

West Central Texas Council of Governments

Regional Solid Waste Management Plan 2000-2020

**Adopted by the West Central Texas Council of Governments
Natural Resources Committee on August 22, 2002
And the WCTCOG Executive Committee on
September 25, 2002**

This plan was funded through a solid waste management grant provided by the Texas Commission on Environmental Quality, formerly known as the Texas Natural Resource Conservation Commission, through the West Central Texas Council of Governments. This funding does not necessarily indicate endorsement or support of the plan findings and recommendations.

ADOPTION RESOLUTION

A RESOLUTION OF THE EXECUTIVE COMMITTEE OF THE WEST CENTRAL TEXAS COUNCIL OF GOVERNMENTS ADOPTING THE REGIONAL SOLID WASTE MANAGEMENT PLAN 2000-2020.

WHEREAS, the Texas Commission on Environmental Quality (TCEQ), formerly known as the Texas Natural Resource Conservation Commission (TNRCC), has set forth guidelines regarding the writing of a Regional Solid Waste Management Plan (RSWMP); and

WHEREAS, the West Central Texas Council of Governments (WCTCOG) has been designated by the state as the regional planning agency for a nineteen county region; and

WHEREAS, members of the WCTCOG Natural Resources Committee, representing the governmental, private, and civic sectors of each county in the area, were chosen to assist in the development of the plan; and

WHEREAS, public participation and education during the planning process included committee meetings that were open to the public and a public hearing held prior to the adoption of this plan; and

WHEREAS, the attached RSWMP has been written to support the State Solid Waste Management Plan and it includes a compilation of planning data including the regional description, current solid waste management system, system evaluation, needs assessment, and evaluation of alternatives; and

WHEREAS, the purpose of the plan is to provide guidance regarding solid waste management within the region, including waste reduction, recycling, and disposal for the period of 2000-2020, and any local plans and solid waste initiatives that may be developed in the area will be required to conform to this regional plan:

NOW, THEREFORE, BE IT RESOLVED by the Executive Committee of the West Central Texas Council of Governments that the Regional Solid Waste Management Plan 2000- 2020 attached be and the same is hereby adopted as the Regional Solid Waste Management Plan 2000-2020 of the West Central Texas Council of Governments on the date of this Resolution.

DULY ADOPTED this the 25th day of September 2002.

Attest:

Honorable Ricky Fritz, President
West Central Texas Council of Governments

Honorable Keith Collom, Secretary
West Central Texas Council of Governments

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ACKNOWLEDGEMENTS

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Executive Summary

In the fall of 1992, the West Central Texas Council of Governments (WCTCOG) Executive Committee adopted the first 20-year Regional Solid Waste Management Plan (RSWMP), and over the past ten years several revised updates have been published to better reflect the changing needs of the region. However, revisions to the RSWMP were again mandated per §363.062 (a), Texas Health & Safety Code. Each of the state's 24 Councils of Governments has been required to develop a Regional Solid Waste Management Plan that conforms to the State Solid Waste Management Plan. This plan amendment will replace the original plan. The new Regional Solid Waste Management Plan (RSWMP) covers the period of 2000 to 2020. This plan will be updated every four years, or as needed, for accuracy.

The RSWMP contains strategies for achieving the solid waste management goals and objectives of the nineteen-county West Central Texas Region. The goals addressed are: assuring adequate levels of transportation and disposal capabilities across the region; developing local source reduction, waste minimization, reuse, recycling, and composting programs to conserve disposal capacity and resources; developing programs to assist regional and local entities in controlling and stemming illegal and improper disposal methods; and developing cost-effective, efficient, and environmentally suitable solid waste management systems within the region.

As directed by the State (TCEQ-Texas Commission on Environmental Quality/TNRCC-Texas Natural Resource Conservation Commission), the plan focuses primarily on the following components: revised population and solid waste projections; analysis of economic trends which may affect solid waste generation; analysis of waste disposal trends, waste imports and exports, and available landfill capacity; recommendations for amendments; and the status of existing, closed, and planned solid waste management facilities in West Central Texas.

The information has been collected from a variety of sources including personal interviews with local governments, private firms, and government source documents. All work has been reviewed and approved through the West Central Texas Regional Natural Resources Committee, a working committee that assists WCTCOG in the solid waste program.

Significant increases in recycling and waste diversion have been noted. Workplace recycling programs for government agencies and schools are continually growing, and there is increased awareness of the waste disposal and reduction situation. Backyard composting programs and household hazardous waste programs have been funded through TCEQ and WCTCOG grants over the last several years. Incidences of illegal dumping are increasing due to the closure of local, rural landfills and lack of public education on the issue. Innovative solutions to the challenges concerning the distance to markets and other rural dilemmas are necessary in the WCTCOG region.

The RSWMP outlines the activities that will be initiated throughout the planning period. The Natural Resources Committee (NRC) of WCTCOG will play a more active role in the solid

waste permitting process by reviewing all permit applications in the region to determine conformity to this plan. Recommendations and findings will be then given to the TCEQ for their review. The Closed Landfill Inventory is also an appendix to this new plan and will be updated as information becomes available.

The West Central Texas region has made considerable progress in recycling and waste reduction through a process of systematically reviewing and meeting goals. That spirit and dedication by both the public and private sectors continues to grow.

Regional Analysis

POPULATION AND GROWTH PATTERNS

Population in the West Central Texas Council of Governments (WCTCOG) Region is unevenly diffused across nineteen counties. Taylor County has the largest population and accounts for 39% of the 324,901 people reported to be living in the region by the 2000 Census. Population in Taylor County is concentrated in the city of Abilene.

The population data for the base year was obtained from the 2000 U. S. Census. All other population data and projections were obtained from the Texas State Data Center (TSDC) at Texas A&M University. Projections were taken from the TSDC's "Projections of the Population of Texas and Counties in Texas by Age, Sex and Race/Ethnicity for 2000-2040 (December 2001)," using the One-Half Migration Scenario which is recommended as the most appropriate scenario for the majority of counties at present. This scenario implies steady growth, but at a lower level than what was experienced between 1990 and 2000.

Table 1: Population Projections 2000-2020

Region/ County	Population 2000*	Population 2005	Population 2010	Population 2015	Population 2020
West Central Texas	324,901	331,501	338,969	345,316	349,623
Brown	37,624	38,450	39,324	40,107	40,602
Callahan	12,905	13,133	13,406	13,695	13,897
Coleman	9,235	9,133	9,141	9,172	9,149
Comanche	14,026	14,094	14,273	14,493	14,721
Eastland	18,297	18,262	18,336	18,403	18,382
Fisher	4,344	4,285	4,264	4,253	4,259
Haskell	6,093	5,914	5,860	5,814	5,741
Jones	20,785	20,963	21,211	21,480	21,729
Kent	859	837	840	850	821
Knox	4,253	4,187	4,197	4,262	4,305
Mitchell	9,698	9,695	9,736	9,738	9,714
Nolan	15,802	16,183	16,550	16,878	17,177
Runnels	11,495	11,613	11,817	12,067	12,291
Scurry	16,361	16,595	16,862	17,066	17,204
Shackelford	3,302	3,337	3,371	3,455	3,529
Stephens	9,674	9,734	9,873	9,983	10,030
Stonewall	1,693	1,685	1,687	1,670	1,634
Taylor	126,555	131,553	136,370	140,105	142,645
Throckmorton	1,850	1,848	1,851	1,825	1,793

Sources: *U.S. Census 2000

Texas State Data Center, Texas A&M University, December 2001

ECONOMIC ACTIVITY

The West Central Texas Region has a diversified economy, which includes Dyess Air Force Base, agribusiness, feedlots, varied manufacturing, distribution centers, hunting leases, and oil field operations. There are three private universities and one private junior college in Abilene, and other colleges and universities in Brownwood, Cisco, Ranger, Sweetwater, and Snyder. There are opportunities for employment in sales, personal services, food preparation, and health-related occupations in the area.

The Abilene Metropolitan Statistical Area (MSA) is located in the Region and consists only of Taylor County. "The largest sector of the Abilene economy is the Service sector, which comprises approximately 35% of the Total Nonagricultural employment. Almost 80% of employment in Abilene comes from Services, Trade, and Government, with the remaining 20% spread evenly between the other major divisions."¹

In 1998 the Service Industry supplied 48% of the Region's employment followed by the Trade Industry with 19%, and Manufacturing and Government with 9% each. Employment predictions for 2008 show a 14% growth rate in both Construction and Service Industries and a decrease in the number of jobs in Mining and Communications/Utilities Industries. The expected combined growth rate for all industries is 10.7%.²

There are six prison facilities in the region at Abilene, Colorado City, Snyder, Breckenridge, Sweetwater, and Brownwood. These facilities provide many jobs in the region from both primary facility positions and support businesses.

¹ Texas Workforce Commission

² Texas Workforce Commission Annual Average Employment

WASTE GENERATION AND CHARACTERIZATION

Waste Generation

According to the MSW Permitted Facility Data report, the WCTCOG Region disposed of 342,260 tons of municipal solid waste (MSW) in Type I and Type IV landfills during the year 2000.

The Region does not currently export any waste, and only a small amount of waste is imported. The City of Eden imports approximately 900 tons per year, San Saba approximately 3,100 tons, and Mills County imports about 2,300 tons; in addition, there are other communities that import waste but there are no available estimates of the tonnage at present. Taken together, there are approximately 6,500 tons of waste imported per year.³

During FY 2000/2001 the West Central Texas Region reduced waste 1,729 tons through recycling, composting, chipping, mulching, and source reduction.⁴ One reason for the low recycling rates in the area is the high transportation cost of moving recyclable materials to Houston, Dallas/Ft. Worth, and other metropolitan areas with adequate recycling facilities.

Table 2: Regional Waste Generation

Year	Disposal	Imports	Recycling	Total MSW Generation (Tons)
2000	342,260	-6,500	1,729	337,489

Source: Annual Reporting Program for Permitted MSW Facilities
Texas Natural Resource Conservation Commission FY 2000/2001 Solid Waste Grants Program Final Program Summary

In 2000, the per capita landfill disposal rate was 5.77 pounds/person/day. This figure was used to determine the waste generation projections through 2020.

Table 3: Regional Waste Generation Projections

Year	Population Projection	Landfill Disposal (Tons)	Disposal Rate	Net Imports/Exports (Tons)	Recycling (Tons)	Recycling Rate	Generation (Tons)
2000	324,901	342,260	5.77	-6,500	1,729	.03	337,489
2005	349,428	368,454	5.77	-6,500	1,913	.03	363,867
2010	359,344	378,398	5.77	-6,500	1,967	.03	373,865
2015	364,033	383,405	5.77	-6,500	1,993	.03	378,898
2020	366,522	385,956	5.77	-6,500	2,006	.03	381,462

Source: Annual Reporting Program for Permitted MSW Facilities

³ City of Brownwood Landfill

⁴ Texas Natural Resource Conservation Commission FY 2000/2001 Solid Waste Grants Program Final Program Summary

Waste Characterization

No primary waste characterization studies have been conducted in the WCTCOG Region. However, WCTCOG staff is planning to complete such a survey by 2005.

