



Project Summary

Proximity of Pennsylvania Sanitary Landfills to Wetlands and Deepwater Habitats

R.C. Herndon, J.E. Moerlins, V.W. Lambou, and R.L. Gebhard

Sanitary landfills can cause considerable harm to sensitive ecosystems if they are not properly located, designed, and managed. The purpose of these reports is to summarize the proximity of sanitary landfills in the state of Pennsylvania to wetlands and deepwater habitats (i.e., rivers, lakes, streams, bays, etc.); and to present data on individual landfills. The source of data used to determine the locations of the sanitary landfills was the computer data file developed by Development Planning and Research Associates, Inc. (DPRA) for use by the U.S. Environmental Protection Agency's Office of Solid Waste in its RCRA Subtitle D program. The sanitary landfills were identified on U.S. Fish and Wildlife Service's National Wetlands Inventory maps. The nearness or proximity of the sanitary landfills to wetlands and deepwater habitats was determined by drawing three concentric regions around the point representing the location of each landfill. The radii of the concentric regions were: 1/4 mile, 1/2 mile, and 1 mile. Data on 135 individual sanitary landfills in the state of Pennsylvania were contained in the DPRA data file. Data were obtained for 131 of these landfills relative to their proximity to wetlands and deepwater habitats. Most sanitary landfills in the state of Pennsylvania are located in or are close to either wetlands or deepwater habitats. Most are located close to wetlands while almost half are close to deepwater habitats. These

facilities have the potential to adversely affect sensitive ecosystems, such as wetlands and deepwater habitats, either through habitat alterations or through the migration of contaminants from sanitary landfills.

This Project Summary was developed by EPA's Environmental Monitoring Systems Laboratory, Las Vegas, NV, to announce key findings of the research project that is fully documented in two separate volumes of the same title (see Project Report ordering information at back).

Introduction

Sanitary landfills, as typically defined, are waste management facilities regulated under Subtitle D of the Resource Conservation and Recovery Act (RCRA). These facilities are commonly referred to as municipal waste landfills, and they are primarily used to receive household refuse and nonhazardous commercial waste. However, sanitary landfills also receive other types of Subtitle D waste, such as sewage sludge and industrial waste. Sanitary landfills typically receive some hazardous waste in the form of household hazardous waste, and hazardous waste from small quantity generators as defined in 40 CFR Part 261.10 (Definitions). Depending upon the definition of a sanitary landfill used by the individual states, there are between 6,500 and 9,300 of these facilities permitted in the United States.

Sanitary landfills can cause considerable harm to sensitive ecosystems if they are not properly located, designed,

and managed. These facilities have the potential to adversely affect sensitive ecosystems, such as wetlands and deepwater habitats, either through habitat alterations or through the migration of contaminants from sanitary landfills. In order to evaluate the seriousness of this problem, information is needed on the nearness of sanitary landfills to wetlands and surface water bodies. The purpose of this study is to document the proximity of sanitary landfills in the state of Pennsylvania to wetlands and deepwater habitats (i.e., rivers, lakes, streams, bays, etc.).

Methodology

The source of data used to determine the locations of the sanitary landfills was the computer data file developed by Development Planning and Research Associates, Inc., (DPRA) for use by the U.S. Environmental Protection Agency's Office of Solid Waste in its RCRA Subtitle D program. The DPRA data file includes information on 7,683 sanitary landfills, and 6,849 of these facilities have latitude and longitude coordinates in degrees, minutes, and seconds specified in the data file. Each set of coordinates defines a point which represents the geographic location of a sanitary landfill. In addition, the data file contains the names of the landfills and data on the cities or counties in which the landfills reside. Individual states are responsible for permitting sanitary landfills under Subtitle D of RCRA, and, since DPRA obtained the information for the data file from state sources, the site location information varies in terms of accuracy and the point chosen to represent the location of each facility.

