Florida Department of Transportation Research

Optimal Design of Stormwater Basins with Bio-sorption Activated Media (BAM) in Karst Environments – Phase I: Site Screening and Selection

November 2015

Project Number
BDV24-977-12

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Current Situation

Nutrient content is a concern in Florida's aquifers and springs – sources of drinking water, recreation, and the state's natural beauty. In recent years, the nitrogen content of Florida's aquifer springs has risen. This increase in nutrients can cause eutrophication– an increase in algal blooms and a decrease in oxygen to levels which do not meet water quality requirements. The Florida Department of Transportation is required by rule to design stormwater management systems that address these excess nutrients.

Research Objectives

In this project, University of Central Florida researchers were contracted to study the use of biosorption activated media (BAM) as a means of removing nutrients from stormwater runoff. In this phase of the project, two stormwater basins were selected as test sites for the BAM treatment systems.

Stormwater basins like this one collect surface runoff that may contain high levels of nutrients, which can be carried through groundwater into local springs.

Project Activities

In task one, fifteen stormwater basins within the Silver Springs springshed were selected for screening and ranking. Five sites were eliminated because of planned nearby construction. The ten remaining basins were ranked in a two-step decision making process, with the ultimate goal of selecting two sites for study in phase two of this project. Initial ranking criteria included basin size, contributing watershed area, total nitrogen concentration, type of watershed or land use, distance to Silver Springs, ease of access, groundwater table depth, and soil permeability.

Task one led to the selection of four stormwater basins for further investigation. In task two, field work was conducted at each site, including collection of surface layer soil samples via hand auger drilling, double ring infiltrometer readings, GPR analysis, and mechanical soil borings/groundwater monitoring well construction at two of the four stormwater basins.

In task three, the four stormwater basins received overall rankings. Two sites, both near SR-35, emerged as the best candidates for BAM application. The two other sites will serve as backup locations in the event that either of the first two sites are compromised. The researchers included possible BAM installation designs for the two selected sites to solicit review comments on design possibilities.

Project Benefits

The quality of Florida's waters is critical to its quality of life. The methods proposed in this project may help to further protect and maintain Florida's freshwater springs.

For more information, please see dot.state.fl.us/research-center