

to remember is that surface residue decomposes over time. Therefore, if you have 60 percent cover after planting with one of the conservation tillage techniques, that amount will decrease throughout the growing season.

Even with flat and well-drained cropland, agricultural fields are generally susceptible to the effects of runoff and erosion. Ephemeral gully erosion is caused by drainage channel depressions in the field where water concentrates and flows over the field (Figure 11). The gullies that are produced can be smoothed with tillage. However, ephemeral gully erosion will occur in the same location year after year if not controlled. As mentioned, less runoff will occur as more crop residue is retained on the soil surface. Since no-till will have the greatest surface cover compared to the other residue management systems, it will have the greatest value in reducing ephemeral gully erosion (Figure 12). For large watersheds or fields with severe gullies, however, a temporary cover or a permanent grassed waterway may be needed to solve the problem.

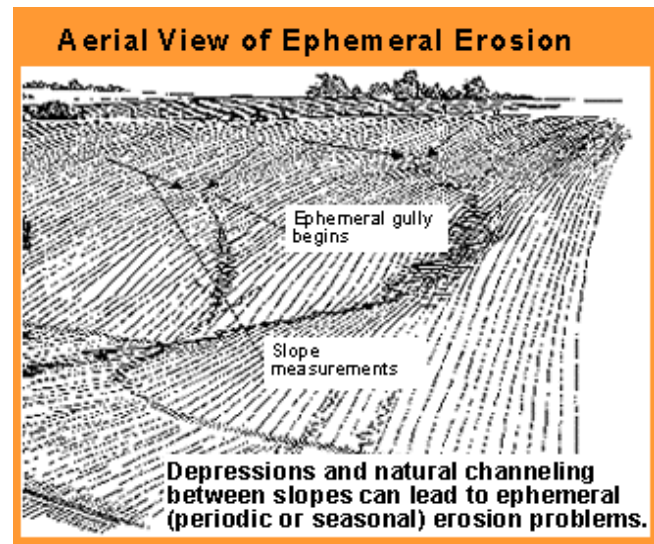


Figure 11

Tillage and residue management practices can have a significant impact in improving soil structure and content of organic matter (Figure 13, next page). The largest increases in soil organic matter result from continuous no-till. Recent research indicates that most of the increase in soil carbon is a result of undisturbed root biomass, not just by leaving crop residue on the surface. Even with continuous no-till, the increase in soil organic matter is a very slow process, sometimes taking many years to replenish.



Effect of crop residue on ephemeral erosion:

- Less runoff as surface residue increases
- No-till leaves the most surface residue
- No-till has greatest value in reducing ephemeral erosion
- Effectiveness depends on soil permeability and watershed size

Figure 12

Some of the soil structure benefits expected to occur from residue management include improved soil aggregate stability, water holding capacity, increased granular structure at the surface, and less surface ponding. The increase in infiltration is primarily a result of improved soil structure, slowed runoff, and leaving the old root and macropore structure undisturbed. Macropores develop from earthworm burrows and decayed root channels. Additionally, high residue management systems can significantly increase plant available water. This is an extremely important benefit, especially in areas where crop moisture stress is common or irrigation supplies are limited.