SPECIAL CONSTRUCTED WETLANDS PROJECT IN SOUTH CAROLINA

SPECIAL CONSTRUCTED WETLANDS PROJECT IN SOUTH CAROLINA

Introduction

The use of constructed wetlands to treat domestic wastewater from single family residences is a rapidly emerging biotechnology. Such treatment systems are called micro-wetlands or rock/reed filters because they have a media filter in which special plants grow to enhance treatment and create a pleasant landscape. These systems provide safe treatment of household wastewater and the use of treated water to sustain a low maintenance landscape. These systems are also a viable treatment alternative where conventional septic tank systems have failed.

Septic tanks are common in South Carolina's rural areas. Although the sandy soil can make them easier to install, the high water table in many areas mean there is danger that a leaky system or one improperly installed can pollute the ground water.

So far 8 new constructed wetland systems have been installed as an alternative to septic tank for some parts of Lake Murray. Ten additional systems are planned for installation around Lake Murray in the next year.

Methodology

A special constructed wetland project to treat failed septic tank system and to improve water quality near Lake Murray has begun. The first constructed wetland project to treat failed septic systems in the Lake Murray area was completed in June 1999.

The first Resource Conservation and Development (RC&D)/ constructed wetland system was completed in Fairfield County. In addition, DHEC, with NRCS and DNR, is monitoring water quality to determine efficiency of the on-site constructed wetland. This project will provide water quality data that has previously not existed in South Carolina. This type of system is intended to demonstrate that constructed wetlands are a viable treatment alternative where conventional septic tank systems have failed.

The wetland plant technology was provided by the NRCS-Plant Materials Program/Jimmy Carter Plant Materials Center.

The site is located in Fairfield County at the home of Tim Rexrode in the East Piedmont RC&D area. Rexrode became interested in the constructed wetland concept after a presentation at the Fairfield Conservation District board meeting. His site is one of eight demonstration sites in the state to be installed by RC&D councils as part of an RC&D Challenge Grant. Rexrode's conventional system has been installed several decades ago

and had begun malfunctioning. Wastewater would occasionally flow on the surface even after he had the system pumped out.

In a conventional septic tank system microbial colonies act to biodegrade many wastewater contaminants. In many cases, this creates subsurface disposal problems. This biomat development in tight soils often clogs pores and retards wastewater infiltration. In extreme cases, the wastewater will actually surface, causing polluted runoff and a public health risk. One method to alleviate this problems is to treat the wastewater prior to in-ground disposal. This is where constructed wetlands can play a major role.

Here is how constructed wetlands work. Two cells are constructed with each being 14 feet wide, 28 feet long, and 1 to 2 feet deep. Wastewater flows through a pipe from a septic tank into the constructed wetlands. Wastewater is distributed evenly across the width of the wetland cell and flows through a gravel medium. A waterproof liner is used in the first cell to contain the wastewater and assure adequate water levels for the wetland plants. The first cell is planted with wetland plants such as canna lilies, blue flag iris, and other native aquatic plants. From the first cell, wastewater enters a second cell that acts as a disposal area.

As wastewater flows through the system, suspended solids and trace metals settle and are filtered. Plants and organic materials also absorb nutrients and trace metals. Microbes or organisms form on the gravel surfaces, stems, and roots of the wetland plants and use the organic materials and nutrients from the wastewater as food. Plants provide much of the oxygen needed by the organisms to live and grow.