

Putting Sludge to Good Use

S.P. Kengla and J.H. Huddleston

Sludge is the solid residue left over from wastewater treatment. When used properly, sewage sludge can be applied to land as an organic fertilizer. Oregonians use more than 90% of Oregon's sludge on lawns, forests, pastures, and agricultural crops.



Benefits

Sludge contains essential plant nutrients, such as nitrogen, phosphorus, potassium, calcium, and magnesium. It also improves the physical condition of the soil.

Farmers and landscapers can substitute sludge nutrients for some commercial fertilizers to reduce their production costs.

Oregonians save landfill space and money when waste products are recycled instead of deposited in a landfill.

Costs

Each sewage treatment plant absorbs most or all of the costs of treating wastewater and making sludge available. Some additional costs, such as for transportation and site evaluation, may be charged to

the landowner using the sludge.

Landowners applying sludge to their property also may be restricted on how they use the land after applying sludge.

Is Sludge Safe?

If sludge suppliers and users take appropriate precautions, sludge is safe to use. Raw sludge always is treated at the wastewater treatment plant before it is used. This kills most potentially harmful disease organisms and reduces odors. Although processes to treat sludge vary, treatment

transforms sludge into a useful soil amendment.

State and federal laws governing sludge use are written to protect the environment and public health. The U.S. Environmental Protection Agency (EPA) requires monitoring and testing of sludge composition from facilities that produce sludge. Oregon regulations require the Department of Environmental Quality (DEQ) to evaluate several factors to decide where and how much sludge can be applied to land. These factors include:

- Contents of the particular batch of sludge.

- Soil conditions and water sources around the site.

- Types of crops to be grown.

DEQ's regional offices and your local county office of the OSU Extension Service can use the data from a chemical analysis of sludge to help you

Shirley P. Kengla, former public affairs representative, Water Quality Division, Oregon Department of Environmental Quality; and J. Herbert Huddleston, Extension soil science specialist, Oregon State University.



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develop a plan for applying the correct amount of sludge to your property at the right time of year.

Where to Get Sludge

You can sometimes purchase small quantities of sludge in lawn and garden stores. To purchase sludge directly from the source, call your community sewage treatment plant or local public works office.

What Is Sludge?

Sludge can be compared to backyard compost. In both products, organic material decays biologically in a contained area. In backyard compost, the material is usually plant debris. In sludge, the organic material includes food waste from garbage disposals, human waste, and detergents drained into the community sewage system. The solid particles in this waste are removed at each stage of wastewater treatment. Usually, the sludge further decomposes in special tanks called "digesters" that help reduce odor and speed up the natural decaying process.

Sludge contains the same essential plant nutrients—nitrogen, phosphorus, and potassium—found in commercial fertilizers. It also contains some essential nutrients such as magnesium, manganese, iron, and calcium that are needed in small amounts and are not commonly found in commercially-manufactured fertilizer.

Sludge may contain traces of metals and organics, if it comes from industrial waste discharged to a treatment plant. Because these metals may accumulate in soils, DEQ uses the amounts of metals in sludge to limit how much sludge can be applied to land.

No two sludge products are alike. A DEQ field representative can help you determine when and how much sludge you can apply to your land (see *For More Information*). Too much sludge could cause excessive nutrients to leach into the groundwater.



Why Use Sludge?

Some essential plant nutrients are lost by leaching or are taken up by crops, the soil becomes depleted. Like commercial fertilizer or other composts, sludge restores nutrients the plant needs to sustain healthy growth. Organic materials in sludge release nutrients more slowly than commercial fertilizers as the materials decompose during the growing season. By using sludge to offset the cost of commercial fertilizers, you

can save money and increase yields.

Mixing sludge into the surface soil improves the "tilth" or physical condition of the soil. Good tilth means soils are easy to dig in and work up, easy for seedling plants to emerge from, and easy for plant roots to move through.

Sludge increases the number and size of air spaces in the soil and enhances soil strength. This makes it easier for water to enter and stay in the soil, reduces runoff and soil erosion, improves the air-water balance for plant growth, and increases the amount of water available for crops.

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Uses of Sludge

- Fertilizer for farm crops
- Compost for landscaping
- Mulch

Where to Use Sludge

Sludge from wastewater treatment plants has been used successfully on pastures, grass seed fields, grain fields, nurseries, and commercial forest farms. Composted sludge is good for private and public landscapers.

