C. a requirement that notification is given to the contacting authority if the estimated reject rate is not met.

   In addition, public entities and commercial generators should consider requiring, as a contractual obligation, written or oral notification when their source separated recyclables are diverted to a disposal facility. A specific acceptable reject rate may also be negotiated with a particular collector or facility. Regular reports that identify the facility reject rate factor over a given period may also be used to track performance by companies or communities.

5) If contract provisions are established that contain estimated performance factors for specific facilities and a system wide basis, contracting authorities should conduct several, unscheduled visits to those facilities throughout the year as a means of monitoring compliance. This practice will also provide a communication feedback loop between the generators and recycling program operator to reduce contamination due to a lack of understanding on acceptable materials.

Performance recommendations

6) If maximum landfill abatement through recycling is the objective, source segregated collections will recover the highest percent of recyclables and have the fewest amount of rejects. Based only on this performance factor of the annual rejects rate, source segregated systems should be a higher preference

for implementing, but the Legislature may want to invest in a longer term study which considers other performance factors.

7) All recycling facilities should:
   A. develop emergency action plans for unexpected, unwanted wastes. This should include an arrangement for household hazardous waste (HHW) to be transferred safely between the facilities; and
   B. notify all recyclers, material brokers or end users that receive recyclables that have been sorted or come in direct contact with MSW.

FINDINGS

Recycling facility description

1) The 1995 Recycling Facility Census located 891 recycling facilities that openly accept materials from citizens and businesses in Minnesota.

2) There are probably no identical recycling facilities in the state, but the differences are minor. For this report, recycling facilities are categorized into several classes: (note: overlap does exist because some facilities are considered to have dual functions.)
   A. **Drop-off:** a location where materials are collected from the general public with little or no processing done to the materials. These may be staffed or unstaffed and typically are a trailer or a drop shed.
   B. **Material Recovery Facility (MRF):** accepts at least one or more materials that are prepared for an end using market through sorting, baling, crushing, etc. These facilities are always staffed, although an attended or unattended drop-off may exist on the premises. A wide variety of materials may be accepted and other retail functions may exist. Materials collected in curbside programs are processed at these types of facilities.
   C. **End Market:** a manufacturer that accepts recyclable feedstock from the drop-offs, MRFs, as well as citizens. The vast majority of end users require that prior to delivering materials that a visual inspection be conducted and that contaminants be removed, but limited situations openly collect materials from the general public.

3) About 76% of the recycling facilities are publicly owned. However, most are operated by private contractors.

4) Four percent of the facilities separate recyclables from MSW. Only 10% of the facilities collect MSW in addition to source separated recyclables and about 2% collect items for reuse.

5) Minnesota does not have a co-collection program (MSW and recyclables collected on the same vehicle) being operated, yet several national studies have indicated that operational advantages exist in rural areas.

Materials/throughput

6) The decentralized nature of the recycling industry is reflected by 96% of facilities accepting less than 20 tons per day (TPD) and almost 80% accept less than 4 TPD.

7) Materials that are most commonly accepted by recycling facilities are newsprint, glass, aluminum, steel/tin, HDPE and PET plastics. These materials are being collected at over 80% of Minnesota's facilities.

Performance

8) Although the census found that almost 80% considered themselves "source segregated," empirical evidence exists that very few operate strictly as a source segregated facilities for all grades of materials accepted. A strict interpretation of source segregation would not allow the mixing of more than one material grade within a given recycling collection (e.g., aluminum and tin or several plastic resin types). Twelve counties reported reaching this level of separation.

9) Of the facilities that accepted commingled materials, about half separated the materials on-site. Hand separation is the most common method of separation and only one-third use any mechanical system.

10) Glass is increasingly being collected in the mixed color form and is most often used as aggregate or sorted on-route.

11) Plastic film continues to present the greatest challenges to recycling. Many operators claim that plastic film bags add disproportionately to rejects and markets are extremely limited for the materials. Only 7 of the 891 recycling facilities or less than 1% accept film plastics.

Performance issues

12) The vast majority of recyclers oppose any state policy that establishes a "highest and best use" criteria for the marketing of materials.

13) Contamination of recyclables has improved only marginally over the past few years. Open, public bins seem to be the hardest hit by contamination problems. The most concerning types of contaminates include sharps, HHW and aerosol containers which contain a hazardous product or an explosive and are not totally empty. Illegal dumping of MSW seems to be stable, yet still occurs in almost all facilities.

DEFINITIONS

Note: Minnesota State Law uses numerous definitions that are tailored for a specific purpose such as taxes, fees or policy directives. Several terms have been defined throughout this report as:

Census: An official, usually periodic, enumeration of population. A governmental count.

Commingled recyclables: Source separated materials that are collected together with different material types or grades.

Dirty MRF: A facility that accepts MSW and/or source separated recyclables, but has an annual reject rate of more than 50% of materials received ending up in a recycling market.

Dumped recyclables: Materials that are source separated from MSW for the purpose of recycling, but instead, with or without the approval of the generator, the materials are deposited into the waste stream.

End user or end market: Anyone that accepts post-consumer recyclables for the use as a feedstock in a manufacturing process. Often the broad term of 'market' is mistakenly applied to this narrow group of recyclers.

Generator: Anyone that separates recyclables from MSW for the purpose of recycling. Generators that self haul materials to a market are not recyclers.

HDPE or high-density polyethylene: A type of thermoplastic resin.

Illegal dumping: The disposal of MSW in a manner other than the formal solid waste management system such as burning or burial on-site, either on-site or on another's property. Another type includes theft of service by depositing materials in someone else's garbage service without paying for the costs.

LDPE or low-density polyethylene: A type of thermoplastic resin.

Material recovery facility or MRF: Any recycling facility that prepares at least one material grade for the purpose of recycling.

PET or polyethylene terephthalate: A type of thermoplastic resin.

Recycler or market: Anyone that accepts materials for the purpose of recycling. Generators may get paid, pay nothing or pay a fee for the transfer to a recycler.

Recycling facility: Any solid waste facility that accepts materials that have been separated from MSW for the purpose of recycling.

Rejects: Materials that are collected for recycling and are sorted or redirected during the recycling process for disposal at a mixed municipal solid waste facility.

Total rejects = cross-contaminates + economic rejects + process residues

- Cross-contaminates (trash and other recyclables that are mixed into or not adequately separated from a material grade).
- Economic rejects (recyclable materials that, in the judgment of the recycler, are not economically marketable and the added processing costs would not be off-set by revenues received).
- Processing residues (non-recyclable materials that are generated, via the processing of materials, such as labels, food, dirt, screenings, etc.)

Source segregated recyclables: Source separated materials that are separated into individual material grades prior to collection.

Source separated recyclables: Materials separated from MSW by the generator for the purpose of recycling.

SECTION III

PURPOSE OF THIS SECTION

The purpose of this section of the MPCA's Recycling Facility Report is to answer several specific policy questions that have been raised regarding the operating methods and performance rate of Minnesota's recycling facilities. The answers to these policy questions represent the collective understanding of the MPCA staff that worked on the development of this report. To gather input and perspective, the MPCA held extensive public meetings [Recycling Association of Minnesota (RAM) Recycling Roundtables and the Recycling Operators Forum held at the 1995 Solid Waste Seminar], gave presentations and solicited input from advisory councils, developed and implemented the 1995 Recycling Facility Census, toured recycling facilities and made hundreds of phone calls. We believe the process of developing the report, which provided greater interaction/networking with the recycling community, is as important as the final recommendations.

The questions are based on the statutory charge of the report, but also on the evolution of the issues. Since this report was required, the trade journals and academicians have been actively debating the worth of recycling. The waste hauling system has experienced fundamental changes due to recent court rulings on the interstate commerce of garbage. Over the past year, market prices and demand for materials were at an all time high for almost all grades of recyclables. Recyclable materials are a tradable commodity. Public support for recycling programs remains strong despite years of rising costs and constant change in the rules for recycling. Widespread concern has been, and continues to be, expressed that expensive or wasteful recycling programs reflect poorly on the industry as a whole. Many citizens and companies have witnessed packer trucks collecting recyclables and have heard accusations that the materials sorted are "just dumped" down at the loading dock and eventually mixed in with solid waste.

POLICY QUESTIONS

Are all materials collected for recycling, in fact, being recycled?

The MPCA does not expect that all materials sorted or collected for recycling will eventually reach an end user. Rejects and residuals are expected from any recycling process. No recycling facility or process will ever be 100% effective.

Disposal of recyclables occurs for two reasons: rejected materials and dumped recyclables. The difference between the two types is distinct and profound.

> **Rejects:** Materials that are collected for recycling and are sorted or redirected during the recycling process for disposal at a mixed municipal solid waste facility.
>
> **Total rejects = cross-contaminates + economic rejects + process residues**

Rejects may occur at all steps in the recycling process: collection (drop-off centers or curbside), facility preparation (removal of contaminants) or final usage (additional material upgrading). The majority of rejects are contaminants from improperly sorted materials. The quality of materials available is impacted by product or packaging designs. Other factors that impact the reject or residual rates at a recycling facility include type and condition of equipment, storage of materials and market specifications. In

addition, facilities receive unwanted materials including: hazardous (HHW, pesticides, etc.) and dangerous (sharps, explosive, etc.) materials. In most cases, these materials are received because of a lack of awareness by the generator about what is collected, rather than by a malicious act. The level of education of the citizen or company and the facility operation often dictates the amount of materials that are rejected to a landfill.

Collection program and recycling facilities performance

The primary focus of discussion is aimed at performance at a recycling facility, but the collection program has a direct and profound affect in dictating the performance factor of the facility.

Issues affecting performance of collection programs.

- Education of generators.
- Degree in which unwanted or improperly prepared materials are refused and left behind at the collection point.
- Age, design and condition of equipment used for collection, especially rollingstock.
- The number of materials collected (fewer materials collected result in less rejects).
- Simple signs on drop-off bins and clear, graphic mailers to generators on program rules.
- Experience of driver and crew.

Source: MPCA Staff

Issues affecting recycling facility performance that occur on-site.

- The efficiency of the collection programs delivering materials (e.g., collection service accepting contaminated materials that burden the recycling facility).
- Mechanization of the material sorting or contamination removal process.
- Level at which modern technology is being operated.
- Type of sorting technique used: positive or negative systems.
- Safety issues: employee turnover and comprehensive worker safety and training programs, proper lighting and ventilation, good gloves that are frequently replaced.
- Level of commingling occurring with materials accepted.
- Percent of materials that are sent to another recycling facility.
- Weight based performance factors always favor lighter materials like plastic.
- Favorable arrangements and relation with the end user or material broker (a procedure for rejected loads, lenient specifications for acceptable contamination levels).
- Ample sized building that allows for efficient material receiving, sorting, storage, etc.
- Product and packaging designs. Source reduction works both for, and against, recycling programs.

Source: MPCA Staff

Facility performance

Given the variability in facility operations, materials collected and level of education of the public, calculating an efficiency or performance factor on any individual facility or program is difficult. **For the purpose of this report, performance is measured by annual reject rate**. Other types of performance indicators such as throughput per hour, cost per ton, cost per household or accident/injury rate were considered, but rejected, because good data does not exist for these parameters.

This reject rate of recycling facilities is the most controllable and easiest to determine. This performance indicator is easy to determine and provides an important measure of recycling effectiveness. The annual reject rate clearly answers the questions of 'how much was diverted from the landfill.'

Typically, a simple calculation of the recyclables received at a specific location divided by waste sent into the disposal stream is:

$$\textbf{Facility reject rate} = \frac{\text{materials received - materials sent to a landfill}}{\text{materials received}}$$

Most facilities receiving materials that have been source segregated rather than commingled, will operate with at least 90% of materials recycled (less than 10% rejects). The MPCA staff believed that most of Minnesota's 891 recycling facilities should be able to document an annual recycling rate of 95% or better. A current state law states that recycling facilities that achieve an annual recycling rate of at least 85% by weight may receive an exemption from certain landfill fees.

"75% of our rejects are LDPE bags!" County Recycling Facility Operator

To truly calculate effectiveness of performance for recycling facilities, the rejects that are removed from the materials as they flow from collection through to an end user should be totaled together. If a facility is measured on an individual basis, it may have a very low annual reject rate, but the primary reason is that very little processing or sorting may be conducted at that particular location. Although contamination may be removed at every step in the collection to the end user, certain facility types such as MRFs or single material processing facilities (such as those providing plastic grinding activities) are designed to conduct the majority of sorting and thus have the lowest performance factor (highest reject rate).

Few, if any, programs have conducted this type of holistic review to establish their individual system annual reject rate. Due to the decentralized nature of certain program designs and the use of a variety of markets depending on spot market conditions, this type of review may not be possible in all instances. However, it is reasonable to request commercial or community recycling operators that are bidding on service contracts to estimate total collection system-wide rejects given their collection and processing system. All facilities that receive materials from the program should be included.

The OEA/Metropolitan Council commissioned a report *"Analysis of Disposal Potential for Collected Recyclables in the Twin Cities Metropolitan Area: July 1994"* to evaluate the overall reject rate from recyclables collected in the metropolitan area. This study estimated that 8.2% of the material collected in 1994 was disposed of as a reject. It also found that 68% of those rejects were resulting from commingled commercial collections and only 2% were from source segregated residential recyclables. About half of all rejects were due to the sorting and marketing of paper. The findings of the study confirm that, overall, the system in the metropolitan area was efficiently recovering materials and achieving an acceptable recovery rate for recyclables.

The public and the MPCA are concerned about the low annual recycling percentage of certain recycling facilities or programs. The issue is, at what percentage is a facility no longer a recycling facility, but a

mixed waste disposal operation. Sometimes facilities with a low recovery have been referred to as a "dirty" MRF.

> **Dirty MRF:** A facility that accepts MSW and/or source separated recyclables, but has an annual reject rate of more than 50% of materials received ending up in a recycling market.

Supporters of dirty MRFs argue that any recovery of materials is better than none and that when the convenience to the generator and collection efficiency are considered, such a system makes environmental and economic sense. Opponents claim that such inefficient systems dirty the image of recycling, confuse the generators and result in unacceptably low levels of recovered materials. National and state studies, as well as comments from recyclers, typically estimate that reject rates at facilities that accept source segregated materials to be less than 5% and 20-40% for commingled recyclables. Studies and comments also indicate that the greater the commingling of materials, the greater the participation.