Statewide, the largest waste type in 2000 was commercial waste at 36.5%, followed by residential waste at 29.3%, and C&D debris at 19.3%. These three categories of waste accounted for 85.1% of total landfill disposal in the state.⁵

The waste disposed in landfills includes: residential, commercial, institutional, recreational, military, industrial, agricultural, special wastes, and some sludge. Landfill waste does not include hazardous or mining waste.

Sludge and septic tank waste generated was landfilled, land applied, or otherwise disposed. Little data is readily available on sludge production in the region.

The quantity of waste generated by type was estimated and includes residential, commercial, institutional, and industrial. Not enough information was available to quantify the recreational, military, agricultural, or special waste generated. The quantity of recreational waste is thought to be small as parks with landfills in the past received little waste annually. The quantity of agricultural waste is also thought to be small as farmers typically dispose much of their waste on-site and hire commercial companies for pest control. The quantity of military waste is small as Dyess Air Force Base recycles much of the military waste it generates.

Special wastes generally of concern to the public are used oil, lead acid batteries, medical waste, and household hazardous waste (HHW). No data is known to be available which would allow one to determine the extent to which these wastes enter the waste stream. However, based on studies done elsewhere in the State and the U.S., the likely quantity of these wastes entering landfills in the region is small. It is not known if asbestos or petroleum containing soils are generated or disposed in the region.

⁵ Texas Natural Resource Conservation Commission Annual Reporting Program for Permitted MSW Facilities, 2000

WASTE MANAGEMENT SYSTEM

Roles Responsibilities, and Institutional Arrangements

Many public and private agencies, authorities, organizations, and districts, share responsibility for the management of municipal solid waste.

The United States Environmental Protection Agency (USEPA) regulates municipal solid waste landfill operations under "Subtitle D" and related provisions of the Resource Conservation and Recovery Act (RCRA), the Federal Clean Air Act, and the Federal Clean Water Act. The RCRA of 1976 is the main federal legislation governing the management of solid waste in the United States. It aims to protect public health and the environment while conserving resources. The United States Army Corps of Engineers (USACOE) regulates the construction of facilities in flood plains on wetlands. The Fish and Wildlife Service (FWS) regulate any activities affecting the habitat of threatened or endangered species. The Federal Aviation Administration regulates the siting of solid waste activities relative to airports because of the hazard birds present to aircraft. The Soil Conservation Service (SCS) is involved in developing plans for rural solid waste management. Other federal regulations having an impact on solid waste management activities include the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or Superfund), and the Safe Drinking Water Act.

The Solid Waste Disposal Act (Texas Health & Safety Code, Chapter 361) is the state act governing the management of solid waste. The Texas Commission on Environmental Quality (TCEQ), formerly known as the Texas Natural Resource Conservation Commission (TNRCC), is responsible for enforcing the Solid Waste Disposal Act. TCEQ regulates the construction, operation, and maintenance of all MSW facilities, and all air emissions from MSW facilities.

Under Texas Health & Safety Code, Chapter 363, regional councils are designated as the primary entities for solid waste planning. The TCEQ administers the Regional Solid Waste Grants Program as part of its waste planning efforts. Under this program, the TCEQ provides funding and technical assistance to the regional councils to support their regional solid waste-planning role, and also provides funding for a pass-through grant program to local governments, which is administered by the regional councils.

Several bills that affect solid waste management policy were passed in the 77th Texas Legislative Session of 2001. The most important of these new laws is House Bill 2912, the TNRCC Sunset review bill. It requires many changes including:

- Changes the name of the agency to the Texas Commission on Environmental Quality, to be phased in by January 1, 2004.
- Establishes a performance-oriented regulatory structure based on compliance history, which will be used in permitting and enforcement decisions.
- Requires the review of solid waste disposal permits every five years to assess compliance performance.

- Changes public notice requirements for new solid waste facilities.
- Strengthens and clarifies the regulation of solid waste facilities, specifically addressing sham recycling facilities, and specifying the conditions under which a MSW landfill that has stopped accepting waste may again accept waste.
- Authorize remedial action at a scrap tire site that threatens to release a hazardous substance, and allows the TCEQ to seek recovery of expenses for remediation from responsible parties.
- Changes permitting regulations for Type IV landfills.
- Requires a permit, rather than a registration, to apply Class B sewage sludge to land.
- Addresses the remediation of hazardous waste at a solid waste facility.

HB 631 increases the fines for illegal dumping by making existing fines and punishments apply to smaller quantities of dumped waste. It also adds a jail felony punishment for certain types of illegal dumping. HB 630 allows municipal enforcement officers to use unmarked cars for surveillance of illegal dumpsites. HB 2092 broadens the definition of a public nuisance. SB 352 allows counties to collect solid waste disposal fees.

WCTCOG interacts with adjacent councils of governments for interregional solid waste management. Other regional districts and authorities are involved in solid waste management, educational programs, and disposal activities by way of negotiating collection contracts, billing for collection and disposal, and furnishing sites for rural drop-off boxes. Districts and authorities within the WCTCOG region include the following:

- Brown Mills Soil and Water Conservation District (SWCD)
- California Creek SWCD
- Duck Creek SWCD
- Middle Clear Fork SWCD
- Nolan County SWCD
- Throckmorton County SWCD
- Mitchell SWCD
- Runnels County SWCD
- Upper Clear Fork SWCD
- Upper Leon River Municipal Water District
- Wichita-Brazos SWCD
- Lower Clear Fork SWCD
- Upper Colorado SWCD
- Central Colorado SWCD
- Haskell County SWCD
- Brown County Water Improvement District
- Eastland County Water Supply District
- North Central Texas Municipal Water Authority (MWA)
- Rotan MWA
- Central Colorado River Authority
- West Central Texas MWA
- Lone Wolf GCD

Counties and cities located within the region have varying involvement in solid waste management including the collection of solid waste, operation of landfills, operation of recycling facilities, negotiating for collection and disposal efforts provided by others, and zoning. Among these local entities are *Keep Texas Beautiful* and its affiliates in counties and cities. These groups promote environmental education, recycling, and anti-litter campaigns.

Entities known to be responsible for the collection, transportation, and disposal of residential, commercial, and industrial solid waste include:

- Registered haulers of municipal sludge and tires;
- Registered sites for land application of sludge; and
- Permitted facilities including transfer stations, landfills, and incinerators⁶.

The implementation of “Subtitle D” Regulations has greatly affected solid waste disposal in the WCTCOG region. The statewide trend of transitioning from small rural landfills to larger regional landfills has caused the closure of many landfills in the area since the 1992 plan was adopted. This has left many rural areas with limited solid waste disposal options because of the increased distance to landfills and the cost of transportation. The closing of area landfills is not creating a crisis, but it is making landfill access unbalanced across the region.

Waste Disposal and Capacity

The West Central Texas Region currently has Type I and Type IV landfills. According to 30 TAC §330.41(b) and 30 TAC §330.41(e) a Type I is a standard landfill for the disposal of municipal solid waste, and a Type IV is a facility for the disposal of brush, construction-demolition waste, and/or rubbish that are free of putrescible and household wastes.⁷

There are six operating Type I permitted landfills in the region, but one currently has an “inactive” status and is not receiving waste. The other two landfills in the Region are Type IV. Four of the landfills have an “arid exemption.”

Table 4: MSW Permitted Facilities

	Permit Number	Permittee	Type	Status
1	1562	City of Brownwood	I	Active
2	1302	City of Coleman	IVAE	Active
3	1604	City of Haskell	IAE	Active
4	1469	BFI Waste Systems of North America	I	Active
5	420	City of Colorado City	IAE	Active
6	1809	City of Colorado City	IAE	Inactive
7	50	City of Sweetwater	IVAE	Active
8	1463	City of Snyder	I	Active

Source: MSW Permitted Facility Data for 2000

⁶ At this time, there are no transfer stations or incinerators in the region, but WCTCOG recognizes the benefit of both.

⁷ The City of Anson is pursuing permitting of a Type I and Type IV landfill.

There were 342,260 tons of waste disposed in landfills in the region during the year 2000. The following table provides a breakdown by Subregion and individual landfill site, as well as the remaining capacity data.

Table 5: 2000 Landfill Disposal and Remaining Capacity

Permit Number	Permittee	2000 Tons Disposed	Remaining Tons of Capacity	Remaining Years of Capacity
Subregion One				
1469	BFI	221,146	14,364,408	65.0
	<i>Total</i>	221,146	14,364,408	65.0
Subregion Two				
50	Sweetwater	6,962	82,211	11.8
420	Colorado City	4,316	195,059	45.0
1809	Colorado City	0	225,225	45.0
1463	Snyder	35,176	4,941,607	140.0
	<i>Total</i>	46,454	5,444,102	117.2
Subregion Three				
1604	Haskell	11,430	399,730	34.9
	<i>Total</i>	11,430	399,730	34.9
Subregion Four				
	No Facilities Permitted			
Subregion Five				
1562	Brownwood	63,142	12,326,814	195.2
1302	Coleman	88	6,855	78.0
	<i>Total</i>	63,230	12,333,669	195.1
Total 2000 tons Disposed and Capacity Available		342,260	32,541,909	95.1

Source: MSW Permitted Facility Data for 2000

Based on the year 2000 data a per capita disposal rate of 1.05343 tons per person per year was determined. That rate is used below to calculate projected regional waste disposal and remaining capacity.

Table 6: Projected Regional Waste Disposal and Remaining Capacity

Year	Population	Landfill Disposal (tons)	Per Capita Landfill Disposal Rate (tons/person/year)	Remaining Tons of Capacity	Remaining Years of Capacity
2000	324,901	342,260	1.05343	32,541,909	95.1
2005	331,501	349,213	1.05343	30,795,844	88.2
2010	338,969	357,080	1.05343	29,010,444	81.2
2015	345,316	363,766	1.05343	27,191,614	74.8
2020	349,623	368,303	1.05343	25,350,099	68.8

Waste Transfer, Storage, Treatment, and Processing

There is one other permitted MSW facility in the planning region, a grease and grit trap processing facility, but no waste has ever been accepted.

Table 7: Other Permitted MSW Facilities

Permit Number	Permittee	Type	Status
2183	SOJO, Inc.	5GG	IP

Source: MSW Permitted Facility Data for 2000 Report

The WCTCOG Region does not currently have a transfer station. The possibility of placing - transfer stations in some of the more rural counties, Eastland County for example, is being considered at present.

Waste Collection and Transportation Services

Cities and Counties in the WCTCOG Region were asked to reply to a Solid Waste Survey. The information on residential and commercial collection is given in the table below. Please note that all cities may not have complete information based on inadequate survey results.

