

Biosolids Recycling

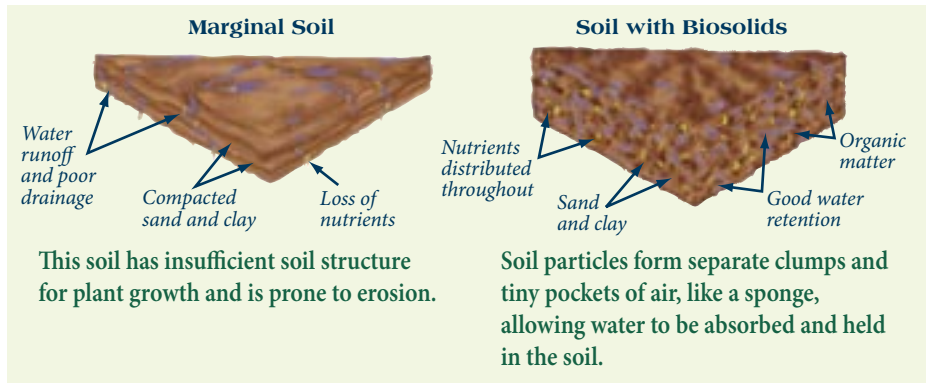
What are biosolids?

For more than 30 years, King County's wastewater treatment utility has been turning wastewater solids into a natural resource called biosolids. Biosolids are the nutrient-rich organic matter produced by the treatment of wastewater. King County treats wastewater to protect public health and the environment.

Why recycle biosolids?

Biosolids improve soil

Biosolids provide organic matter to the soil, improving soil tilth, and increasing water retention and infiltration. Healthy soil is the key to healthy plants.



Biosolids increase plant growth

Biosolids contain nitrogen, phosphorus, potassium, zinc, and other nutrients necessary for healthy plant growth. Some of these nutrients are immediately available to plants, while others are released slowly as the organic matter decomposes in the soil. When used in agriculture, biosolids can significantly improve plant growth and increase crop yields.

Nitrogen-deficient soils commonly found in Douglas-fir forests of the Pacific Northwest benefit from biosolids nutrients.

Biosolids reduce erosion

Soils amended with biosolids are more resistant to erosion by wind and water. Soils fertilized with biosolids grow thick vegetation, and the organic material in biosolids helps hold water in the soil. These improvements can prevent sediment from running off during rainstorms. Powdery soils in eastern Washington also resist wind erosion after biosolids application.

Biosolids enhance habitat

Organic matter provides food for soil organisms, such as earthworms. They, in turn, help to keep the soil healthy. Wildlife can benefit from recycled biosolids too. Since plants grow bigger and better with biosolids, the quality of forage and habitat is improved.



FERTILIZER COMPARISON	Chemical Fertilizer	Biosolids
Provides nitrogen	✓	✓
Provides all plant nutrients		✓
Slowly releases nutrients	Sometimes	✓
Contains organic matter		✓
Holds water in soil		✓
Prevents erosion		✓
Conditions soil		✓
Resists leaching		✓



King County

Department of Natural Resources and Parks
Wastewater Treatment Division

Technology Assessment and Resource Recovery



Decades of biosolids recycling



Recycling of this natural resource is a great way to return valuable nutrients to the soil.

All essential plant nutrients are found in biosolids. The organic matter in biosolids provides advantages that are not available from chemical fertilizers, such as retaining moisture and improving soil texture.

Biosolids recycling is a classic story of converting waste to resource. Today's highly treated wastewater solids are sought-after soil conditioners and fertilizers.

The history of biosolids

King County's wastewater treatment utility was a pioneer in recycling biosolids. Until 40 years ago, sewers discharged raw or partially treated sewage directly into Lake Washington and Puget Sound. In King County and elsewhere, improvements to wastewater treatment facilities helped reduce pollution to waterways, but solids were still considered a waste and typically dumped in landfills or discharged into the ocean.

Looking for an environmentally sound alternative, the Biosolids Program began working with local universities to find safe and beneficial uses for this nutrient-rich soil-like material. Landfills were a costly option with no environmental benefit. Research projects showed that biosolids enhanced tree and plant growth and could be used safely in the environment.

Federal and state governments used results from research and demonstration programs to establish standards for land application of biosolids. These regulations and guidelines protect public health and the environment. King County's biosolids quality and recycling practices meet these stringent requirements for land application.

