



## *Project Summary*

# Municipal Solid Waste Disposal in Estuaries and Coastal Marshlands

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The project summarized herein presents information on the environmental effect of disposing of municipal solid waste in estuarine and coastal marshlands. Twenty-three coastal states and Puerto Rico were surveyed to: determine current disposal operations; evaluate the disposal regulations and permit procedures of these states; search the literature to determine the effect of this type of waste disposal; and suggest future regulatory action to mitigate the adverse effect of municipal solid waste disposal in the coastal zone.

### Introduction

In an earlier time, the U.S. coastal zone was viewed as a low-productivity, low-value environment. The population living adjacent to coastal areas used these low-lying lands as depositories for their solid waste. In recent years, however, coastal lands have been formally identified as having significant ecological, flood control, water purification, and aesthetic value. This study documents past and present instances of municipal solid waste disposal in these lands and investigates the environmental impact from such waste disposal.

### Questionnaire Survey and Site Visits

Questionnaires (186) were mailed to governmental agencies having primary responsibility for coastal and estuarine municipal solid waste disposal in 23 coastal states and Puerto Rico. The questionnaires were designed to elicit specific data on case histories, environmental impacts, and governmental attitudes toward this type of solid waste disposal. Specific factual information was sought: Have coastal saline environments been used as a repository for municipal solid waste in your state/city? Where are these located? How long was the site used? What kind of waste was deposited? Other questions were designed to determine agency attitudes and public response to the costs and benefits of such waste disposal operations.

Site visits were made to the administrative or regulatory agencies having jurisdiction over solid waste disposal landfills to evaluate past, existing, or potential adverse environmental or economic effects of such landfills. Generally, landfill data were sought on geographical, geological and hydrological aspects, operational methods and capacities, and evaluation of monitoring data on the effects of landfill operations on the surrounding land, air, and ground and surface waters. Specifically,

at each landfill site, data were developed in the following areas:

**Location**—topographical and site plan maps.

**Hydrology**—surface and groundwater levels and flow directions, presence of saltwater wedges.

**Geology**—surficial deposits, depth to bedrock, and porosity of soils.

**Landfill operation**—amount and type of deposited material, and volume and amount of compaction.

**Landfill effects**—leachate generation, surface and groundwater quality, bioassays, and gas generation.

## Regulations

Federal environmental protection acts as well as many state regulations have sought, with varying degrees of success, to integrate environmental considerations into the governmental decision-making process. The Federal Clean Water Act requires permits to discharge pollutants to surface waters, or to dredge or fill in wetlands or coastal waters of the United States. The Coastal Zone Management Act encourages integrated state planning and management in the coastal zone. Some state protection acts strictly regulate wetland modifications and filling.

Two major Federal actions within the last five years directly affected the use of coastal areas for municipal solid waste disposal. The Resource Conservation and Recovery Act of 1976 (P.L. 94-580) defines criteria for acceptable solid waste disposal sites, and identifies wetlands as among a group of environmentally sensitive areas whose use is to be avoided. Because generating leachate is considered to be discharge of a pollutant, National Pollutant Discharge Elimination System permits are required, and there is a presumption against their issuance. Those coastal areas that are not wetlands are regulated as floodplains. By requiring disposal sites in such areas to be protected to the level of the 100-year storm, an economic sanction against disposal in coastal saline environments is provided.

Another Federal restriction operates more indirectly. Executive Order 11990 (May 24, 1977) was issued "to avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands

wherever there is a practicable alternative." The order requires leadership action by Federal agencies to avoid destruction or degradation of wetlands and their natural values. This includes avoiding direct or indirect support of construction on wetlands, unless there is no practicable alternative and provided that all feasible mitigating measures are taken. Implementing regulations recently issued by the U.S. Environmental Protection Agency require explicit justification of wetland projects and demonstration that no practicable alternative exists.

As part of this project, state and Federal laws on the disposal of municipal solid waste in a saline environment were studied, compared, and analyzed. Laws investigated include those regulating solid waste disposal, solid waste management, resource recovery, sanitary landfill management, water pollution, coastal activity, coastal and other wetlands, land use, and site location. Each law was examined for its applicability, purpose and prohibitions, control (including enforcement and penalties), permit requirements, and specific requirements pertaining to disposal of waste. Further analyses were made of the control exerted by coastal states over municipal solid waste disposal.

## Literature Search

Computerized abstract data bases were used to gather information on available published literature pertaining to municipal solid waste disposal in saline environments. From the initial abstracts, gray or fugitive literature was extracted, again using computerized access systems. In addition, U.S. Environmental Protection Agency libraries, the Yale University Library of Forestry and Environmental Sciences, and the technical library of Management Resources and the Environment were manually searched. To obtain the unpublished literature, the Smithsonian Scientific Information Exchange data base of ongoing and recently completed basic and applied research was searched. Monitoring data came from landfill site visits.

## Conclusions

- Municipal solid waste disposal sites should be located with consideration of geologic site char-

acteristics to prevent leachate migration; operated so as to minimize leachate production; and monitored and regulated to control the detrimental effects to the environment.

- The impact of municipal solid waste disposal on coastal ecosystems has not been analyzed in depth by either the scientific or the regulatory community.
- The only well-documented impact is habitat depletion, probably the most serious impact resulting from municipal solid waste disposal.
- There are circumstances in which coastal disposal can be used for beneficial purposes; e.g., to provide a substrate for habitat creation.

## Recommendations

1. Coastal areas should be protected from development resulting in destruction of wildlife habitats.
2. In saline environments, municipal solid waste should be disposed of in an environmentally safe manner.
  - a. Accepted landfilling practices should be used to ensure safe operation of landfills in saline environments.
  - b. Despite significant pressures for continued operation, landfills which contribute a significant quantity of leachate to the environment must be closed.
3. A regional approach should be taken to solid waste management to:
  - a. Avoid duplication of effort.
  - b. Make expert advice and assistance available to smaller communities.
  - c. Isolate decisions concerning the planning and siting of facilities from local political concerns.
  - d. Minimize discrepancies in disposal sites among neighboring municipalities.

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*The complete report, entitled "Municipal Solid Waste Disposal in Estuaries and Coastal Marshlands," (Order No. PB 81-129 223; Cost: \$15.50, subject to change) will be available only from:*

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