Table 8: Regional Waste Collection

County/City	Service Provider	Residential Pick-ups/ week	Commercial Pick-ups/ week	Monthly Residential Rates	Monthly Commercial Rates
Brown					
Bangs	Community Sanitation	1	1 or 2	\$16.50	\$22.50/ \$54.00
Blanket	City	1	1	\$12.00	\$25.00
Brownwood	City				
Early	City				
Callahan	Open				
Baird	City	1	3	\$9.00	\$39.12
Clyde	BFI				
Cross Plains	BFI				
Putnam	BFI	1	1	\$9.14	\$37.83- \$101.22
Coleman	BFI				
Coleman	BFI	1	Varies	\$11.91	\$12.50/ \$14.52
Novice	BFI				
Santa Anna	BFI				
Comanche	BFI				
Comanche	BFI	1	1	\$12.05	\$12.99
De Leon	BFI				
Gustine	Community Sanitation				
Eastland	Duncan				
Carbon	Keller				
Cisco	BFI	1	1 to 3	\$14.00	Varies
Eastland	Private Hauler				
Gorman	BFI				

Ranger	Lake County Refuse	1	1 or 2	\$15.91	\$20.90- \$75.00
Rising Star	Community Sanitation				
Fisher	Open				
Roby	BFI				
Rotan	BFI	1	1	\$14.00	\$27.40- \$67.08
Haskell					
Haskell	City				
O'Brien	Duncan Disposal				
Rochester	Duncan Disposal				
Rule	Knox Waste Service				
Weinert	BFI				
Jones	Open				
Anson	Duncan Disposal				
Hamlin	Duncan Disposal				
Hawley	Duncan Disposal	NA	NA	\$17.00	NA
Lueders	BFI				
Stamford	Duncan Disposal				
Kent					
Jayton	Caprock Waste	1	1	\$12.00	\$30.00
Knox	Open				
Benjamin	BFI	NA	NA	NA	NA
Goree	BFI				
Knox City	BFI				
Munday	BFI				
Mitchell					
Colorado City	City				
Loraine					
Westbrook					
Nolan					
Blackwell	B&B Trash Hauling and Lake Side Sanitation	NA	NA	NA	NA
Roscoe	BFI	1	1	\$12.93	\$48.60
Sweetwater	City				
Runnels					
Ballinger	Trash Away	NA	NA	NA	NA
Miles	Trash Away				
Winters	BFI				
Scurry					
Snyder	City	2	2	\$14.50	\$28.05
Shackelford	Open				
Albany	BFI	1	Varies	\$10.25	\$10.00/ \$75.00
Moran	BFI	1	1	\$10.88	\$11.92- \$58.06
Stephens	Open				
Breckenridge	BFI	1	1	\$10.04/ \$14.04	Varies
Stonewall	Open				
Aspermont					
Taylor	Open				
Abilene	City	2	2	\$11.50	\$32.00- \$116.00

Buffalo Gap	Duncan Disposal				
Impact	City of Abilene				
Lawn	Duncan Disposal				
Merkel	BFI				
Trent	Open				
Tuscola	Knox Waste Service				
Tye	City				
Throckmorton					
Throckmorton	Duncan Disposal				
Woodson	Open				

Source: Survey Data

Recycling Services

A Solid Waste survey done in 2002 provided the following information:

The City of Abilene has the following recycling programs in place:

- Tree limb recycling center,
- Drop-off igloo container system for glass, aluminum, bi-metal, #1 and #2 plastics, newspaper, junk mail, and magazines,
- School supply recycling,
- Glass pulverizing system, and

Dyess Air Force Base has a very effective recycling program that decreases MSW generated at the base by 70%. The decrease is attributed to a material recovery facility and other innovative programs.

The City of Brownwood has a recycling site that handles household hazardous waste disposal and recyclable materials. The recycling program also focuses on yard waste reduction, and has a mobile recycling center that serves many areas of the city.

The City of Snyder has drop-off containers around the city. The materials collected are taken to a centralized location with a shelter to protect the recyclables, and a baler to create a more transportable, sellable product. Snyder has also distributed backyard- composting bins at city events and provides training and public education on composting projects.

The City of Sweetwater has a recycling drop-off center with a composting demonstration project and a baler.

The City of Coleman has distributed household bins to collect materials and deposit them at the centralized drop-off center.

The Cities of Ballinger, Haskell, Benjamin, and Rotan have trailers where recyclables can be easily deposited and transported from these rural communities.

The City of Winters has started a backyard composting bin project in an effort to reduce yard waste.

The City of Breckenridge has curbside pick-up for recyclables.

Tree-limb chippers have been put in place in several communities, significantly reducing the amount of yard waste. BFI performs curbside recycling pick-up in several cities in the region and brings all materials to a central location for processing.

Markets for recyclables exist within the region but quantification of these markets is difficult. Recycling programs for one or more categories of waste exist in fifteen of the region's nineteen counties, twenty-five communities, and Dyess Air Force Base.

Some of the markets for these materials exist within the WCTCOG region. Additional cities with markets available to the WCTCOG region include: Dallas, Fort Worth, Austin, San Angelo, Midland, and Odessa. A summary of the recycling markets within these cities is included in Appendix 2. Additional information should be collected to further quantify the market for recyclable materials available to the region.

The WCTCOG's geographic area is approximately 17,914 square miles with 18.34 people per square mile. A challenge our region continues to face concerning recycling is the cost of transportation associated with vast rural distances to markets for recyclable materials. To transport (import or export), the communities within the region have to stock pile recyclable materials until there is enough to allow a hauler to make a profit.

Assessment of the economic impact of increased collection of recyclables is beyond the scope of this plan. Some general conclusions of the relationship between economics and waste management practices are as follows:

- A significant increase in population and employment will result in an increase in the quantity of waste generated,
- An increase in the collection of recyclables within the region will likely increase the market for recyclables within the region and consequently create jobs within the region,
- The market will respond to a reliable and predictable flow of recyclable materials,
- Economy of scale can be achieved through collective stockpiling of such available materials.

A summary of the recycling projects in the region is reflected in the table below:

Table 9: Regional Recycling

County/City	Recycling Program	Description
Brown	Yes	Chipper
Bangs	No	
Blanket	Not Available	
Brownwood	Yes	Recycling containers, Chipper, Baler, Conveyor, Skid steer loader
Early		
Callahan	Yes	Chipper

Baird	Not Available	
Clyde		
Cross Plains	Not Available	
Putnam	Not Available	
Coleman		
Coleman	Yes	Baler, Recycle containers, Compost equipment, Chipper
Novice		
Santa Anna	Not Available	
Comanche		
Comanche	Yes	Chipper
De Leon		
Gustine		
Eastland		
Carbon		
Cisco	Yes	
Eastland	Yes	
Gorman	Not Available	
Ranger	Yes	Chipper, Recycle drop-off center
Rising Star		
Fisher		
Roby		
Rotan	Yes	Chipper
Haskell		
Haskell		
O'Brien		
Rochester		
Rule	Not Available	
Weinert		
Jones	Yes	Chipper
Anson		
Hamlin	Yes	Recycle trailer, Chipper, Recycle center building
Hawley	Not Available	
Lueders		
Stamford	Yes	Chipper
Kent		
Jayton	Not Available	
Knox	Yes	Chipper
Benjamin	Yes	Recycle Trailer, Baler, Recycle center equipment
Goree		
Knox City		
Munday		
Mitchell		
Colorado City	Yes	Chipper
Loraine		
Westbrook		
Nolan	Yes	Chipper
Blackwell	Not Available	
Roscoe	Yes	Chipper, Recycle Trailer
Sweetwater	Yes	Recycle conveyor, Recycling center building
Runnels		
Ballinger	Yes	Recycling trailers, Recycle storage building
Miles		
Winters	Yes	Chipper, Compost bins, Recycle trailer

Scurry		
Snyder	Yes	Recycling center, Used oil recycling
Shackelford		
Albany	Not Available	
Moran	Not Available	
Stephens		
Breckenridge	Yes	Chipper, Wood waste, Curbside recycle pick-up
Stonewall		
Aspermont		
Taylor	Yes	Chipper
Abilene	Yes	Wood waste, Glass pulverizer, Trailer, CFC program, Workplace recycling, Used oil recycling
Buffalo Gap	Yes	Chipper
Impact		
Lawn		
Merkel	Yes	Recycle trailer
Trent		
Tuscola		
Tye		
Throckmorton		
Throckmorton	Yes	Chipper
Woodson		

Source: Survey Data

Household Hazardous Waste (HHW) Services

The City of Abilene has initiated a premier Household Hazardous Waste year-round drop-off facility. Dyess Air Force Base has a program with a documented 80% decrease in hazardous waste disposal into the mainstream disposal system. The City of Brownwood has established a year-round-dedicated recycling site to include household hazardous waste disposal.

Other Solid Waste Services

As mentioned previously, there is one other permitted MSW facility in the planning region, a grease and grit trap processing facility, but no waste has ever been accepted.

Table 7: Other Permitted MSW Facilities

Permit Number	Permittee	Type	Status
2183	SOJO, Inc.	5GG	IP

Source: MSW Permitted Facility Data for 2000 Report

There are currently no solid waste services provided or planned that are not mentioned elsewhere in the “Waste Management System” section of this plan.

Litter and Illegal Dumping

Some common illegal dumping practices are: dumping along county roads and in pastures, or bringing trash to the city and discarding it into the nearest waste container. Many citizens are not aware that they are encroaching upon individual and commercial waste containers, which is actually theft of service.

Since the closing of many landfills within the planning region, the occurrence of illegal dumping has escalated. The cost to dispose of waste and the inaccessibility of landfills perpetuates the illegal dumping situation. Cleanup efforts precipitated by this problem create great additional expense to the region in both the rural and urban areas.

To illustrate, the City of Abilene averages 500 citizen complaints a year pertaining to illegal dumping or illegal dumpsites. The complaints are fielded through various offices or divisions such as: Streets and Drainage Services, Building Inspections, Refuse Collection, Planning and Zoning, Health, *Keep Abilene Beautiful*, and the Fire Department's Weed Control Office. Brown County also has prosecuted many cases of illegal dumping. The number of illegal dumpsites in the rural parts of the county is thought to be even greater than near the city.

Likewise, rural counties experience high incidences of illegal dumping. Landfills are not easily accessible to citizens in rural areas; some citizens have to travel across several counties to get rid of their waste. Transportation costs, coupled with actual disposal costs, create an even greater deterrent to proper waste disposal. This has the effect of causing average citizens to become recurring violators of state and local dumping laws.

The West Central Texas Natural Resources staff serves as a referral hub for citizen-reported illegal dumping incidents. A 1-800 hotline number is publicized on informational magnets and pencils, and bumper stickers, to convey the message that illegal dumping will not be tolerated in the region. Staff responds to calls to the hotline by forwarding information to the appropriate authorities for investigation and prosecution.

The WCTCOG staff also coordinates an Environmental Enforcement training event every two years to assist local law enforcement officials, government officials, policy makers, and judiciary members (such as JPs, prosecutors and lawyers) in learning and implementing the environmental laws of Texas.

