

**Effect of Livestock Grazing or Feeding on
Cropland Soil Compaction and Nutrient Deposition
(ABSTRACT)**

N. Thompson¹, B. Whitney², W. Poland²

¹ Dickinson State University - Department of Agricultural Studies and

² North Dakota State University – Dickinson Research Extension Service

As agriculture in North Dakota continually evolves, livestock grazing of unharvested crops is increasing in popularity. The objective of this project was to determine the effect of livestock grazing or feeding on soil compaction in cropland and to measure the nutrient deposition caused by using these practices. The treatments (2 replicates/treatment) included dry beef cows grazing in harvested corn, (8.01 ac/replicate) grazing oat swaths (7.95 ac/replicate) and fed oat hay (9.83 ac/replicate). Stocking rate varied with treatment replicate and was estimated at the beginning of the grazing period to provide enough grazing pressure to remove 50% of available forage in 8 weeks. The oat hay feeding areas were mob grazed prior to the initiation of the grazing period to remove all grazable forage. Soil samples were taken before mob grazing (oat hay) in early October, treatment immediately prior to the initiation of grazing period in mid October and one week following the termination of grazing in mid December. Soil samples were used to establish bulk density and were later analyzed for Nitrogen, Phosphorus, Potassium, pH, Electrical Conductivity, Organic Matter, Chlorine, and Sodium. Soil density was not affected by time ($P = .17$), but was affected by treatment ($P = .01$). Soil density increased with the feeding of hay in the dry lot, and decreased with the grazing of oat swaths. The corn lots were intermediate. Nitrogen ($P = .01$) and sodium ($P < .01$) decreased with the grazing period, while phosphorus ($P = .04$) increased in the grazing period. Density, phosphorus, and sodium increased in the dry lot. Density was least in the oat swaths and intermediate in the corn, while phosphorus was low in the corn and intermediate in the oat swaths. Sodium was high in the dry lot and intermediate in the oat swaths and corn. Potassium ($P < .01$) was low in the corn and pH ($P = .01$) was low in the oat swaths. Electrical conductivity, organic matter, and chlorine were not affected ($P > .91$) by treatment or time. Cattle grazing or feeding on cropland does not increase soil density and any treatment affects were relatively small. Soil nutrient concentration appears to be affected inconsistently across both treatment and time and warrant future investigations. The increased popularity in extending the grazing season onto cropland with beef cattle seems feasible in Southwest North Dakota.