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SOIL SURVEYS

can help you...

Waste Disposal

USDA NRCS
Natural Resources Conservation Service–Lakewood, Colorado
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Waste Disposal

Whether you are a homeowner, land use planner, board of health official, county sanitarian or land developer, waste management concerns you. This pamphlet tells how soil surveys available from the **Natural Resources Conservation Service (NRCS)** can help in planning the disposal of liquid and solid waste through septic tank absorption fields, sewage lagoons and sanitary landfills.

Soil maps show soil limitations for buildings, recreation, waste disposal and other land uses, providing a major reference for land use planning.

Septic Tank Absorption Fields

Because of rapid suburban expansion, the number of homes that do not have access to a public sewage disposal system has increased greatly. The most common system for individual homes is one in which the sewer line from the house leads to an underground septic tank in the yard. Overflow from the tank disperses into the soil through a system of underground drains or perforated pipes.

To design a system that will work, you need to know the capacity of the soil to absorb effluent. Movement of effluent through soil is determined mainly by the porosity of the soil, the size of the soil particles, and the kind of clay in the soil. Effluent moves through sand and gravelly soil faster than through clayey soil. Some kinds of clay expand when wet, closing the pores entirely. Such soil is unsuitable for absorption fields. If the soil is not porous, the effluent simply builds up and seeps to the surface.

Soil that has a high water table may be saturated part of the year. A saturated soil cannot absorb additional liquid, and the unfiltered septic tank effluent discharged into the drains may seep to the surface. If there is a seasonal high water table, the septic tank absorption field may work in dry seasons but fail in wet seasons.

Soil that is shallow to rock, or soil that has a cemented layer just below the bottom of the trench in which drains are laid, lacks space for the effluent to be absorbed. With conventional septic system design, about four feet of soil material between the bottom of the trench and any rock formation is necessary for absorption, filtration and purification of septic tank effluent. More than four feet may be required if the underlying rock is limestone that contains water that is used for domestic purposes.

Steep slopes—15 percent or steeper—make it difficult to control the distribution of effluent. Effluent distributed into soil on a steep slope may seep to the surface at a lower level. Digging drain trenches on the contour ensures that the effluent flows slowly through the drains and disperses throughout the absorption field.

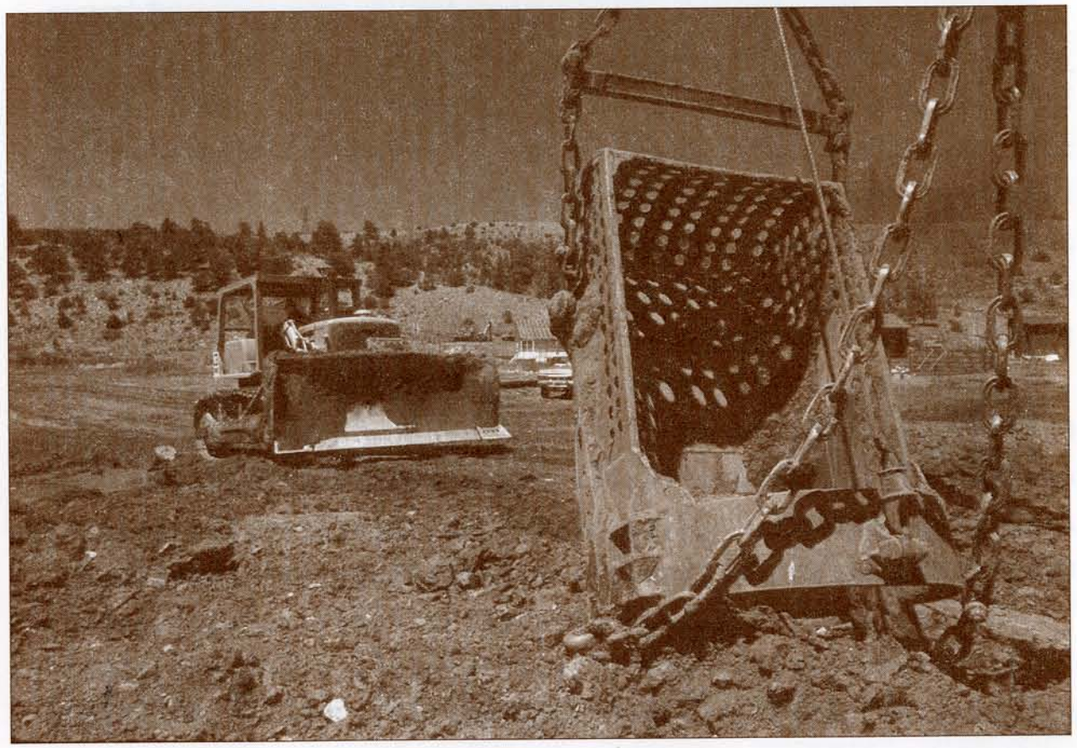
Soil subject to flooding should not be used for absorption fields. Flooding destroys the effectiveness of the field and allows unfiltered effluent to pollute the stream.

Sewage Lagoons

Sewage lagoons are shallow, man-made ponds used to hold sewage for the time required for bacterial decomposition, after which the clarified water is released from the lagoon.

The lagoon must be capable of holding water with a minimum of seepage. The soil material in the bottom of the lagoon and in the embankment should be free of stones and boulders that interfere with compaction. Porous soil has severe limitations for sewage lagoons because water moves through the soil too rapidly.