Effective regional illegal dumping enforcement programs consist of education, public awareness, clean up of existing sites, and provision of basic services. Several counties in the region have initiated illegal dumping enforcement programs. To date, Brown County and Taylor County have developed and maintained successful programs.

Facility Siting

There are six operating Type I permitted landfills in the region, but one currently has an “inactive” status and is not receiving waste. The other two landfills in the Region are Type IV. Four of the landfills have an “arid exemption.”

Permit Number: 1562

Year Original Permit Issued: June 1983
Permit Holder: City of Brownwood
Facility Type: I
Status: Active
County: Brown
Nearest City: Brownwood

Permit Number: 1302

Year Original Permit Issued: August 1979
Permit Holder: City of Coleman
Facility Type: IVAE
Status: Active
County: Coleman
Nearest City: Coleman

Permit Number: 1604

Year Original Permit Issued: May 1985
Permit Holder: City of Haskell
Facility Type: IAE
Status: Active
County: Haskell
Nearest City: Haskell

Permit Number: 1469

Year Original Permit Issued: Feb. 1982
Permit Holder: BFI Waste Systems of
North America
Facility Type: I
Status: Active
County: Jones
Nearest City: Abilene

Permit Number: 420

Year Original Permit Issued: 1975
Permit Holder: City of Colorado City
Facility Type: IAE
Status: Active
County: Mitchell
Nearest City: Colorado City

Permit Number: 1809

Year Original Permit Issued: 1986
Permit Holder: City of Colorado City
Facility Type: IAE
Status: Inactive
County: Mitchell
Nearest City: Colorado City

Permit Number: 50

Year Original Permit Issued: 1975
Permit Holder: City of Sweetwater
Facility Type: IVAE
Status: Active
County: Nolan
Nearest City: Sweetwater
Comment: Converted to Type IVAE in
1995⁸

Permit Number: 1463

Year Original Permit Issued: Dec. 1981
Permit Holder: City of Snyder
Facility Type: I
Status: Active
County: Scurry
Nearest City: Snyder
Comment: Modification for “Subtitle D”
occurred in December 1994

⁸ The City of Sweetwater is currently pursuing a major amendment to the landfill permit to increase the life capacity to 25 years.

Closed MSW Landfill Inventory

The 24 Councils of Governments in Texas were required to conduct an inventory of closed municipal solid waste landfills within the planning regions under §363.064(a)(10) of the Texas Health and Safety Code, as amended by Senate Bill 1446, 76th Texas Legislature.

Per the statutory requirement, the landfill inventory must include: landfill units no longer in operation; a description of the exact metes and bounds of the landfills, or if the exact boundaries are unknown, a description of the best approximation of each unit's boundaries; a map showing the location and exact boundaries, if known, or the approximate boundaries of each former landfill unit, if the exact boundaries are not known; if known, the current owners of the land on which the former landfill units were located; and, if known, the current use of the land.

The WCTCOG closed and abandoned landfill inventory includes 187 permitted and unpermitted sites. The inventory includes research on the locations of the landfills and, if applicable, current landowners, land use, metes and bounds of the sites, and any other pertinent information. In order to compile the information, WCTCOG staff and the subcontractor Hibbs & Todd, Inc. researched materials provided by TCEQ, SWTSU, local appraisal districts, and various other agencies. The landfill inventory is located in Appendix 3.

Regional Goals, Objectives, and Action Plan

SUMMARY OF NEEDS AND PROBLEMS

Based on feedback from the Natural Resources Advisory Committee (NRAC) and the Natural Resources Committee (NRC) as well as the general public, the priority needs and problems of the region are as follows:

Local Enforcement/Illegal Dumping Issues

- More enforcement assistance in the communities
- More public education about the problems associated with illegal dumping

Recycling and Waste Reduction

- Continue promotion of existing effective waste reduction programs
- Concern with the difficulty of finding markets for collected material
- Concern that recycling methods are ineffective
- Effectively lessen the impact of the distances between markets

Educational and Training Projects

- Need to promote programs already existing in the region
- Need to further public education on recycling and illegal dumping
- Need for continued training for general public on environmental law

Household Hazardous Waste Management

- Expensive for annual one-time collection events
- Illegally dumped HHW materials

Scrap Tire Collection and Proper Disposal

- State level initiative needed
- Lack of funding to clean up and dispose of tires
- Need to develop regional markets and end-uses

By using this feedback the NRAC and the NRC will have the opportunity to establish priorities for the use of funding and determine the most effective ways to serve the region. WCTCOG staff will also note these priorities when structuring program and project ideas in order to provide regional coordination in basic management of the grant program.

GOALS AND OBJECTIVES

Goals for the WCTCOG region were developed by the Natural Resources Committee with input of the public. The goals are as follows:

- 1) Regionally assure adequate levels of transportation and disposal capabilities,
- 2) Develop local source reduction, waste minimization, reuse, recycling, and composting programs to conserve disposal capacity and resources,
- 3) Develop programs to assist regional and local entities in controlling and stemming illegal and improper disposal practices, and
- 4) Develop regional cost-effective, efficient, and environmentally suitable solid waste management systems.

The objectives of a goal are the steps necessary to reach that goal. The objectives of each goal are discussed in the following paragraphs.

Goal 1: Regionally assure adequate levels of transportation and disposal capabilities.

Short-Term Recommendations (1-5 years):

Local governments in each county should assess disposal strategies.

Lead Entity: Regional MSW Coordinator

Funding: TBD by Local Governments

Management methods for grease-grit trap and other liquids prohibited from landfill disposal under Subtitle D shall be assessed by NRC.

Lead Entity: NRC and Landfill Owners

Funding: None Required

Each city government should ensure that convenient MSW collection service is provided at least once weekly in its jurisdiction.

Lead Entity: Local Governments

Funding: TBD by Local Governments

Each county government should ensure that convenient MSW collection service is provided in its jurisdiction at least once weekly.

Lead Entity: County Governments

Funding: TBD by Cities

Transfer Stations should be operated in counties without any State-permitted disposal facilities to the extent needed to support a disposal alternative.

Lead Entity: Cities permitting facilities

Funding: TBD by Cities

Medium-Term Recommendations (6-10 years):

Assess the need for additional publicly permitted disposal capacity within the region.

Lead Entity: NRC and Local Governments

Funding: TBD by NRC

Local governments in rural areas should cooperatively work toward standardization of MSW collection and transportation services.

Lead Entity: Regional MSW Coordinator and Local Governments

Funding: TBD by Regional MSW Coordinator and County Governments

Long-Term Recommendations (11-25 years):

Need for additional disposal capacity should be monitored in the region.

Lead Entity: Regional MSW Coordinator

Funding: TBD

Waste-to-energy and mixed waste composting should be given preference to landfilling to the extent technically and economically feasible.

Lead Entity: Regional MSW Coordinator and NRC

Funding: TBD by Regional MSW Coordinator and NRC

Goal 2: Develop local source reduction, waste minimization, reuse, recycling, and composting programs to conserve disposal capacity and resources.

Short-Term Recommendations (1-5 years):

A study should be performed to evaluate regional collection, transportation, processing, and marketing options including options for residential, commercial, and institutional recycling.

Lead Entity: WCTCOG and NRC

Funding: State or Federal funds

Develop a regional material recovery facility to receive and consolidate recyclable material.

Lead Entity: NRC and Local Governments

Funding: TBD by Local Governments

At a minimum, drop-off collection centers for recyclables should be provided to each incorporated city of 1,000 or greater population and at each county collection center.

Lead Entity: Local Governments

Funding: TBD by Local Governments.

Technical assistance should be provided to local governments, businesses, and institutions in identifying and implementing source reduction, waste minimization, re-use, and recycling strategies.

Lead Entity: Regional MSW Coordinator

Funding: State Funding for MSW Coordinators

Local Governments and school districts should adopt internal source reduction, re-use, recycling, and recycled content procurement policies and programs.

Lead Entity: Regional MSW Coordinator and Local Governments

Funding: TBD by Local Governments

Education/awareness programs targeting proper methods or preparing recyclables, identifying collection locations for recyclables in the region and encouraging consumers to precycle and buy recycled should be implemented.

Lead Entity: Regional MSW Coordinator and WCTCOG

Funding: Included in duties associated with Regional MSW Coordinators funded by State Grants

Education/awareness programs targeting preferred options for yard waste reduction/management should be implemented.

Lead Entity: Regional MSW Coordinator and WCTCOG

Funding: Included in duties associated with Regional MSW Coordinators funded by State Grants

Assistance in marketing recyclables and compost/mulch products and developing such markets should be provided.

Lead Entity: Regional MSW Coordinator and State

Funding: State Funding

Assistance in procuring products with recycled content should be provided.

Lead Entity: WCTCOG, the State, Local Governments, and Special Districts

Funding: State Assistance

The amount of MSW diverted from disposal through source reduction, waste minimization, re-use, and recycling programs in the West Central Texas region should be estimated on an annual basis and publicized.

Lead Entity: Regional MSW Coordinator and WCTCOG

Funding: State Grants

The region should support, encourage, and benefit from State-level recyclable market development efforts.

Lead Entity: Regional MSW Coordinator, WCTCOG, and Local Governments

Funding: State Funded Study

Recyclables and compost/mulch market development efforts should be coordinated with other economic development efforts.

Lead Entity: WCTCOG

Funding: TBD by WCTCOG and Local Governments

Medium-Term Recommendations (6-10 years):

More aggressive waste reduction programs should be implemented as needed to meet recycling goals to the extent technically possible and economically feasible.

Lead Entity: Regional MSW Coordinator and NRC

Funding: TBD by NRC and Local Governments

Financial incentives to increase waste reduction should be considered.

Lead Entity: NRC and Local Governments

Funding: Local Governments

More aggressive waste reduction programs should be implemented as needed to meet recycling goals to the extent technically possible and economically feasible.

Lead Entity: Regional MSW Coordinator, Local Governments, and NRC

Funding: TBD

Goal 3: Develop programs to assist regional and local entities in controlling and stemming illegal and improper disposal uses.

Short-Term Recommendations (1-5 years):

Education/awareness programs for citizens discouraging illegal waste removal, open burning, and other improper disposal practices should be implemented.

Lead Entity: Regional MSW Coordinator and WCTCOG

Funding: State Funds

Education/awareness programs should be developed to inform residents about alternatives to hazardous home products and proper disposal methods for household hazardous waste.

Lead Entity: WCTCOG

Funding: State Funds

Education/awareness programs should be developed to inform small quantity generators of hazardous waste and infectious medical waste about proper management practices.

Lead Entity: State, facilitated by WCTCOG, private haulers, and Local Governments

Funding: State Funding

Local Governments should develop plans for management of special waste.

Lead Entity: Local Governments

Funding: TBD by Local Governments

Technical assistance should be provided to local governments, businesses, and institutions in identifying and implementing proper management practices for special and problem wastes.

Lead Entity: WCTCOG and State

Funding: State Funds

Each county within the region should develop and maintain litter abatement programs to reduce amount of illegal dumping in rural areas.

