

# INVESTIGATING SOIL CARBON, NITROGEN AND RESPIRATION ACROSS AN INTRA-URBAN GRADIENT IN MID-MISSOURI

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## ABSTRACT

Carbon (C) storage by urban soils is an attractive option to reduce atmospheric CO<sub>2</sub>. However, C dynamics are complicated by the gradient of land use and vegetation assemblages associated with urban development. Soil total organic carbon (TOC), total nitrogen (TN), and soil respiration (SR) as well as surface litter inputs, air temperature, soil volumetric water content, and soil temperature (Ts) were measured across six study sites in Boone County, Missouri, USA. Study sites included one rural reference forest (UHF), one urban forest (BHF), and four additional intra-urban sites of varying land use and vegetation including a floodplain grassland (FG), a natural regeneration plot (NR), an older residential plot (ON), and a high intensity urban parking area (PA). The urban sites contained the greatest TOC and TN from 0-35 cm with 15.81 kg TOC m<sup>-2</sup> and 960.57 g TN m<sup>-2</sup> and 22.78 kg TOC m<sup>-2</sup> and 1262.41 g TN m<sup>-2</sup> for the ON and PA respectively. The BHF contained 7.64 kg TOC m<sup>-2</sup> and 637.62 g TN m<sup>-2</sup> and the UHF contained 7.11 kg TOC m<sup>-2</sup> and 639.61 g TN m<sup>-2</sup> from 0-35 cm. Average growing season SR rates across sites ranged from 7.96 μmol m<sup>-2</sup> s<sup>-1</sup> at the UHF to 12.92 μmol m<sup>-2</sup> s<sup>-1</sup> at the PA site. High and low soil Ts corresponded to sites with the highest and lowest rates of SR, with an average growing season Ts of 18.71°C at the UHF and 23.72°C at the PA site. Results indicate that varying urban land use has the potential to impact C storage and cycling in that soils under more intense urban land use may contain more C and N.