Wetlands typically form part of a continuous transition zone between uplands and open water. Therefore, the delineation of the upper and lower boundaries in any wetland definition is somewhat arbitrary. There are a number of definitions of wetlands that have been developed for use in classifying natural environments or for regulatory purposes. While these definitions are not identical, they are very similar. The selection of a specific definition for use in this study was determined by the availability of national wetlands and deepwater habitats geographic data.

The most extensive, consistent source of wetlands and deepwater habitats geographic data is the U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI). The NWI has developed detailed, large-scale maps for a

significant portion of the United States. To date, wetland maps have been developed for approximately 40 percent of the contiguous 48 states, 10 percent of Alaska, and all of Hawaii. Large-scale NWI maps typically are either 1:24,000 scale or 1:63,360 scale U.S. Geological Survey quadrangle maps; however, most are 1:24,000 scale. Wetlands and deepwater habitats are delineated on the NWI maps. The delineation of wetlands and deepwater habitats was developed using remote sensing techniques and field investigations. The NWI maps are developed in accordance with the National Map Accuracy Standard (NMAS). The NWI 1:24,000 scale maps used in this study are accurate, according to the NMAS, to within 40 feet of ground measurements. These maps were particularly useful for plotting the location of sanitary landfills and for determining the proximity of these facilities to wetlands and deepwater habitats.

The NWI maps use the definitions and the classification system for wetlands and deepwater habitats developed by the U.S. Fish and Wildlife Service. Wetlands are defined as lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by shallow water. Deepwater habitats are defined as permanently flooded lands lying below the deepwater boundary of wetlands.

The U.S. Fish and Wildlife Service's classification of wetlands and deepwater habitats is hierarchical in nature proceeding from general to specific. There are 5 systems, 10 subsystems, and 55 classes. In this study only the "system," i.e., the complex of wetlands and deepwater habitats that share the influence of similar hydrologic, geomorphologic, chemical, or biological factors, was used for classification purposes.

In order to link the location of sanitary landfills in the DPRA data file to the appropriate NWI maps, we used the information on the T-70 computer tape obtained from the U.S. Geological Survey. The NWI large-scale maps were developed using U.S. Geological Survey's quadrangle maps as base maps. The T-70 computer tape contains 67 fields of information including latitude and longitude that can be used for identifying the 1:24,000 scale maps, the map names, and the state codes assigned to the maps. Sanitary landfill location data on the DPRA computer file tape were matched by a computer program against location data on the U.S. Geological Survey's T-70 computer tape

in order to identify the specific maps that contain sanitary landfills and/or that would be needed to evaluate the wetlands and deepwater habitats that are within 1 mile of each sanitary landfill. The map names obtained from the computer match were sorted by state and compared with inventories of available NWI maps.

Each sanitary landfill included in this study was located on NWI large-scale maps using standard cartographic techniques. Nearness or proximity of sanitary landfills to wetlands and deepwater habitats was determined by drawing three concentric regions around the point representing the location of each landfill. The radii of the concentric regions were: 1/4 mile, 1/2 mile, and 1 mile. The occurrence or nonoccurrence of the wetlands and deepwater habitat systems in each concentric region was then recorded.

Many sanitary landfills are typically in the order of 100 acres in size. For example, in the state of Florida about 3 percent of the active sanitary landfills are between 50 and 150 acres in size, with the average size being 110 acres. A landfill that is 100 acres in size are uniformly distributed about its latitude/longitude point designation will have a radius of approximately 1/4 mile and, therefore, will approximate the boundary of the first concentric 1/4-mile radius region. Undoubtedly, most of the landfills located in a 1/4-mile radius region containing either wetlands or deepwater habitats should be considered to be located in wetlands or deepwater habitats. Since landfills vary considerably in size and shape, some of the landfills located in the 1/2-mile radius and 1-mile radius regions containing wetlands or deepwater habitats will probably also be located in wetlands or deepwater habitats. The exact geographic boundary of the landfill is not the critical consideration for determining adverse impacts associated with these facilities since contaminants can migrate off-site to affect wetlands and deepwater habitats.