Lead Entity: State, facilitated by WCTCOG, private haulers, and Local Governments

Funding: State Funding

A regional “dumpstoppers” hotline and reward system should be used to encourage citizens to anonymously report illegal dumping and other improper disposal practices.

Lead Entity: State Regulatory Agency

Funding: State Funds

Economic incentives should be provided to encourage local businesses to accept used oil and oil filters from do-it-yourself oil changes.

Lead Entity: local Governments facilitated by WCTCOG

Funding: State Assistance

Large appliances, furniture, tires and source separated wood waste should be accepted at all MSW management facilities, collected in every city and county, and recycled or reused to the greatest extent technically and economically feasible.

Lead Entity: MSW Facility Owners, Local Governments

Funding: TBD by Local Governments

Local Governments and school districts should ensure that lead-acid batteries, waste oil, and used oil filters from their fleets are recycled.

Lead Entity: Local Governments

Funding: Local Governments

Success of programs to encourage proper management of special and problem wastes should be monitored.

Lead Entity: Regional MSW Coordinator

Funding: State Grant Funds

Medium-Term Recommendations (6-10 years)

Household hazardous waste and small quantity generated waste collection should be available in the region.

Lead Entity: WCTCOG and State

Funding: TBD

Special and problem wastes should be minimized reused or recycled to the extent technically and economically feasible.

Lead Entity: WCTCOG and Local Governments

Funding: TBD

Goal 4: Develop regional cost-effective, efficient, and environmentally suitable solid waste management systems.

Short-Term Recommendations (1-5 years):

Existing regional Natural Resources Committee (NRC) should be maintained as a standing WCTCOG committee.

Lead Entity: WCTCOG should facilitate meetings

Funding: State Funds

The NRC and the WCTCOG Executive Board should approve new appointments to the NRC.

Lead Entity: WCTCOG

Funding: State Funds

NRC shall determine the need for establishment of sub-regional plans.

Lead Entity: NRC and Local Governments

Funding: State Funds

MSW management should be coordinated at the regional level and a regional coordinator should be designated.

Lead Entity: WCTCOG and NRC

Funding: State Funds

Implementation of regional plan should be monitored at the regional level.

Lead Entity: Regional MSW Coordinator, NRC

Funding: State Funds

Periodic newsletter on solid waste topics should be published in the region.

Lead Entity: WCTCOG and Regional MSW Coordinator

Funding: State Funds

Local Government officials, facility/service operators, and generators should be educated about changes in State MSW laws, regulations, and policies.

Lead Entity: WCTCOG and Regional MSW Coordinator

Funding: State Funds

Regional Clearinghouse on State and Federal MSW laws, regulations, and policies should be established.

Lead Entity: WCTCOG, State

Funding: State Funds

NRC should provide input to State officials of Solid Waste management issues important to the region.

Lead Entity: NRC

Funding: TBD as needed

Local, State, and Federal funding sources should be tracked at the regional level.

Lead Entity: Regional MSW Coordinator and WCTCOG

Funding: TBD as needed

Assistance to Local Governments in the preparation of applications for MSW management funding sources should be provided at the regional level.

Lead Entity: WCTCOG

Funding: TBD by WCTCOG

The regional plan should be updated at least every five years.

Lead Entity: WCTCOG

Funding: State Funds

Medium-Term Recommendation (6-10 years)

NRC should review and discuss MSW grant applications to the State.

Lead Entity: WCTCOG, NRC

Funding: TBD by WCTCOG

General/MSW/Management education/awareness campaign should be implemented in the region.

Lead Entity: WCTCOG

Funding: TBD by NRC

Additional education/awareness programs should be developed at the regional level to support MSW management programs in the region and encourage proper management practices.

Lead Entity: WCTCOG

Funding: State Funds

Use the Plan Conformance/Facility Application Review process and the provisions of §363.066, Health & Safety Code, to address land use compatibility and other local issues in order to avoid if possible, or minimize if avoidance is not possible, adverse impacts from municipal solid waste (MSW) facilities on human health and the environment.

Lead Entity: WCTCOG, NRC

Funding: State Funds

Long-Term Recommendations (11-25 years):

Regional plan should continue to be updated.

Lead Entity: WCTCOG

Funding: State Funds

ACTION PLAN

Plan Conformance/Permit Review

Under Texas Health and Safety Code §363.066 and TCEQ rules 30 TAC §330.556, state municipal solid waste regulatory activities must conform to an adopted regional and/or local solid waste management plan. To this point, TCEQ requires every Council of Governments, through its solid waste advisory committee, to review applications for municipal solid waste facility permits within its particular region. Each application must be reviewed for conformity with the regional solid waste management plan.

The permitting requirement within 30 TAC §330.51 state “that it is the responsibility of the applicant to demonstrate conformity with the regional solid waste management plan.” It is the responsibility of the TCEQ, during permit review, to take into account land use compatibility, zoning, and community growth patterns. These items, then, are the responsibility of the regulatory agency and the applicant to demonstrate to the Council of Governments. Regional performance measures linked directly to the goals and objectives of the regional plan therefore become the most straight -forward measure of a permit application’s conformity.

The following outlines the procedure WCTCOG will use to review solid waste facility permit applications for conformity to the regional solid waste management plan. The WCTCOG through its Natural Resources Advisory Committee (NRAC) and the Natural Resources Committee (NRC) will develop a checklist of this plan’s goals and objectives. Each goal and objective relevant to facility siting issues will be addressed on the checklist, and the permit applicant will be required to demonstrate how its proposed facility either:

- Facilitates;
- Does not facilitate;
- Or has no effect/ is not applicable to

implementing each goal or objective. NRAC review of the permit application will be initiated after Parts 1 & 2 of the application have been completed and sent to the COG by the TCEQ, along with the applicant’s completed checklist. The NRAC will review the applicant’s completed checklist along with summary information from the permit application. Findings from the NRAC review will take the form of the following:

- Conforms
- Conforms, with comments
- Does not conform

Grants Funding Plan

Regional Solid Waste Management Plan Priorities

Grant funds will be allocated and distributed to help implement the region's goals and objectives. Funding will only be given to projects that implement these goals and objectives. Projects must promote cooperation between public and private entities for services that may not be otherwise readily available or create a competitive advantage over a private industry that provides recycling or solid waste services. Applicants must follow specific guidelines during the notification process. Applicants are also encouraged to incorporate an educational component to their projects, and advertise any collection events or grant-provided services to the public.

Specific Projects

The WCTCOG has decided not to identify specific projects for grant funding allocation in this plan at this time. Entities eligible for grant funding will continue to develop grant applications, which address the goals, objectives, and implementation strategies of the regional plan, and then submit them to the NRC for review and funding recommendations.

Project Categories

The following project categories have been established by WCTCOG for the fiscal year 2002/2003 biennium. All project applications must fit within one of these categories to be eligible for funding. Project categories will be reviewed and may be revised prior to each biennium (grant funding period). Eligible project categories will adhere to all guidelines, limitations, and restrictions on the use of grant funding which may be imposed by TCEQ or its successor agency (ies). Eligible project categories include:

Local Enforcement This category consists of projects that contribute to the prevention of illegal dumping of municipal solid waste, including liquid wastes. Under this category, grant recipients may investigate illegal dumping problems; enforce laws and regulations pertaining to the illegal dumping of municipal solid waste, including liquid waste; establish a program to monitor the collection and transport of municipal liquid wastes, through administration of a manifesting system; and educate the public on illegal dumping laws and regulations.

Litter and Illegal Dumping Cleanup Funds may be used for ongoing and periodic activities to cleanup litter and illegal dumping of municipal solid waste, including scrap tire dumping sites. Projects may include support at Lake and River Clean up events, conducted in conjunction with TCEQ's and Keep Texas Beautiful's Lake and River Clean up Program. Funded activities may include: waste removal; disposal or recycling of removed materials; fencing and barriers; and signage. Placement of trash collection receptacles in public areas with chronic littering problems may also be funded. Reuse or recycling options should be considered for managing the materials cleaned up under this program, to the extent feasible.

Source Reduction and Recycling Programs and projects funded under this category shall have as a goal and be designed to provide a measurable effect on reducing the amount of municipal solid waste being disposed of in landfills. Any program or project aimed at demonstrating the use of products made from recycled and/or reused materials shall have as its primary function the education and training of residents, governmental officials, and others in order to encourage support for recycling efforts. Programs aimed at efficiency improvements in the local government's solid waste management system to increase the source reduction of solid waste must be coordinated with the TCEQ. Any program to develop a full-cost accounting system shall utilize the full-cost accounting guidance prepared by the TCEQ.

Local Solid Waste Management Plans This category includes projects to develop and have adopted by the TCEQ a local solid waste management plan by local governments, in accordance with Subchapter D, §363, TX Health & Safety Code, as implemented by TCEQ rule, 30 TAC Chapter 330, Subchapter O., or to amend an existing local solid waste management plan that has been adopted by the TCEQ. The funding limitation applicable to this category is that the local planning area must be consistent with one or a combination of local solid waste management planning subregions identified by the WCTCOG in its regional solid waste management plan.

All local solid waste management plans shall be consistent with the adopted regional solid waste management plan, and prepared in accordance with Subchapter O of the TNRCC Municipal Solid Waste regulations (30 TAC Chapter 330) and the Content and Format Guidelines provided by the TNRCC.

Citizens' Collection Stations, "Small" Registered Transfer Stations, and Community Collection Events This category includes projects to construct municipal solid waste collection facilities in areas of the state which are under-served by collection services or do not have access to proper disposal facilities. Projects funded under this category include citizens collection stations, as these facilities are defined under 30 TAC Chapter 330, §330.2 the Municipal Solid Waste regulations.

Municipal solid waste transfer stations that qualify for registration under §330.4(d)(1)-(3) or §330.4(r) of the Municipal Solid Waste regulations may also be funded. A project funded under this category shall include consideration of an integrated approach to solid waste management, to include providing recycling services at the site, if appropriate to the management system in place

Household Hazardous Waste Management This category includes projects, which provide a means for the collection, recycling or reuse, and/or proper disposal of household hazardous waste, including household chemicals and other materials. Projects may include collection events; consolidation and transportation costs associated with collection activities, permanent collection facilities, and education and public awareness programs

Technical Studies This category includes projects which include the collection of pertinent data, analysis of issues and needs, evaluation of alternative solutions, public input, and recommended actions, to assist in making solid waste management decisions at the local level. Projects under this category may also include research and investigations to determine the location and boundaries of closed municipal solid waste landfills in support of the regional solid waste landfill inventory program.

Educational and Training Projects Educational components are encouraged under the other categories in order to better ensure public participation in projects; those educational components should be funded as part of those projects and not separately under this category. This category may be used for stand-alone educational projects dealing with a variety of solid waste management topics. This category may include funding for information-exchange activities, subject to limitations on travel expenses.

Allocation and Priorities

Fiscal Year 2002 Budget - \$282,758.00

Fiscal Year 2003 Budget - \$282,758.00

Fiscal Year 2004/2005 Budgets - unknown at this time

Minimum or maximum funding limits – No allocation limits, category funding limits, or grant award funding caps are proposed.