How biosolids are produced

Today's wastewater technologies separate the solids from the water during treatment. This process allows us to make a soil-like product to be recycled back into the earth's nutrient cycle. The water is cleaned and discharged to surface water, or it can be further treated to produce reclaimed water. The solids are biologically decomposed in heated digester tanks. This processing kills 95 percent of the pathogens and reduces odors. Following digestion, additional water is removed from the biosolids. Trucks haul biosolids to field sites for application.



Treatment



Application



Biosolids

No biosolids



Recycling 100% of this valuable resource

King County's biosolids are used to enhance soils of agricultural land in eastern Washington and forests in western Washington. Some of our biosolids are mixed with sawdust and composted for use as a garden soil amendment.



Agriculture

More than 100 landowners and farmers have discovered the benefits of biosolids in improving growth of agricultural crops.

Biosolids are used extensively to grow wheat and other grains on farms throughout Douglas County. Nutrients from biosolids increase crop yield and organic matter helps hold soil moisture in this arid environment where crops are not irrigated.



In the Yakima Valley, biosolids are used to improve soils and fertilize a variety of irrigated crops, including tree fruit, grapes, corn, hops and pasture grass, and for dryland wheat. Biosolids are also used to enhance grazing quality of rangeland.



Forestry

The Mountains to Sound Greenway Biosolids Program is a public/private partnership using biosolids to fertilize forests in eastern King County. Besides promoting tree growth, biosolids enhance understory vegetation and wildlife habitat.



Landscaping

GroCo compost has been produced and marketed by a local company, GroCo Inc., for more than 25 years. This composted mixture of biosolids and sawdust is a high-quality soil amendment for use in residential and commercial landscaping, home gardens and soil restoration.

Partnerships

King County's biosolids program is built on partnerships with public agencies, private companies, landowners, university researchers and environmental organizations. These partners manage field sites, provide information, and conduct research.

Educators:

- Mountains to Sound Greenway Trust
- Northwest Biosolids Management Assn.

Researchers:

- University of Washington
College of Forest Resources
- Washington State University
Department of Crop and Soil Science
- University of Arizona National
Science Foundation Water Quality
Center

Customers:

- Natural Selection Farms
- Boulder Park, Inc.
- Washington State Department of
Natural Resources
- Hancock Forest Management
- GroCo, Inc.

Learn about our projects:

<http://dnr.metrokc.gov/WTD/biosolids>





Ensuring quality and safety of biosolids



More than 40 years of research by university and government scientists has proven the safety of biosolids recycling. The U.S. Environmental Protection Agency and Washington State Department of Ecology have developed strict scientific standards to maintain biosolids quality. Our biosolids are routinely analyzed and meet the most stringent quality requirements for land application.

What can you do to protect biosolids quality?

Throw these things in the garbage, not down the drain:



- Stickers from fruits and vegetables



- Plastic and non-organic materials such as tampon applicators or condoms.



- Expired/unwanted prescription or over-the-counter drugs.

For more information on how to dispose of most items safely, check our Web site.

<http://dnr.metrokc.gov/wtd/biosolids/>



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Source control: keeping contaminants out of the waste stream in the first place

King County's Industrial Waste and Local Hazardous Waste programs work with residents and businesses to reduce, reuse and recycle their waste materials so less contaminants go into the sewer system. These programs provide information on how to find safer alternatives to common products.

Eliminating pathogens

Wastewater solids that enter the treatment plant can contain disease-causing organisms called pathogens. During treatment, the biological digestion process kills about 95 percent of the pathogens. Any remaining pathogens die quickly when exposed to light, air and soil at application sites. Public access and grazing are restricted for 30 days while this natural die-off takes place. Additional treatment processes, such as composting, eliminate pathogens completely and create a product that is safe for all uses, including home gardens.

Binding metals

Small amounts of metals such as cadmium, lead and zinc enter wastewater from homes, pipes, industries and street runoff. While these metals remain in solids throughout the treatment process, they do not measurably increase the concentration of metals in soils when biosolids are recycled. Most metals are chemically bound to organic matter in biosolids so they won't be taken up by plants or move through the soil. In fact, biosolids are used as a tool to remediate contaminated soils because of their ability to bind metals and safely restore fertility to barren soils.



In 2004, King County became one of the first public wastewater utilities to be awarded the prestigious certification from the National Biosolids Partnership for its Environmental Management System for biosolids. Staff from source control, wastewater operations and the biosolids program are proud of this achievement.



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