

# CHARACTERIZATION OF SOIL ORGANIC MATTER UNDER VARYING CONSERVATION MANAGEMENT PRACTICES

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## ABSTRACT

This study examined the effects of three conservation management practices (i.e., no-till, grass vegetative filter strips (VFS) and agroforestry VFS) and four landscape positions (i.e., summit, shoulder, backslope and footslope) on many aspects of soil organic matter (SOM) quantity and quality. Initial work indicated that losses of dissolved organic carbon in runoff and stocks of soil organic carbon were not significantly different among conservation management practices 10 years after installation; therefore more sensitive indicators of SOM quality were required to detect changes in SOM at this spatial and temporal scale. Using multiple physical, chemical and biological indicators, this study demonstrated that VFS enhance aggregate-associated organic carbon in the particulate, adsorbed and occluded fraction, water-extractable organic carbon, labile  $\text{KMnO}_4$ -oxidizable organic carbon, aggregate stability and microbial enzyme activity. Spectroscopic analysis of confirmed the greater proportions of partially degraded plant residues and a lower index of degradation under grass VFS. This may be the result of differing quantity and/or quality of organic matter inputs to the soil, or the result of differences in the decomposition rate due to protection in soil aggregates under the perennial vegetation of VFS. Overall, this study contributes to a greater understanding of conservation management practices on a field scale, and has implications for the role of management practices in the global soil carbon cycle.