Results

We obtained data on the proximity of 131 sanitary landfills in the state of Pennsylvania to wetlands and deepwater habitats. There are 135 sanitary landfills in the DPRA data file for the state of Pennsylvania and 131 (97 percent) of these facilities have NWI maps available for site interpretation. As a result, 4 percent of the 135 sanitary landfills in the state of Pennsylvania are not included in this study.

Approximately 55 percent of the sanitary landfills are located in or within 1/4 mile of wetlands, while 79 and 94 percent are located in or within 1/2 and 1 mile of wetlands, respectively (Figure 1). Only eight (6 percent) of the landfills are located more than a mile from any type of wetland. Most sanitary landfills are located either in or are close to Palustrine wetlands (approximately 53, 78, and 92 percent are located in or within 1/4, 1/2, and 1 mile, respectively, of a Palustrine wetland).

Approximately 18 percent of the sanitary landfills are located in or within 1/4 mile of deepwater habitats, while 31 and 44 percent are located in or within 1/2 and 1 mile of deepwater habitats, respectively (Figure 2). Seventy-four (57 percent) of the landfills are located more than a mile from any type of deepwater habitat. Most of the facilities that are located in or that are close to deepwater habitats are in the vicinity of Riverine or Lacustrine deepwater habitats (i.e., 41 percent are located in or within 1 mile of a Riverine deepwater habitat and 11 percent are located in or within 1 mile of a Lacustrine deepwater habitat).

Approximately 65 percent of the sanitary landfills are located in or within 1/4 mile of either wetlands or deepwater habitats, while 87 and 99 percent are located in or within 1/2 and 1 mile of either wetlands or deepwater habitats, respectively (Figure 3). Only two (2 percent) of the landfills are located more than a mile from either wetlands or deepwater habitats. Most of the sanitary landfills are located either in or are close to Palustrine or Riverine habitats (approximately 53, 78, and 92 percent are located in or within 1/4, 1/2, and 1 mile, respectively, of a Palustrine deepwater habitat while approximately 21, 42, and 60 percent are located in or within 1/4, 1/2, and 1 mile, respectively, of a Riverine habitat).

Coding procedures used to compile the data on the proximity of waste sites to wetlands and deepwater habitats are given in the "Data on Individual Landfills" report. Appendix B of that report presents the data on the individual landfills in the state of Pennsylvania.

Conclusions

Most sanitary landfills included in the state of Pennsylvania are located either in or close to wetlands. From this, we conclude that these facilities have the potential to adversely affect sensitive ecosystems, such as wetlands, either through habitat alterations or through the

migration of contaminants from sanitary landfills. In addition, almost half of the sanitary landfills in the state of Pennsylvania are located either in or

close to deepwater habitats and they also have the potential for adversely affecting these sensitive ecosystems.