Funding priorities – At this time the only priority set is for Illegal Dumping and Local Enforcement issues, no other prioritization is set at this time.

Project Selection Process

Requests for Proposals (RFP's) will be mailed to all eligible grant recipients. Applicants will have 30 to 45 days to complete the application and submit all necessary forms. The NRAC will screen all applications received. Applicants will then have the opportunity to do a brief presentation, if they desire. The NRAC will review, score, and rank all applications and make recommendations to the NRC to present then to the WCTCOG Executive Committee and forward to the TCEQ. An example of the Score Sheet is provided in Appendix 4.

Regional Coordination and Planning

The Natural Resources Department at WCTCOG will continue to provide regional coordination and planning to the pass-through grant program, as well as continued work and maintenance on the Closed MSW Landfill Inventory. Under contract with the TCEQ, the WCTCOG carries out several core functions as the state's designated regional solid waste planning entity. It provides technical assistance to local governmental entities and individuals on solid waste issues, conducts informational programs and participates in civic and community organizations and events related to municipal solid waste issues.

The WCTCOG maintains a Solid Waste Advisory Committee called the Natural Resources Advisory Committee (NRAC), which acts as a central advisory and coordinating body to the Council of Governments' Executive Committee on regional solid waste issues, planning

studies such as this amendment to the regional solid waste plan. The NRAC also reviews permit applications for MSW facilities in the region and for the selection of MSW projects for grant funding.

WCTCOG also serves as a central point of contact for solid waste management outreach, education, and training programs in the planning region, and maintains a regional collection of solid waste information and reference materials that are available to the public and to local governments.

Local Solid Waste Management Plans

At present, no local plans have been required or voluntarily submitted to the WCTCOG. However, within the next five-ten (5-10) years, cities with a population of at least 30,000 will be encouraged to submit a plan for review. The City of Abilene is presently creating a local plan.

Local and Subregional Recommendations

Local and Subregional recommendations for municipal solid waste planning, facilities, and services are addressed in the Goals and Objectives section of this regional solid waste management plan.

It is recommended that any entity within the WCTCOG region should contact the Natural Resource Department if they need assistance with solid waste issues.

Recommendations for State-Level Action

Continued efforts should be made in order to establish an effective scrap tire program.

Appendix 2

Recycling Markets Available within WCTCOG region

Industry Name	Types of Materials	Address
A-1 Core	Aluminum cans, cardboard, Auto parts	301 N. Treadaway Abilene, TX 79601
Aldersgate Enrichment Center	Newspaper, cardboard, Paperboard, plastics	P.O. Box 1406 Early, TX 76802
American Resource Recovery	Oil filters, absorbents	11698 FM 608 Maryneal, TX 79535
Brownwood Iron & Metal	Metal, aluminum, & steel cans, scrap metals, radiators	P.O. Box 477 Brownwood, TX 76804
CFC Reclamation & Recycling Services	Refrigerant Gases	P.O. Box 560 Abilene, TX 79604
City Recycling Center	Aluminum cans, glass, antifreeze, bimetal cans, oil, oil filters, tires, tree-limbs & yard waste	2209 Oak Street Abilene, TX 79601
David's Auto Salvage	Metal & steel scrap automobiles	3902 Pine St. Abilene, TX 79601
Environmental Recycling & Recovery	Tires	P.O. Box 388 Stamford, TX 79553
Foster Wrecking	Metal & aluminum cans, scrap metals, radiators	P.O. Box 430 Stamford, TX 79553
Guy's Salvage	Aluminum, aluminum cans, copper, brass, radiators, batteries, scrap metals	RT 3 Box 23 Sweetwater, TX 79556
Midwestern Reclamation	Chemicals, Still bottoms, solvents	P.O. Box 1395 Snyder, TX 79549
Pine Street Salvage	Aluminum, scrap iron, bimetal, aluminum cans,	3833 Pine Street Abilene, TX 79601
Potter's Industries	Auto glass, clear glass, & plate window glass	HC 30 Box 20 Brownwood, TX 76801
RWL Recycling	Newspaper, aluminum & aluminum cans, magazines, cardboard, copper, brass, office paper, radiators, & plastics 1 & 2.	2989 Pine Street Abilene, TX 79601 915/673-8813 Fax 915/676-1704
Safety Kleen	Hazardous waste-excluding radioactive	4234 Oil Belt Lane Abilene, TX 79605
Snyder Iron & Metal	Appliances, batteries, bimetal, aluminum & tin cans, scrap metals, & lead	208 N Old Post Road Snyder, TX 79549 915/573-6862

	contaminated materials	
Texas Metal & Recycling	Aluminum cans, steel, cast iron, copper, brass, scrap metals, radiators & metal appliances	549 N Second Abilene, TX 79601 915/672-8585 Fax 915/676-1704
Texas Recycling Gas & Oil	Metal & aluminum cans, scrap metals, radiators	Box 670 Brownwood, TX 76804
United States Gypsum	Corrugated-cardboard, magazines,-newspapers,- ledger/ colored/computer - paper	P.O. Box 1429 Sweetwater, TX 79556

Recycling Markets Available outside WCTCOG region
(Including Dallas- Fort Worth, San Angelo, and Midland-Odessa)

	Aluminum	
Big Spring Iron & Metal	Big Spring	915-267-5367
Sceptor Recycling	Arlington	817-261-5578
City Industries	Dallas	214-421-5406
Gold Metal Recyclers	Dallas	214-421-0247
Trinity Recycling	Dallas	214-428-4681
Atlas Scrap Iron & Metal	Dallas	800-209-0511
Butts recycling	Midland	915-687-4225
	Glass Containers	
Westex Iron & Metal	Fort Worth	817-626-7033
San Angelo Friends of the Environment	San Angelo	915-659-0722
Green Guy Recycling	San Marcos	512-353-3266
	Metals	
Empire Iron & Metal	Dallas	214-747-9339
Ace Iron & Metal	Dallas	214-631-2256
Duggan Industries Inc.	Dallas	214-428-8336
Westex Iron & Metal	Fort Worth	817-626-7033
Gachman Metals & Recycling	Fort Worth	817-334-0211
Lone Star Metals Co.	Fort Worth	817-534-7161
San Angelo Friends of the Environment	San Angelo	915-659-0722
Green Guy Recycling	San Marcos	512-353-3266
Big Spring Iron & Metal	Big Spring	915-267-5367
Oak Cliff Metals	Dallas	214-946-2267
Northside Salvage & Scrap Metal	Fort Worth	817-626-5771
Commercial Metals, Secondary Metals Processing Division	Odessa	915/337-1513
	Paper	
Vista Fibers	Dallas	214-366-3800
San Angelo Friends of the Environment	San Angelo	915-659-0722
Green Guy Recycling	San Marcos	512-353-3266

Appendix 3

WEST CENTRAL TEXAS COUNCIL OF GOVERNMENTS

CLOSED LANDFILL INVENTORY

(See notebooks for complete inventory.)

Appendix 4

WEST CENTRAL TEXAS COUNCIL OF GOVERNMENTS SELECTION CRITERIA

(Possible total score of 100 points)

Applicant:

A. Project Merit and Need (0-40 Points)

- a. Is the proposed project clearly described and does it justify its need in a form consistent with the priority category, strategies and recommendations in the Regional Plan. Does the application specify how this project targets and maximizes waste stream diversion in the project area; or stops illegal dumping? (0-15 points)
- b. Does it state who would be directly benefited or served? Is the affected geography listed (jurisdictions involved)? (0-5 points)
- c. Did the applicant indicate if they had participated in local solid waste management planning activities, demonstrating a commitment to solid waste management goals, alone or in cooperation with other communities? Did the applicant clearly describe if the project is multi jurisdictional, cooperative, or regional in nature, and who the primary applicant and partners are. Did the applicant describe whether the project promotes public/private cooperation (if applicable) (0-10 points)?
- d. Is the application clear in defining if this is a startup or pilot project where no such program exists, how does it benefit the local government or region?
Or,
If this is an enhancement of an existing program, is there a brief description of an existing program and is it indicated of how the proposed project will significantly improve the program? (0-10 points)

_____ **Subtotal**

B. WORK PROGRAM (0-25 Points)

- a. Are major steps/tasks identified and described in logical, understandable manner, achieving the project objectives? (0-10 points)
- b. Are measurable outputs (deliverables) identified? (YES OR NO)
- c. Is there a clearly defined timetable? (0-10 points)
- d. Extra points for innovation, creativity, cooperative approach and/or well-written program (0-5 points)

_____ **Subtotal**

C. Local Commitment (0-20 Points)

- a. Did the applicant clearly identify staff or other entities responsible for undertaking the project and briefly describe their appropriate experience? (0-3 points)
- b. If the proposed project could become an ongoing service, is it clearly described? Of how that projects may be sustained beyond the grant period? (0-2 points)
- c. Did the applicant or a partner in a group of applicants indicate if they are or have applied for status of a Clean Texas local government, a certified Keep America Beautiful city, and/or a Proud Community in Keep Texas Beautiful, thus demonstrating a commitment to environmental programs in the community; (0-5 points)
- d. Does the applicant have a Local Solid Waste Management Plan, developed and adopted according to the State’s SubChapter O guidelines (0-2 points)
- e. If applicant is providing cash matching funds (not in-kind services) to indicate special commitment, is it clearly written? The contribution is taken into consideration by the SWAC (0-5 points for cash match, assigned at discretion of reviewer).

_____ **Subtotal**

D. Project Budget (0-15 Points)

- a. Are the total related costs and the inkind costs of the proposed project (not just grant expenditures) adequately considered? (0-10 points)
- b. Are the costs of the proposed project presented in unit terms, such as cost per ton, cost per customer, or cost per capita, as applicable? (0-5 points)
- c. Will the proposed project result in measurable cost savings, or are the costs of the proposed project otherwise reasonable justified? (0-5 points)

_____ **Subtotal**

_____ **Total Score**

Comments/Suggestions

Appendix 5

Solid Waste Characterization –1990 Plan

Municipal Solid Waste (MSW) characterization is an analysis of the quantity and composition of the waste generated by a community and discarded in a landfill. The types of MSW produced in the WCTCOG region can be defined as follows:

Municipal Solid Waste (MSW) - Solid waste resulting from or incidental to municipal, community, commercial, institutional and recreational activities, including garbage, rubbish, ashes, street cleanings, dead animals, abandoned automobiles, and all other solid waste other than industrial solid waste.

Garbage - Solid waste consisting of putrescible animal and vegetable waste materials resulting from the handling, preparation, cooking, and consumption of food including waste materials from markets, storage facilities, handling, and sale of produce and other food products.

Rubbish (Refuse) - Non-putrescible solid waste (excluding ashes), consisting of both combustible and non-combustible waste materials.

Residential - Garbage-rubbish produced at single and multi-family residences.

