

Department of Biosystems Engineering and Soil Science

CONSIDERATIONS: POST-FLOODING SOIL MANAGEMENT

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In October 2024, Hurricane Helene caused severe flooding in several counties in East Tennessee. Many farms and thousands of acres were affected with some farms suffering extensive damage to property, barns, equipment and livestock. Some fields lost significant amounts of topsoil or were covered in sand, clay sediments, woody debris, river rocks or other debris washed in from upstream. This factsheet provides guidance to landowners on steps to restore fields and bring them back into production.

Government Assistance from USDA

The United States Department of Agriculture (USDA) Farm Service Agency (FSA) offers several disaster assistance programs, including the Livestock Forage Disaster Program, Livestock Indemnity Program and the Emergency Conservation Program. Contact your local FSA office for more information on how to access these resources.

Keep Livestock Off Flooded Fields

As a precaution, livestock should be moved from flooded fields to avoid exposure to potential pathogens and contaminants. Animals should be kept off flooded fields for at least 30 days or longer if possible. Additionally, avoid feeding hay from bales that were flooded, as it may be contaminated. However, these bales can be used for composting or erosion control if unrolled.

Do Not Harvest Vegetables from Flooded Fields

To minimize the risk of contamination, do not harvest vegetables from flooded fields. Similarly, avoid planting vegetables in these fields for at least 60 days after floodwaters have receded.

Assessing the Damage to Your Fields

Field management may vary depending on location, proximity to nearby streams or rivers, the extent of flooding and the types of sediments or debris left behind. Floodwaters may contain contaminants such as pesticides, fuel and disease-causing organisms from septic systems or animal manure. Cleanup should be carried out using proper protective gear to avoid direct contact with contaminated surfaces or materials. Wear rubber boots and gloves when handling mud or silt. Wash your hands and exposed skin after cleaning up. If the material is dried and creates dust, wear a dust mask.

Debris and partially hidden objects that may pose a risk to livestock or damage machinery should be removed once the field has dried sufficiently. It's important to assess the amount and type of sediment left on the field before deciding on the next steps. Avoid driving vehicles or machinery on the field until it is dry enough to safely do so without causing rutting or soil compaction. When possible, remove non-sediment debris or fallen trees from the field.

Dealing with Rocks

Some fields may have significant quantities of river rocks deposited. Your local Farm Service Agency (FSA) may assist with the cost of rock removal. Before beginning any work, consult with the FSA office. Document the damage with photographs and keep detailed records of the time and expenses involved in renovating the field.

Assessing the Types of Sediments in Your Fields

Soil typically consists of three main particle types: sand, silt and clay. As floodwaters moved across fields, they first deposited larger sand particles, followed by smaller silt and clay particles. If the water pooled in the field for an extended period, the deposits primarily consist of silt-sized particles. The sediments may lack structure, with varying particle sizes at different depths throughout the field. Siltier deposits tend to dry and crack on the surface, while sandier deposits dry more quickly and lack distinct surface cracks. Generally, siltier sediments are more fertile than sandier ones.

If your field has larger sediment deposits, sample different sediment types separately to a depth of up to 6 inches. Send these samples to the UT Extension Soil and Plant Center in Nashville, Tennessee, as you would with any other soil sample. The results will indicate the pH of the sediments and whether lime is needed for optimal plant growth. The analysis will also provide recommendations for adding phosphorus or potassium prior to spring planting.

Keep in mind that 6 to 8 inches of sediment over an acre weighs approximately 1,000 tons. In many cases, it may be best to leave the sediments in place and implement measures to prevent surface sealing and improve the physical and chemical properties of the soil. Regulations prohibit dumping sediments into rivers.

Dealing with Sediments

If siltier sediments are allowed to dry out, they may form a hard, sealed surface. Assess the sediment types before deciding on a treatment plan. Avoid deep tillage or subsoiling if the sediments are still wet, as this can lead to further compaction. In areas where it's feasible, overseeding with a cover crop like wheat or cereal rye is recommended. However, due to the limited planting window before winter, reseeding of many pastures or hay fields may not be possible until early 2025. For more information, refer to the UT publication D 245: “Pasture and Hay Challenges after a Hurricane” at tiny.utk.edu/afterhurricane.

In the meantime, covering the sediments with locally available organic materials, such as spoiled hay or chipped woody debris, can help prevent surface sealing and protect the soil from erosion over the winter.

What Will Grow in the Sediments

The University of Tennessee has conducted analyses of sediments deposited on fields adjacent to the Nolichucky River in Unicoi, Washington and Greene counties. They have also performed germination tests on various crops, grasses and vegetables typical of the region. Initial observations include issues such as crusting, compaction of mixed sediments and changes in the soil profile with repeated watering.

Soil analyses have shown that many of the sediments have a pH of around 6.5, medium to high levels of phosphorus and potassium, and 2 percent to 8 percent organic matter. This suggests that the sediments may not require significant amendments to establish a vegetative cover of grasses and legumes. However, it is still strongly recommended that samples be sent to the UT Extension Soil, Plant, and Pest Center in Nashville for analysis before planting. It is still unknown what has ultimately changed in production scenarios with further testing and investigation required.



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