No-tillage and crop rotations have long been recognized as conservation practices, but questions remain on their long-term impact on soil health and crop productivity. Our study evaluated half a century of different tillage intensities and crop rotation diversity on soil health indicators in the oldest experimental trial in America: the Triplett and Van Doren No-till and Crop Rotation Trial. Our purpose was to evaluate active organic matter dynamics throughout corn growing seasons as insight into organic matter stabilization and biologically based nutrient cycling. Does no-till promote healthier soils? Does increased crop diversity improve soil health? Do healthier soils translate into increased corn productivity? This talk will discuss our findings and attempt to answer some of these questions.