Mains of Balgavies Farm

SAC CONSULTING | Part of Scotland's Rural College (SRUC)

Farm Carbon Storage Network

Through the establishment of a Farm Carbon Storage Network, this project seeks to raise awareness of the value of carbon stored on farms. Funded by the Scottish Government's Knowledge Transfer and Innovation Fund (KTIF), five farms were selected to participate in the first phase of the project.

Why do the project?

Farmers are increasingly aware of their need to help tackle the climate crisis, through a combination of reducing greenhouse gas (GHG) emissions and increasing sequestration of carbon dioxide on farms. A farm's soils, trees and hedges act as a carbon sink, which can be difficult to quantify, however, technology can help us improve the accuracy of these estimated carbon stocks.

This project quantifies the value of these natural assets in terms of their carbon storage, establishing a baseline for future monitoring. The carbon stock on each representative farm was estimated by combining soil testing and LiDAR (Light Detection and Ranging) aerial surveys.

The network data delivers a better understanding of the impact and importance of certain farm habitats, identifying management strategies that could be employed to enhance them.

Mains of Balgavies Farm

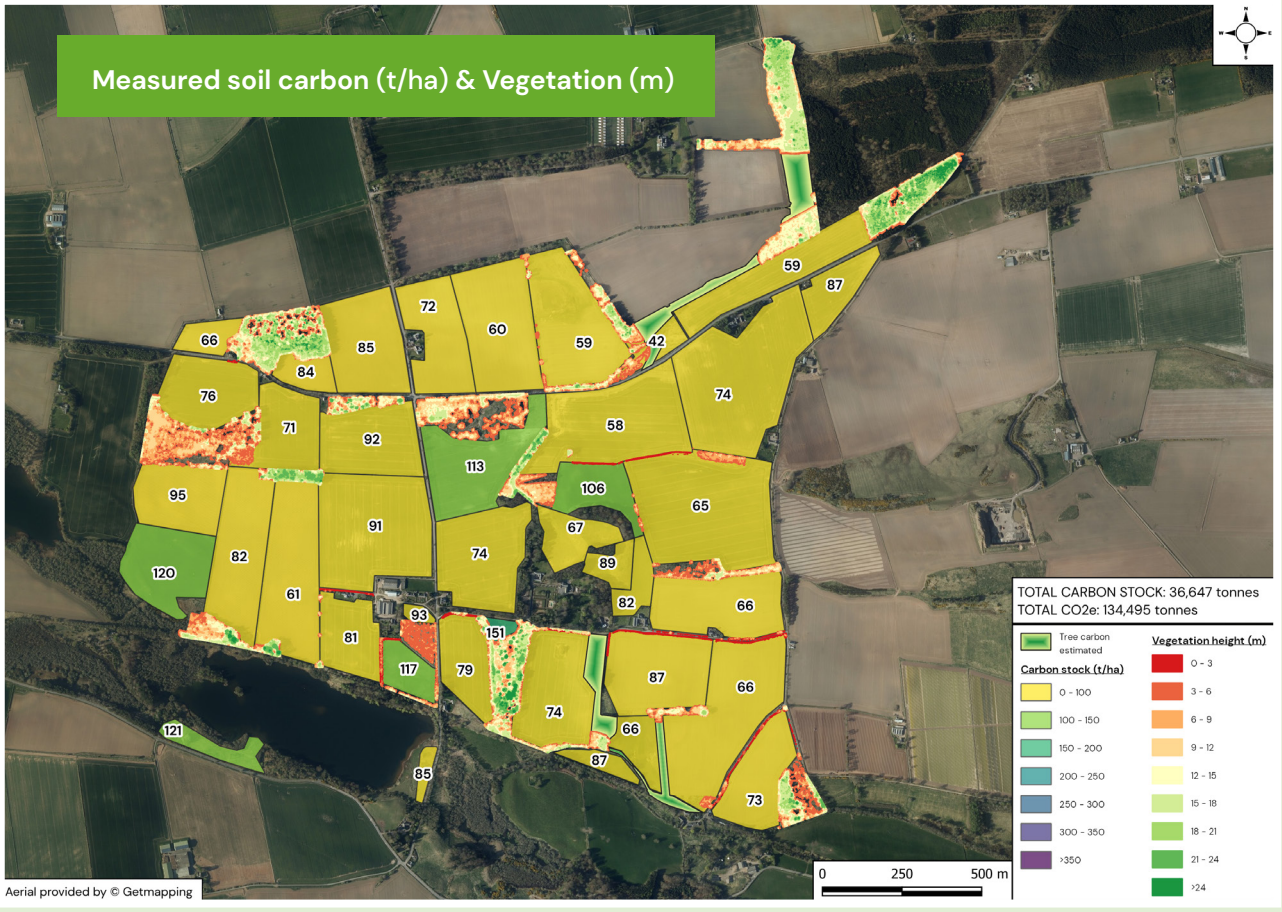
Mains of Balgavies Farm, located just east of Forfar, was the arable farm selected for phase one of the Farm Carbon Storage Network project. Managed by Jack Carnegy and Tom Sampson, land use is predominantly arable with some areas of improved grassland. Located in some of Scotland's prime agricultural land, the farm sits on low lying ground with sloping fields south of the steading. Large areas of woodland are spread out across the farm consisting of mixed woodlands, with an array of hedgerows along the field boundaries.

