

APPENDIX

ADDITIONAL INFORMATION

REGARDING THE

SELECTED SYSTEM

EVALUATION OF RECYCLING

The following provides additional information regarding implementation and evaluations of various components of the Selected System.

Leelanau County's volume of materials being reused and recycled has increased drastically over the past ten years. The volume of each material collected at the county drop-off sites continues to increase every year except for paper products which peaked in 1995. The numbers on the following pages reflect collection volumes provided by Renewable Waste Inc, Construction Waste Recycling, Goodwill Industries, and Cedar Disposal Service. USA Waste Inc provided the volumes for the County's drop-off sites and Glen's Sanitary Landfill. The recycling volume for beverage containers is estimated using the average recovery rate provided in the 1989 Plan.

DETAILED FEATURES OF RECYCLING AND COMPOSTING PROGRAMS

The following describes the techniques used and proposed to be used throughout the County which reduce the volume of solid waste requiring disposal. The annual amount of landfill air space not used as a result of each of these techniques is estimated. Since volume reduction is practically voluntary and because technologies change and equipment may need replacing, it is not this Plan update's intention to limit the technologies to only what is listed. Persons within the County are encouraged to utilize the technique that provides the most efficient and practical volume reduction for their needs. Documentation explaining achievements of implemented programs or expected results of proposed programs is attached.

Effort Description	Estimated Air Space Conserved Cubic Yards Per Year		
	Current	5th Year	10th Year
Beverage Container Resource Recovery	3,440	3,600	3,780
<ul style="list-style-type: none"> • Containers returned for deposit at purchase sites such as grocery stores and fueling stations. • Estimates based on five percent of total waste volume attributed to beverage containers. 			
Leelanau County Drop-Off Recycling Sites	2,160	3,640	6,170
<ul style="list-style-type: none"> • Materials collected at the various recycling sites located throughout Leelanau County. • Estimates based on a continual ten percent annual increase per capita multiplied by population estimates for the future. 			
Commercial Cardboard Recycling	1,740	1,820	1,920
<ul style="list-style-type: none"> • Cardboard collected by haulers from containers at business and school locations. • Estimates based on current recycling rates multiplied by the estimated population increase. 			
Construction and Demolition Recycling	3,690	3,640	3,960
<ul style="list-style-type: none"> • Materials collected at the transfer station or removed from construction and demolition sites. • Estimates based on the difference in the number of construction permits issued over the past five and ten year periods. There was a slight decrease in the number of permits issued between 1992 and 1997, therefore, a decrease is projected for the 5th year. An increase in the volume of air space conserved is expected if there is an increase in the number of building permits issued over the next five year period. 			
Goodwill Industries Textile Reuse	170	230	300
<ul style="list-style-type: none"> • Materials donated at one of three permanent sites and two proposed portable collection trucks over the next ten years. • Estimates based on a proportional increase in percentage donations with each new collection site. 			

The following briefly describes the processes used or to be used to select the equipment and locations of the recycling and composting programs included in the Selected System. Difficulties encountered during the past selection processes are also summarized along with how those problems were addressed:

Existing Recycling Program:

The seven County funded recycling drop-off sites are operated on a contract basis with United Waste Inc. The sites are located on County owned property and each is open one day a week. One site in the County is open on Tuesday, one on Wednesday, and one on Thursday. Since Friday and Saturday have higher participation rates, two sites are open on each of those two days. Sites are located in locations that seem to maximize participation through geographic location. In the past, sites had permanent recycling dumpsters which were left open without supervision. Unfortunately, solid waste as well as recyclable were left on the premises. Today, roll-off trucks are utilized. This has decreased contaminants from being mixed with recyclable materials. Participation rates do not seem affected. The volume of material has increased for all categories except paper products which seems to have peaked in 1995.

Proposed Recycling Program:

The present system of recycling will continue to be utilized in Leelanau County. The location of drop-off sites and operating hours will be periodically evaluated to maximize participation in the program.

Existing Composting Program:

Composting in Leelanau County is currently done by private households for use on site. No County funded composting program is in place.

