

Managing for Better Soil Structure

SOUTH DAKOTA BACKGROUNDER April 17, 2019

REPAIR FIELD RUTS – Advice for Farmers

10 Steps to Improved Ruts and Soil Management

Written by agronomists and soil scientists with USDA Natural Resources Conservation Service South Dakota and South Dakota State University Extension, with support from South Dakota's Conservation Districts and South Dakota Soil Health Coalition.

Situation:

Tire or track ruts exist in a field. What is best advice to smooth them out before planting?

- 1. Assess the damage:** How deep are the ruts; how large is the affected area? All ruts deeper than planting depth should be leveled. In locations where soils were fully saturated (*soil pores were filled with water*), compaction may not be as bad as perceived. Therefore, just leveling the ruts themselves may be all that is necessary to get the field in planting condition. In the rut area, soil structure has been damaged. In no-till fields, where ruts are often shallow, many growers choose to let nature, not steel, rebuild the ruts. Living roots, improved biological activity, and the freeze/thaw/wet/dry cycles with natural heaving, will help level the compacted areas.
- 2. Wait for drier soil:** The top 2-4 inches of soil need to be dry. Use secondary light tillage (vertical tillage tool, light disk, soil finisher or harrow), while leaving residue on the surface. Tillage in a rutted area, when too wet, smears and compacts soils even more, reducing root growth and yields. If necessary, consider light use of tillage equipment only in the width of the impacted areas, not the entire field, which will still accommodate the use of traditional no-till equipment. Best advice is to smooth and plant these areas last. If wet soil continues in spring, avoid tillage and try no-till in this area.
- 3. Test for soil dryness:** Grab a handful of soil in the area between ruts and 2 inches above the operating depth of tillage. Form a ball and toss like throwing a runner out at first. If ball stays mostly intact when it hits the ground, it's still too wet.

4. **Avoid deep tillage:** It's a myth that deep tillage is the best fix for ruts because any tillage causes compaction in wet soils. Compaction caused by tillage breaks down soil structure, reduces root growth, slows water infiltration and cuts water availability to growing plants.
5. **Quick fill for ruts to make the area suitable for planting:** A tractor and blade can help push heaved soil back into ruts. It may not deliver a complete fill, but might be level enough for the planter.
6. **Deeper ruts need more time:** For 5-inch or deeper compacted ruts, multiple tillage passes will be necessary, with a week in-between passes to dry the tilled layer. If needed, a chisel plow set to depth just below the ruts could work, but only use in the rutted area to avoid further compaction.
7. **Expect yield losses in the rut-damaged area.** Research show losses of 10 to 25%, depending on soil type and compaction severity. Even with the best management practices to remedy rut issues, it will take some areas 3 to 5 years for yields to normalize. Heavy, fully-loaded harvest equipment can weigh between 20 and 40 tons per axle, which can create compaction as deep as 3 feet.
8. **What if ruts produced gullies?** Use of zone tillage can temporary help fill in gullies. Some growers use center pivot track fillers, or even ATVs with small implements. Some move topsoil from field edge to refill upslope losses. Always check the area slope, as it likely needs a grassed waterway established to stop soil erosion.
9. **Preventive Actions - Focus on long-term soil structure:** Growers using no-till, especially with diverse rotations and cover crops, are achieving improved soil biological activity and increasing soil organic matter--which leads to fewer ruts, less compaction, quicker access to fields following rains, and reduced inputs to produce equal or greater yields as current conventional-tilled fields.
10. **Cover crops can help:** Seeding cereal rye after harvest, with its fibrous root system, can help alleviate soil compaction in these rutted areas, as well as build a healthier soil. Manure and residue cover also help build soil structure by increasing soil biological activity.

For more details, see [Stuck in a Rut: SDSU Extension Offers Tips on How to Deal with Field Ruts](#) by Sara Bauder, SDSU Extension Agronomy Field Specialist, and Anthony Bly, SDSU Extension Soils Field Specialist.

For a free one-on-one field consultation, contact your local NRCS or conservation district office.

(Information compiled from agronomists and researchers at USDA Natural Resources Conservation Service South Dakota, South Dakota State University, Iowa State University, Michigan State University, University of Minnesota, University of Nebraska.)