Example of Biological, Physical & Chemical disturbances on Soil Health

**Biological Disturbance (e.g., Grazing)**

Overgraze: to graze land excessively, to the detriment of the land and its vegetation.

**Physical Disturbance (e.g., Tillage)**

Soil tillage can increase soil erosion and CO2 emission (i.e., reducing soil carbon pool), and it disrupts ecosystem processes (i.e., negatively affects the Soil Food Web).

**Chemical Disturbance (e.g., Fertilizer)**

Excessive N fertilizer applications can hasten soil organic matter decomposition. Therefore, when used, incorporate the 4R concept: Right fertilizer source at the Right rate, at the Right time and in the Right place.

**Soil Health Planning Principles:**

- Use plant diversity to increase the diversity in the soil biota
- Keep a living root growing throughout the year
- Keep the soil covered as much as possible
- Manage more by disturbing less
- Livestock integration where applicable

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**Cover Crop mix (grasses, legumes & brassicas):** Soil building/nutrient cycling

**Crop Rotation**

(Soil building/nutrient cycling)

**No-Till (biodiversity with minimal soil disturbance drives soil health)**

**Slake test**

Water-stable aggregates (soil is from a field that has been managed using no-till for several years)

**Slake test**

Unstable aggregates (soil is from a conventionally-tilled field).

**Crumbly soils (left) have more pores & channels than cloddy soils (right). Pores & channels allow air and water to move into the soil.**

**Healthy Soil**

(diverse Soil Food Web)

**Poor Soil Health**

(bacterial-dominated Soil Food Web)

Is your soil “in the red”?