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## **Soil Nitrogen and Carbon Distribution on Native Shortgrass Prairie Adjacent to a Cattle Feedyard.**

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Cattle feedyards are a potential source of fugitive N as gaseous ammonia or manure dust, which can be deposited on downwind land. In a previous study on a shortgrass prairie pasture adjacent to a feedyard, change in soil phosphorus or dust deposition across the pasture indicated that from 19 to 31 kg N/ha/yr was deposited nearest the feedyard over 30 years. The objective here was to determine the distribution of total soil N and C with distance downwind from the feedyard. Soil samples were collected at 119 locations on a 22.5-m by 60-m grid at depths of 0-2, 2-4, 4-6, 6-15 and 15-30 cm. Locations were grouped into seven 75-m distance classes. Total soil N and C were determined by dry combustion and analysis of evolved gases. Soil N and C decreased linearly with distance from the feedyard in the top three depths. At depths below 6 cm, there was no effect of distance on soil N or C, except for locations <150 m from the feedyard. Nitrogen in the 0-2 cm layer decreased from 3.35 g/kg at <150 m from the feedyard to 2.09 g/kg at more than 525 m. Carbon in the 0-2 cm layer decreased from 33.1 g/kg at <150 m to 21.0 g/kg at >525 m. Nitrogen and carbon at >525 m approached values observed for undisturbed shortgrass prairie on this soil. Difference in N in the top 15 cm of soil between <150 and >525 m from the feedyard was 990 kg/ha, a potential loading rate of 29 kg N/ha/yr at <150 m from the feedyard. These results provide additional evidence that observed vegetation and soil fertility changes were initiated by nutrient addition from the feedyard.

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