

# AREAS IN GEORGIA POORLY SUITED FOR MUNICIPAL LANDFILLS

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## INTRODUCTION

Georgia, like the rest of the nation, is experiencing a problem with a shortage of landfill capacity. With each passing day, the need for additional landfill space is becoming more critical. In addition, there is a growing concern about groundwater protection by the citizens in the state. In response, the Geologic Survey Branch of the Environmental Protection Division, Georgia Department of Natural Resources is preparing maps showing areas considered to be poorly suited for the siting of municipal sanitary solid waste landfills by using a Geographic Information System (GIS). This project is being conducted in cooperation with the Georgia District of the U.S. Geological Survey, Water Resources Division. Maps are being generated for each of the State's Regional Development Centers (RDC) to assist in landfill siting decisions on a regional basis.

## METHODOLOGY

In light of the growing "not-in-my-backyard" sentiment among citizens, any new landfill site decision must be made with the assurance that the entire county and region has been given equal treatment. GIS is an ideal way to perform a systematic and rational evaluation for potential landfill sites. GIS is a computerized relational database system that allows for organizing and analyzing geographic data. The system facilitates efficient handling of spatial data by describing the location of point, line, and area features, and the attribute data which describes the characteristics of those features.

Information was compiled and data entered from a variety of sources at scales ranging from 1:63,360 to 1:500,000. Primary criteria were rated as either suitable or poorly suitable for locating municipal solid waste landfills. Secondary data sets were created by interpretive processing (buffering) of existing data sets. All data is output

as 1:100,000 scaled maps and any inaccuracies are believed to be no more than one mile in the field, or 5/8 of an inch on the large composite map. Such maps are, therefore, not site specific but rather show general areas where suitable sites are more likely to be found.

## CRITERIA DEFINED

Criteria were developed for both technical considerations and non-technical concerns. Factors considered in developing the primary overlays were: groundwater and surface water protection; aircraft safety; recreational, wildlife, historical and archaeological lands; urban centers; and terrain and soil associations.

**Protection of Groundwater Resources.** The criteria which was used to establish groundwater resource protection is the proximity of the groundwater recharge areas as well as the municipal groundwater supplies to a potential pollution source, a landfill site.

A groundwater aquifer recharge area is considered poorly suited for siting a landfill. The major groundwater recharge areas for the state have been defined by Georgia Geologic Survey at a scale of 1:500,000. The defined recharge areas were digitally compiled to create a recharge data base.

Location of a landfill disposal area within 2 miles of a municipal unconfined aquifer well is considered poorly suited. The water well digital data base was generated from point data from the Georgia Department of Natural Resources and the U.S. Geological Survey. The unconfined well points were selected and buffered with a 2 mile stand off distance to create an exclusion zone.

**Protection of Surface Water Resources.** Protection of surface water resources from a potential pollution source is based on the location of surface water supply intakes, surface water impoundments, and soils which are in association with flood plains and wetlands.

Any area within 2 miles of an surface water intake point is considered poorly suited for location

of a landfill. The water intake location points were acquired from the Georgia Department of Natural Resources and the U.S. Geological Survey. The intake points were selected and buffered with a 2 mile stand off distance to create an exclusion zone.

Locating a landfill disposal area in a stream, lake, or wetland areas is not allowed. The source for this digital information is the U.S. Geological Survey, Earth Science Information Center. The streams and lakes data are from the "Digital Line Graph" data base with a source scale of 1:100,000. Water bodies and wetlands data are from the "Landuse and Landcover Information" data base with a source scale of 1:250,000.

Flood plains and poorly drained soils are considered poorly suited for siting a landfill. The information source is the U.S. Department of Agriculture, Soil Conservation Service General County Soils Maps compiled to a common scale of 1:63,360. The Georgia Geologic Survey compiled the information and created the digital data base.

**Aircraft Safety.** Locating a landfill within 2 miles of an airport is not allowed because of the potential for flocks of birds being in the

flight path. An aircraft exclusion zone was created by buffering the airport boundary with a 2 mile stand off distance. The source for this digital data is from the U.S. Geological Survey, Earth Science Information Center. The airport information is from the "Digital Line Graph" data base with a source scale of 1:100,000.

**Federal, State and other Public Lands.** Location of landfills in areas that would directly impact national and state parks, historical sites, wildlife areas, military bases and national forest is generally not allowed. The national forest lands data base was digitally compiled by the U.S. Geological Survey from U.S. Department of Agriculture, National Forest Service, where the source scale is 1:24,000. The remaining information comes from the Georgia Department of Transportation County Highway Maps with a source scale of either 1:63,360 or 1:126,720. The Georgia Geologic Survey compiled this information and created the digital data base.

**Urban and Developed Lands.** The digital information concerning the urban and developed areas was obtained from the U.S. Geological Survey, Earth Science Information Center. Where the original source scale was 1:250,000. Locating a landfill within areas of urban development is generally not possible.

**Soils and Terrain.** Steep terrain will not only enhance surface water runoff within a site but will also establish topographic constraints to the

development and the operation of a landfill. A slope of 25 percent or more is rated as poorly suited. In addition, any soils associations which are poorly drained or are associated with flood plain deposits is also rated as poorly suited. This rating is due in part to the workability of these soils for daily cover during inclement weather. The slope digital data base, Digital Elevation Model, is from the U.S. Geological Survey, Earth Science Information Center. The original source scale for this data is 1:250,000. The source for the soils information is the same as previously given.

## RESULTS AND CONCLUSIONS

The above criteria were used to filter through each data base for each RDC to generate nine overlay maps and one composite map. The composite map shows, by shading, those areas which are poorly suited for locating a municipal solid waste landfill site. Any search for a solid waste landfill site within the shaded area has a low probability of finding an appropriate site, although it is not impossible.

The resulting maps are not a replacement for site investigations. Because some of the data bases have an original mapping scale of 1:500,000, any inaccuracies in the 1:100,000 scale composite map produced for each RDC are thought to be less than one mile. Individual detailed site investigations are required to determine if any proposed site is suitable for a municipal solid waste landfill.