

Where to go with the flow:

Created wetlands grow in popularity as tool for addressing water quality issues

By ANTHONY C. MAGLIONE

In an effort to boost capacity and comply with increasingly stringent water quality requirements, industries and municipalities throughout the Southeast are scurrying to upgrade their wastewater treatment and disposal systems. Projections for population growth, expanded industry, intensified agriculture, total maximum daily loads and maintenance costs, all feed into the decision-making process for assessing which technologies to employ. Created wetlands are increasingly emerging as an attractive alternative for the treatment and disposal of wastewater for a number of reasons.

Regulatory environment

It is impossible to pinpoint the first use of wetlands for treatment of wastewater, as informal and unregulated use has gone on for centuries. During the 1970s and '80s, wetland systems as a receptor for treated wastewater were increasingly utilized and studied. Even with the development of projects such as California's Arcata Marsh in the late '80s that demonstrated the potential incorporation of wetlands into large-scale municipal treatment systems, definitive national "wet-

land use" laws did not rapidly materialize. The federal regulations that did arise to govern wetland use in wastewater management mainly served as simple guidance to the states for their wetlands.

State regulatory agencies in the Southeast and across the country began promulgating rules during the 1970s that required stringent water quality standards for effluent releases into natural wetlands fearing degradation of these natural systems. To capitalize on the demonstrated performance of wetland systems with secondary treatment, and potentially tertiary treatment, wastewater system designers began to propose created wetlands as alternatives to traditional methods of treatment.

My firm, Applied Technology & Management Inc., was able to successfully permit and construct the first created wetland treatment system in South Carolina during 1995 at Daniel Island. The system was designed to address the requirements for local reuse of

wastewater and accommodate future growth. An abandoned dredge spoil site that was formerly marsh and unsuitable for future development was identified. There, contractors were able to meet the community's effluent disposal needs, while restoring part of a previous wetlands system.

The state's regulatory agency required some type of land reuse option in an undeveloped area with no traditional disposal options available, according to John Cook, assistant general manager for the Commissioners of Public Works of Charleston, SC. At the time, this was the only reasonable, cost-effective alternative, continued Cook. After the establishment of this system, state regulators have begun to accept created wetlands as an acceptable form of effluent reuse.

And South Carolina is not alone. Most states in the Southeast have followed suit in accepting the systems for wastewater treatment and have promoted their use through regulations providing reasonable hydraulic and nutrient loading rates for created systems. Several communities in Georgia, including Richmond Hill, Glennville and Baxley, have moved to incorporate wetland technology into their wastewater treatment. Richmond Hill abandoned its existing sludge system in favor of a long-term solution for treatment—a 1.5-mgd constructed wetland treatment system. In Baxley, a 2.8-mgd overland flow system and created wetlands provided the solution for spray fields not capable of handling projected increases in flow. And, in Glennville, a new treatment plant feeds treated wastewater into a 2-mgd created system for final polishing before discharging into a natural wetland system.

The price is right

Cost is a major factor in the appeal of incorporating wetlands into new and existing wastewater treatment systems. Cost-benefit analysis often favor created wetlands in areas of favorable topography and land costs. Compared with traditional tertiary technologies, wetlands offer considerably lower start-up and maintenance costs. Correct design, establishment, and management also make the life span of a created wetlands system comparable to traditional treatment technologies. Moreover, correct design affords created wetland owners confidence that their systems will meet capacity needs and water

quality standards well into the future.

The popular vote

Where citizen input is pivotal, created wetlands have proven to be the popular choice. Community members are increasingly educated about water quality and the short- and long-term impacts on their local and regional environment. Their decisions favoring created wetland treatment are based not only on the comparable or lower cost to implement, but also the popularity of relatively natural re-introduction of treated waters into the environment. In the Glennville and Baxley cases, the strong belief of elected officials and the citizenry that direct discharge into the Altamaha River was unacceptable proved essential in the decision to employ created wetlands for polishing their treated wastewater.

Appealing also to communities is the creation of natural habitats for numerous species of animals using native soils and plants. In Richmond Hill, the Elbow Swamp Wastewater Treatment Facility has provided quantifiable environmental benefits with the creation of 90 acres of wooded and herbaceous wetlands that offset losses in other areas and have been colonized by numerous resident and migratory bird species.

Created wetlands have also provided the basis for the development of passive parks, such as Daniel Island, with the popular support of residents.

What will tomorrow bring?

The future and continued application of created wetlands is as certain as their success in contaminant removal—bright. Their growing application reflects regulatory acceptance of the technology's effectiveness and broad recognition of secondary benefits such as restoration of former wetlands and creation of natural habitats. This trend indicates the probability for expanded application in addressing water quality requirements for stormwater, including responses to the National Pollutant Discharge Elimination System Phase II program. With the March 2003 filing deadline getting closer every day, municipal separate storm sewer systems owners must move rapidly to improve water quality to the mandated maximum extent possible. As with wastewater treatment, created wetlands have great appeal and are a valuable tool for determining where to go with the flow.

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