Carbon storage

At Mains of Balgavies, the project looked at quantifying the carbon stored within the topsoil and above-ground biomass in trees and hedges on the farm. These numbers are estimates, based on a snapshot of the carbon that was stored on the farm at the time of surveying.

It is important to note that there is a difference between carbon stored and carbon sequestration. **Carbon stored** is the carbon that is locked away in the soils, trees, and hedges at the moment of sampling, whereas **carbon sequestration** is the carbon that is actively being taken out of the atmosphere and stored in the farm's soils, trees, and hedges.

Carbon stored on site does not influence the estimated GHG emissions from the carbon footprint of the farm businesses. However, continuous monitoring can help to identify accurate sequestration across farms when action is taken to increase carbon stocks.



Trees and hedges

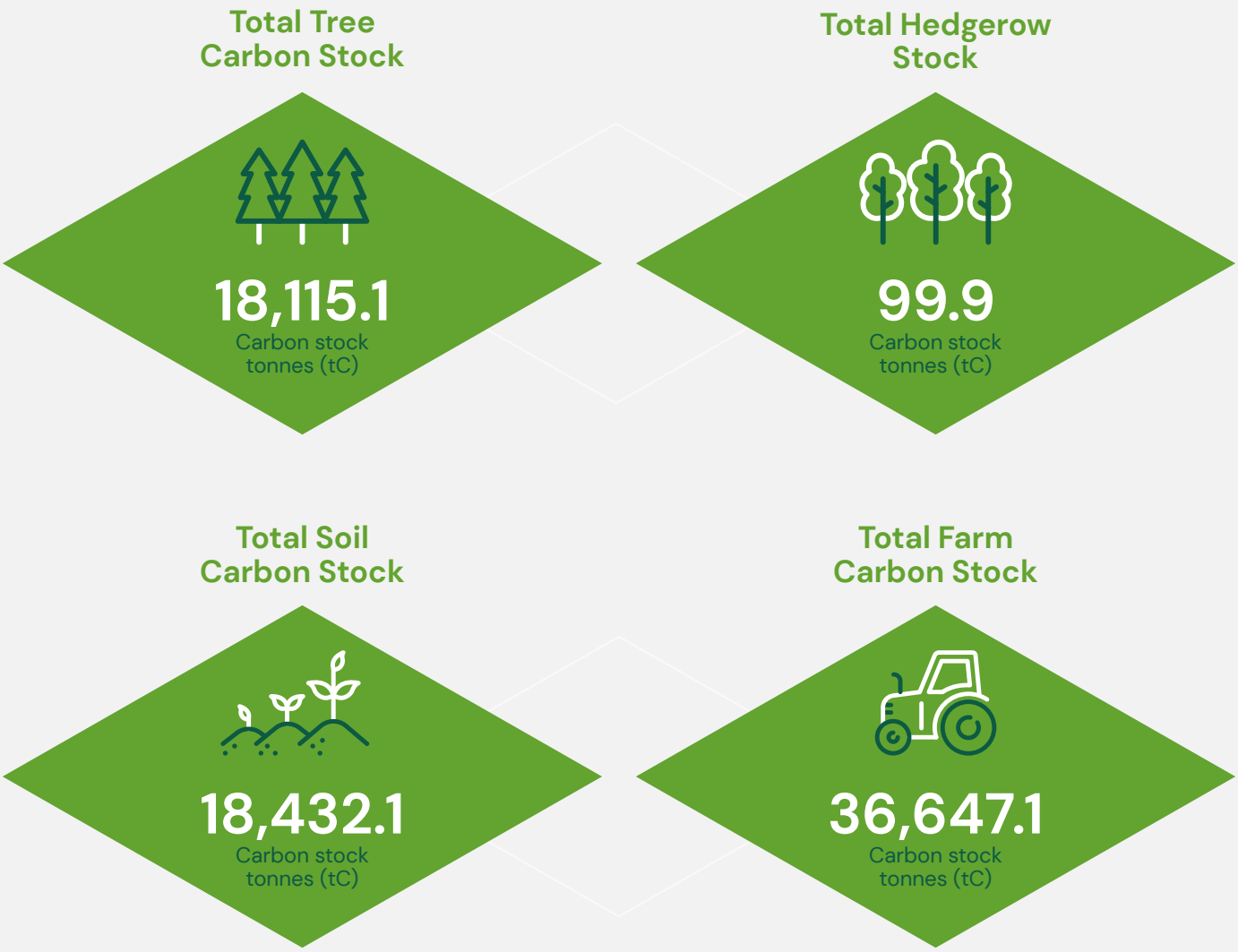
Mains of Balgavies consists of extensive mixed mature woodland with some areas of new tree planting and hedgerows. The trees are predominantly planted woodlands with some natural regeneration. Large sections of the this are classified as ancient woodland of plantation origin. The hedgerows were introduced over the last 20 years.