Homeowners use composted sludge as a mulch in lawns and flowerbeds.

Studies by the U.S. Department of Agriculture, the Food and Drug Administration, and EPA show that potential environmental or health risks from trace metals, organics, and disease-producing microorganisms and parasites are insignificant when high quality sludges are properly applied to land. However, sludge is not recommended for use in home vegetable gardens because of health concerns.

What Are the Concerns About Sludge?

Before DEQ approves application of sludge to a particular site, the landowner, the sludge supplier, and DEQ must address certain health concerns.

Nitrogen. An essential nutrient for plants, nitrogen is considered water pollution in excessive amounts. High nitrogen in drinking water supplies can cause "blue baby syndrome," a concern for infants and pregnant or nursing women.

Pathogens (disease-causing organisms) and parasites. Among the pathogens and parasites found in sewage sludge are salmonella bacteria, hepatitis virus, giardia protozoa, and tapeworms. Sewage treatment plants eliminate most of the pathogens and parasites. When applied to soil, those few organisms that survive the treatment process are killed by sunlight and other environmental conditions.

Trace metals. Because trace metals such as zinc, copper, nickel, lead, and cadmium are one of the greatest concerns with sludge, DEQ works closely with cities and industries to prevent excess discharge of these pollutants into city sewer systems. Before industries can

discharge waste to the sewer system, their wastewater must be pretreated to remove chemicals, including trace metals and organics.

Metals also come from deteriorating plumbing and household chemicals. Although high concentrations of metals can be toxic to people, research shows that metal levels in sludges pose no public health risks if land application is properly managed.

Organic toxics. Oregon relies on national EPA standards for toxic organic chemicals, such as dioxins and polychlorinated biphenyls (PCB) to decide what concentrations of organic toxic materials are harmful to human health and the environment.

These standards are based on levels of human exposure to toxics by eating, drinking, or breathing them daily for many years.

Odors. Sludge treatment is designed to eliminate odors that normally occur when organic matter decomposes. Even so, sludge can have an earthy odor for several days after application, especially in humid weather.

How Is Sludge Regulated?

DEQ is responsible for monitoring the composition and use of sludge to protect public health and the environment. The sludge treatment processes for wastewater treatment plants must meet numerous state and federal requirements. Uses of sludge to grow crops for direct human or livestock consumption are carefully regulated.

Since state guidelines were adopted in 1981, DEQ has worked with cities to properly manage and use sludge. Each community wastewater treatment plant must test sludge for nutrients and certain metals to make sure it is acceptable for use. Wastewater treatment plants must process sludge so pathogens, parasites, and objectionable odors are reduced to limits established by EPA.

Wastewater treatment plants must follow guidelines on how much sludge can be

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applied to a specific land-spreading site. These guidelines consider:

- soils, landscape, and the type of crop or vegetation
- distance to ground and surface water and wells
- how the site is managed
- location
- annual and long-term accumulation of heavy metals
- buffers between sludge land-spreading areas and human habitation (to reduce the risk of human disease and to protect the public waters from potential sludge-borne diseases).

Acceptable sludge spreading rates set by DEQ are designed to protect the soil, plants, animals, and groundwater from becoming overloaded with metals and nutrients.

Growing salad crops (rooted or leafy plants) in sludge-amended soil is not

recommended. For animals whose products are in the food chain, grazing is not allowed for 1 month after sludge application.

Incentives for Sludge Use

Proper use of sludge can reduce your fertilizer expenses and enhance your soil. It also prevents unnecessary disposal of sludge in landfills.

Using sludge requires proper management during land application. By understanding the concerns and benefits of using sludge, you can decide if you are interested in using the product on your land.



For More Information

Agencies. Call or visit your local county office of the OSU Extension Service (listed under "County Government" in your local telephone book). Call or visit a regional DEQ office (listed under "State Government" in your local telephone book) or call toll free 1 (800) 452-4011.



CITY OF PORTLAND
ENVIRONMENTAL SERVICES

Funding for this publication provided by Department of Environmental Quality, Public Affairs Division. Photographs courtesy of City of Portland, Bureau of Environmental Services.

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