



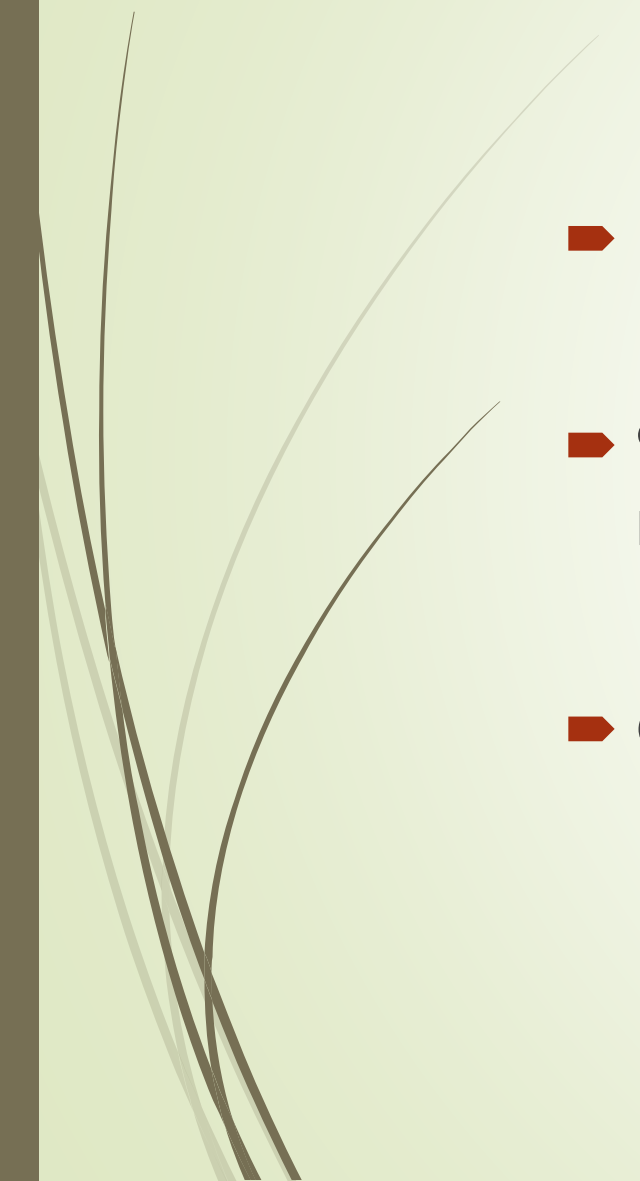
# Managing for Rangeland Soil Health in the National Forest System

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# The National Forest & Grassland System

- ▶ 193 million acres
  - ▶ 96 million acres allocated to grazing along with other multiple uses
  - ▶ Over 7,300 individual grazing allotments
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# US Forest Service Strategic Plan Goals & Objectives


## Two of the Four Strategic Plan Goals:

- Sustain our nation's forests and grasslands by fostering resilient adaptive ecosystems.
- Deliver benefits to the public by providing abundant clean water.



# Resilient Ecosystems = Healthy Rangelands

At the broadest scale for the Forest Service we measure this by:

- ▶ The absence of invasive plant species
  - ▶ The landscape scale coverage of shrubs
  - ▶ Soil cover (relative to the site potential adequate soil cover to protect the long term site productivity)
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# What does this mean at Grazing Allotment Level?





# Allotment Specific objectives that drive livestock management

Examples:

- ▶ It could be a threshold set to maintain a minimum amount of soil cover
- ▶ It could be a threshold amount of litter left at the end of the grazing period
- ▶ It could trigger an every other year rest grazing sequence
- ▶ It could influence the amount of forage planned to be consumed each year



# Is this important?

The “INTERPRETING INDICATORS OF RANGELAND HEALTH” guide sometimes referred to as the 17 indicators of rangeland health.

