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Innovative stormwater retrofits for barrier island applications: Septic tank conversion in Holden Beach, NC

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Abstract Text:

The town of Holden Beach, located in coastal Brunswick county North Carolina, has experienced tremendous growth in the last few years. This growth has posed many challenges to dealing with the added impervious surface causing a strain on the stormwater system. The Town of Holden Beach partnered with NC State University to develop an innovative solution to treating their stormwater. Three residents were identified, through cooperation with town officials, who volunteered to convert their previously unused septic tanks to cisterns. Downspouts from three homes were connected to previously unused septic tanks in an effort to determine the effectiveness of using septic tanks to capture roof top runoff. Holes were punched in the bottom of two of the septic tanks to allow the water to infiltrate into the sand below. A ¼ horse power sump pump was installed in the third tank to allow the water to be harvested for irrigation. A basic spreadsheet based model was developed to estimate the effectiveness of the septic tanks. It was calibrated using the size of the tanks and the infiltration rates determined from the observed data. Using the model it was determined that the tanks used for infiltration captured and infiltrated 78% to 87% of the rainfall that fell on the rooftop draining to the septic tank. The town of Holden Beach converted to municipal sewer in early 2007 giving the potential to capture roof top runoff from each home in a septic tank greatly reducing the amount of stormwater runoff and alleviating the strain on the storm water system.

Impact Statement:

Urban development increases stormwater runoff, while limiting the amount of available land that can be used to treat the stormwater. Stormwater runoff typically contains pollutants such as hydrocarbons, nutrients, metals, bacteria, pathogens, and sediment. Baker et al. (2005) conducted a study using data from two California beaches, Newport and Huntington, to estimate the economic impact of illnesses associated with polluted recreational waters. It was found that recreational swimming in these coastal water cost the public \$3 million per year in health related expenses. By routing stormwater through septic tanks you substantially reduce pollutant load in surface stormwater runoff.