Are There Alternative Methods for Treating Wastewater in the Rural Southeast?

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Problem Statement:
The treatment of municipal wastewater is widely considered one of the greatest environmental health achievements of the 20th century; however, insufficient household wastewater disposal systems—such as piping raw sewage into streams—still persist in rural regions of the southeastern United States (aka “straight pipes”). These systems are commonly found in isolated residential areas where it is technically and financially difficult to extend municipal waste treatment technology. As constructed wetland technology improves, subsurface, lateral-flow wetlands are increasingly valid alternatives to traditional septic drain fields, and could be successfully implemented to replace straight pipes in the rural Southeast.

Research Objectives:
1) Raise awareness of current wastewater treatment challenges in rural communities.
2) Explore the use of constructed wetlands for use on-site treatment of wastewater
3) Seek out current design methods and standards for commonly used alternative wetland treatment systems
4) Understand policy requirements and regulatory jurisdiction for alternative onsite wastewater systems in Virginia

How is Wastewater Treatment Regulated in Virginia?

What is the Design Process?

Suggested Parameters?

How Well Do Wetlands Perform?

Where is Implementation of Sewage Infrastructure a Problem?

Conclusions:
• Subsurface, lateral-flow constructed wetlands could be a viable alternative to septic drain fields in the rural Southeast, but are currently uncommonly used because of the lack of established standards and regulations, due to limited regional performance data for this application, particularly for nitrogen removal.
• According to current knowledge, additional mechanisms such as aerobic suspended growth units, or further filtration may have to be utilized in order to meet nitrogen effluent requirements.
• To develop viable solutions to meet this public health need, the following are needed: the collection of performance data from existing wastewater wetlands treating septic effluent, the advancement of innovative designs which increase nitrogen removal, and the development of design standards for general permitting.

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