Collection contracts established by municipalities or businesses are the primary method for collection and processing. Some licensing ordinances establish targeted recyclables and prohibit the disposal of any materials collected. Several sample contract provisions include:

- Disposal of Recyclables: Contractor shall use its best efforts to assure that all recyclables collected in the city are not placed in landfills or incinerated and are distributed to the appropriate markets for reuse. If any recyclables are landfilled or incinerated, the contractor shall report that fact to the city with its next monthly billing statements. The report shall include the types and amounts of materials landfilled or incinerated, the reason for the landfilling or incineration and the steps being taken by the contractor to avoid future landfill or incineration. In the event that the market for a particular recyclable ceases to exist, or becomes economically depressed that it becomes economically unfeasible to continue collection of that particular recyclable, or is directed to do so by the county and the city directs to the contrary, the city agrees to bear the cost incurred by the contractor in disposing of recyclables by landfill or incineration. The contractor shall, at all times, be under a duty to minimize recyclables ending up in landfills or incineration, and in consultation with the city, at all times attempt to find and use the lowest cost method of disposal.

- Disposal of Recyclables: The contractor shall use its best efforts to assure that all recyclables collected in the city are not placed in landfills or incineration and are distributed to the appropriate markets for reuse. If any recyclables are landfilled or incinerated, the contractor shall report that fact to the contracting authority in advance of such disposal occurring. The report shall include the types and amounts of materials landfilled or incinerated, the reason for the landfilling or incineration, and the steps being taken by the contractor to avoid future landfill or incineration. The contractor shall at all times be under a duty to minimize recyclables ending up in landfills or incineration. In the event that the market for a particular recyclable ceases to exist, or becomes economically depressed that it becomes economically not feasible to continue collection of that particular recyclable, either party shall have the right to cause the contractor to cease the pick up of that particular recyclable. The contractor shall bear all costs incurred to dispose of recyclable materials except for when the contractor requests to cease collection of a particular recyclable material or is directed to do so by the county, and the contracting authority directs to the contrary, the contracting authority agrees to bear the cost incurred by the contractor in disposing of recyclables by landfill, incineration or other mutually acceptable methods of disposal.

Collection contracts established by municipalities or commercial establishments may also set a maximum reject rate. The city of Minneapolis curbside collection contract requires the contractor to notify the city if the facility where the recyclables are processed have rejects exceeding 0.5% per day.

Conclusions and recommendations

High demand and current market prices for recyclables provide strong incentives for maximum material recovery. In addition, some areas of the state disposal fees for rejects and residuals has dropped slightly. Yet, larger amounts of rejects and the resulting high disposal costs impact profits. Statewide, facility operators and owners have consistently expressed determination to expand services by collecting more materials or providing a greater frequency of collections while reducing reject rates, as a means of remaining competitive in the recycling industry.

- Before selecting a service provider, public entities should consider the reject rates that may result from the recycling program operation or facility under their contracts or ordinances.
- Requests for proposals (RFPs) or invitations to bid on recycling service should include:
  - a requirement that the service identify the primary and secondary recycling facilities used;
  - an estimate, by the bidder, of what annual reject rate by primary, secondary and overall system operations is expected over the contract period; and
  - a requirement that notification is given to the contracting authority if the estimated reject rate is not met.

In addition, public entities and commercial generators should consider requiring, as a contractual obligation, written or oral notification when their source separated recyclables are diverted to a disposal facility. A specific acceptable reject rate may also be negotiated with a particular collector or facility. Regular reports that identify the facility reject rate over a given period may also be used to track the level of recovery by companies or communities.

Are source separated recyclables being dumped?

As a result of this study, some circumstances or operating practices have been discovered that result in the disposal of source separated recyclables.

There are several distinct and separate reasons or operating systems that result in recyclables being disposed of as a waste, with or without the approval of the generator. The MPCA is aware that recyclables are being disposed of as waste. However, we believe this happens only in isolated circumstances.

Most common problems or methods that result in the disposal of recyclables.

Over-supply or under-capacity

Limited space or processing capacity at some facilities has resulted in small amounts of recyclables being landfilled. There are very few recycling facilities that have too much room. Plus, the list of materials accepted and the tonnage continues to grow each year. Many recycling facilities are located in remodeled warehouses or old buildings which limit the efficient flow and storage of materials. However, some new facilities were constructed with tight budgets and limited space which have been overwhelmed by a flood of materials from eager citizens and businesses. Exterior or remote storage can provide temporary relief at

a cost. Dangerous conditions may be created in the sorting and baling areas if more material is processed than is able to be handled by the equipment.

Few options exist when collection vehicles reach capacity before the end of a scheduled route. The truck must either unload and return empty to complete the route, or another vehicle must be dispatched. Waiting until the next day may result in irate or concerned citizens calling, or the recyclables may be scattered by weather or vandals. Some operators have claimed that the most efficient, and perhaps environmental, solution is to have a packer truck follow the recycling vehicle when same day service is provided. If the recycling truck reaches capacity before the end of the route, recyclables for the balance of the route would be discarded. Others say that to dispose of the recyclables is a loss to the environment and a fraud to the program participant. Another option for collection programs that consistently exceed truck capacity would be to provide some type of off-loading station or arrangement with another nearby facility. No environmental impact analysis that has been done to date, adequately identifies and accounts for all impacts such as incremental fuel usage, wear and tear on vehicle and roads, emissions and other factors that would definitively decide this issue. Dumping of recyclables by collection programs is believed to be extremely limited and has been corrected by adjusting the route for the next collection. There are several other collection options that exist to prevent disposal of recyclables from routes, and therefore, reoccurring incidents of the disposal of recyclables is deemed unacceptable by the MPCA.

Rejected loads

When a recycling facility or end user rejects a load of materials, one of two things will occur. Most commonly, the material will be returned and the contaminants will be removed. However, in some situations, the material may be rerouted to a resource recovery or disposal facility. Many factors influence the decision of whether the material is re-sorted or dumped. These factors include, the distance from the facility that can upgrade the material, the tipping fee at the disposal facility, equipment shortages and expected revenue for the recyclables. The economics of the options typically dictate the result. Markets expect consistent quality in the materials delivered and a rejected load is a serious matter. The rate at which loads are rejected depend on end users standards, but the total materials disposed because of this cause is insignificant because most facility operators indicate that rejected loads are re-sorted. End market rejection of loads motivate recycling operators to take quick actions to prevent future rejected loads and the resulting hassles and costs.

Illegal dumping

In the past and today, allegations have been made that individual operators have illegally disposed of materials either by burning or burying of materials on-site or at another location.

> **Illegal dumping:** The disposal of MSW in a manner other than the formal solid waste management system such as burning or burial, either on-site or on another's property. Another type includes theft of service by depositing materials in someone else's garbage service without paying for the costs.

Broad and long-standing authorities exist on the state and local level to prevent the disposal of solid waste that impacts public health or the environment. The existing legal framework, if properly executed, provides the necessary and appropriate criminal and civil penalties. Prosecution efforts under these laws can be hindered by lack of proof that the incident has taken place. To address this, enforcement officers from the Minnesota Department of Natural Resources (DNR) and the MPCA have been granted authority to issue field citations. Law enforcement officers at the state and local level, MPCA regional staff, county, city and town officials also have responsibilities to monitor littering and illegal dumping.

The total number of convictions of recycling operators in a given year is not known since no central authority tracks court proceedings. Solid waste administrators, county attorneys and others have documented several specific cases, but widespread illegal dumping of recyclables is unlikely.

For the most part, what is received at recycling facilities are the targeted items that have been properly prepared by the generator, but not in all cases.

- **Unwanted items:** Facility operators have learned they may receive almost anything. The unwanted materials are usually placed immediately in the dumpster and sent to a disposal facility with the other rejects. The unwanted items of most concern are hazardous: including HHW, pesticides or dangerous materials such as sharps and explosives (which require special handling).

- **Wanted, but improperly prepared materials:** Some recycling facilities collect a wide range of items including those known to have the potential for environmental contamination. Although acceptable materials may include HHW, fluorescent bulbs, automotive fluids and paints, aerosol containers for hazardous products and other similar items, the condition in which the item is received affects the potential for environmental harm. Most items that can pose environmental harm are the subject of additional regulations at the state and local level.

Conditions that are thought to influence illegal dumping are: receipt or collection of a material with no, or marginal, market value; dramatically fluctuating market conditions; combustible materials; malfunctioning equipment; and marginal operations. Burn barrels have been sporadically sighted by MPCA staff at some recycling facilities. Late in 1994, a recycling operator in the East Central area had been accused of canceling garbage collections and relying on various illegal means to dispose of thousands of plastic bags. Criminal proceedings are in process with this individual.

Abandoned or contaminated materials

When a recycling operator vacates their facility without removing all materials, many times others (e.g., landlords, the county, city or the generator) must pay for handling abandoned recyclables. In these cases, the direct link to the owner is much easier to establish. Local authorities may decide to prosecute to recover cleanup costs, but often find that such actions have high legal costs and often result in little money actually being recovered. In some cases, the decision may be for the county, city, township or other responsible parties to share the financial burden, rather than pursue a protracted court effort. For example, in 1991, an incident in the city of Elk River occurred involving a carpet recycling company on leased land. The operator left town, without removing wet and contaminated carpeting from several buildings on the property. The city and several generators shared the expenses of landfilling the materials. MPCA research indicates abandonment of materials is not a widespread or significant problem.

One of the reasons that the MPCA's permit-by-rule program for recycling facilities was revised in 1995 was to address this issue. The inclusion of requirements for contingency action plans and a three year storage limit, with annual notification, were adopted to prevent these problems.

Fluctuating market prices and demand

Until an end user utilizes the recyclables as a feedstock, the recycling cycle is not complete and all the recycler has is a pile of sorted trash. Material gluts and depressed prices in the past have given way to strong demand and high prices. Yet, there are some market conditions that lead to recyclables being

dumped, including pilot collection projects, or specialized collection programs established by manufacturing associations.

Throughout the research performed by this study, mention was made by some recyclers that certain independent collection programs targeting a specific or same family of materials failed to deliver the materials to market. Anytime a new collection program begins, firm marketing arrangements must be in place. The well publicized events of a pilot project effort by the city of Minneapolis to collect non-bottle rigid containers and the lack of a willing market stands testament to how important it is to establish end markets that have achievable standards. Significant market price and demand drops have also required temporary storage of materials until markets stabilized.

Not "true" recycling

There are several specific items that have been directly challenged by recycling advocates as not truly being recycled. Farm pesticide container recycling programs have been operating for many years, with the primary outlet for materials being incineration, while product and safety testing was conducted to establish the best use for the recovered containers. Household batteries that are collected for "recycling" have a very low recycling rate (except for silver oxide, mercury, sealed lead acid and rechargeable nickel-cadmium types), yet proper disposal has been accomplished. Used motor oil collections commonly proclaim to be recycling, yet the vast majority is burned as a fuel. Plastic LDPE bags that are collected in grocery and other retail stores throughout the state have also been the focus of concern. Several recycling operators and citizens claim that when pressed to reveal the final market used, none is named. MPCA staff have received assurances that there is an on-going marketing arrangement for the recycling of the LDPE bags into plastic lumber and other usable products. This issue will continue to be closely monitored.

"I wondered about the plastic bags recycling at local grocery stores. So I called the hotline number and 'we were it' and we do not accept plastic bags" County Recycling Coordinator

Dumping operations

In some cases, materials have been separated by the generator for recycling, but are delivered to a facility that does not market that particular material grade. That type of material stream might be thought of as a reject of the facility rather than the "dumping of recyclables." However, if a material is separated from MSW by a generator for the purposes of recycling, the Waste Management Act prohibits the disposal of the recyclables without permission from the OEA.

> **Recyclable materials prohibition [Minn. Stat. § 115A.95]:** A disposal facility or a resource recovery facility that is composting waste, burning waste or converting waste to energy or to materials for combustion may not accept source separated recyclable materials, and a solid waste collector or transporter may not deliver source separated recyclable materials to such a facility, except for recycling or transfer to a recycler, unless the director [of OEA] determines that no person is willing to accept the recyclable materials.

This state law, first adopted in 1985, was limited to only publicly owned resource recovery facilities, but was broadened in 1994 to also include all private facilities as well as disposal facilities. The only time that the state authorized the disposal of materials was during the newspaper glut of 1989 and no recyclers have requested permission by the state since that time. As a result of research for this report, the MPCA has discovered two specific incidents of facilities or haulers not complying with this requirement. Corrective actions have been taken.

The MPCA believes that the disposal of recyclables rarely constitute an immediate environmental threat. Yet, if a generator is given assurances that materials will be recycled and are not, the consumer has received fraudulent service. If a contract or a negotiated business arrangement has been agreed upon to recycle an item and that item is knowingly and routinely disposed of as a facility reject, the generator should be made aware of this practice.

Conclusion and recommendations

The potential for the dumping of recyclables exists and probably always will, but since occurrences are extremely rare and always based on individual conditions within a specific program or facility, no new actions are recommended by the MPCA. Instead, existing legal authority on the state and local level should be used to focus on the issues identified. If disposal fees continue to decline, more attention should be given to monitoring frequent, widespread or large quantity disposal on the state, local and individual (person or company) level. Phone calls to recycling program operators can be a significant drain on staff resources, but often helps stem contamination problems and provide valuable feedback to the service provider.

- Before selecting a service provider, public entities and commercial establishments should issue requests for proposals (RFPs) or invitations to bid on recycling services which include:
  - a requirement that the service identify the primary and secondary recycling facilities used;
  - an estimate, by the bidder, of what annual reject rate by primary, secondary and overall system operations is expected over the contract period; and
  - a requirement that notification is given to the contacting authority if the estimated reject rate is not met.

In addition, public entities and commercial generators should consider requiring, as a contractual obligation, written or oral notification when their source separated recyclables are diverted to a disposal facility. A specific acceptable reject rate may also be negotiated with a particular collector or facility. Regular reports that identify the facility reject rate factor over a given period may also be used to track the level of recovery by companies or communities.

Do source segregated recyclables have a greater resource value or better markets than commingled?

Source separated recyclables: Materials separated from MSW by the generator for the purpose of recycling.

Source segregated recyclables: Source separated materials that are separated into individual material grades prior to collection.

Commingled recyclables: Source separated materials that are collected together with different material types or grades.

"I think that contamination is 50% from confusion on the rules and 50% because the person doesn't care" RAM Recycling Roundtable - Marshall

Commingling of materials can take many different forms depending on materials collected and equipment. Equipment plays a determining factor since programs often invest in either rollingstock or processing machines that place practical limits on the program modification.

Types of commingling (listed in order of commonality).

- Plastic containers (usually with necks).
- Aluminum and tin cans.
- Paper grades.
- Containers (plastic, metal and maybe glass).
- Dry mix of non-compostables (paper, metal, plastic and sometimes textiles).
- Commercial commingled materials (mostly paper, containers, plastics, rarely glass).
- Complete commingle (all materials mixed including glass).
- Co-collection (recyclables in bags collected in packer truck and MSW).

Source: MPCA Staff and the 1995 Recycling Facility Census data

A simple economic analysis and common sense would indicate that the price for commingled materials would be equal to the price of segregated materials minus the cost of sorting and processing of commingled materials.