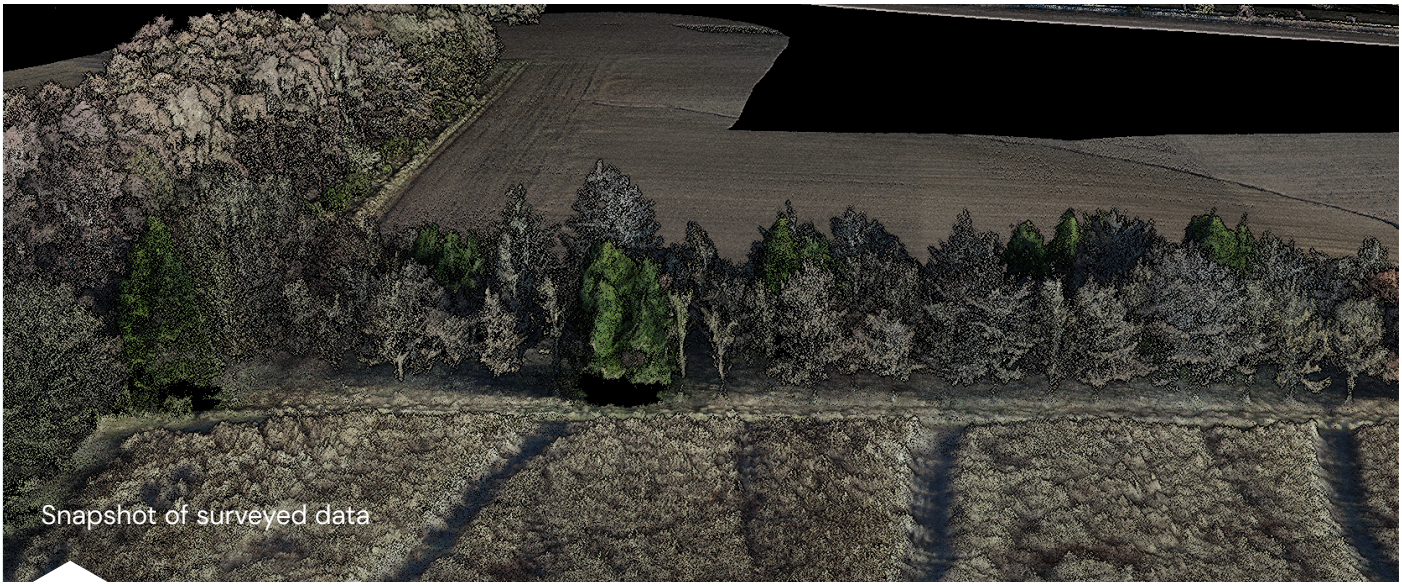
The total carbon that is stored in the above ground biomass was estimated to be in the range of 18,215 tonnes (tC).

Soils

The characteristics of the soil across this region support arable systems and crop rotation. Soil sampling was conducted in the Autumn period at which time the majority of fields were in stubble, winter brassicas or recently harvested. In preparation for livestock outwintering, some fields were segregated.

The total carbon stored in the soils at the time of sampling was estimated to be 18,432 tonnes (tC).





Snapshot of surveyed data

Recommendations

Trees and hedges

To enhance and increase the above ground biomass of the trees on the farm there are a few different options:

Hedges and trees across field boundaries: There are already a significant number of trees across Mains of Balgavies of different ages and species, therefore there are limited opportunities to increase planting stock. One section of windblow was identified during the survey which could be cleared and replanted. The field boundaries consist of dry stonewalls which may restrict further expansion of hedgerows, though there may be opportunities to enhance species diversity in hedges. Whilst this would increase site biodiversity, the carbon benefit of this may be limited.

Agroforestry Silvo-Arable System: There is potential for an agroforestry system to be included in areas of improved grassland across the farm.

Soils

To improve soil carbon the following options could be implemented:

Due to the arable nature of the farm, it is difficult to make suggestions that would improve long-term carbon storage in the soil. Regenerative agriculture practices including use of cover crops, imported slurry/manures, overwintering of livestock and minimum tillage could be introduced. Some of these practices have already been trialled by the farm.