The soil also should be low in organic matter content to reduce the potential growth of aquatic plants. There should be no hazard of flooding, and depth to water table should be at least 40 inches. Slope should be no more than about 7 percent.



Soil surveys can help in selecting areas suitable for constructing sewage lagoons.

Sanitary Landfills

Sanitary landfill is one way to dispose of garbage, boxes, plastic and metal containers, and other solid waste. Refuse is spread, compacted and covered with soil material daily.

A landfill cannot be placed just anywhere. The properties of the soil and the kind of management determine the success of a sanitary landfill. Soil used for landfill should not be subject to flooding or have a high water table. Flooding the landfill pollutes off-site areas. If the water table is seasonally high, leachate from the landfill may contaminate ground water.

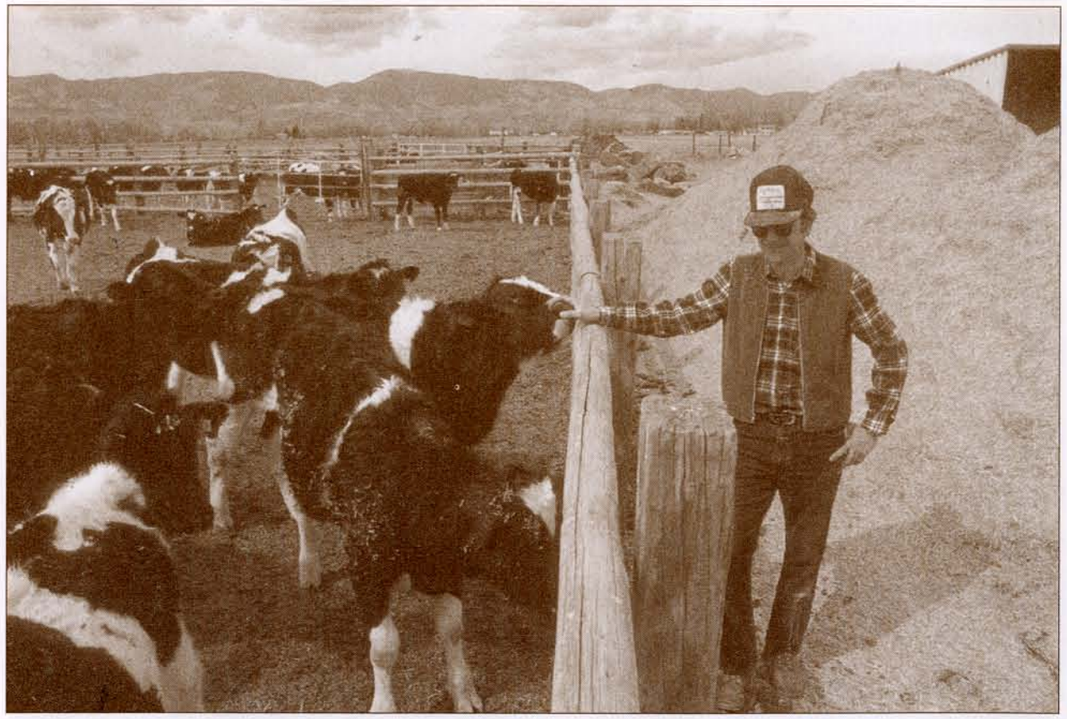
Steep slopes cause an erosion hazard. More care is needed on sloping to steep soils to dispose of runoff water, including that from adjacent higher elevations. More grading is required for roads that lead to and from a landfill on sloping to steep soil than on nearly level soil. Soil used for landfill should be easy to excavate and should hold up under heavy vehicular traffic in all kinds of weather. Most fine-textured (high clay content) soil is plastic and sticky when wet and is difficult to excavate, grade and compact.

Water movement through the soil should be moderate to slow to retard the movement of leachate from the landfill into underlying layers where it may pollute ground water.

Cover material must be easy to dig, move and spread over the refuse during both wet and dry periods. It must be easy to compact in order to reduce the rate of water intake. The area from which cover material is taken should be suitable for revegetating, thereby preventing erosion in the borrow area. Soil used for the final cover layer should be well suited to the growth of plants.

Disposing of Other Kinds of Waste

Research is being conducted on the disposal of many kinds of waste into soil: animal waste from feedlots; residues from vegetable, meat, poultry and dairy processing plants; chemicals used for fertilizers, pesticides and herbicides; and effluent and sludge from municipal sewage plants. Basic factors to consider in disposing of this waste into the soil are the ability of the soil to assimilate waste safely; the quality of the waste, particularly its content of nutrients and heavy metals; and the ability of vegetation grown in the disposal areas to utilize the nutrients in the waste. Soil properties that affect use for landfills also affect use of soil for disposing of other kinds of waste.



Soil surveys are useful in planning for the disposal of waste from feedlots and other sources.

How can soil surveys help?

Soil surveys of counties throughout the United States are conducted cooperatively by the **NRCS**, other federal agencies and state agencies. Each survey contains detailed soil maps and describes soil properties that affect waste disposal. By studying the soil survey for the area that interests you, you can determine the general suitability of areas for a septic tank absorption field, sewage lagoon or sanitary landfill. Before installing a waste disposal system, the specific site selected should be examined in detail and local regulations should be observed.

How can you get a soil survey?

You can call the local **NRCS** office to determine whether a soil survey of your area is available. If the soil survey has not yet been published, you can arrange to look at maps that have been completed. If you are in a conservation district, an NRCS conservationist or soil scientist assigned to the district can discuss soil and waste disposal with you.