Some municipalities have enacted ordinances or established contract provisions that require a certain degree of segregation by generators. The city of Oakdale has had a long-standing ordinance that requires generators to separate certain materials into target categories and thereby prohibiting commingling. Lake of the Woods, Winona and Swift are among those counties that have adopted mandatory recycling ordinances (these are primarily source segregated collections) that require residents to separate materials prior to generation of MSW.

In the most strict definition of commingling, the majority of recycling facilities operating in Minnesota are believed to accept at least one type of commingled material. Certainly the commingling of aluminum and metal cans is widespread since a magnetized conveyor or hand sort provides efficient system. Paper and plastic are also becoming more commonly accepted in a commingled form.

"Sometimes it is hard to tell whether the bin is a commingle bin or a garbage can." Recycling Coordinator

Source segregation

In many communities, source segregation is the historical approach to recycling in Minnesota. As recycling systems have developed over the past decade, new materials are being added to collection programs. Originally, the few number of materials collected at the curb allowed for smaller trucks with larger bins. Yet, as new materials have been added such as plastics, magazines and catalogs, textiles, mixed paper, etc., the physical and practical limits have been reached on collection vehicles. Trailer systems have been added to many curbside vehicles and off-loading of certain materials may be required to maintain space on the vehicle to complete the route.

The educational and cost saving benefits of having generators provide the initial sorting steps cannot be disputed. If generators do not completely separate the materials into a desired marketable grade, the

collection worker at the curb, or en route, will need to perform this function. Participation rates in source segregated programs may be affected by the inconvenience of sorting (burden of preparing) recyclables for collection.

Source separated set-out programs tend to have high collection costs due to the increased amount of time collection workers need to do additional sorting curbside and loading the different materials. However, program mangers do find a return on these increased collection costs. These high costs are offset by lower processing costs and an overall decrease in material breakage and rejection rates. In certain markets, a higher price may be paid.

Most of the processing facilities accepting source separated materials have lower capital costs than those accepting commingled materials. Processing costs can be reduced by either delivering materials directly to high-value markets after baling without prior processing or to performing minimum level of processing, such as color-sorting glass or hand-sorting plastics.

Commingling

Commingled recycling programs are collection programs in which residents combine a variety of materials such as paper, metal, plastic and sometimes glass containers in a single container for curbside collection. Communities or companies that choose to commingle their recyclables do so because these collection programs tend to have high participation rates associated with low collection costs, or is the only service option available.

In commingled programs, operators strive to make recycling as easy and convenient as possible to help guarantee recovery of a high volume of materials. The convenience factor of commingled recyclable collection is traded for increasing the processing costs. Sorting recyclables at a MRF can increase program participation and speed up the rate of collection, but also requires a capital or labor intensive processing facility. The tendency of larger communities to opt for commingled systems is encouraged by their ability to support these large, capital intensive processing centers, while at the same time, profit from lower collection costs as a result of economies of scale.

"I would rather train 20 employees than to educate all my customers." Private Recycling Facility Operator

"We commingle because it is convenient for our customer and it speeds up our collection" Private Recycling Operator

Comparison between source separated and commingled programs

Some program managers find it easier to add materials to a commingled system which does not occur in a source segregated program. If a new material is added to a commingled program, residents simply add the material to the recycling bin. More education is required if a material is added to a source segregated program. The truck used for commingled collection can more easily add or subtract materials as a response to market conditions or contract bids. This truck can also better manage differences in the volume of recyclables residents set out at the curb. A truck whose compartments are already in full use for an established number of source separated materials may not be able to handle the addition of a new material as easily.

Breakage, residue cross contamination and rejection rates are ongoing problems in commingled programs. The commingled collection and processing method results in high breakage and reject rates compared to source segregated programs. A U.S. Environmental Protection Agency (EPA) study titled *"Waste Prevention, Recycling and Composting Options: Lessons from 30 Communities"* evaluated programs operating across the nation. In this study, communities report that reject rates at centers for source segregated materials range from 1- 8% by weight, with an average of a little over 1%. For commingled facilities the range is 2- 32% by weight, with an average of 10%, largely due to glass breakage.

The 1995 Recycling Facility Census indicated that currently between 75-80% of Minnesota's recycling facilities accept source segregated recyclables. Most operators/owners believe that commingled collections will see a significant increase over the next few years. Commercial recycling programs already show this trend by the implementation of the dedicated dumpster for mixed paper or container types. The largest recycling programs in the state collect at least two types of commingled materials.

The degree in which the commingling of materials is allowed in collection has a direct effect on the facility performance factor in the time to process a ton of materials, the cost per ton, but most importantly in the overall reject rate. Minnesota also has only one facility that accepts completely commingled materials. Facility reject rates for commingled residential and commercial collections were estimated by the OEA/Metropolitan *"Analysis of Disposal Potential for Collected Recyclables in the Twin Cities Metropolitan Area: July 1994"* to be an average of 10% and 21%, respectively, in the metropolitan area. These materials are then sent to a MRF where the materials are sorted into a variety of "marketable" material categories. These facilities may perform all the preparations needed and ship the product directly to an end user or to another recycler for additional preparation.

Cost benefit analysis

Most efforts to determine cost benefit of source segregated or commingled systems evaluate a single material or a specific type of operation, rather than an overall conclusion. Trade journals and governmental reports which have evaluated the issues indicate that significant advantages and disadvantages can be linked to either, as shown in the table below. Costs calculations often exclude the full spectrum of expenses or evaluate only some expenditures (e.g., public costs are more often accounted for than private costs). The cost per ton varies greatly from program to program based on factors other than how the materials are collected or processed.

Advantages and Disadvantages Between Commingled and Segregated Set-Out and Collection Systems

	Commingled	Segregated
O & M Cost	The O & M cost to collect commingled recyclables may be less since there are usually only two different containers or bags to pick up, but processing costs may be higher. Collection costs will increase if the processing center is located far away.	The O & M cost may be more due to the slower speed of collection since there can be many different containers or bags to pick up, but processing costs may be lower or avoided altogether.
Capital Cost	The capital cost for collection may be less because specialized recycling vehicles are not needed. Processing facilities may be more expensive to build since more sorting equipment may be needed.	Capital cost for collection may be higher if specialized recycling vehicles or several different vehicles are used. Processing facilities will not need as much sorting equipment.
Reject Rate	More materials entering the processing facility are rejected (average 7% with a range of 0.5-16%).	Segregated materials entering the processing facility have a lower reject rate (average 1.2% with a range of 0-4%).
Revenue	Materials may be more contaminated resulting in a lower market value.	Materials may be higher quality and have a higher market value.
Labor	Less labor is required for collection. More time is needed for crew to load recyclables into collection vehicle.	More labor may be needed for processing. Less labor may be needed for processing.

Source: *Waste Prevention, Recycling, and Composting Options: Lessons from 30 U.S. Communities, EPA, February 1994*

The recycling infrastructure has been developed in Minnesota over the past several decades and primarily within the last five years. Many of these local or individual program decisions have embraced one design over the other. Many claim that the trend is toward commingling more and more materials, yet the 1995 Recycling Facility Census shows Minnesota predominantly operates source segregated collections. One program that is operated by a private company started out as a source segregated collection, switched to multiple commingled materials, and then, due to serious contamination problems, switched back to source segregation. Other programs have made the switch to commingling without experiencing many problems.

Markets

The MPCA staff found it difficult to discuss market conditions and prices for recyclables. The competitive nature of the industry and the lingering suspicions of the MPCA from the former permit-by-rule requirement to report market locations and prices increased the difficulty of gathering consistent and conclusive market information from recyclers. Market arrangements are private and unique between the facility and the end user or material broker. Based on what we have learned, factors such as the quality, volume of materials and frequency of delivery have more impact on the market price than the type of collection system.

Facilities that collect or process commingled materials verify the source segregated materials have "better" markets than those that have been mixed with MSW or recyclables. "Better" may include higher prices, greater flexibility on specifications, and longer term agreements.

The MPCA was unable to substantiate the idea that source segregated materials have more secure markets or better prices. As discussed earlier, all materials, whether collected separately or in a commingled fashion, must meet the standards set by the purchasing market. In times of material shortages, standards may be relaxed to increase materials received, and in times of surplus, supply standards may increase or be more strictly enforced to reduce costs for the end user.

Market comparison

MPCA's research indicates divergent opinions in the recycling community on this policy question. Some end users emphatically stated that the difference between source segregated and commingled material grades or types were not detectable because both program types are held to the same market specifications. Still, other end markets stated the exact opposite. Recycling program managers and facility operators were also divided on the question. The issues are explained in the January - February, 1995 "Point Counter Point" column of *The Resource*, published by OEA. The lack of agreement on the preferred system is also being debated on the national level in trade journals and technical conferences. Due to the diversity of opinions regarding market specifications and the varying levels of information provided by recyclers, information on this subject is incomplete.

Glass may be the exception to the general rule. Broken glass is a serious cross contamination in almost every material market grade and between colors. Other serious contaminants from commingled collections include: soaps, oils, milk and other sticky goo by attracting dirt and other foreign materials.

Conclusion

The MPCA analysis is based solely on rejects as the primary performance factor. If the Legislature accepts this premise, then source segregated systems provide the highest performance effectiveness. However, the Legislature may want to consider additional collection and facility operations efficiency, cost effectiveness, worker safety conditions, environmental protection and resource conservation on a statewide or regional basis. Such a broad scoping analysis would be difficult, time-consuming and expensive.

Are additional performance standards needed at this time?

> **Performance standard:** A state or local regulation or a contractual obligation that mandates specific operating procedures.

The MPCA staff considered, but rejected, performance standards in adopting revisions to the recycling permit-by-rule standards. Several meetings were held to solicit comments from industry representatives on whether recycling facilities that were unable to achieve a certain annual reject rate of, for example 85%, would be permitted as a transfer station rather than a permit-by-rule recycling facility. Although some supported the concept and even argued for performance standards at a higher rate, the MPCA believed the costs and time required to establish the performance standards through a controversial rulemaking process would have shifted activities from other legislative priorities. Annual administrative costs for a more regulated approach to recycling facilities would be significant with little attributable improvement to the environment. In the research for this report, the vast majority of recyclers felt that the market specifications or standards established by end users for the quality of recyclables provides the necessary control over industry performance.

State regulations

Recycling facilities are a component of the solid waste management system of the state, and are regulated by the Solid Waste Management Rules. First regulated in 1988, with the passage of the amended state rules, the number of these facilities has dramatically increased since that time. As discussed previously, there are two distinctly different types of recycling facilities: those accepting only source separated recyclables and those accepting MSW.

Any facility that accepts MSW or sorts recyclables from MSW is required to obtain a solid waste permit prior to beginning operations. The development of the permit and subsequent facility inspections to ensure compliance provided the necessary oversight. Typically, the portion of the facility operation regarding the recycling activities is addressed within all relevant portions of the solid waste permit. The MPCA has also required specific recycling provisions such as in the case of Dakota Resource Recovery Inc. (DRRI) where a 30% by weight annual reject rate has been established. Recycling facilities that accept certain materials such as major appliances, fluorescent tubes, etc., may have additional regulatory requirements. Facilities accepting items that are regulated must ensure that the proper approval for all items is received prior to beginning operations.

If properly operated, facilities that accept source separated recyclables have been determined by the MPCA to pose a low potential for environmental harm. Therefore, a less detailed compliance program is pursued through a permit-by-rule system. Any facility accepting 40 or more cubic yards of material(s) at any given time is required to receive a permit-by-rule prior to starting operations. The requirements established within this program include an abbreviated annual report, materials storage limit of three years, quarterly inspections with a recorded log maintained and other basic operational procedures. The administrative rule governing this program has recently been amended to take into account the experience the MPCA and recyclers gained over the past six years of implementation. The permit-by-rule program has redefined the types of applicable facilities to provide a more focused and effective state regulatory program.

Why regulate recycling facilities?

Although recycling facilities have an extremely positive public image and are generally thought to be environmentally safe, due to the location, materials accepted or processed and other operational factors, a variety of environmental conditions may exist. The major source of environmental release is in the management of the rejected materials. Some facilities have been involved in the cost recovery actions associated with environmental cleanup. Proper facility management and selection of a disposal facility with environmental controls for disposal of the rejects will greatly reduce financial liabilities from remediation of disposal sites.

Most would agree that a certain level of regulatory oversight should exist to provide for the protection of the environment and public health. Recycling facilities vary greatly in size and function, yet almost all have the potential to contaminate the environment or to cause public health problems. The existence of local and state governmental regulations regarding the management of waste (which includes recyclables) dates back to the early days of statehood. Some communities are using contracts to reduce the amount of rejects at recycling facilities to provide a greater degree of accountability from service providers.

In addition, citizens and companies across the state have made a commitment to recycle, and as a result, watch the collection and facility operations closely. Many have called governmental agencies or local officials to ask questions or report suspicious acts.

These mechanisms not only provide environmental protection, but also help to protect the public image of the recycling industry. Collectively, and cooperatively, the industry can work to protect the public image of recycling. However, a few poorly operated programs have the potential to discredit the vast majority of programs that have made Minnesota a national role model in recycling.

Some within the recycling industry are calling for increased performance standards to ensure minimum service levels or to increase operating efficiencies. They believe that performance standards could act as a force to level the playing field on an industry-wide basis and to remove any competitive advantage for sham operations.

Possible performance standards mechanisms that exist or could be developed include (from the most severe to the least control).

⇒ Direct regulation (strict permit requirements regarding reporting, materials accepted and reject rates).
⇒ License or contract provisions (maximum reject rates with notification, disposal restrictions on rejects, generators required to segregate materials).
⇒ Generator disclosure/notification requirements.
⇒ Standardized terms and symbols (regulations adopted that establish enforced usage of key terms and symbols).
⇒ Accreditation (some public or private organization would establish a course or test that would provide a codes of conduct).
⇒ Best management practices (voluntary actions that are developed through a consensus process).

Source: MPCA staff

Best management practices (BMPs) have been used successfully in similar industry and environmental issue areas. If the result is to be a true consensus document that addresses a comprehensive approach to

controversial issues or establishes strict protocols, development may take 2-5 years of detailed negotiating. Although BMPs would be helpful in many aspects of the recycling process, the MPCA does not call for their development at this time because feedback from industry representatives indicate that the dedication of resources would not be justified by the end product. BMPs may not be as useful in an industry that is based on competition with minimal potential for contaminating the environment.

County or city ordinances

Counties and cities have the ability to establish regulatory programs to govern operations within their respective jurisdiction. Most local authorities rely on the MPCA program to govern recycling operations. However, some have established local programs that work in tandem with the MPCA to provide oversight and environmental protection.

See the select laws and regulations regarding recycling collection and facilities in Section IV for more detailed information regarding state and local regulatory programs.

In addition to the direct regulation of recycling facilities, there exists a variety of other legal safeguards against improper operation as discussed earlier in this report. Criminal and civil penalties are available and field citation authority has been extended to certain authorities.