**13 of the 17 indicators are tied to or influenced soil – clearly yes soil is important in the rangeland setting.**

# The 17 Indicators

## Rangeland health indicator

- 1. Rills**
- 2. Waterflow patterns**
- 3. Pedestals and/or terracettes**
- 4. Bare ground**
- 5. Gullies**
- 6. Wind-scoured areas**
- 7. Litter movement**
- 8. Soil surface resistance to erosion**
- 9. Soil surface loss or degradation**

## Related rangeland soil attribute/factor

Water Erosion  
Infiltration

Water Erosion, Wind Erosion  
Water Erosion, Wind Erosion  
Water Erosion  
Wind Erosion  
Water Erosion, Wind Erosion

Physical and Biological Soil  
Crusts, Aggregate Stability

Water Erosion, Wind Erosion



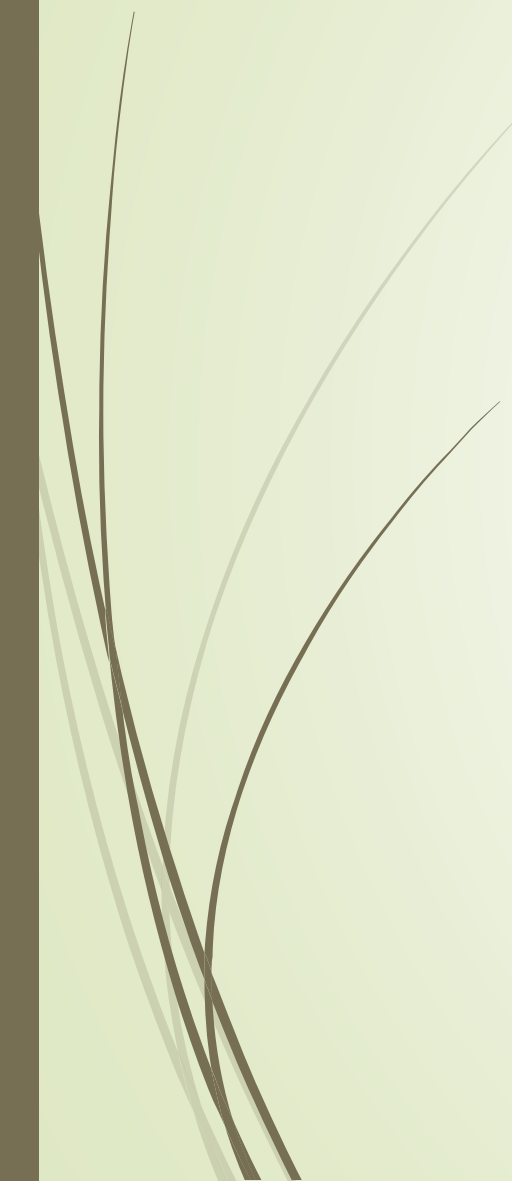


## The 17 Indicators cont.

<u>Rangeland health</u> <u>Indicator</u>	<u>Related rangeland soil</u> <u>attribute/factor</u>
10. Plant community composition and distribution relative to infiltration and runoff	Infiltration
11. Compaction layer	Compaction
12. Functional/structural groups	Soil Biota
13. Plant mortality/decadence	
14. Litter amount	Organic Matter
15. Annual production	
16. Invasive plants	
17. Reproductive capability of perennial plants	



## To tie back to specific grazing allotments & management requirements – a few facts to consider

- ▶ Each percent of soil organic matter in the top 6 inches releases about 10 - 20 pounds of nitrogen, 1 to 2 pounds of phosphorus, and 0.4 to 0.8 pounds of sulfur per acre per year.
  - ▶ Organic matter behaves somewhat like a sponge; absorbing and holding up to 90 percent of its weight in water. It releases nearly all of the water it holds for use by plants. In contrast, clay holds great quantities of water, but much of it is unavailable to plants.
  - ▶ Grasslands may have 1.4 tons of above ground biomass, and 4 tons of below ground biomass – potential future soil organic matter.
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**Retaining and recruiting some of this biomass every year as litter is critical to a grazing operation to maintain a resilient ecosystem.**

Protection & Improvement of the Soil:

- Increases fertility & productivity
- Increase water holding capacity and thus productivity
- Decrease runoff and erosion