Healthy Grassland Soils – Four quick steps to assess soil structure

Step one: **Surface assessment**

Look at sward quality to identify potentially damaged areas which require further assessment.

- **Good**
  - Sward intact
  - No poaching
  - Few wheelings

- **Moderate**
  - Surface poached
  - Wheelings in places
  - More weed species

- **Poor**
  - Surface compacted
  - Soil exposed
  - Poaching
  - Poor sward quality

Step two: **Soil extraction**

- Dig out one spade-sized block of soil (depth approx. 30cm). Cut down on three sides and then lever the block out leaving one side undisturbed
- Lay soil block on a plastic sheet or tray

**Tip:** When starting out it is useful to dig in an area where you know there may be a problem (e.g., a gateway) and get familiar with signs of soil structure damage.

**Remember:** Sample when the topsoil is moist – if the soil is too dry or too wet it is difficult to distinguish signs of poor soil structure.

Step three: **Soil assessment**

Gently open the soil block like a book to break it up

- If the structure is uniform – assess the block as a whole
- If there are two or more horizontal layers of differing structure identify the layer with the poorest structure
- Carry out the rest of the assessment on this **limiting layer**

Step four: **Soil scoring**

Break up the soil with your hands into smaller structural units or aggregates (soil clumps)

- Assign a score by matching what you see to the descriptions and photos overleaf
- A score of 1 or 2 is **Good**; a score of 3 **Moderate**; and 4 or 5 is **Poor** and requires management action
- Record depth of limiting layer to assess management options
<table>
<thead>
<tr>
<th>Structure quality</th>
<th>Identification of structural problem eg limiting layer</th>
<th>Soil structure features</th>
<th>Description</th>
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</table>
| Score 1 Crumbly   | ![Image of crumbly soil](image1.png) | Small (<6mm), round   | • Good soil structure  
• Highly porous  
• Many, well-distributed roots  
• Sweet earthy smell  
• Small, rounded aggregates |
| Management Options | Re-assess after equipment crosses the ground or grazing in wet conditions or every two years. |
| Score 2 Intact    | ![Image of intact soil](image2.png) | ![Image of rounded aggregates](image3.png) | • Good soil structure  
• Earthy smell  
• Porous  
• Some indication of larger aggregates  
• Good root distribution |
| Management Options | Re-assess after equipment crosses the ground or grazing in wet conditions or annually in spring. |
| Score 3 Firm      | ![Image of firm soil](image4.png) | ![Image of round (10mm) aggregates](image5.png) | • Adequate soil structure  
• Larger aggregates, some angular  
• Moderate root distribution  
• No strong smell  
• Less visible pores |
| Management Options | Consider infrastructure changes (eg back-fencing, multiple field entrance or tracks) to minimise traffic in marginal weather conditions. |
| Score 4 Compact   | ![Image of compact soil](image6.png) | ![Image of larger (>5cm) angular aggregates](image7.png) | • Large angular aggregates (>5cm across) with low pore numbers  
• Some red/orange mottling may be present (sign of poor drainage)  
• Roots clustered in large pores, worm channels and cracks between aggregates  
• May have sulphur smell (ie bad eggs) |
| Management Options | Consider use of sward slitter or aerator (if poor soil structure <10cm) or top-soiler or sward lifter (if poor soil structure deeper than 10cm). Assess sward then plough and reseed if required. |
| Score 5 Very compact | ![Image of very compact soil](image8.png) | ![Image of large initially (>10cm) angular aggregates](image9.png) | • Very large angular aggregates (>10cm), with very few pores  
• Any roots seen mainly at the surface or clustered down large pores or cracks  
• May have grey colour with red/orange mottling (sign of poor drainage)  
• May have strong sulphur smell (ie bad eggs) |
| Management Options | Use sward slitter or aerator (if poor soil structure <10cm) or top-soiler or sward lifter (if poor soil structure deeper than 10cm). Assess sward then plough and reseed if required. |

Based on the VESS method of soil structure assessment (www.sru.ac.uk/vess)  
See Healthy Grassland Soil Pocketbook for more information. It is available at healthygrasslandsoils.co.uk.