MSW recycling

When recyclable materials are collected with or sorted from MSW, additional caution must be taken with the storage and marketing. The materials may have come in contact with contaminating and harmful elements. These potentially tainted recyclables may be processed at high temperatures, as is the case with glass and metals, that purifies the feedstock. Processing of paper, plastics, textiles and other organic materials may not sufficiently clean and purify them to remove potential dangers. In particular, food packagers have established a strict approval process for the use of recycled materials. Limited testing of recyclables pulled from the waste stream has occurred to date.

The Metropolitan Council and the MPCA conducted a 20 sample chemical analysis of various materials in municipal solid waste. Data from the 1992 study showed several samples with high levels of cadmium, lead or mercury. One sample showed 9500 mg/kg mercury. The same sample had 67 mg/kg cadmium. The sample was coated with a slimy substance that appeared to be a contaminant, most likely picked up some time after being discarded. The Ramsey Washington Resource Recovery Facility located in Newport has conducted multiple tests in 1993 and 1994 to determine if the glass grit removed from MSW at the facility poses a threat of leaching contaminants into the environment. The samples were composited and leach tested according to EPA's Methods 1311 (Toxicity Characteristic Leaching Procedure) and 1312. The test result shows that there is variability in the level of contamination. Some samples did not exceed limits set by EPA for hazardous waste while others showed elevated levels for lead, cadmium and sulfate. These tests raise questions about the quality of materials sorted from MSW for recycling. Of primary concern are paper, plastic and textile materials since the low processing temperatures does not sterilize the materials.

Until additional testing is funded to draw conclusions regarding the health and safety impact on recyclables pulled from MSW, great care should be taken with the marketing of the materials. At a minimum, all recyclers should duly notify all other processors or end users that receive any materials that have come in contact with MSW.

Conclusions and recommendations

The MPCA and the majority of the recycling community believe an appropriate level of regulation exists to protect the environment and public health from the environmental impacts associated with recycling. The amended permit-by-rule program for recycling facilities should provide effective oversight of the facilities across the state. Any type of performance standard that could be established also requires resources for management of that program. This report finds that no new regulatory or performance standards are necessary to be established at this time.

However, the MPCA encourages public entities and private organizations to seek detailed information from recycling collectors to assure that recycling or appropriate management of the materials collected truly occurs. An estimated annual operating efficiency or reject rate should be required of facilities. The program operators should ensure that the MSW facility used for the disposal of the rejected materials is utilizing the most stringent environmental control systems to minimize long term liabilities.

- If materials have come in direct contact with MSW, notification should be given to other recyclers, material brokers or end users that gain possession of the material.
- If maximum landfill abatement through recycling is the objective, source segregated collections will recover the highest percent of recyclables and have the fewest amount of rejects. Based only on this performance factor of rejects, source segregated systems should be a higher preference for implementing, but the Legislature may want to invest in a longer term study which considers other performance factors.

SECTION IV

PURPOSE OF THIS SECTION

This section presents the findings and data collected by the 1995 Recycling Facility Census.

METHODOLOGY OF THE 1995 RECYCLING FACILITY CENSUS

Census: An official, usually periodic, enumeration of population. A governmental count.

A census was selected because existing databases developed by the OEA and the MPCA provide a good count of how many facilities exist in each county, but contain limited locational and operational information. The MPCA believed given the time frames and resources available for development of this report, that a short-run, comprehensive survey of all facilities operating would provide the most useful data on the recycling system. The statewide survey required a large amount of personal contact, but provided additional information and insight on current market conditions, historical milestones and recent acquisitions.

Census conducted: February - June 1995
Contacted: Almost 500 county solid waste administrators, private operators and municipal coordinators.

The census was designed to identify all locations within the state where citizens or companies may drop-off recyclables (see map A1). To be considered, these facilities must be open to the public and accept materials that have been collected separately from MSW. There are several counties that have facilities operating that do not accept materials directly from the public and instead function as a MRF (see map A10) for curbside collection programs or for commercial recycling collectors that were not included unless the facility accepts recyclables directly from generators.

Process

The initial step was to develop a one-page recycling census form, which required descriptive information of each individual facility. Included in this census form were geographic, ownership, annual throughput range (see map A3), operating functions and specific materials accepted by each facility. Two staff members drafted standard correspondence and oral explanations of the census process. County solid waste administrators, recycling coordinators, existing databases and trade associations were tapped to develop a comprehensive contact list for all current operations.

After developing the census, MPCA staff called each contact, giving oral instructions to the person completing the forms. The staff member explained the importance and background, as well as what was needed for the completion of the census, to each respondent. This is the first time that locational or site specific information was collected for each recycling facility in the state.

Although the original intent was to collect adequate locational descriptions for each facility, only a handful of counties could be that specific. Each location was manually plotted and then digitized into a mapping software package that provides a link to a Geographic Information System (GIS). The database resulting from the census was then linked to ARC View II -- GIS presentation software used to customize map

information and produce final map views. As field visits allow, GIS equipment will be used to confirm locations.

The census provides a snapshot of recycling opportunities in Minnesota. Even after the conclusion of this report, on-going work to verify the Census data with the Select Committee on Recycling and the Environment (SCORE) data, MPCA permit reports and other data sources will continue.

Please contact the MPCA with corrections or updates.

CENSUS OVERVIEW AND HIGHLIGHTS

The 1995 Recycling Facility Census was designed specifically to identify the geographic locations of all recycling facilities in Minnesota that are open to the public for dropping off recyclables separated from the mixed municipal solid waste (MSW) and to determine to what degree commingling of materials was occurring (see appendix A). In addition to these opportunities to recycle, there are 679 curbside programs operating in the state that provide convenient service and a flow of materials to these facilities. There are an estimated 20+ MRFs accepting materials from recycling collectors, but not the general public. All 56 of the class one wayside rest area recycling centers sponsored by MN/DOT are not included in the Census because they are for travelers only.

Unlike existing databases which provide the total number of facilities per county, the Census provides facility location and specific operating information on a statewide basis.

As a cross-check for the accuracy of the census, several questions were posed in similar ways. For instance, the number of facilities was totaled by ownership, type or annual throughput. Another indicator of data quality is the response to several questions regarding the source segregating or commingling of materials.

Geographic locations

The Census map of facilities by county identifies those counties that have taken the initiative or facilitated the development of a local recycling facility infrastructure. Curbside service is not shown, so areas which do not indicate development of facilities may have recycling opportunities that are not illustrated. On this map, almost half of Greater Minnesota counties have established drop-off locations in every city and some townships. The pattern of county-run drop-off sheds or compartmentalized trailers can easily be detected.

Major transportation routes and large cities are easily identifiable. Certain communities or regions, such as Mankato, Marshall, Morris, Alexandria and the Iron Range have the highest density of facilities. Several regions, such as the west central, southeast and southwest, also cover large areas or multiple counties with similar collection services. The Census identifies less than 10 areas which have large distances between facilities and the MPCA believes the majority either have curbside service or few residents.

Ownership

Ownership was categorized in the Census by three different ways: public, private and mixed (see maps A2, A11 and A12). The mixed category was intended to capture public/private partnership, but may be underestimated due to many counties regarding the facility as publicly owned even though a private firm was contracted for operations. The Waste Management Act requires that counties provide the

"opportunity to recycle" to residents resulting in a dominance of public facilities. Less than 25% of the facilities were privately owned and operated. However, the private facilities tend to be the largest in the state. Twenty-seven of the 34 facilities that accept over 5,000 tons per year (TPY) and less than 20% of the facilities accepting less than 5,000 TPY were private.

Types of facilities

The Census form defined three different types of facilities. These major facility types were generally understood by those completing the interview, but differences in definitions between the Census and OEA's SCORE form required explanation and added considerably to the time needed to conduct the census. Facilities that have dual functions were credited for both types of facilities.

Drop-off facilities comprised more than 90% (see map A4) of the total facilities in the state, with 145 accepting more than 1,000 tons per year or no more than 4 tons per day. The biggest surprise is that fewer than 10% of the drop-offs were mobile trailers or dumpsters. Almost 65% of the facilities were unattended and many comments were made regarding illegal dumping or contamination problems. Many MRFs provide drop boxes outside the processing areas to avoid congestion problems within the processing area. Fewer than 1% of the drop-offs have scales installed.

Material recovery facilities or MRFs prepare (bale, crush, smash, grind, shred, etc.) at least one material (SCORE has traditionally required three different materials to be processed). These are the large facilities that provide the processing hubs in strategic locations. Almost half of these facilities employ sheltered workshop staff to assist in the task of preparing materials for end users. Over 20% of the MRFs make animal bedding, but these operations are only in 11 counties all in the southern portion of the state, showing the regional nature of the market for the product. Over 60% provide collection service in addition to the processing of recyclables. Scales are not operated in 23% of the MRFs.

End users turned out to be difficult to identify and are believed to be underrepresented. The intention was to provide for a comprehensive count of all manufacturers that accept recyclables for the general public. The main issue is whether strict quality control can be guaranteed from generators that delivered directly to an end user. Almost 75% provide collection service as a means of providing for a flow of post-consumer materials. Only one utilized more than one type of material.

Commingled or source segregated

This was perhaps the most difficult question for facility operators to answer. All were attuned to the distinction between the two different methods to collect recyclables and only 128 facilities responded affirmatively to both functions (which was allowed). Only half of those facilities accepting commingled materials separated the materials on-site (see map A6). Almost all of the facilities that sorted materials used hand separation and 33% had conveyor belts (see map A8). Mechanical systems may be slightly under represented since only 18% responded and a magnetized bulk-head conveyor system to sort aluminum and tin cans is common place in most commingled facilities.

As mentioned previously, there were several questions regarding commingling of materials. Some facility operators answered questions on commingling inconsistently. For example, one question asked whether materials were source segregated or commingled. Another asked specifically if they accept commingled papers, metals or plastic. The discrepancy comes from the fact that the first question is more general, and

many facility operators mix one or two materials, yet still consider the mixture as source segregated materials.

Of the 233 facilities that accept commingled materials:

- 92 accept commingled paper, metal and plastic;
- 174 accept commingled metal and plastic;
- plastic is the most commonly commingled material; and
- 60 of the 111 MRFs in the state accept commingled materials (see map A7).

MSW and recyclables accepted

Only 10% of the recycling facilities accept MSW (see map A9). Most have found that when waste streams are mixed, illegal dumping follows. Thirty-four counties provide at least one opportunity to deposit mixed solid waste at the same location as recyclable drop-off (separate containers). Several counties, most notably Houston County have developed attended collection sites that serve the dual purpose believing the combined functions would reduce on-site burial or burn barrels. Of the 891 facilities statewide, only 35 facilities, or 4%, regularly separate recyclables from MSW. Of these operations, 25 of the 35 are publicly owned.

Problem materials

These materials already have regulatory programs that have been developed to control environmental releases and to maximize recovery. The MPCA believes that these items were not widely collected by recycling facilities and the Census confirmed this fact. Fluorescent bulbs were the most collected problem material at 7%, 6% accepted construction demo, 7% oil filters, 5% auto parts and only 2% accepted HHW.

Additional materials

Many of the facilities interviewed indicated that they were considering adding a particular recyclable or adjusting the mix of materials to accommodate more materials. The state's packaging hierarchy (Minn. Stat. § 115A.5502) establishes a preference for packaging which is regularly collected in programs that are available to at least 75% of the residents in the state, and even though the Census does not account for curbside programs, several types of packages meet that goal including: aluminum, steel/tin, glass, HDPE and PET plastics. In addition, newsprint was the most collected item with 94% of recycling facilities accepting the item.

Below is a list of materials accepted at recycling facilities from the most to least commonly accepted.

- newspaper;
- glass;
- aluminum;
- steel/tin;
- HDPE and PET commingled;
- corrugated containers;
- office paper;
- magazines and catalogs;
- commingle paper grades;

- phone books;
- commingled metals;
- mixed plastic;
- scrap metal;
- textiles;
- aerosol containers;
- fluorescent bulbs;
- oil filters;
- yard waste;
- aseptic or paper milk cartons;
- auto parts;
- polystyrene; and
- film plastics.

Other notable items

- Only 2% of the facilities accepted items for reuse.
- 13% accept textiles, a readily recyclable commodity.
- Only 15% of facilities had scales, all MRFs did have a scale.
- Of the 46 facilities that pay a redemption value on any material (other than aluminum), only 10 charge a drop charge.

MINNESOTA POLLUTION CONTROL AGENCY
520 Lafayette Road North, St. Paul, Minnesota 55155-4194 • 1-800-657-3864 • FAX 612-296-9707

Facility Name: **RESULTS PRESENTED IN TOTAL NUMBERS**

County:

Address:

City, State, Zip:

Mr.
Mrs. Ms.

Phone:

Fax:

OWNERSHIP

681 Public

191 Private

19 Mixed

817 DROP-OFF	111 MRF (prepares 1 material)	17 END USER / MARKET
344 Staffed	46 Sheltered workshop staff	12 Operate collection service
519 Unstaffed	23 Makes animal bedding	1 Utilize more than 1 type of recyclable material
92 Mobile	69 Operate collection service	

THROUGHPUT RANGE

706 1-1,000 Tons/Year or Less Than 3 Tons Per Day
154 1,001 - 5,000 TPY or Less Than 20 TPD
13 5,001 - 10,000 TPY or Less Than 39 TPD
17 Over 10,000 TPY or Greater Than 39 TPD

FUNCTIONS AND MATERIALS

729 Source segregated 233 Commingled
112 Are Commingled Materials Separated On-Site
38 Mechanical 105 Hand separation
66 Use of Conveyor

35 Separate recyclables from mixed wastes?
87 Accepts mixed municipal solid waste (MSW)
18 Accepts household hazardous waste (HHW)
20 Accepts items for reuse
56 Yard waste 27 NOT composted on-site
49 Construction/Demo
58 Fluorescent Bulbs
40 Auto Parts

127 Do use a scale to weigh materials
46 Pay redemption value on any material from generator (other than aluminum)
43 Drop charge on any material

26 Retail function associated with facility

PAPERS:

627 Corrugated containers
839 Newsprint 518 Magazines & catalogs
524 Office paper 331 Phone books
351 Commingled paper grades
54 Aseptic/milk cartons
29 Other

METALS

830 Aluminum
814 Steel/tin
307 Commingled containers
169 Scrap metal (ferrous & non-ferrous)
108 Aerosol cans
56 Oil filters

GLASS:

838 Glass containers
19 Other glass

PLASTICS:

718 PET (SPI Code 1)
728 HDPE (SPI Code 2)
196 Mixed plastics (SPI Code 1-6)
29 Polystyrene (SPI Code 6)
7 Film plastics
54 Other

118 TEXTILES:

65 OTHER *(please specify)*

 This census was conducted February - June of 1995. Call Bill Dunn at 612-282-2663 with questions.

