Biosolids Facts

Number 2 in a Series • Presented by the Mid-Atlantic Biosolids Association

Q. Can biosolids harm our streams and groundwater?

A. Federal and state regulations, industry and farming best management practices and nature provide multiple layers of protection for our streams and groundwater. Studies also show that biosolids actually help to reduce runoff into our streams and leaching into groundwater.

There are two ways to protect water resources: don't add contaminants in the first place or prevent them from being transported. Both of these methods are used to protect Pennsylvania's streams and groundwater.

All biosolids that are land applied in the region must meet stringent federal and state regulations for pathogens and other pollutants. Most pathogens are killed during the wastewater treatment process and the additional treatment required for EPA-approved biosolids. Federal pre-treatment requirements for industrial waste for the past few decades and reductions in manufacturing waste streams have resulted in a major decline in pollutants in biosolids, many to undetectable levels.

All wastewater treatment facilities must use an EPA approved process to produce biosolids and conduct regular tests to ensure that they meet EPA requirements for pathogens and other pollutants before they can be land applied.

State agencies and the EPA also regulates how biosolids are applied in order to prevent runoff into streams or leaching into groundwater. Biosolids applicators must identify all streams (including intermittent or dry stream beds), wells and other water sources and provide specified buffers between them and the area to be land applied. Land applicators may not apply biosolids on steep slopes, frozen ground or when the ground has been or may likely be saturated with rain or snow. Thin soils above bedrock or tracts with a high water table are also restricted. All proposed application sites must be mapped by the applicator and permitted or approved by the State environmental agency before biosolids can be applied.

Each application must also meet the nutrient needs of the soil and the proposed crop. This reduces the potential for excess nitrogen levels in the soil that could leach into ground water or move in runoff. Flags are placed around the application site boundaries to identify the areas that can receive biosolids and to identify buffered areas where application is prohibited.

Once the biosolids are applied, any remaining pathogens face a very hostile environment from sunlight and air and quickly die. Research by Dr. Rufus Chaney, U.S. Department of Agriculture, and other scientists, has shown that metals in biosolids, although at barely detectable levels, do not migrate into the soils or leach into groundwater, but are chemically bound to the biosolids and soil and do not move through runoff or leaching. [1]

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Numerous other studies have demonstrated that biosolids that are applied according to current EPA and State standards pose no risk to the regional ground or surface water. Some of these studies are summarized as follows:

- Groundwater and surface water monitoring data from the Hampton Roads, Virginia, biosolids management program shows no environmental degradation. The site was monitored more extensively than any other site surveyed. *Water Environment Research Foundation, 1993.*

- Use of biosolids on severely degraded mine lands in Pennsylvania has been highly successful in reclamation and revegetation efforts with no negative impacts to regional water quality. "We have been monitoring data for thirty-three (33) biosolids projects, one hundred seventy five (175) monitoring points, and a total of 1,622 samples. The sample data spans a time period of 14 years. In all this data over a period of 14 years of monitoring, we have not experienced any deleterious trends in the quality of water as a result of using biosolids to reclaim mine lands. We are seeing improvements to acid mine drainage (AMD) water quality and, as a result, we are using biosolids to do reclamation in conjunction with watershed rehabilitation." *Letter, L. Douglas Saylor, Pennsylvania Department of Environmental Protection, January 8, 1999.*

- **"**Exceptional quality sludge can be beneficially used in agriculture without degrading the environment," according to research at a closely monitored Minnesota watershed where biosolids were used over a 20-year period as a fertilizer and soil amendment. "Periodic monitoring of the small stream below the watershed showed no degradation of water quality over the study period." Groundwater was also not adversely affected. Corn yields were the same or greater than controls. *Dowdy et. al, eds., USDA Agricultural Research Service/Univ. of Minnesota: Sewage Sludge: Land Utilization and the Environment, 1994.*

- "Studies in New Mexico have shown sustained improved growth and nutritional quality of desirable native vegetation on rangeland and reduced run-off of rain water from a one-time, 10 to 20 dry tons per acre surface application of biosolids." *U. S. Environmental Protection Agency, 1994.*

- Runoff from pastures receiving a surface application of biosolids exhibited the least overall potential for pollution when compared with pastureland that received applications of dairy and poultry manure or to commercial fertilizer. *McLeod, R. V. and R. O. Hegg, Journal of Environmental Quality, 1984.*

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[1] Trace Element Chemistry in Residual-Treated Soil: Key Concepts and Metal Bioavailability, N. T. Basta, J. A. Ryan, and R. L. Chaney, *Journal of Environmental Quality*, vol. 34, January–February 2005.