

Septage - Biosolids

Suggested Course Materials

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Citation of Materials

The educational materials included in this module should be cited as follows:

Lesikar, B.J., A. Kenimer and D.Gustafson. 2005. Septage-Biosolids Text. *in* (M.A. Gross and N.E. Deal, eds.) University Curriculum Development for Decentralized Wastewater Management. National Decentralized Water Resources Capacity Development Project. University of Arkansas, Fayetteville, AR.

Lesikar, B.J., A. Kenimer and D.Gustafson. 2005. Septage-Biosolids – PowerPoint Presentation. *in* (M.A. Gross and N.E. Deal, eds.) University Curriculum Development for Decentralized Wastewater Management. National Decentralized Water Resources Capacity Development Project. University of Arkansas, Fayetteville, AR.

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Septage - Biosolids Overview

This module provides students a basic understanding of the management for land application of septage and biosolids. These residuals are a component of all wastewater treatment process and need proper management. Failure to recognize the existence of these materials and development of a strategy to manage the materials will potentially result in a public or environmental health risk. At least one lecture period of any course should be devoted to discussing the need to properly manage the residuals.

The concept of residuals management is not new. Land application systems can effectively treat and recycle the nutrients into the environment. The constituents of septage and biosolids will be presented. Proper treatment and land application approached will be discussed.

These residuals can contain constituents with potential health and environmental risks. Proper management is essential for safe and effective use of these materials. Design of application systems and operational requirements for safely applying the materials is presented.

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Agenda

The septage-biosolids land application materials cover an introduction to the regulation of septage-biosolids, constituents in septage, management options, land application techniques and potential issues for managing septage-biosolids. It is anticipated that each instructor will customize the septage-biosolids land application materials to suit their particular situation, no single agenda could address the myriad of possible permutations. Should an instructor choose to cover all the topics included in this module, the following agenda is suggested. These materials were developed to be covered in a 50 minute lecture.

Introduction to Septage

- Sources

- Septage Characteristics

Choices for Septage Handling

- Wastewater Treatment Plants

- Septage Treatment Plant

- Land Application

Land Application of Septage

- Direct Injection

- Liquid Spreading

- Semi-solid material

Potential Septage Issues

- Perception

- Nutrients

- Public Health

 - Pathogens

 - Treatment through lime stabilization

 - Odor Management

Summary

Septage - Biosolids Outline

- I. Beneficial Resource
- II. Public health considerations
 - A. Pathogens
 - B. Heavy metals
- III. Septage treatment methods
 - A. pH treatment
 - B. Heat treatment
- IV. Land Application Area Design Considerations
 - A. Nitrogen
 - B. Phosphorous
 - C. Heavy Metals
 - D. Vector Control
- V. Record Keeping

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Goals

The goal for this module is to provide students a basic understanding of septage – biosolids land application and how it can be safely managed.

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Learning Objectives

Upon completing this module, students will have:

- a. a fundamental understanding of septage - biosolids,
- b. an understanding of potential risks associated with septage - biosolids usage
- c. a functional knowledge of the mechanisms for septage - biosolids treatment and management.

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Prerequisites

It is anticipated that the students who take this class will have a basic understanding of wastewater treatment including terminology associated with discussions of wastewater systems and wastewater quality parameters. It is anticipated that the materials in this module will be used in conjunction with materials in other modules. The student should be familiar with the need for removal of waste from the different treatment technologies.

The typical student utilizing these materials will be a junior- or senior-level undergraduate in engineering, soil science or public health related field who has an interest in decentralized wastewater management.