MINNESOTA POLLUTION CONTROL AGENCY
520 Lafayette Road North, St. Paul, Minnesota 55155-4194 • 1-800-657-3864 • FAX 612-296-9707

Facility Name: **RESULTS PRESENTED IN PERCENTS**

County:

Address:

City, State, Zip:

Mr.
Mrs. Ms.

Phone:

Fax:

OWNERSHIP

76% Public

21% Private

2% Mixed

92% DROP-OFF	12% MRF (prepares 1 material)	2% END USER / MARKET
42% Staffed	41% Sheltered workshop staff	71% Operate collection service
64% Unstaffed	21% Makes animal bedding	6% Utilize more than 1 type of recyclable material
11% Mobile	62% Operate collection service	

THROUGHPUT RANGE (ANNUAL)

79% 1-1,000 Tons/Year or Less Than 3 Tons Per Day
17% 1,001 - 5,000 TPY or Less Than 20 TPD
2% 5,001 - 10,000 TPY or Less Than 39 TPD
2% Over 10,000 TPY or Greater Than 39 TPD

FUNCTIONS AND MATERIALS

82% Source segregated 26% Commingled

48% Are Commingled Materials Separated On-Site
16% Mechanical 45% Hand separation
28% Use of Conveyor

4% Separate recyclables from mixed wastes?
10% Accepts mixed municipal solid waste (MSW)
2% Accepts household hazardous waste (HHW)
2% Accepts items for reuse
6% Yard waste 3% NOT composted on-site
6% Construction/Demo
7% Fluorescent Bulbs
4% Auto Parts

14% Do use a scale to weigh materials
5% Pay redemption value on any material from generator (other than aluminum)
5% Drop charge on any material

3% Retail function associated with facility

PAPERS:

70% Corrugated containers
94% Newsprint 58% Magazines & catalogs
59% Office paper 37% Phone books
39% Commingled paper grades
6% Aseptic/milk cartons
3% Other

METALS:

93% Aluminum
91% Steel/tin
34% Commingled containers
19% Scrap metal (ferrous & non-ferrous)
12% Aerosol cans
6% Oil filters

GLASS:

94% Glass containers
2% Other glass

PLASTICS:

81% PET (SPI Code 1)
82% HDPE (SPI Code 2)
22% Mixed plastics (SPI Code 1-6)
3% Polystyrene (SPI Code 6)
1% Film plastics
6% Other

13% TEXTILES

7% OTHER *(please specify):*

This census was conducted February - June of 1995. Call Bill Dunn at 612-282-2663 with questions.

LAWS AND REGULATIONS REGARDING RECYCLING COLLECTION AND FACILITIES

Listed below are primary laws and regulations that affect recyclers. This is not intended to be a comprehensive list.

Opportunity to recycle

This law establishes base level residential recycling collection services and quarterly recycling promotion that counties must ensure exists. At a minimum, all counties must have at least one recycling center. Cities in the metropolitan area with a population of more than 5,000, or cities in Greater Minnesota with a population of over 20,000 must provide monthly curbside collection. Counties should also "encourage" commercial and industrial collection programs. [Minn. Stat. § 115A.552]

Public building recycling bins

All public buildings that generate MSW must provide for the recycling of at least 3 materials. These materials may either be collected in separate bins or in a commingled fashion. Due to contamination concerns, most recycling activities occur in work areas, not in public areas. [Minn. Stat. § 115A.151]

Broad material types (not just materials grades)

Broad material types are explicitly mentioned in 3 provisions (opportunity to recycle, public bins and highway signs), but implied throughout the Waste Management Act. Statutory language on exactly what a "broad material type" constitutes does not exist and, therefore, is left to common sense, market standards and OEA interpretation.

County collection and transportation of recyclable materials

This provision requires counties to ensure that materials collected for recycling have a market available, but forbids counties from enacting measures that prevent collectors from delivering materials to a facility of their choice. [Minn. Stat. § 115A.553]

Recycling center highway signs

The MPCA and MN/DOT work together to certify and install a uniform directional highway sign for recycling centers. To qualify, a recycling facility must be in compliance with MPCA's permit-by-rule requirements, accept at least 4 material types and be open at least 12 hours per week all year. A fee for fabrication and installation is charged to the facility requesting the sign. [Minn. Stat. §§ 115A.555 and 173.086]

No extra charge for recycling services

A generator may not be charged more if they recycle. Many communities and counties, especially in the metropolitan area, have developed service fees as a funding base that pays for the extra costs of recycling. [Minn. Stat. § 115A.93]

Disposal bans

- ∅ waste tires [Minn. Stat. § 115A.904];
- ∅ source separated recyclable materials [Minn. Stat. § 115A.95];
- ∅ spent lead acid batteries and used oil [Minn. Stat. §§ 115A.915, 115A.916];
- ∅ yard and tree waste [Minn. Stat. § 115A.931];
- ∅ major appliances [clothes washers and dryers, dishwashers, hot water heaters, heat pumps, furnaces, garbage disposals, trash compactors, conventional and microwave ovens, ranges and stoves, air conditioners, dehumidifiers, refrigerators and freezers. This includes the removal of capacitors and ballasts that may contain PCBs, removal of chlorofluorocarbons (CFCs) refrigerant gas, and recycling or reuse of metals, including mercury. [Minn. Stat. §§ 115A.02, subd. 17a, 115A.552, 115A.9561];
- ∅ dry cell battery containing mercuric oxide electrode, silver oxide electrode, nickel-cadmium or sealed lead-acid [Minn. Stat. § 115A.9155];
- ∅ rechargeable battery, rechargeable battery pack or a product with a non-removable battery pack [Minn. Stat. § 115A.9157];
- ∅ mercury, a thermostat, thermometer, electric switch, appliance, medical/scientific instruments. Tax exempt clothing or wearing apparel that contains a mercury switch was added in 1994. [Minn. Stat. §§ 115A.932, 116.92, 116.932];
- ∅ fluorescent or high intensity discharge lamps. [Minn. Stat. § 115A.932];
- ∅ lead paint [Minn. Stat. §§ 116.875, 116.88];
- ∅ motor and vehicle fluids and filters expanded to include brake fluid, power steering fluid, transmission fluid, motor oil filters (certain exemptions exist) and antifreeze (effective December 31, 1996) [Minn. Stat. § 115A.916];
- ∅ telephone directory [Minn. Stat. § 115A.951];
- ∅ no person may knowingly vent CFCs [Minn. Stat. § 116.731].

Many Minnesota counties and several states have enacted land disposal bans on certain material grades that affect recycling. Most notably, Wisconsin recently enacted sweeping bans on 26 materials statewide unless the local recycling program is deemed sufficient by the Wisconsin Department of Natural Resources; this has impacted several Minnesota counties.

STATE AND LOCAL REGULATORY REQUIREMENTS

Permits for recycling facilities

All facilities that accept or sort recyclable materials must be permitted by the state. If MSW is received at the facility, a full solid waste permit must be issued. If the recyclables have been source separated by the generator from MSW, then an abbreviated program called "permit-by-rule" is followed.

As defined in Minn. Rule 7035.0300, a recycling facility is a solid waste facility that accepts materials that:

- ♦ fit the definition of MSW prior to being separated for recycling;
- ♦ are not included as an item that is banned from disposal with MSW, unless the MPCA commissioner takes action;
- ♦ have been separated from MSW by the generator; and
- ♦ are not hazardous waste as defined in Minn. R. Ch. 7045 or household hazardous waste Minn. Stat. § 115A.96.

Recycling facilities do not include individual generators of recyclable materials or manufacturers that use recyclables.

Facilities may accept and process materials that are not included in the above list, but proper approval must be received and operating standards established in other relevant laws or rules must be followed. Examples include those facilities that accept auto hulks, major appliances, motor vehicle used oil or fluids and other separately regulated waste streams. Permit-by-rule only covers the activities and items limited to source separated recyclables.

Very small facilities (handling no more than 40 cubic yards at any one time) are exempted from the system and only physical locations are permitted (not rollingstock). All facilities are required to notify the MPCA prior to beginning operations. Materials may not be stored for over 3 years and storage of materials requires an annual notice to the MPCA. Operators must conduct inspections at least monthly and correct malfunctioning equipment within 2 weeks. Reports are due to the MPCA on April 1st of each year, primarily describing the weight of materials received.

County or city facility licenses

Local authorities have historically had broad reaching authority in regulating waste management. Those facilities that handle mixed wastes, decomposing organic materials or process food or pesticide containers (that represent higher environmental and public health threats) are more strictly regulated. Source separated or commingled recyclables typically do not pose an environmental threat. Consequently, not all counties and few cities have established local licensing programs.

County may license recycling collectors (optional)

Counties are given the authority to enact licensing systems for recycling collectors. Minn. R. Chs. 400 and 473 provide overall authority for the development of recycling programs, but increased recycling activities and data requirements have led some counties to enact licensing systems. In some cases, vehicles need to be licensed. [Minn. Stat. § 115A.553]

Licensing authorities often reinforce existing state laws, rules and local regulations. One example is the city of Oakdale which passed an ordinance in 1989 that established targeted recyclables that must be properly processed by the generator in order for the collector to pick up the materials. This requires source separation by the residents. A recycling collector is not permitted to encourage residents to commingle material grades even if that is their method of processing the recyclables.

Mandatory Recycling Ordinances

Seventeen counties and 84 cities have passed ordinances that mandate recycling of certain items by residential and/commercial generators. Counties and cities are given broad powers with which to plan and implement polices that encourage recycling and proper disposal. Mandatory recycling ordinances were first used in the state during the depression and the World War II years to boost recovery and salvage drives. Many counties and cities have adopted ordinances in the late 1980s and early 1990s. These types of ordinances are more predominant in Greater Minnesota than the metropolitan area.

Statewide, the "opportunity to recycle" approach is taken to direct units of government to provide collection service rather than mandating recycling on generators. Recycling requirements have been established in state statute for certain problem materials such as mercury containing products and major appliances.

Recycling space and the state building code

State law and the uniform building code require all new or significantly remodeled buildings and structures that contain over 1,000 square feet to provide suitable space for the storage of recyclables. This provision does not apply to residential structures with fewer than 4 units. The space should be located so that it is at least as convenient as the solid waste containers. There are specific factors established for each type of building use, but these factors are the minimum and should be used as a starting point rather than the numbers used to determine the area that is suitable for the structure. [Minn. UBC 1300.4700]

Local storage screening ordinances

Many counties and cities have established restrictions on exterior storage of materials. These ordinances may require fencing, concrete block structures with gates or time storage limits.

Fire Codes

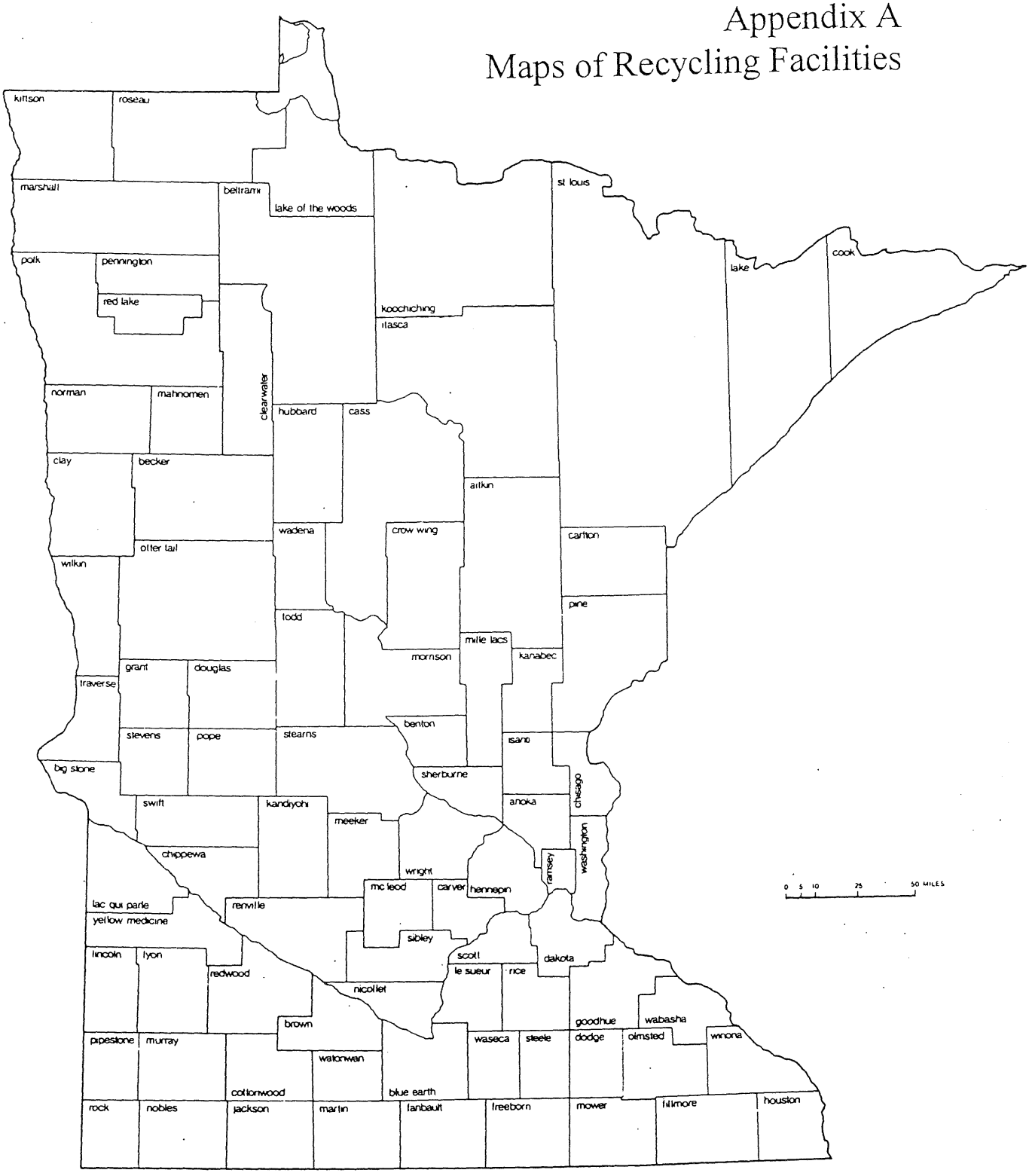
The State Fire Marshall and local fire departments' codes and restrictions vary based on the specific facility's situation.