Proposed Composting Program:

The unknown costs of equipment, collection methods, and disposal techniques make it economically unfeasible for countywide composting without a Composting Plan. This does not preclude any household from operating a single family compost pile using waste generated at their residence for use in their garden.

COMPOSTING OPERATING PARAMETERS

No multiple household or commercial composting programs are available in Leelanau County at this time. No programs are planned until the completion of a Composting Plan.

COORDINATION EFFORTS

Solid Waste Management Plans need to be developed and implemented with due regard for both local conditions and the state and federal regulatory framework for protecting public health and the quality of the air, water, and land. The following states the ways in which coordination will be achieved to minimize potential conflicts with other programs and, if possible, to enhance those programs.

It may be necessary to enter into various types of agreements between public and private sectors to be able to implement the various components of this solid waste management system. The known existing arrangements are described below which are considered necessary to successfully implement this system within the County. In addition, proposed arrangements are recommended which address any discrepancies that the existing arrangements may have created or overlooked. Since arrangements may exist between two or more private parties that are not public knowledge, this section may not be comprehensive of all the arrangements within the County. Additionally, it may be necessary to cancel or enter into new or revised arrangements as conditions change during the planning period. The entities responsible for developing, approving, and enforcing these arrangements are also noted.

Leelanau County will coordinate its solid waste management plans with other ongoing projects in the regional and within the county. This coordination will be done by the Leelanau County Board of Commissioners, the Planning Department, and any other entity as designated by the Board of Commissioners. This coordination and cooperation is particularly important in efforts by the county to deal with the DEQ and in efforts to obtain state and federal grants for solid waste projects. Ultimate authority for implementing the Solid Waste Management Plan, allocating funds, and authorizing solid waste agreements is the responsibility of the Leelanau County Board of Commissioners.

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COSTS AND FUNDING

The following estimates the necessary management, capital, and operational and maintenance requirements for each applicable component of the solid waste management system. In addition, potential funding sources have been identified to support those components.

<i>System Component*</i>	<i>Estimated Costs</i>	<i>Potential Funding Sources</i>
Resource Conservation Efforts	n/a	Private Industry
Resource Recovery Programs	n/a	Unknown
Volume Reduction Techniques	\$120,000**	Board of Commissioners
Collection and Transportation	\$1,920,000	Consumers
Disposal Areas	\$806,000	Consumers
Future Disposal Area Uses	n/a	Private Industry
Management Arrangements	n/a	Board of Commissioners
Educational and Informational Programs	\$8,000	Board of Commissioners

* These components and their sub-components may vary with each system.

** Estimate for recycling efforts only.

EVALUATION SUMMARY OF THE SELECTED SYSTEM

The solid waste management system has been evaluated for anticipated positive and negative impacts on the public health, economics, environmental conditions, siting, existing disposal areas, and energy consumption and production which would occur as a result of implementing this Selected System. In addition, the Selected System was evaluated to determine if it would be technically and economically feasible, whether the public would accept this Selected System, and the effectiveness of the educational and informational programs. Impacts to the resource recovery programs created by the solid waste collection system, local support groups, institutional arrangements, and the population in the County in addition to market availability for the collected materials and the transportation network were also considered. Impediments to implementing the solid waste management system are identified and proposed activities which will help overcome those problems are also addressed to assure successful programs. The Selected System was also evaluated as to how it relates to the Michigan Solid Waste Policy's goals. The following summarizes the findings of this evaluation and the basis for selecting the system.

ALTERNATIVE NO. 1 - IN-COUNTY LANDFILL WITH WASTE DIVERSION

System Components:

- ◆ Waste collection by private haulers
- ◆ Drop off sites for recyclables with collected materials transported to a processing plant.
- ◆ Household hazardous waste collection program with disposal at a licensed out of County facility.
- ◆ Public education program encouraging source reduction, recycling, composting, and proper hazardous waste disposal.
- ◆ Disposal of wastes not removed by the diversion methods listed above at a licensed in-County landfill.