Commercial - Solid wastes produced at business establishments including offices, shopping centers, restaurants, and other service establishments.

Industrial - Solid waste produced resulting from or incidental to any process of industry, manufacturing, mining, or agriculture.

Military - Solid wastes resulting from military activities.

Institutional - Solid wastes generated by schools, hospitals, nursing homes and similar facilities.

Recreational - Solid wastes produced at parks and other recreational facilities.

Municipal Sludge - Any solid, semi-solid, or liquid waste generated from a municipal wastewater or water supply treatment plant or any other such waste, such as septage, grease and grit trap waste having similar characteristics. For example, grease trap wastes can be generated at restaurants and grit trap waste are generated from car washes.

Special wastes with the potential to adversely affect health and the environment are as follows.

Medical Waste - special waste from health care related facilities to include a solid waste which if improperly treated or handled may serve to transmit infectious disease(s) and which is comprised of the following; animal wastes, bulk blood and blood products, microbiological wastes, pathological wastes, and sharps (needles, etc.).

Used Oil - Used crankcase and transmission oil from motor vehicles.

Used Tires

Batteries - Storage batteries from motor vehicles and those used in a variety of consumer applications and containing lead, nickel, cadmium, and mercury.

Household Hazardous Waste - Solid wastes generated in a household by a consumer which, except for the exclusion provided in 40 CFR 261.4(b)(1), would be classified as a hazardous waste under 40 CFR, Part 261.

Asbestos - A general name for the useful, fibrous varieties of a number of well-forming silicate minerals that are heat-resistant and chemically inert; two varieties exist; amphibole asbestos, the best grade of which approaches the composition $C_{22}Mg_2(OH)_2Si_8O_{22}$ (tremolite), and serpentine asbestos, usually chrysolite, $Mg_3Si_2(OH)_4O_5$.

Petroleum Containing Soils - Soils excavated or removed resulting from spills or leaking storage tanks including automotive, diesel fuel, used motor and other petroleum contaminated soils, which may contain benzene, toluene, ethylbenzene, and xylene.

Definitions of other terms used in characterization studies are as follows:

Composting - The controlled biological decomposition of organic materials through microbial activity. Depending on the specific application, composting can serve as both a volume reduction and a waste treatment measure.

Discards - Discards include the MSW remaining after recovery for recycling and composting. These discards are usually combusted or disposed of in landfills, although some MSW is littered, stored, or disposed of on-site, particularly in rural areas.

Generation - Refers to the amount (weight, volume or percentage of the overall waste stream) of materials and products as they enter the waste stream and before materials recovery, composting, or combustion (incineration) takes place.

Recovery - Refers to materials removed from the waste stream for the purpose of recycling or composting. Recovery does not automatically equal recycling and composting, however. For example, if markets for recovered materials are not

available, the materials that were separated from the waste stream for recycling may simply be stored, or in some cases, sent to a landfill.

Recycling - A process by which materials that have served their intended use or are scrapped, discarded, used, surplus, or obsolete are collected, separated, or processed and returned to use in the form of raw materials in the production of new products. Except for mixed municipal solid waste composting, that is, composting of the typical mixed solid waste stream generated by residential, commercial, or institutional sources, recycling includes the composting process if the compost material is put to beneficial reuse.

Resource Recovery - The recovery of material or energy from solid waste.

Source Reduction - Any action that avoids the generation of waste by reducing waste at the source, including redesigning products or packaging so that less material is used, voluntary or imposed behavioral changes in the use and reuse of materials, or increasing durability or re-usability of materials.

Sub-regions - Relatively small geographic areas with similar conditions and logical relationships, forming "local" planning areas. Local solid waste management systems and plans can be developed by the sub-regions, while enabling two or more local governments with common problems or needs to combine their resources into area-wide waste management systems. Each area-wide waste management system will eventually develop its own separate waste management plan

Waste Reduction Goal - The quantity of waste (measured as percent) desired to be eliminated from the stream of waste discarded in municipal solid waste landfills.

No primary waste characterization studies are known to have been conducted in the WCTCOG region. Secondary sources were utilized to estimate MSW generation within the region. Regional or sub-regional waste characterization studies would be beneficial in evaluating existing facilities and programs and in projecting the impact of future facilities and programs.

Physical Characteristics of the WCTCOG Area

Geography

Geography is important to the siting of solid waste facilities. Geographical considerations include topography, flora, and fauna. Topography is important because of hydrology and erosion considerations. Flora and fauna are important because of screening and environmental compatibility considerations.

The WCTCOG encompasses 19 counties covering an area of 17,764 square miles of West-Central Texas. The topography of the region as a whole ranges from nearly level to rough. Elevation generally increases from east to west, with a low in Comanche County (1,056 ft.) and a high in Kent County (2,830 ft.). Portions of three major river basins are included in the region. These are the Colorado River Basin, the Brazos River Basin, and the Red River Basin. The Colorado River Basin lies at the southern extremity of the region and drains approximately one-fourth of the WCTCOG area. The Red River Basin lies in the northern portion of Knox County. The Brazos River Basin comprises the remainder of the region. Major reservoirs throughout the WCTCOG region include: J.B. Thomas, Colorado City, Champion Creek, Lake Sweetwater, Millers Creek, Lake Stamford, Ft. Phantom Hill, Lake Kirby, Lake Abilene, Hords Creek, Lake Coleman, Lake Clyde, Lake Cisco, Lake O.H. Ivie, Hubbard Creek, Lake Daniel, Lake Leon, Lake Proctor, and Lake Brownwood.

The WCTCOG intersects three natural regions in Central Texas: the Oak Woods and Plains, the Edwards Plateau, and the Rolling Plains (Figure 2). Most of Comanche County and parts of southeastern Eastland County fall into the Western Cross Timbers Sub-region of the Oak Woods and Plains, while portions of Brown, Eastland, Callahan, and Comanche Counties are found in the Lampasas Cut Plain Sub-region of the Edwards Plateau. The bulk of the WCTCOG area, however, is contained in the Rolling Plains Region. The extreme northwestern corner of Kent County lies within the Escarpment Breaks Sub-region, while the remainder of the WCTCOG is in the Mesquite Plains Sub-region of the Rolling Plains.

The Oak Woods and Prairies Region is comprised of oak-hickory forest intermixed with tall-grass prairies. River valleys crossing the region support forests of hackberries and pecans mixed with oaks on the alluvial soils. Forests in the Western Cross Timbers Sub-region are neither as dense nor as tall as those in the Eastern Cross Timbers due to the lessened availability of moisture. There are fewer eastern species of trees in the Western Cross Timbers. Pockets of deep clay soils support bluestem prairies. Gray squirrels exist only in the hardwood bottoms.

The Edwards Plateau Region comprises an area of West Central Texas commonly known as the "hill country." It is bounded on the east and south by the Balcones Fault. To the north it extends to the Western Cross Timbers of the Oak Woods and Prairies Region and grades into the Plains Region. Scrub forest is the most characteristic plant association of the Edwards Plateau Region. Mesquite occurs throughout the Edwards Plateau; together with live oak it dominates the wood vegetation in the west. Grassland with scattered mesquite woods on low

rolling hills underlain by limestone describes the Lampasas Cut Plain Sub-region. Grasslands are found in alluvial valleys and canyon lands species are found on slopes.

The Rolling Plains Region, together with the High Plains Region, is the southern extension of the Great Plains of the central United States. The original prairie vegetation included tall and mid-grasses such as bluestems and grammas. Buffalo grass and species of three-awn, among others, tend to increase under grazing. Mesquite is a common invader on all soils. Shinnery oak and sand sage increase or invade on the sandy soils. Stream floodplains are dominated by various hardwood species. Juniper clings to the steep slopes along the rivers. The Mesquite Plains Sub-region, much of which is also known as the Reddish Plains, typifies the Rolling Plains. It is a gently rolling plain of mesquite-short grass savanna. Oak, cedar, acacia, and mimosa are important secondary elements of the brush portion on the savanna. Steep slopes, cliffs, and canyons occurring just below the edge of the High Plains Caprock comprise the Escarpment Breaks Sub-region found in northwestern Kent County. The Breaks are an ecotone or transition zone between the High Plains grasslands and the mesquite savanna of the Rolling Plains. Brush species including junipers, buffalo currant, and joint-fir dominate the vegetation of this sub-region.

Sites of low relief are less subject to erosion, landslide, and slumping. Additionally, sites should be selected which do not lie within floodplains. Broad upland flats or divides away from major or tributary drainages are preferred. The geography of the WCTCOG region is widely varying with differences occurring in each county. The selection of potential sites for facilities is beyond the scope of this plan and should be evaluated on a case-by-case basis.

Climate

Climatical considerations in the selection of potential solid waste management sites include rainfall, wind velocity and prevailing direction. Rainfall is probably the most important of these considerations.

Average precipitation in the WCTCOG area is about 24 inches per year. Generally, western Counties receive the least rainfall (Scurry County averages only 19.3 inches per year) and eastern counties receive the most (Comanche County averages 28.4 inches per year). Compared to other regions in Texas, the WCTCOG area receives approximately 50 percent of that of East Texas and 300 percent of that of Far West Texas. Rainfall peaks in May or June and again in September. A summer dry period with high temperatures and high evaporation rates is typical. July tends to be the hottest month (averaging 96^{EF}), while January temperatures average around 31^{EF}. Growing season is around 225 days, with the first annual freeze date around November 10, and the last annual freeze date around March 30. The moderate climate permits, on the average, six months of prime time for outdoor recreational, commercial, and other activities.

Rainfall in the WCTCOG region is low enough that with proper design and operations landfills are not adversely impacted. Wind velocity and prevailing direction should be considered such that populated areas are minimally impacted. Consideration should be given to sites concerning low inversion potential and good circulation but not in areas of high winds such

that blowing debris and wind erosion of the soil is detrimental. Landfill operations of prompt compaction and covering of placed wastes and the daily gathering of loose debris can maximize the control of windblown wastes. The selection of potential landfill sites should be evaluated individually and the climate considered as well as other factors.

Geology and Hydrology

Geology and hydrology are important considerations when selecting a site for landfill disposal. Geology considerations include nearest source of clay and type of formation. Hydrology considerations include formation permeability and depth to groundwater.

Clay soil is needed for liner construction. Therefore, a site with clay soils would be preferred to one without clay soils; if clay is not available, the owner must pay to have clay brought onto the site. Additionally, easily excavated formations are preferred over formations such as rock. Below grade landfills are likely more cost effective to construct than above grade landfills.

Relatively impermeable materials, such as shale and clay, are desirable foundation materials. Relatively impermeable soils are desired so that if a landfill were to leak, the liquid would not be able to migrate a great distance. Conversely, highly permeable formations such as limestone and fluvial terrace deposits should be avoided. Additionally, the bottom of a landfill should be above the historical high groundwater table and preferably have no significant hydraulic connection between the landfill bottom and the groundwater table.