Contracts

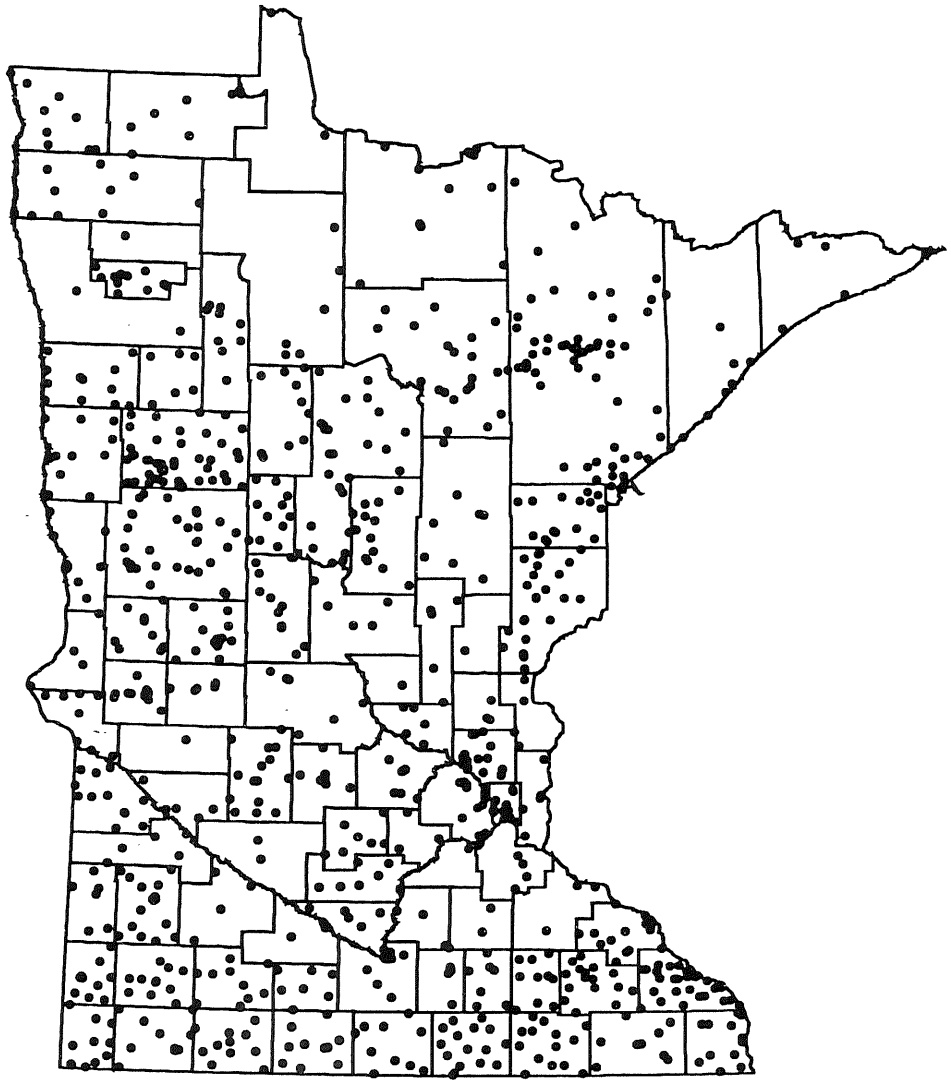
Local units of government that have taken the initiative to develop a recycling program for a given area may either provide collection service through public works staff or put a contract out for bid. These contracts can cover a broad range of issues such as service frequency, hours of operation, required insurance levels, program design features and other elements. Some areas have developed ordinances or other operating procedures that are reflected in contract provisions.

Some local authorities have established maximum reject levels for the recycling program. Most municipal contracts contain boilerplate provisions that require that recyclables collected must be recycled. The city of Minneapolis current contract establishes a 0.5% per day reject level from the materials collected curbside. If this level is exceeded, then the contractor must contact the city to receive instructions concerning the facility to which the waste materials should be delivered.

Appendix A
Maps of Recycling Facilities



1995 Minnesota Recycling Facility Census



Total Recycling Facilities

recycling facility

county boundary

N

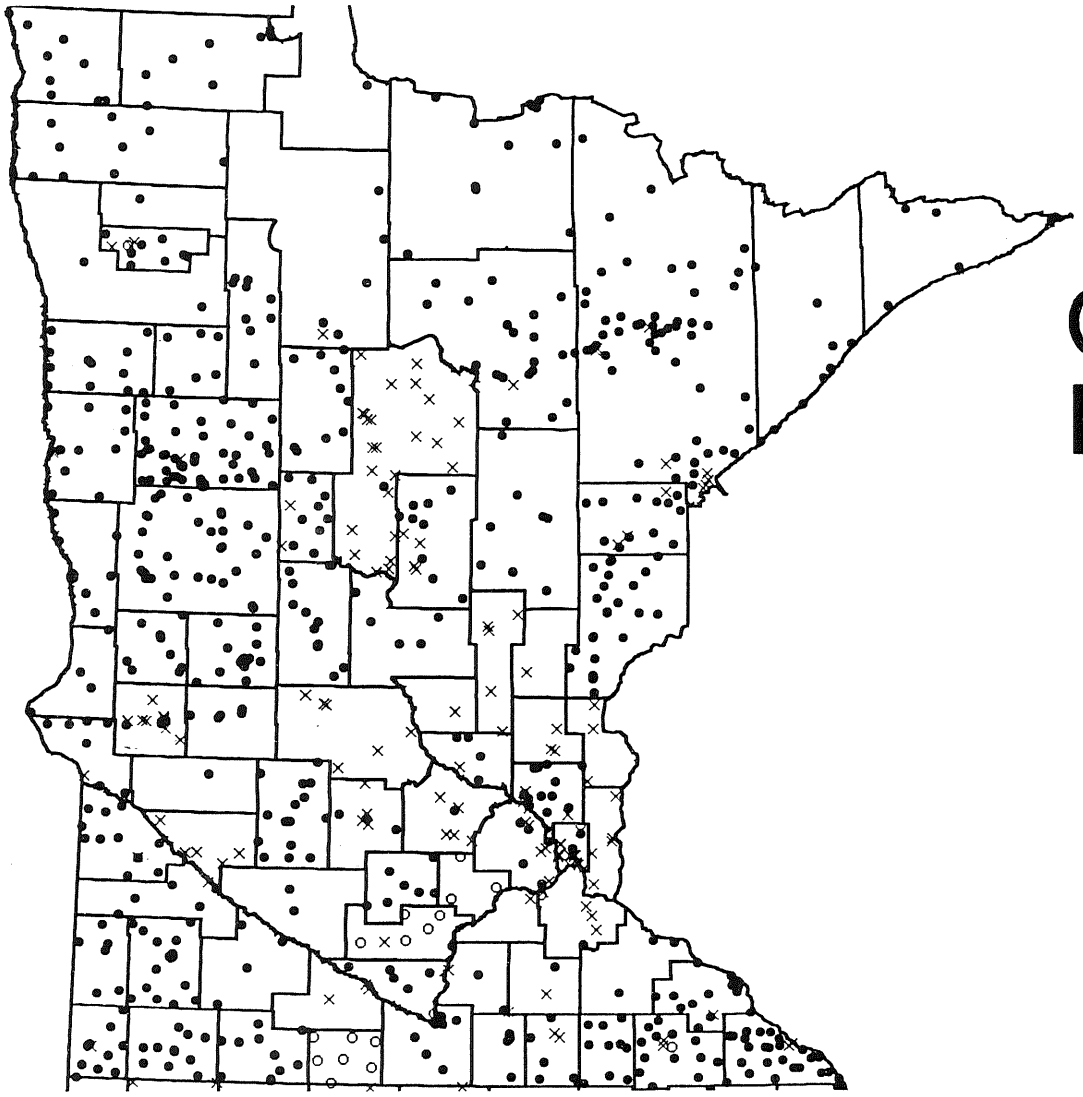
W E

S

One Inch = 75 Miles

Map A1

1995 Minnesota Recycling Facility Census



Ownership of Recycling Facilities

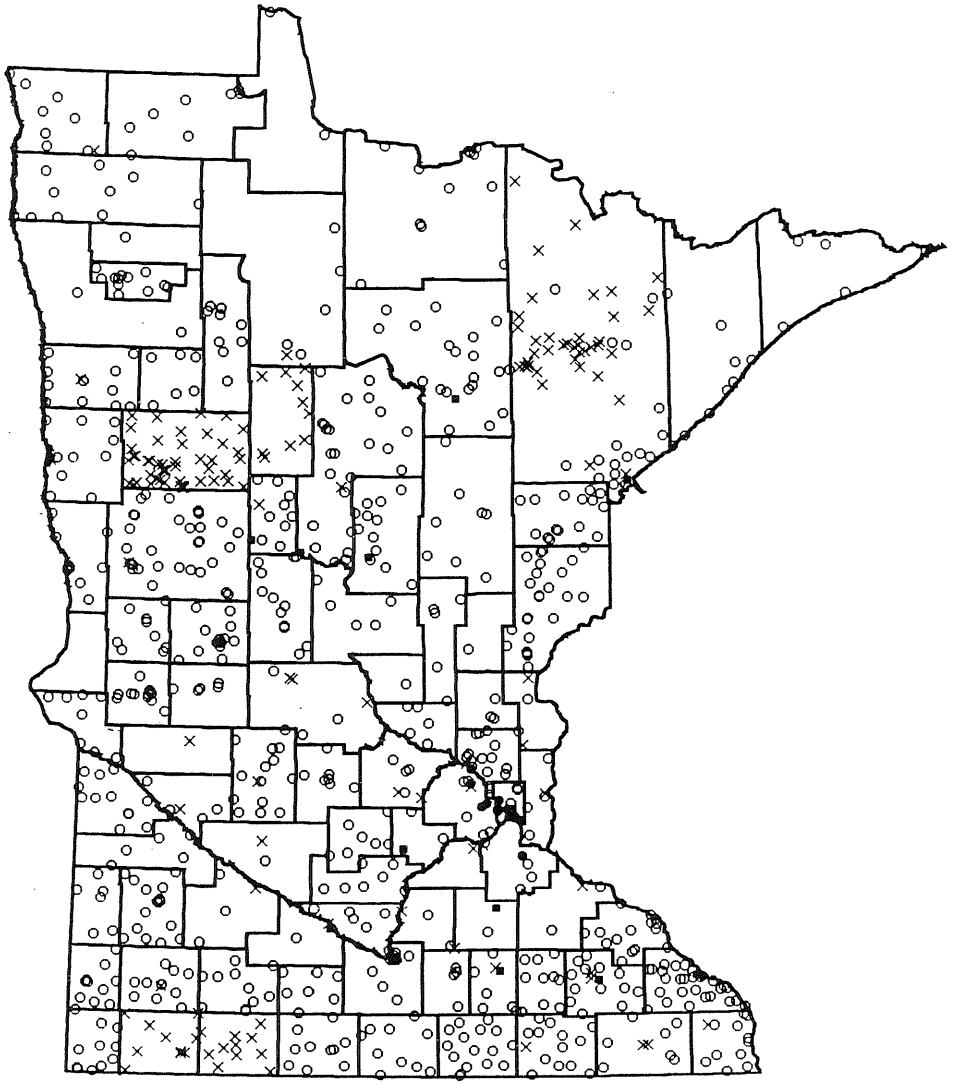
- mixed
- private
- public
- county boundary

N
W E
S

One Inch = 75 Miles

Map A2

1995 Minnesota Recycling Facility Census

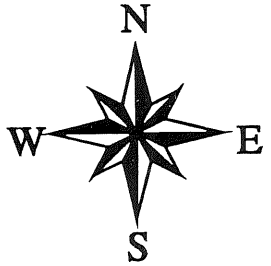


One Inch = 75 Miles

Map A3

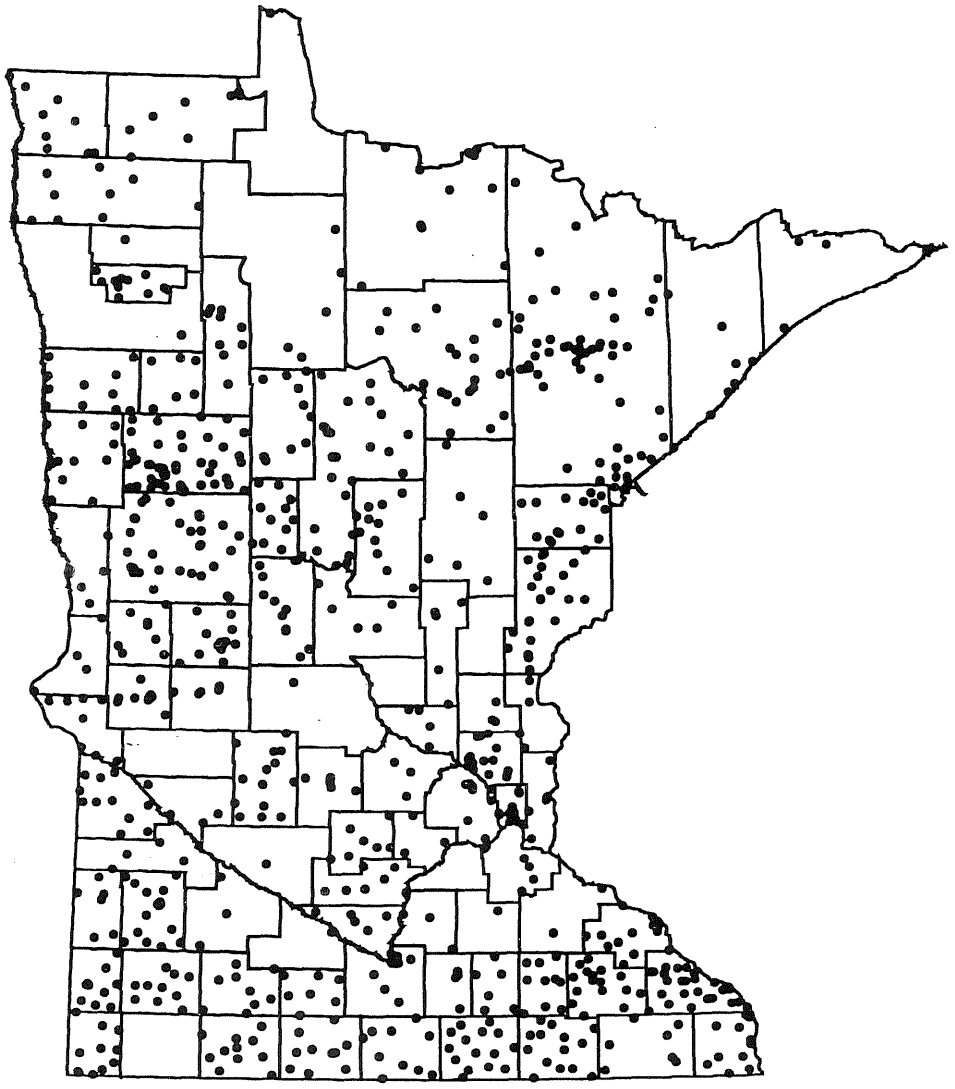
Throughput of Recyclables

- small facility (1-1,000 TPY)
- medium facility (1,001-5,000 TPY)
- large facility (5,001-10,000 TPY)
- extra-large facility (over 10,000 TPY)
- county boundary



