A Comparison of Soil Properties in Compacted Versus Non-Compacted Bryant Soil Series Twenty-Five Years After Compaction Ceased

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Soil compaction may be one of the most common effects the human race has on the natural environment. In some instances, such as when constructing a roadbed, soil compaction is desirable. In other instances, such as the compaction that occurs along a trail, in a campsite, at a plow-pan, or in the yard around a building site, it may not be desired but could be an inevitable result of the pursued activity. Whether the land use is agricultural, recreational, or urban in nature, virtually everything we do that leads to some form of trafficking has the potential to cause soil compaction.

Given that conditions may lead to soil compaction are so prevalent, it is not surprising that soil compaction has been heavily studied. A search for “soil compaction” in the National Agricultural Library’s AGRICOLA database yielded over 1700 references that focused on a wide range of topics. These included compaction by animals, the effect of compaction on crops, trees, or pasture, compaction due to recreational activities, compaction due to agricultural traffic, and the effect of compaction on soil fauna.

Despite the large body of published literature, at least one topic has been largely overlooked. The literature includes few papers that document natural recovery of the soil from compaction over long time periods (>20 yr). Papers that address natural soil recovery include recovery in agricultural soils (e.g., Orr, 1975; Blake et al., 1976; Voorhees, 1983; Voorhees et al., 1986; Etana and Hakansson, 1994). However, each of these studies covers time spans of less than 15 yr. Each of these studies also concluded that soil recovery was probably not complete.

The lack of long-term studies on agricultural land is probably due in large part to the fact that some land must be taken out of production for the duration of the study in order to observe natural soil recovery. A period of inactivity of 20-plus years in a production agriculture field would often lead to significant crop loss and thus, income loss. There are, however, sites in agricultural areas of the USA that have undergone compaction and then been allowed to recover naturally for long periods of time, including the abandoned farmyards found throughout the American Midwest. While these sites usually have not been used for production agriculture, they often include soils used for such purposes in adjoining fields. One such farmyard in Emmons County, North Dakota, was chosen for this study.

Study Site

The abandoned farmyard chosen for this study was owned and operated by Dave and Pauline Wagner from 1942 until 1972 (P. Wagner, 1998, personal comm-

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52