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Soil and Water Science
Research Brief

University of Florida Institute of Food and Agricultural Sciences

Evaluation of Soil Quality in a Wetland-Storm water Retention Basin

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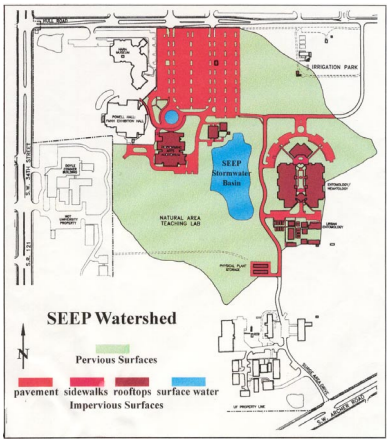
Precipitation, which is deposited during rainfall events and transported across the earth's surface, is classified as storm water runoff. As urbanization of an area increases, valuable infiltrative soil surfaces are lost creating more runoff. In the past, issues with urban storm water collection were based on quantity of storage rather than quality. However, studies have indicated that urban storm water runoff carries a variety of pollutants, including metals and hydrocarbons. The effect that these pollutants may have on the environment has changed the methodology of watershed management to consider water quality issues.

Increased storm water pollutant loads place a greater emphasis on the soils ability to act as a natural filter. Through pollutant filtration though, the natural soil forming processes may become altered allowing for excessive r this reason that intense study should be done to assess soil quality and characteristics of existing retention basins accepting urban storm water.

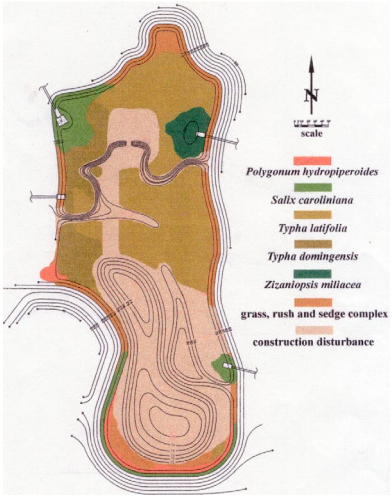
One method of storm water runoff disposal is the use of retention/detention accumulation of contaminants. The specific site chosen for this study is the basin located at the Natural Areas Teaching Lab (NATL) at the University of Florida. This 3-acre basin collects storm water runoff from roads, parking lots and natural surface swales. The current design of this system includes a treatment marsh to receive the initial storm water, followed by several wetland-simulated ecosystems, which then discharge to an open water pond for groundwater recharge through infiltration.



Evaluation of soil characteristics and quality is being done within the basin to assess the effectiveness of the wetland design on pollutant transport. In

addition, soil quality is being examined to determine the extent of pollutant loading on the basin soils in comparison to existing soils in the surrounding area.

The main objective of this study is being to identify hydrocarbon and heavy metal distribution within the storm water basin. The accumulation of these contaminants is being examined for both lateral movement and depth from their point of entry. By evaluating and studying these parameters, future considerations may be made on storm water retention basin design.



Soil samples were collected from various locations within the basin, which best reflect directional water flow and potential discharge area. These samples are being analyzed in depth intervals of 0-5cm and 5-10cm for total organic carbon, particle size distribution, pH, metals and hydrocarbons. In addition to soils, water quality is being evaluated for pH, metals, and hydrocarbons.

It is the intent of this study to show that hydrocarbons and metals are collecting along the flow lines established by the storm water runoff in the treatment marsh. These contaminants should not be distributed equally throughout the treatment marsh, nor will they be transported outside the treatment marsh boundary. The effectiveness of the wetland to remove pollutants from storm water will be creating a secondary hazard as pollutant concentrations are accumulating to potentially toxic levels.

This study is an independent project for master research. However, findings from the evaluation will be submitted to the Department of Environmental Protection (DEP) for review and hopeful consideration upon future storm water regulation criteria. The expected time frame for project completion will be August 2001.

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