NOTE: TPY = tons per year

1995 Minnesota Recycling Facility Census



Drop-off Sites Only

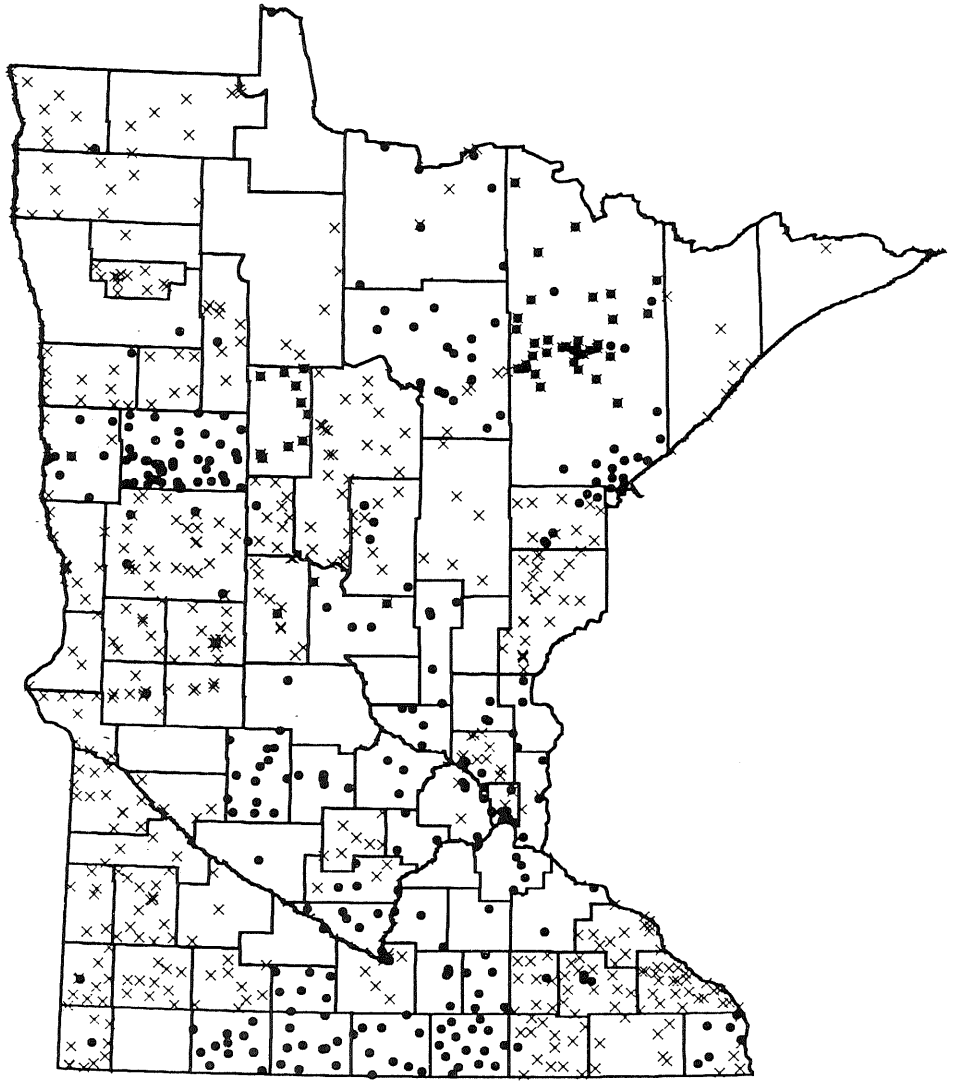
drop-off sites
county boundary

N
W E
S

One Inch = 75 Miles

Map A4

1995 Minnesota Recycling Facility Census



Staffing at Drop-off Sites

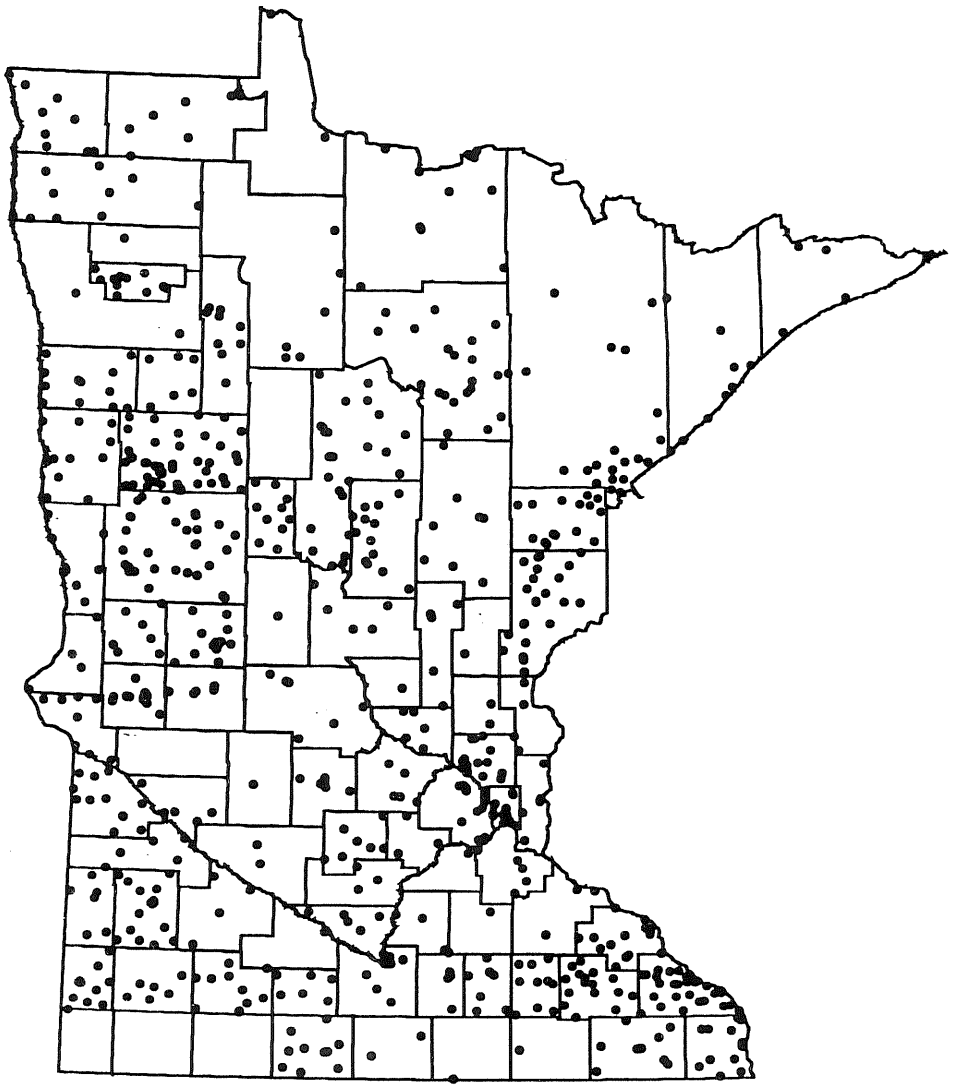
× unattended
• attended
▭ county boundary

N
W E
S

One Inch = 75 Miles

Map A5

1995 Minnesota Recycling Facility Census



Source Segregated Recycling Sites

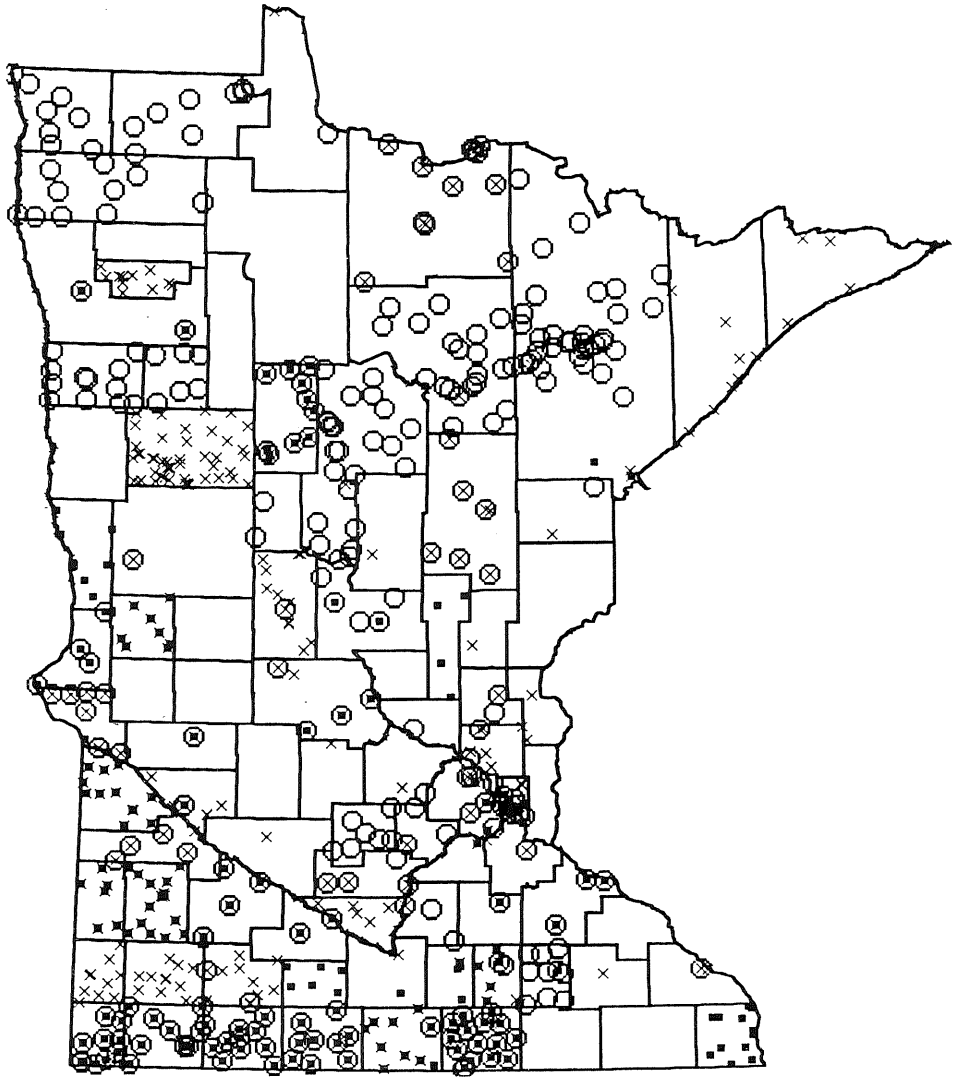
source segregated recycling facilities
county boundary

N
W E
S

One Inch = 75 Miles

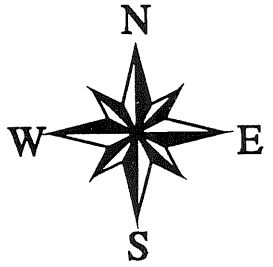
Map A6

1995 Minnesota Recycling Facility Census



Commingled Recyclables Accepted

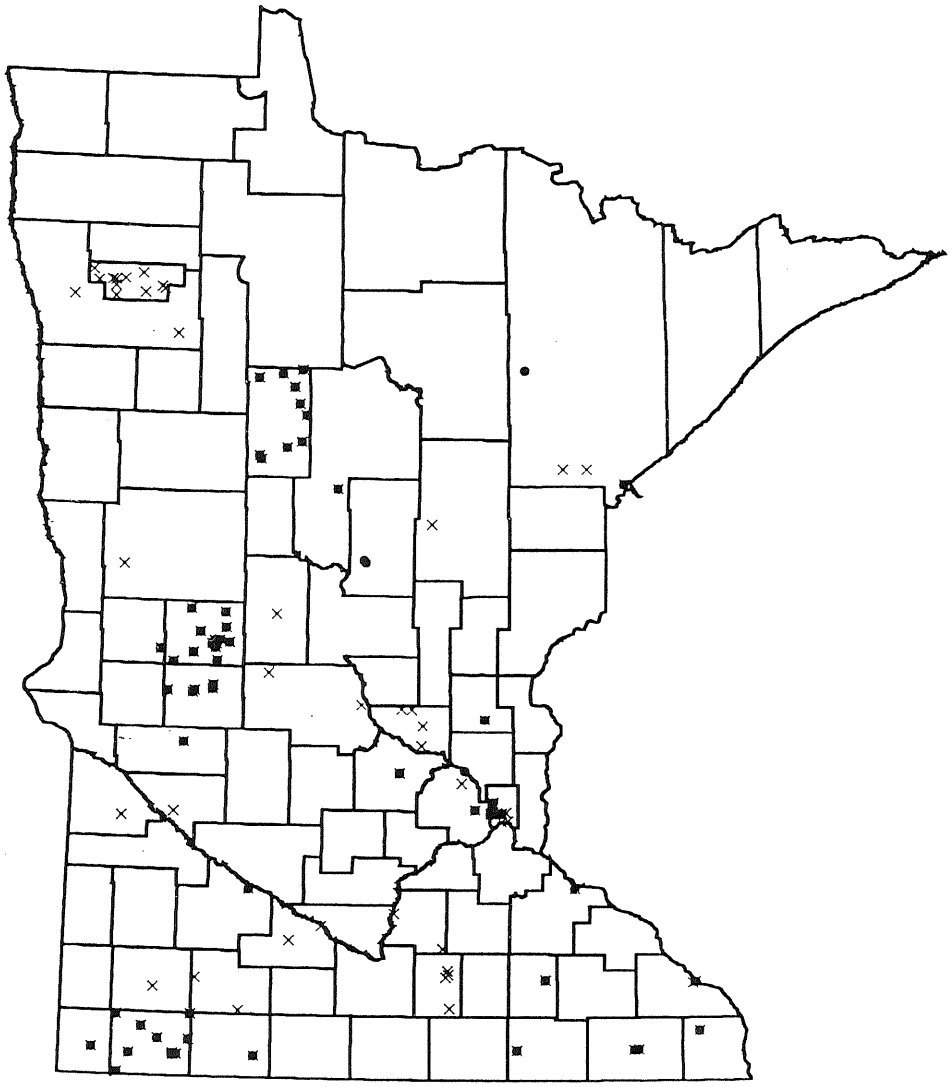
× commingled paper
▪ mixed plastic
○ commingled metal
▭ county boundary