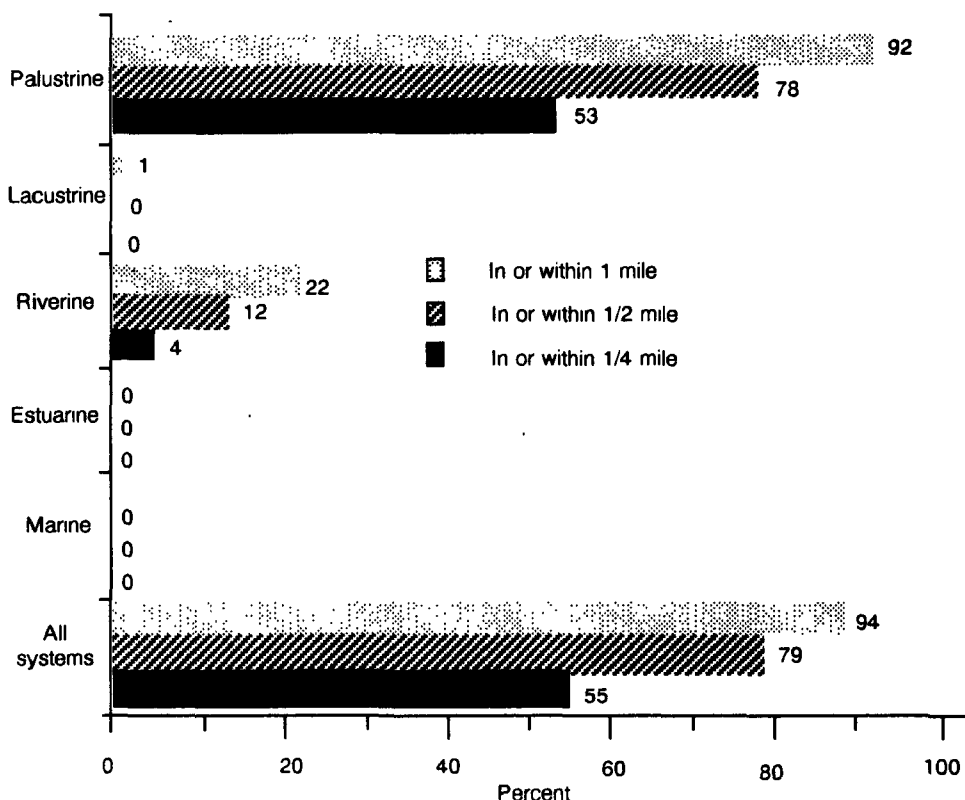


Figure 1. Proximity of 131 Pennsylvania sanitary landfills to wetlands.

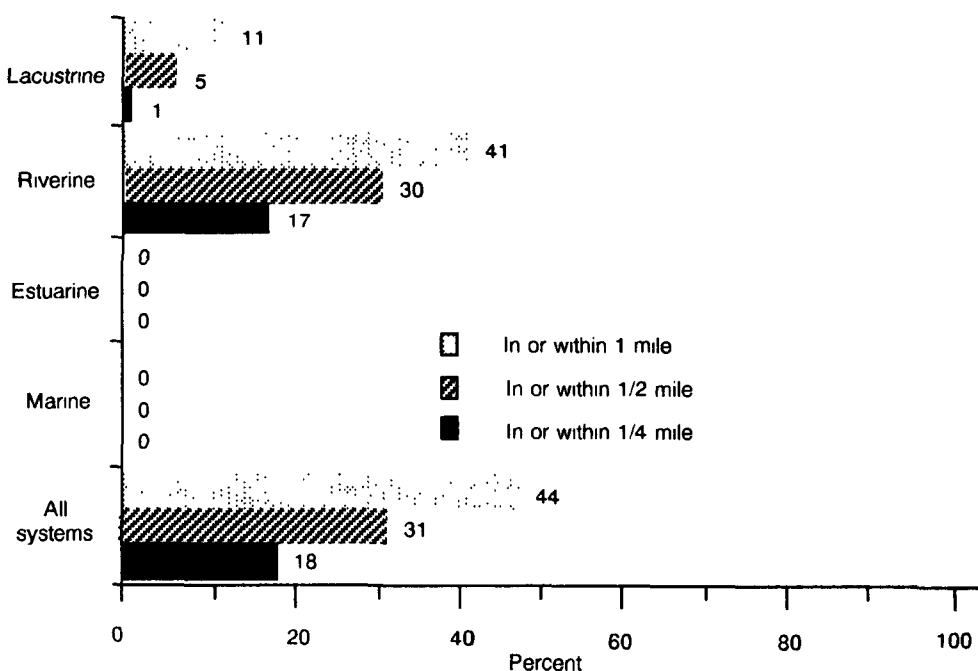


Figure 2. Proximity of 131 Pennsylvania sanitary landfills to deepwater habitats.