Resource Conservation Efforts:

Resource conservation efforts included in this alternative consist of recycling and source reduction that would occur as a result of the public education program. The recovery of wastes that are then recycled can reduce the need to consume non-renewable materials in manufacturing processes.

The public education program can provide information on how industries, commercial establishments, and the general public can modify their operations to reduce the quantity of wastes created. Examples of how household waste volumes can be reduced include buying materials utilizing less packaging material, buying reusable rather than disposable items, and purchasing fewer items that eventually require disposal. Commercial establishments can reduce waste volumes in a similar fashion.

Industries that produce large quantities of specific waste materials should be encouraged to find uses for these materials. Examples of how industries have reduced waste volumes include machine shops and fish processing facilities in Leelanau County. When the initial Solid Waste Management Plan for Leelanau County was prepared, these industries sent large waste volumes to landfills. The machine shops generated waste metal shavings and the fish processing plant had large quantities of fish wastes requiring disposal. Five years later when the Plan was updated, these wastes were being reprocessed and reused rather than being disposed of in landfills. Other industries could reduce waste volumes in a similar fashion.

The education program and the household hazardous waste program can also decrease waste volumes to be handled at the local facilities by creating opportunities for proper disposal of hazardous wastes.

Volume Reduction Techniques:

Volume reduction in the waste stream can result in overall cost savings. Techniques that are presently being utilized to reduce the volume of the waste stream include compaction in collection vehicles and compaction in the landfill.

Typically solid waste set out for collection has a density of approximately 200 pounds per cubic yard. Collection trucks will compact this waste to approximately 25% of its original volume resulting in an in-truck density of approximately 800 pounds per cubic yard. This is an average figure that has been observed at Glen's Landfill in recent years. Compaction of the waste in this fashion allows collection trucks to transport larger quantities of solid waste to the disposal site per trip. Since landfill tipping fees are based on volume rather than weight, disposal fees that haulers pass on to customers can be reduced with better compaction. As collection trucks are improved to achieve greater degrees of compaction, additional axles may be required on vehicles to keep wheel loadings on pavement within legal limits.

When the waste reaches the disposal site, it is further compacted when placed in the landfill. Based on topographic surveys of Glen's Landfill and the waste quantities received at the gate, it is estimated that the in-place waste density in the landfill is approximately 1200 pounds per cubic yard. This is a compaction rate of 1.5 times the density of the waste as it is received. The company wide goal for Waste Management, Inc. is to achieve an in-place density of 1500 pounds per cubic yard. Good compaction equipment and operator training can be achieved through a combination of waste mixing, proper compaction equipment, and operator training. The higher compaction rates in the landfill will result in the maximum use of the available air-space, thus decreasing the rate at which the landfill cells are filled and new ones need to be constructed. An additional benefit of compaction is that settlement of the cap over the waste is minimized.

Resource Recovery Programs:

The resource recovery programs in this alternative consist of recycling materials that are source separated from the waste stream. The proposed recycling system consists of drop-off sites with voluntary participation. The collected materials would be processed and shipped to markets where they could be reused. Hauling and processing of collected materials would be contracted to private enterprise. Composting would be on a voluntary basis by individuals.

Factors affecting the proposed recycling and composting programs include:

1. Willingness of the public to source separate wastes and take them to a drop-off site.
2. Public awareness as to the need for recycling and composting.
3. Convenient drop-off sites.
4. Feasibility of private enterprise to pick up source separated materials and transport them to processing centers and to markets.
5. Financial support by County government.
6. Availability of markets for recovered materials within a reasonable haul distance.

Impediments to implementing the proposed recycling and composting programs include:

1. Inconvenience to the individual.
2. The "Throw-away society" tradition.
3. Present cost to the individual for recycling and composting is higher than that for landfilling.

4. Public lack of knowledge as to how the solid waste system works and the importance of recycling and composting.
5. The tourism industry accelerates waste production . It can be inconvenient for visitors to participate in recycling efforts. Most visitors are unaware of the existing recycling program and therefore tend to dispose of all wastes using the simplest method available.

