NCEA
Natural Capital and Ecosystem Assessment

England Peat Map

Detailed Hand Texturing Method and Use of Soil Maps

May 2025

Natural England Research Report NERR149 Annex 4

Lead Author: Jakub Olewski

Contributors: Chris J. Miller

www.gov.uk/natural-england

NATURAL ENGLAND

About Natural England

Natural England is here to secure a healthy natural environment for people to enjoy, where wildlife is protected, and England's traditional landscapes are safeguarded for future generations.

Further Information

This report can be downloaded from the Natural England Access to Evidence Catalogue. For information on Natural England publications or if you require an alternative format, please contact the Natural England Enquiry Service on 0300 060 3900 or email enquiries@naturalengland.org.uk.

Copyright

Acknowledgements

This project is funded by the UK Government through Defra's Natural Capital and Ecosystem Assessment programme.

Citation

Olewski, J. and Miller, C.J. 2025. 'England Peat Map Detailed Hand Texturing Method and Use of Soil Maps' in Kratz, C. and others. 2025. England Peat Map Project Final Report. Natural England Research Report NERR149. Natural England.

Contents

1. Introduction

This guidance was provided to field surveyors for the EPM (England Peat Map) project, to assist in the assessment of soil texture in the EPM soil survey. Soil surveys were carried out across England according to a comprehensive sampling strategy, following the methods set out in Annex 1: EPM field protocol soils.

2. Field method for assessing soil texture

2.1 Overall method

- Take about half a handful of soil and work it between your fingers, add water to achieve maximum stickiness and plasticity.
- If there is a film of water or if the soil turns into slurry, you have added too much water.
- Perform the stickiness test and plasticity tests in sections 2.2 & 2.3.
- Identify soil texture using the key for mineral soils provided below in section 4. Initially identify the broad group your sample belongs to e.g. moderately sticky and moderately plastic, and then within that group choose the most appropriate soil texture class based on the descriptions provided.
- If organic soil textures are suspected, please follow the instructions in the field protocol and the additional guidance provided.
- Supplement your judgement with information about expected soil types from the National Soil Map layer(s) and online LandIS® guide.

2.2 Stickiness test

Wet the soil gradually, working it thoroughly in your hand to the point of maximum stickiness. Then press the soil between thumb and forefinger and separate:

- Little or no soil adheres to the digits: **non-sticky**
- Soil adheres to both digits but separates cleanly from one: **slightly sticky**
- Soil adheres to both digits and stretches when they are separated: **moderately sticky**
- Soil adheres strongly to both digits and stretches when they are separated leaving part on each: **very sticky**

2.3 Plasticity test

Try to form a roll (a thread) of very moist to wet soil 4cm long between the palms of the hands. Check if 6mm, 4mm, and then 2mm diameter can be formed and if they break or not when supported at the centre of their length.

- A 6mm diameter roll cannot be formed: **non-plastic**

- A 6mm diameter roll can be formed and will support its own weight but a 4mm one will not: **slightly plastic**
- A roll 4mm diameter can be formed and will support its own weight but a 2mm one will not: **moderately plastic**
- A roll 2mm diameter can be formed: **very plastic**

2.4 Key for assessing soil texture for mineral soils

Soil feels (or sounds) gritty and is non-sticky or only slightly sticky.

Sand

Cannot form a ball. Has a dominantly gritty feel.

Loamy sand

Can be formed into a ball but not rolled into a 6mm thick thread. Does not stick to thumb and forefinger and feels gritty.

Sandy loam

Can be formed into a ball, which when pressed sticks to thumb but pulls cleanly away from forefinger (slightly sticky). Can be rolled into a thread 4cm long and 6mm (but not 4mm) thick (slightly plastic), which cracks immediately when bent. Feels or sounds gritty.

Soil feels moderately sticky and moderately plastic.

Sandy clay loam

Sticks to both thumb and forefinger, starts to stretch when they are pulled apart (moderately sticky). Can be rolled into a thread 4cm long and 4mm (but not 2mm) thick. The thread can be bent into half ring before cracks appear (moderately plastic). Feels gritty.

Silty clay loam

As with sandy clay loam but feels smooth and slippery or silky and non-gritty.

Clay loam

As with sandy clay loam but feels neither particularly gritty, slippery or silky.