The WCTCOG area extends across three different physiographic provinces. The provinces, from northwest to southeast, are the Red Bed Plains, North Central Plains, and the Lampasas Cut Plain. Each of these has a distinct surface and subsurface geology. Some of the areas located in these provinces are considered to be good for solid-waste disposal. The areas that are considered to be good for solid-waste disposal have low permeability, low flood potential, and flat to gently rolling topography. Other areas are considered to be moderately suitable for solid-waste disposal. These areas generally have moderate permeability, low flood potential, and rolling topography.

The Red Bed Plains includes Knox, Haskell, Jones, Taylor, Runnels, Stonewall, Fisher, Nolan, Kent, Scurry, and Mitchell Counties. This province also includes portions of Throckmorton, Shackelford, and Callahan Counties. This province is located on the Eastern platform of the Permian basin of West Texas. Permian Age through Cretaceous Age sedimentary rocks are found to outcrop within this region. The rocks found include mudstone, limestone, shale, dolomite, siltstone, and sandstone that are indicative of the marine and continental depositional environments that existed during the Permian, Triassic, and Cretaceous periods. The areas that are considered good for solid waste disposal are found predominately in Stonewall, Haskell, Jones, and Taylor Counties. Other good areas are found in minor amounts within Knox, Kent, Scurry, Fisher, Mitchell, and Runnels Counties. The soils in these areas are predominately moderate to thin clay loams and sandy loams with low infiltration capacity. The aquifer potential is very poor. The areas which are considered to be moderate for solid waste disposal are found predominately in Kent, Stonewall, and Mitchell Counties. Moderate disposal areas are also found in Knox, Scurry, Fisher, Jones, Nolan,

Taylor, and Runnels Counties. The soils in these areas are composed of thin to moderate silt loams and thin, stony clay and sandy loams with moderate to low infiltration capacity. The aquifer potential is poor.

The North Central Plains includes Stephens, Coleman, and portions of Throckmorton, Shackelford, Callahan, Eastland, and Brown Counties. The western portion of this province is located on the Concho shelf where rocks of Pennsylvanian and Permian age form a westward-dipping homocline. The eastern portion of this province is found within the Bend flexure which came into existence during late Pennsylvanian and early Permian times. Pennsylvanian age through Cretaceous age sedimentary rocks are found to outcrop within this region. The rocks found include limestone, shale, sandstone, siltstone, mudstone, and claystone. The areas which are considered to be good for solid waste disposal are found in minor amounts within Stephens, Eastland, Coleman, and Brown Counties. The soils in these areas are predominately clay loams with low infiltration capacity. The aquifer potential in these areas is considered to be poor. All of the counties found within North Central Plains province contain areas which are considered to be moderate for solid waste disposal. The soils in these areas are considered to be predominately clay and sandy loams with low to moderate infiltration capacity. The aquifer potential in these areas is considered to be poor.

The Lampasas Cut Plain includes Comanche and portions of Eastland and Brown Counties. The Bend flexure is the predominate structural feature found within this area which is also the northwestern boundary of the Edwards Plateau region. Pennsylvanian age through Cretaceous age sedimentary rocks are found to outcrop within the referenced counties. The rocks found include limestone, claystone, sandstone, shale, mudstone, and siltstone. No areas were located within this province which are considered good for solid waste disposal. However, some areas were considered to be moderate for solid waste disposal. These areas have soils that are predominately clay and sandy loams as well as thin, stony clay loams with low to moderate infiltration capacity. The aquifer potential in these areas is considered to be poor.

Major Aquifers

A total of three major aquifers are located within the WCTCOG area. A major aquifer is defined as an aquifer which yields large quantities of usable quality water over large areas of the State. The three major aquifers are the Trinity, Ellenburger-San Saba, and Lipan Aquifers.

Trinity Aquifer

The Trinity Aquifer is found in the following counties of the WCTCOG region: Eastland, Brown, Comanche, Callahan, and part of Taylor County. The Trinity Aquifer is a major water-bearing unit in the region. It is comprised of the Paluxy, Glen Rose, Travis Peak, and Antlers Formations, all of Cretaceous age. The Paluxy consists of sand and shale and is capable of yielding small to moderate amounts of water. The Glen Rose is composed predominantly of limestone and yields only small amounts of water. The Travis Peak is composed of limestone, sand, and shale. It is the principal water-

bearing formation of Cretaceous age in the area and is capable of yielding large quantities of good quality water (Texas Water Development Board, Report 195, 1975).

Edwards-Trinity (Plateau) Aquifer

The Edwards-Trinity (Plateau) Aquifer is found in portions of Taylor and Nolan Counties within the WCTCOG region. The Edwards-Trinity (Plateau) Aquifer includes all of the strata in hydraulic communication between the base of the Antlers Formation (Trinity Group) and the top of the Georgetown Formation (Washita Group). Where the Santa Rosa Formation (Triassic) subcrops below the Antlers Formation (Cretaceous) is in hydraulic contact, and the two formations are considered to be a single hydrologic unit. It is in these areas, where the Santa Rosa Formation is included with the Antlers, Edwards and associated limestones, the aquifer is designated as the Edwards-Trinity (Plateau) Aquifer. The Edwards Formation contains water in varying amounts in solution cavities, fractures and dolomitic limestones over the region except where the water is found to be confined to the sands of the Antlers and Santa Rosa Formations. Water in the Edwards-Trinity (Plateau) Aquifer generally flows in a southeasterly direction. However, the direction of flow will vary locally due to the influence of lakes, streams and pumping wells. To a certain extent, the ground-water flow directions conform to the surface topography (Texas Department of Water Resources, Report 235, 1979).

Seymour Aquifer

The Seymour Aquifer is found in the following counties of the WCTCOG region: Knox, Haskell, Throckmorton, Stonewall, Kent, Fisher, Jones, and part of Taylor County. The Seymour Aquifer is not an extensive, contiguous regional aquifer like the Trinity and Edwards-Trinity (Plateau) Aquifers. The Seymour Aquifer is significant in that it is the primary source of water to a large area since there are no other sources of ground-water available. The Seymour Aquifer is composed of the Seymour Formation (Pleistocene) and associated Quaternary alluvium. These sediments consist of sand, silt, clay, and gravel and in some places are more than 340 feet thick. These sediments were deposited as channel fillings of ancestral streams, terraces, flood plains associated with present-day drainage, and sheets of windblown material, which explains the noncontiguous nature of the aquifer. The Seymour Aquifer yields small to large amounts of water depending on the saturated thickness of the unit. Generally, the water is of a relatively poor quality due to a very high dissolved solids content (Texas Water Commission, Bulletin 6306, 1963).

Minor Aquifers

A total of five minor aquifers are located within the WCTCOG area. A minor aquifer is defined as an aquifer which yields large quantities of useable quality water over small areas or relatively small quantities of water over large areas of the State. The five minor aquifers in this region are the Santa Rosa Aquifer, Blaine Aquifer, Hickory Sandstone Aquifer, Ellenburger- San Saba Aquifer, and the Lipan Aquifer.

Santa Rosa Aquifer

The Santa Rosa Aquifer is found in Kent, Fisher, Scurry, Mitchell, and Nolan Counties of the WCTCOG region. The Santa Rosa Aquifer is composed of the Santa Rosa Formation of Triassic-age (Triassic). Sediments of the Santa Rosa Group were deposited in continental (terrigenous) environments and were probably deposited as river channel and flood plain deposits. The sediments consist of shale and sandy shale, sandstone, and conglomerates. Wells drilled into the Santa Rosa Aquifer yield low to moderate amounts of highly mineralized water deemed unsuitable for irrigation or public supply and perhaps limited to certain industrial uses (Texas Water Commission, Bulletin 6306, 1963).

Blaine Aquifer

The Blaine Aquifer is a minor (secondary) aquifer found only in Knox County within the WCTCOG region. The Blaine Aquifer occurs in a very small portion of the extreme northwestern corner of Knox County. The Blaine Aquifer is comprised of the Blaine Gypsum (Permian) which is composed of anhydrite, gypsum, shale, and dolomite. The gypsum beds are typically cavernous and are known to have formed sinkholes. The Blaine Aquifer yields low to moderate amounts of highly mineralized water to wells drilled into the unit. The water is not suitable for public supply due to its high sulfate and chloride content.

Hickory Sandstone Aquifer

The Hickory Sandstone aquifer is present in southern Coleman and Brown counties. The Hickory Sandstone aquifer is composed primarily of the Hickory Sandstone Member of the Cambrian-age Riley Formation. This aquifer outcrops around the Precambrian-age rocks of the Llano Uplift and dips steeply into the subsurface in a radial direction away from the Uplift. The aquifer sediments were deposited in a shoreline environment (Black, 1988) and consist primarily of fine to coarse sand with light to moderate cementation. In this area, TDS values range from 1,000 mg/L nearest the outcrop to >10,000 mg/L in the distal portion of the aquifer (Texas Water Commission Report 89-01).

Ellenburger-San Saba Aquifer

The Ellenburger-San Saba aquifer is present in southern Coleman and Brown counties. The Ellenburger-San Saba aquifer is composed of the San Saba Member of the late Cambrian-age Wilberns Formation and the Ellenburger Group of early Ordovician age. Similar to the Hickory Sandstone, the Ellenburger-San Saba aquifer outcrops in a circular pattern around the Llano Uplift and dips into the subsurface radially away from the Uplift. The aquifer consists mostly of limestone and dolomite which were deposited in a shallow marine environment. In the WCTCOG area, TDS values range from 1,000 mg/L nearest the outcrop to <10,000 mg/L in the distal portions of the aquifer (Texas Water Commission Report 89-01).

Lipan Aquifer

The Lipan aquifer is present in extreme southwestern Runnels County. The Lipan aquifer is composed primarily of Quaternary-age alluvial gravel deposits. Although this aquifer is not aerially extensive it supplies the majority of water for irrigation, domestic and livestock use in eastern Tom Green and southern Runnels counties. TDS values of ground water from the Lipan aquifer range from 500 to 1,400 mg/L (Texas Water Development Board Report 51).

The geology and hydrogeology of the WCTCOG region is not uniform. Great differences occur throughout the region. Therefore, the selection of a site for landfill must be evaluated on a case-by-case basis.

Land Uses

Land use is important to the selection of a site for a solid waste management facility. For example, a new landfill must be certain distances from roads, airports, water wells, and property lines. Therefore, areas with little development and little groundwater would likely be desirable.

Over 65 percent of the land in the WCTCOG area is used in ranching or is vacant. Another 31 percent is farmland, while only two and one-half percent is urbanized. Despite diversification, this is one area of Texas where cattle and oil still form the economic base of the region. Scurry County, in fact, is one of the nation's leading oil-producing counties. In virtually all counties, however, agribusiness (led by beef cattle) or oil-related industry is the most important contributor to the economy. One exception is Taylor County in which Dyess Air Force Base has a profound economic impact. In addition to cattle, the major livestock produced include hogs, angora goats, sheep, and horses. The major crops for the region include peanuts, wheat, grain sorghum, and cotton. Also important in some counties are hay, oats, peaches, milo, vegetables, and watermelon.