Methods of removing or minimizing the impediments include:

1. Public education and training.
2. Convenient drop-off sites for source separated material.
3. Collection and landfill tipping fees based on a by-the-bag system to encourage volume reduction.
4. Financial incentives to encourage recycling.
5. Implement a composting program for yard waste.
6. Create markets by requiring all governmental units to purchase supplies made from recycled materials.
7. Continued County financial support of the recycling program.
8. Provide County financial support for implementing a yard waste composting program.
9. Create opportunities for private enterprise to profitably participate in recycling programs.
10. Obtain grants or low interest loans to support recycling and composting programs.

How recycling and composting and other processing or disposal methods can compliment each other and the feasibility of excluding site separated material and source separated material from other processing or disposal methods:

Recycling, composting, and hazardous waste collection can compliment other phases of the solid waste management system. By recovering a portion of the waste stream, the remaining waste volume that must be handled and disposed of will be reduced. This will reduce the required capacity and therefore the cost of any future solid waste facilities that are needed. Reducing the waste volume will also extend the life of the existing landfill and delay the need to establish a new one. The removal of household hazardous wastes from the waste stream will assist the landfill and other waste facilities to operate safely with regard to the environment and facility employees.

The feasibility of excluding recoverable materials from landfill disposal depends mostly on the willingness of the public to participate in the waste diversion programs. The quantities of recycled materials shown on page II-1 indicate that 1810 tons of material were recycled in 1997 from a total waste stream of 21,010 tons. The recycled material represents only 8.6% of the waste volume generated. The 1989 Solid Waste Plan includes data from a waste stream assessment performed at Glen's Landfill in 1988. The waste stream assessment found that over half the waste stream consisted of materials that are presently being recycled. This is a good indication that the materials are available in the waste stream and are capable of being recovered with cooperation of the public.

Benefits that could result from the implementation of a recycling and composting program include:

Since a large portion of Leelanau County's economy is based on tourism, preservation of the environment will result in economic benefits. Environmental and economic benefits from recycling and composting include:

1. Energy savings by using recovered rather than virgin materials.
2. Conservation of natural resources such as land, trees, and oil.
3. Avoiding the need for additional land to be dedicated for landfill and other disposal sites.
4. Preservation of existing environmental conditions.

Feasibility of source separation of materials that contain potentially hazardous components at disposal areas:

The landfill would be a natural site for collecting hazardous wastes that are source separated from the waste stream. These materials could be prevented from entering the landfill and possibly disrupting its performance. By collecting hazardous wastes at the same location used for disposal of other wastes, it would be more convenient for individuals to separate rather than co-mingle these wastes. This type of system would encourage customers who haul their own wastes to disposal sites to source separate their hazardous wastes, but for customers served by haulers, the haulers will not likely be able to keep them separated.

Collection of hazardous wastes at the disposal area would create some problems. Regulations may prohibit collection of certain wastes at these sites. Also facility operators may not be willing to accept these materials due to employee safety and liability concerns. Storage and handling would be needed at the landfills. A professional person who can identify the wastes and determine how to safely store these wastes would be required.

There are existing hazardous waste haulers located in nearby counties that are capable of handling Leelanau County's disposal requirements.

Collection Processes:

The existing system of private haulers would be utilized for solid waste collection and transportation to the landfill.

Transportation:

The existing system of private haulers would be utilized to transport the collected wastes to the landfill for disposal. Private enterprise would also be utilized for hauling source separated materials that are collected at drop-off sites.

Disposal Areas:

With this alternative, the in-County landfill would be used for the ultimate disposal of solid wastes that are not otherwise removed from the waste stream.

Institutional Arrangements:

Since Leelanau County has a landfill and many of the surrounding counties do not, the local landfill serves several other counties. The landfill needs to be identified in these counties Solid Waste Management Plans as their primary or contingency disposal site. Agreements between counties are necessary to allow out of County waste disposal in Leelanau County. Also, Leelanau County will need agreements with other counties in which landfills or other disposal sites are located to utilize these sites on a contingency basis.