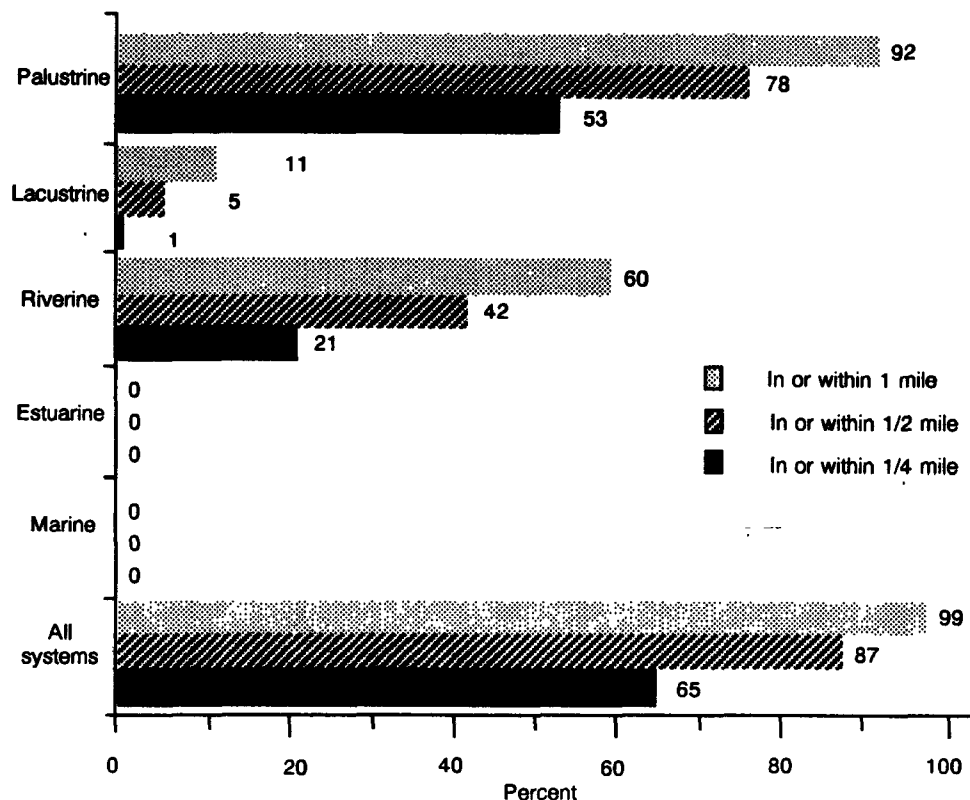


Figure 3. Proximity of 131 Pennsylvania sanitary landfills to either wetland or deepwater habitat.

The EPA author, Victor W. Lambou, (also the EPA Project Officer, see below) is with the Environmental Monitoring Systems Laboratory in Las Vegas, NV 89193-3478; J.E. Moerlins and R.C. Herndon are with Florida State University, Tallahassee, FL 32306; and R.L. Gebhard is with the U.S. Fish and Wildlife Service, St. Petersburg, FL 33702

The complete report, two volumes entitled "Proximity of Pennsylvania Sanitary Landfills to Wetlands and Deepwater Habitats: Statewide Results," and "Proximity of Pennsylvania Sanitary Landfills to Wetlands and Deepwater Habitats: Data on Individual

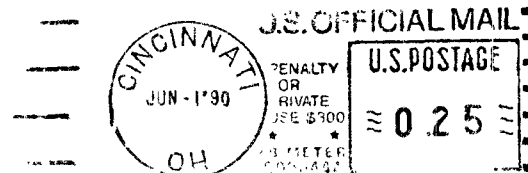
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The EPA Project Officer can be contacted at:
Environmental Monitoring Systems Laboratory
U.S. Environmental Protection Agency
Las Vegas, NV 89193-3478

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