

Using Marshes to Treat Domestic Wastewater

Challenge

One third of the shellfish-growing waters in the US are closed to harvesting because of sewage contamination, predominantly a result of nonexistent or malfunctioning septic systems in coastal dwellings. The marshland upwelling system (MUS), developed by Louisiana State University research personnel, takes advantage of the filtering properties of natural soils and sediments to treat wastewater. This project will further refine MUS technology by subjecting the system to wastewater with varying degrees of contamination. The effluent will then be analyzed to draw conclusions about the system's ability to serve as a wastewater treatment alternative.



Science

MUS System Design

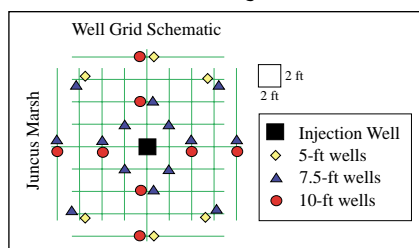
Gray water (water from sinks, showers, etc.) and black water (water from toilets) are collected in a tank and then sent to an injection well in a nearby *Juncus* marsh. The wastewater enters the marsh via the well at a depth of 12.5 feet. Because the wastewater is fresh and the coastal marsh is saline, the wastewater is pushed upwards into the soils area where it is filtered and taken up by plants.



The coastal residence in Louisiana used for this research project.

Monitoring Wells

Surrounding the injection well is a network of monitoring wells, used to determine how the wastewater moves through the marsh and how its chemistry changes during the process.



Recent Results

- Over a period of five months in 2001, the MUS treated over 3,000 gallons of wastewater. The average biochemical oxygen demand (BOD) of raw influent was 177 mg/l and the effluent averaged below 20 mg/l, which is within National Pollutant Discharge Elimination System (NPDES) guidelines.
- For that same time period, fecal coliform counts have averaged below the 14 colonies/100 ml standard for shellfishing waters.

Application

Determining MUS' Ability to Remove Nitrogen from Wastewater

The removal of nitrogen from wastewater depends on denitrification, which in turn depends on nitrification. This research indicates that there isn't sufficient oxygen for the nitrification process. Therefore, project investigators have installed an air pump to promote nitrification. Several years of study are required to determine how well this system removes nitrogen from wastewater.

Technical Manuals

Within the scope of this project, researchers will create a technical manual with design, construction and operational guidelines for the Marshland Upwelling System. In addition, an economic analysis will compare this treatment system with existing domestic wastewater treatment systems.

Project Essentials

Title: Application of the Marshland Upwelling System (MUS) to treat domestic wastewater in sensitive coastal areas

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