Arrangements with private enterprise would be needed for hauling recyclable materials.

Educational and Informational Programs:

The existing public education program that is funded through a portion of the costs paid to operate the recycling drop-off sites would continue under this alternative.

Sanitary Landfill

The existing in-County landfill would be utilized for the disposal of wastes that cannot be removed from the waste stream.

Ultimate Disposal Area Uses

When landfills are eventually closed, they must be capped with an impermeable layer to prevent precipitation from entering the buried waste and creating leachate. Closed landfill sites are not well suited to all types of future development. Buildings should not be constructed since the settlement of wastes and the creation of methane from waste decomposition are likely to occur. Land uses best suited for closed disposal sites are recreational and agricultural uses.

Capital, Operational, and Maintenance Costs:

See "Estimated Budgets for Components of Solid Waste Management Alternatives" beginning on page B-18 for detailed estimates.

	<u>Annual Cost</u>
Collection and Transportation (19,200 Tons @ \$100)	\$ 1,920,000
Recycling Drop-off Sites	\$ 112,000
Household Hazardous Waste Collection	\$ 8,000
Public Education	\$ 8,000
Landfill Disposal	\$ 806,000
Total Estimated Cost	\$ 2,854,000
Estimated Cost per Ton (@ 19,200 TPY)	\$ 150

Evaluation Summary of Selected System:

The selected system was evaluated to determine its potential of impacting human health, economics, environmental, transportation, siting, and energy resources of the County. In addition, it was reviewed for technical feasibility, and whether it would have public support. The following is a brief summary of that evaluation along with an explanation as to why this system was chosen to be implemented.

Technical Feasibility

This alternative includes all existing systems. The technology for the existing collection, recycling, household hazardous waste program, and disposal by landfilling has been in existence for a considerable time.

Economic Feasibility

This alternative will not have a noticeable economic impact since no new facilities are proposed. Costs compared to the existing system could increase slightly with the possible expansion of the recycling and household hazardous waste collection programs.

Access to Land and Transportation Routes

The existing landfill is located on a state highway with good access. It is located near the south boundary of the County, not centrally located. It is in a reasonably convenient location to serve multiple counties.

Energy

This alternative would not noticeably increase energy consumption. Increasing the quantity of materials removed from the waste stream through the recycling program could result in additional shipping costs due to the higher volume. Some energy savings may result in manufacturing processes that can use the reclaimed materials rather than virgin materials although other processes may require more energy.

Environmental

This system would not have a noticeable effect on the environment. The volume of waste disposed of could decrease as participation in the recycling program increases, thus slowing the rate at which landfill expansion will be necessary. The reclaimed materials will help conserve resources in manufacturing processes by decreasing the demand for virgin materials. Since the landfill is already in place, no new sites for solid waste management will be needed. The public education system and possible expansion of the household hazardous waste collection system would have positive environmental effects by decreasing the quantity of non suitable waste disposal in the landfill.

Public Acceptability

Public acceptability is not expected to be a problem since all of the necessary facilities now exist. If increased taxation is required in the future to fund the recycling program, some opposition could be expected.

Public Health

This alternative should have no increased public health hazards since the selected system is the current system. Proper operation of the landfill as well as collection and recycling facilities will minimize public health concerns.

Siting

No new facility sites are needed for this alternative.

Advantages and Disadvantages of Selected System:

Advantages:

1. This alternative utilizes all of the existing components of the solid waste management system.
2. All of the necessary waste handling facilities already exist. This eliminates costs for developing new facilities and the difficulties typically encountered in siting them.
3. This alternative provides opportunities for recycling and household hazardous waste collection that can be expanded in the future.
4. Recycling opportunities would be available to all County residents.
5. This alternative would be the one most acceptable to the public.
6. Since all of the necessary facilities exist, this alternative would be the easiest one to implement.

Disadvantages:

1. Recycling opportunities would be available but not necessarily convenient to all County residents
2. This alternative may not result in the maximum waste volumes being diverted from the landfill.
3. The system provides no opportunities for composting of yard waste other than individual efforts.