One Inch = 75 Miles

Map A7

1995 Minnesota Recycling Facility Census



Sorting Method of Commingled Materials

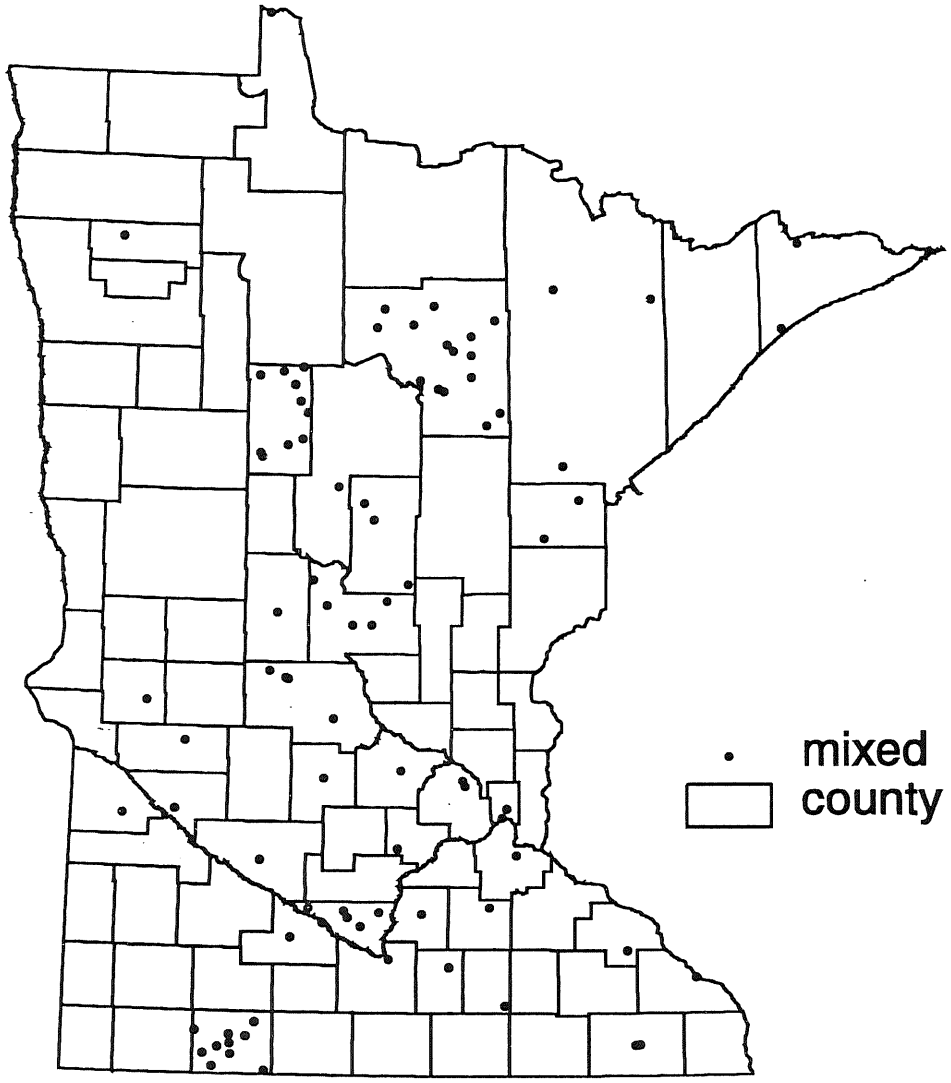
× hand-sorted
• conveyor
▭ county boundary

N
W E
S

One Inch = 75 Miles

Map A8

1995 Minnesota Recycling Facility Census



Recyclables and MSW Accepted

mixed municipal solid waste and recyclable sites

county boundary

N

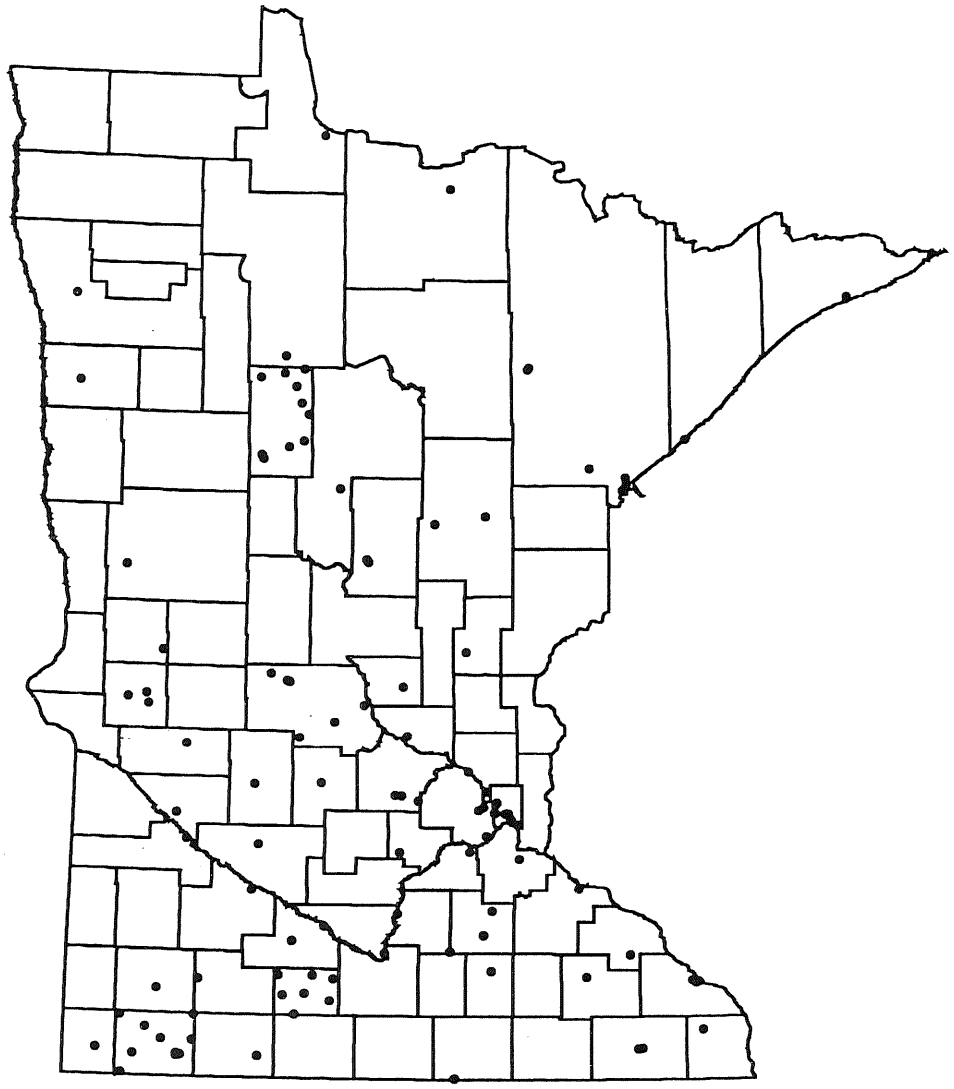
W E

S

One Inch = 75 Miles

Map A9

1995 Minnesota Recycling Facility Census



Material Recovery Facilities (MRF's)

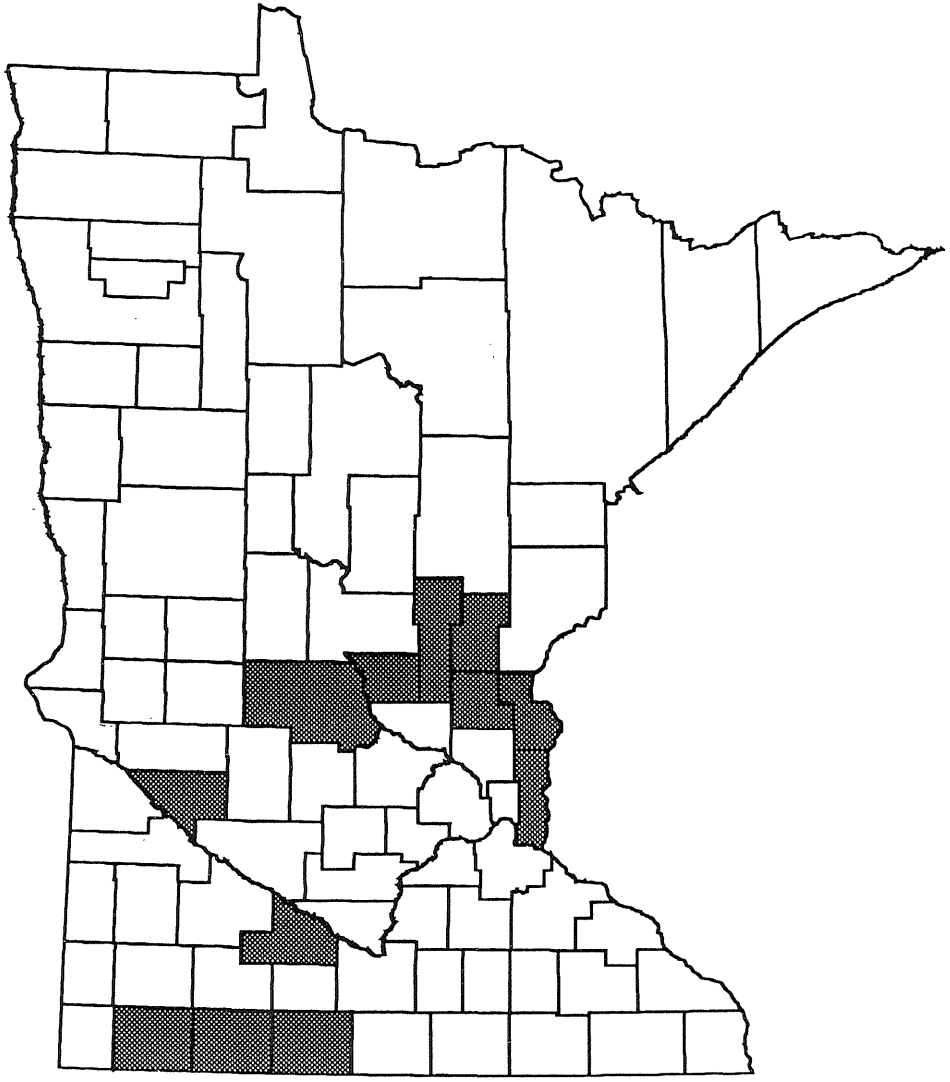
MRF's
county boundary

N
W E
S

One Inch = 75 Miles

Map A10

1995 Minnesota Recycling Facility Census



Counties With Private Recycling Facilities Only

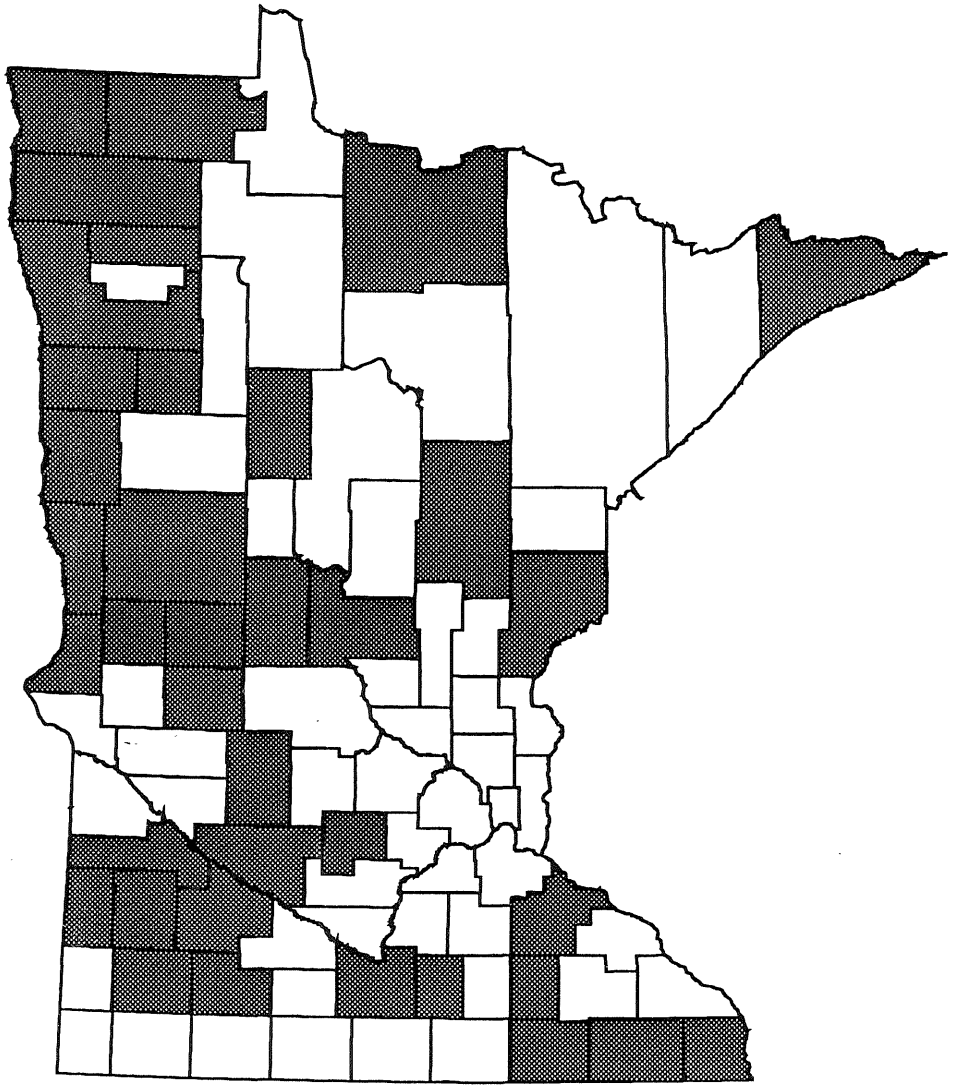
counties with private recyclers
county boundary

N
W E
S

One Inch = 75 Miles

Map A11

1995 Minnesota Recycling Facility Census



Counties With Public Recycling Facilities Only

counties with public recyclers
county boundary

N
W E
S

One Inch = 75 Miles

Map A12

Appendix B

Recycling Facility Trivia

Below is a (growing) list of interesting facts about recycling facilities in Minnesota. The following categories of recyclers are established based on scoring one point for every correct answer. Answers are located on the following page.

Out-of-stater	0-2
Tourist	3-4
Taxpayer	5-7
Policy wonk	8-9
Die-hard recycler	10

1) Name a drop-off center in Minnesota located on an island?

2) Which facility is located at the highest elevation in the state?

3) Which facility is located at the lowest elevation in the state?

4) Which county has the highest recycling rate in Minnesota?

5) Which county has the most recycling facilities that are open to the public?

6) Which Greater Minnesota city has the most recycling facilities that are open to the public?

7) Which county-run recycling center is not located in the sponsor county?

8) Are there any recycling facilities on the national register of buildings?

9) How many counties have only privately owned and operated recycling facilities?

10) Which recycling facility accepts the most recyclable grades, according to the Census?

Answers to the recycling facility trivia questions:

1) Lake Shetek drop-off center in Murray County
2) Loon Lake drop-off in Cook County
3) Any facility on the shores of Lake Superior
4) Waseca County
5) Becker County
6) Alexandria
7) Jasper drop-off located in Rock County but is operated by Pipestone County
8) Not sure
9) 11
10) There was a tie at 20 different material grades -- Python's of St. Cloud and Rice County Recycling Center