

Soil and Nutrient Network



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Helping farmers improve soil and nutrient management

Case study - Waternish Farm, Isle of Skye

Waternish Farm, Isle of Skye, takes managing farm wildlife and biodiversity very seriously. It is certainly understood by the Montgomery family whose “Farm Tours” diversification business relies on opportunities to see not just their Aberdeen Angus herd but also a variety of bird species drawn to the area, in part by the insect life and seeds in a biodiverse habitat based on sound soil.

The farm has a small herd of Aberdeen Angus cattle whose calves are sold at the Portree Mart each September. The silage in the farm is all cut in September to benefit corncrakes. In addition other fields are managed to benefit wading birds. The farm website has list of species recorded on the farm in relation to 23 are red listed species and 41 amber listed. They also do a farm tour walk and talk or an Afternoon Tea (www.waternishfarm.com).

Compaction

At the first meeting there was discussion about compaction in two areas.

1. Damp area near where bales are stored
2. Wheelings from late cut silage

Although the compaction was not as bad as the host farmer feared it was decided at the second meeting that two types of tools would be tested.

In addition Gavin Elrick would draw up a drainage plan to reduce the wet area and prevent future compaction in that area.

Healthy soils are key to maximising productivity. Identifying and remediating problem areas in your soil is key to improving soil health. Removing compacted layers will help root development and help crop growth. Careful management of grass ley soils can help increase the length of time between reseeds.

You can assess your soil structure by digging a hole and using the Visual Examination of Soil Structure (VESS) chart to help identify the type of soil structure in your field. It is important to check several areas within a field, in particular areas that can be seen to have problems, e.g. tracking, puddling, at gateways etc.



Structure quality	Size and appearance of aggregates	Visible porosity and roots	Appearance after break-up: various soils	Appearance after break-up: same soil different tillage	Distinguishing feature	Appearance and description of natural or reduced fragment of ~1.5 cm diameter
Sq1 Friable	Mostly < 6 mm after crumbling	Highly porous Roots throughout the soil			Fine aggregates	The action of breaking the block is enough to reveal them. Large aggregates are composed of smaller ones, held by roots.
Sq2 Intact	A mixture of porous, rounded aggregates from 2mm - 7 cm. No clods present	Most aggregates are porous Roots throughout the soil			High aggregate porosity	Aggregates when obtained are rounded, very fragile, crumble very easily and are highly porous.
Sq3 Firm	A mixture of porous aggregates from 2mm - 10 cm, less than 30% are < 1 cm. Some angular, non-porous aggregates (clods) may be present	Macropores and cracks present Porosity and roots both within aggregates.			Low aggregate porosity	Aggregate fragments are fairly easy to obtain. They have few visible pores and are rounded. Roots usually grow through the aggregates.
Sq4 Compact	Mostly large > 10 cm and sub-angular non-porous. Requires considerable effort to break aggregates with one hand	Few macropores and cracks All roots are clustered in macropores and around aggregates			Distinct macropores	Aggregate fragments are easy to obtain when soil is wet. In cube shapes which are very sharp-edged and show cracks internally.
Sq5 Very compact	Mostly large > 10 cm, very few < 7 cm, angular and non-porous	Very low porosity. Macropores may be present. May contain anaerobic zones. Few roots, if any, and restricted to cracks			Grey-blue colour	Aggregate fragments are easy to obtain when soil is wet, although considerable force may be needed. No pores or cracks are visible usually.

Visual Evaluation of Soil Structure Score Sheet



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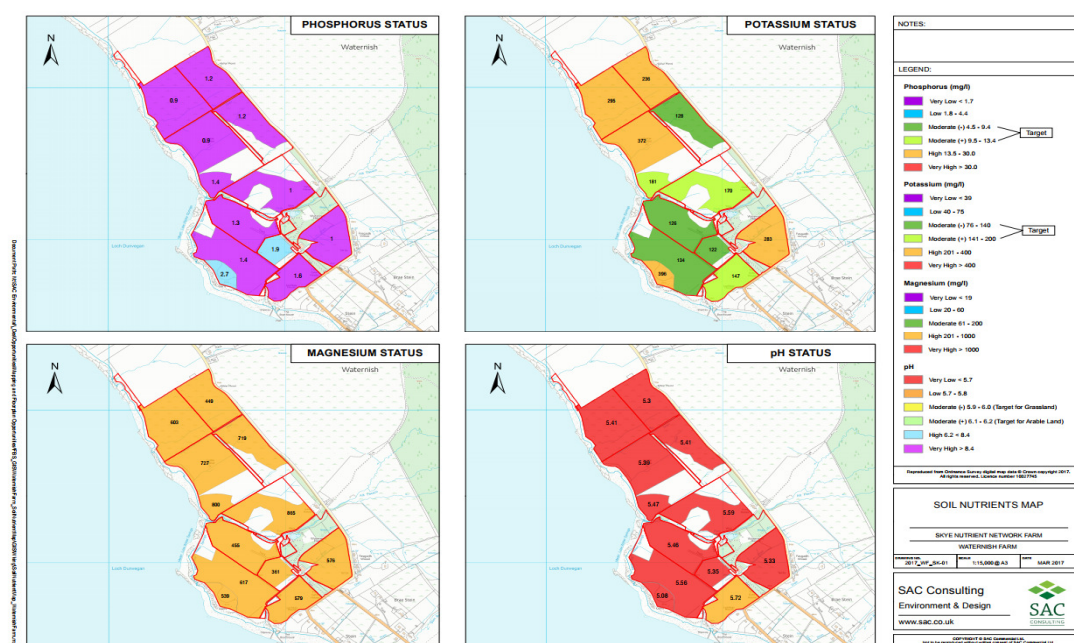
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Nutrient Status

During the first meeting of the Skye Nutrient Network local crofters and farmers learned the significance of what lies beneath the surface of their soils. The health of bacteria, worms and creepy crawlies is as important as the levels of nutrients like nitrogen and phosphate.

The whole farm was soil sampled and the maps below show the analysis for each field



Watnish Farm soil nutrient maps showing Phosphorus, potassium, magnesium & pH status

The fields all have too low pH both for optimum grass and clover yields but more importantly perhaps for invertebrates that are key food for corncrake chick and wading birds.

“The key message is that what is going on below the soil, both chemically and physically, is not just important for grass growth, but for the birds that depend on invertebrates, like young corncrakes and waders.”

“The soil at Watnish Farm has a great depth with roots growing to 500mm in some of the places we tested. However the soil pH or its acidity is low, as are the levels of phosphorous, both of which will have implications both for grass and clover growth as well as worm numbers and other insects and grubs important for wildlife. Applications of lime and other fertilisers will not just benefit crop yields but also biodiversity.”

“The weekend weather offered a great start for our Skye Nutrient Network” commented Janette Sutherland. “Further free meetings will look at soil management options that can that produce both agricultural and wildlife benefits.”

Key Findings

- Cutting silage late to benefit corncrakes can cause compaction issues—future meetings will look at kit which can alleviate this issue
- The low pH of the fields needs to be addressed to benefit both grass and the habitat for wading birds
- The soil testing has shown that a change of fertiliser for the silage to DAP 18:46:0 will target the low P status and we can have a potash holiday
- Soil is a complex living community

For more information on the Soil and Nutrient Network see www.farmingandwaterscotland.org. For dates of SNN events, find us on Facebook or follow us on Twitter @FarmWaterScot.

