Salt affected soils

These soils are developed in non-calcareous clayey marine alluvium on land that was once salt marsh. Over past centuries salt marsh has been reclaimed for grazing and agriculture by building sea walls and draining the land. The marine origin of this clay alluvium means that it is sodium-rich, unlike most clays which tend to be calcium-rich. Clay particles in most soils flocculate, i.e., they stick together, attracted to one another by the electrical charge of attached ions. This flocculation is the basis of their soil structure. However, for sodium-rich clays, this attraction is much weaker.

When left as permanent pasture, water levels in these reclaimed fields remain reasonably high and with a large solute concentration. Under these circumstances soil structure remains fairly stable. However, intensive land drainage and conversion to arable land reduces the solute concentration to a point at which clay particles readily deflocculate, i.e., they move apart. Consequently, the soil structure deteriorates, clay particles block land drains, and the land floods in winter.

The potential instability of a soil may be measured as its dispersion ratio. Particle-size analysis (PSA) uses a dispersant to deflocculate the clay; performing PSA both with and without the dispersant gives an indication of its inherent structural instability.

These soils can be treated with gypsum, which replaces the sodium with calcium improving soil structure, but his is a slow process. Calcium carbonate is not usually used as it can raise the pH to too high a level.

Soil Alert 9
salt affected soils

On the National Soil Map of England and Wales, soils in salt-affected sediments that are potentially structurally unstable occur in the following soil associations:

8.13f Wallasea 1

8.13g Wallasea 2

8.15 Normoor

Soil Series affected by this alert:

8.13 Wallasea

Soil Alert 9
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