



Auchmore Farm



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, identify management strategies that could be employed to enhance them.

Auchmore Farm

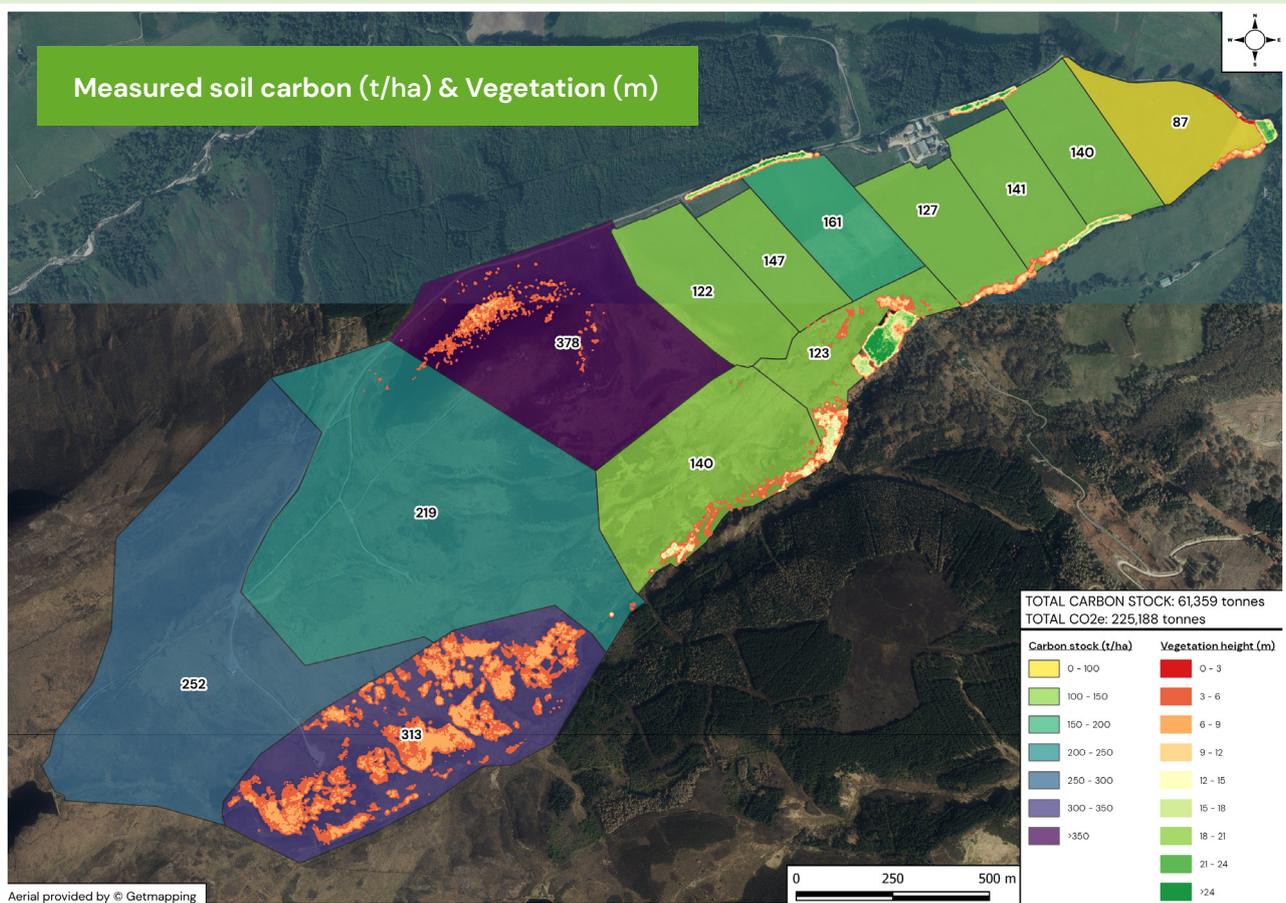
Managed by Stephen and Sheena Mackenzie, Auchmore Farm sits to the west of Muir of Ord in Easter Ross. The farm was selected as a representative upland beef and sheep system for the Farm Carbon Storage Network. From its highest point to its lowest point there is a 270m elevation change starting in the hard hill in the west, transitioning to upland grazing and improved grassland as it moves closer to the east. The farm contains a variety of habitats from peatlands to mature and new native woodlands, and mature Conifer belts.

Carbon storage

At Auchmore, 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

Auchmore Farm has a mixture of woodland across the site. Its deciduous woodland is predominantly concentrated on the southern edge of the farm, while it hosts a large spread of coniferous plantations throughout in the form of small commercial blocks and shelterbelts. A woodland, made up predominantly of native hardwoods, was planted in 2003 on their hill ground. There is also an area of naturally generated mixed woodland growing on the steep northern slopes of the hill.

There was just one recently planted hedgerow on the farm which was unable to be surveyed by drone due to the proximity of overhead powerlines.

The total carbon that is stored in the above ground biomass was estimated to be 4,445 tonnes (tC).

Soils

The soils across Auchmore vary significantly, there are rich organic soils on the western edge of the farm with considerable peat being found at over 30cm in depth in most places. There are also peaty podzols on the upper reaches of the hill ground, moving down to more mineral soils on the eastern side of the farm nearer the steading. This variation in soil type is clearly seen in the soil carbon stocks as the peaty hill ground holds considerably more carbon than the lower mineral soils.

The total carbon stored in the soils at the time of sampling was estimated to be 56,914 tonnes (tC).

Total Tree Carbon Stock



4,444.96

Carbon stock tonnes (tC)

Total Hedgerow Carbon Stock



0.20

Carbon stock tonnes (tC)

Total Soil Carbon Stock



56,914.09

Carbon stock tonnes (tC)

Total Farm Carbon Stock



61,359.3

Carbon stock tonnes (tC)



Recommendations



Trees and hedges

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

Expand hedges and trees across field boundaries: Currently Auchmore has only one hedgerow on the farm. The expansion of hedges across the farm could help to increase the habitat connectivity, while also increasing the carbon that would be stored on the farm. The main barrier to this is the drainage across the field, and how roots may interfere with the underground drainage channels. This limits the hedge and tree planting to the outer edges of the fields. It is unlikely that perimeter hedges would disrupt drainage and could link up with the existing hedge that crosses the farm to create a wildlife corridor.

Agroforestry system: The southernmost section of the farm straddles the Allt nan Eun burn, here there is a significant stretch of land that is relatively unproductive in terms of grass growth. It is here where an agroforestry system could benefit livestock, biodiversity, and carbon alike. The incorporation of a variety of native woodland in this parcel could provide firewood for the farm in the future as well as sheltered grazing in the summer months while enhancing biodiversity and carbon storage across the farm.



Soils

To improve soil carbon the following options could be implemented:

Rotational grazing: The farm already rotationally grazes livestock on their land, the continuation and expansion of this practice is something that will likely maintain and increase the organic carbon stored in the mineral soils. There is also an opportunity to utilise virtual fence collars to graze cattle on the hill ground in a rotational fashion, however, this must be carried out in a careful manner to ensure that intensively grazing the hill would not have a damaging impact on the peatland. It is therefore suggested this practice is carried out on the eastern portion of the hill, maintaining extensive grazing on the peatland.

Protection of organic soil: A key proportion of the soil carbon stock at Auchmore is stored in the peatland soils on the hill. The continued careful management of this is key to the protection of that carbon sink and where possible restoration activities could be undertaken.