Soil feels smooth and slippery or silky but only slightly sticky.

Sandy silt loam

Sticks to both forefinger and thumb but pulls cleanly from forefinger (slightly sticky). Can be rolled into a thread 4cm long and 4mm (but not 2mm) thick that cracks immediately when bent into a ring (slightly to moderately plastic). Feels non-gritty, smooth, slippery or silky.

Silt loam

Can be formed into a ball but fails to stick to thumb or forefinger (non-sticky) and only just forms a thread 4cm long and 6mm (but not 4mm) thick that cracks immediately when bent into a ring. Feels smooth, slippery or silky, and non-gritty.

Soil feels very sticky and very plastic.

Sandy clay

Sticks strongly to thumb and forefinger. Stretches markedly when they are pulled apart (very sticky). Can be rolled into a thread 4cm long and 2mm thick (very plastic). The thread can be bent into full ring without cracking. Slightly gritty feel.

Silty clay

As with sandy clay but with very smooth, slippery, non-gritty feel. Easy to manipulate. Sticks to auger.

Clay

As with sandy clay but neither particularly gritty or excessively smooth. Firm and difficult to manipulate. Extremely sticky and plastic. Sticks strongly to auger.

2.5 Additional clues for recognising soil textural classes

“Clay coheres, silt adheres.” Silt will leave residue on your fingers when it dries out. Clay, whilst sticky, will clean the fingers when it is being worked.

Clay sticks strongly to tools and boots when wet. It is very hard when dry. When sampled when moderately moist, its surfaces take polish from the tool surfaces rubbing against them and become shiny. Clay loam surfaces do not.

Silty textures feel slippery, buttery, silky, and smooth. When dry they resemble flour or talcum powder.

2.6 Additional clues for identifying organic, organic-mineral, and mineral soils

Follow the guide for distinguishing organic (peat and peaty), organic-mineral (humose), and mineral soils given in the main document ‘EPM Field Protocol – Soils Only’.

Organic matter increases stickiness of sandy textures, so they can feel as if they had higher clay content than they otherwise have. The difference from mineral sandy textures will be black colour due to high content of humified (well-decomposed) organic matter. Organic matter in sandy organic-mineral soils is typically humified rather than fibrous. This is due to relative high dryness of such soils.

In clayey textures, high content of organic matter reduces stickiness and plasticity. Peaty soils (between 20 and 35% organic matter) at the most are found to be moderately sticky and moderately plastic. Therefore, organic-mineral clays can be distinguished from peaty loams by applying the stickiness and plasticity test. If they comply with criteria for clay textures, they are likely organic-mineral rather than peaty.

In peat soils at depths where peat wastage (accelerated decomposition) due to drainage has not taken place, the differences between horizons of different organic matter content are usually easy to distinguish. However, in wasted peat the amount of mineral component (sand, silt, clay) in peat can be higher, and change gradually with depth. In such situations it can be difficult to tell if the topsoil is peaty or organic-mineral. The colour of the soil is black but hand texturing reveals high amounts of mineral material as the soil is moderately plastic and moderately sticky.

Where a shallow peat horizon (c. 0.3m) overlies a mineral horizon there can be an increase in mineral material present in the peat due to mixing during cultivation.

Increases in mineral material at the surface can occur where the remaining peat is still deep, but considerable thickness of peat has been lost due to decades of agricultural use and drainage. This is due to mineral component from metres of peat originally present being concentrated in a thinner topsoil layer only. In some parts of the country, the increase in mineral component of the topmost soil horizon is also because of historic additions of marl, human waste (nightsoil), and mixed municipal waste. This is typically well known from descriptions of the soil in the area and is evident from waste, such as ceramics and glass visible in the topsoil.

3. National Soil Maps/ LandIS® website

Additional information can be obtained from National Soils Maps and the LandIS® website which may help with soil texturization. Information can be found on Soil Associations which are groups of soil types which occur together in a particular area. As well as a brief description of the soil association tables listing the soil series (types) which occur in the association along with their relative proportions can be viewed. These provide a guide as to what you may encounter in the field but are not definitive. Often the relative proportions do not add up to 100% so expect the unexpected! Further information can be found about each soil series including a profile description showing what soil textures and other horizon properties are expected in the top 100 cm of soil for each soil series.

www.gov.uk/natural-england

NATURAL ENGLAND