Verification of Impacts of BMPs on Water Quality: Modeling Water Quality Benefits in Richland-Chambers Watershed

Background

Richland-Chambers (RC) Reservoir is the largest among the four major reservoirs maintained by Tarrant Regional Water District (TRWD) that supplies water to a major portion of the 1.5 million people in north-central Texas. It is listed in 2004 303(d) with high pH, nutrient enrichment, and algal growth due to excess nitrate and nitrite as a concern.

The goal of the project is to verify the effectiveness of BMPs installed on a portion (279.4-km2 Mill Creek Watershed) of RC watershed through analyzing the observed water quality data, developing a modeling approach to quantify the benefits of BMPs, and analyzing the spatial and temporal impacts of BMPs on water quality. This study will provide supporting information for BMP implementation within entire 5,157-km2 RC Watershed.

APEX and SWAT models are used to simulate various structural and agronomical BMPs and assess their impacts on water quality.

Benefits

Benefits are being presented as percentage reductions in runoff, and sediment, N, and P loadings at 1) the farm level, 2) subwatershed level, and 3) watershed level. APEX simulation study on Mill Creek Watershed indicated farm level benefits of up to 99% due to the implementation of best management practices whereas subwatershed level benefits amount to up to 10%. The statistical trend analysis of the observed water quality data, in general, showed a decreasing trend in nonpoint source pollution though not statistically significant.

This study will develop a methodology to represent the BMPs in simulation models which can be further used in other studies such as CEAP watershed and national assessment studies.

Partners

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Texas State Soil & Water Conservation Board
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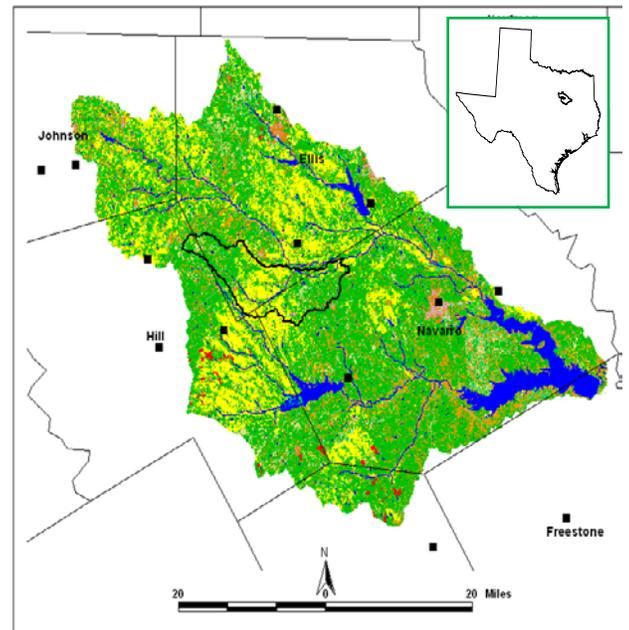
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