Experience of plastic reduction at Jerah Woodland, Stirlingshire

Location: Jerah, Sheriffmuir, Stirlingshire, Scotland Size of Land: 996 hectares Woodland Creation Area: 560 hectares

Jerah is a large-scale multipurpose forest designed, established, and managed by Tilhill Forestry.

The forest is located six miles northeast of Stirling, and just north of the village of Menstrie.

Jerah was originally run as a sheep hill unit with 1,000 ewes and occasional summer cattle grazing.

In 2012, the original owners considered that the unit was not sustainably profitable. They felt the work involved was physically demanding and, having considered their own woodland creation scheme, decided instead to sell the property to raise capital to invest in other land.

This in turn would help them expand and diversify their remaining arable and beef farm business.

The property was acquired by a woodland investor in 2013, to create, at the time, one of the largest new forests planted in the UK for nearly 25 years.

The owner's objective is to establish woodland with timber production as a primary aim, but also through application of the Scottish Forestry Strategy to secure other benefits:

Timber Production – provision of certified sustainable wood products and local and downstream employment opportunities.

Public Access – the property is open for public access with more than nine miles of well-used tracks and trails, including an archaeology trail, and retained flight lines and safe landing zones for paragliders.



Ecological Restoration – the woodland design has allowed for the expansion and linkage of existing native broadleaved woodland and sensitive nonwoodland habitats - riparian corridors, peatlands and wet heath - which has already improved breeding habitat for protected bird species such as hen harrier, short-eared owl, buzzard, kestrel and black grouse.

Carbon Sequestration – more than 500,000 tonnes of carbon will be sequestered by the forest over the next one hundred years. A recent study by Forster, Eilidh & Healey, John & Dymond, Caren & Styles, David (2021) *Commercial afforestation can deliver effective climate change mitigation under multiple decarbonisation pathways*, showed that productive conifer woodland will sequester carbon up to 10 times more effectively than native broadleaves.

Flood Risk Mitigation – like other small villages at the foot of the Ochil Hills, Menstrie is vulnerable to flash flooding and was previously flooded in 2004 and 2012. Following completion of cultivation works, a PhD was instigated to independently monitor the site to assess flood risk, generating an empirical catchment hydrology model based on two years of rainfall, run-off and channel flow measurements. The research has concluded that even after a few years, woodland creation demonstrably reduces flood risk, increases water penetration into soil and ground water reserves, slowing time to peak flow.



Forest Plastics

This case study was prepared by Mike Appleton on behalf of the Forest Plastics Working Group

To find out more about its work email fpwg@ydmt.org or call 015242 51002



Woodland Design Strategy

Deer browsing was identified as a major constraint during the design process, particularly to more vulnerable species, so care was taken to balance the risk of deer browsing versus the scale and cost of deer fencing and to minimise the use of individual plastic protection to vulnerable species outside the deer fence.

The relative proportions of woodland types, tree

species and open ground were dictated by the woodland creation grant models. The use of deer fencing was restricted to 220ha, largely on landscape but also cost, benefit and browse risk grounds.

Voles remain a challenge to tree establishment in the Ochil Hills and, through past experience, can decimate newly planted trees.

To counteract, vulnerable species were fitted with plastic vole guards within the deer fence. Protecting vulnerable broadleaves outside the deer fence required use of individual tree protection, without which Roe deer browsing would have severely limited and prevented establishment. Rather than using 1.2m tubes throughout, these were targeted to more remote undisturbed areas whilst 0.6m spiral guards were located in areas in proximity to access tracks – significantly reducing the volume of plastic. The successful establishment of the range of broadleaf trees within the fence itself is impressive and a substantial amenity area, designed for public use, is flourishing.

"This uses less plastic, and the saving was around £2 per tree versus 1.2m shelters" Andrew Vaughan, Tilhill's North Scotland Regional Manager, said: "Spiral guards used on lower parts of the site – near roads and paths – provide just enough protection against deer browsing provided cull pressure is maintained. This uses less plastic and the saving was around £2 per tree versus 1.2m shelters.

"More extensive fencing was considered but discounted following cost/benefit calculations to arrive at

an optimum blend of protection – and the chosen design has clearly worked."

Fencing

Roe deer are the main deer species present in the wider area and occasionally, in winter months, red deer can appear.

Intensive deer management has been carried out across the whole woodland, with the strategy seeking to reduce browse pressure to trees outside the deer fence and to control deer encroaching within.

Initially, enthusiastic recreational stalkers failed to maintain browse levels to acceptable levels and in the more remote parts of the site browse levels were above 65%. Professional contractors were then introduced and as cull levels increased, browse levels were brought down to less than five per cent.

Ongoing weeding and replacement planting promoted rapid establishment, and with temporary effective deer control, there is little evidence of deer damage with most trees now well above browsing height. The pressure to cull numbers is reducing. The strategy is extensive enough to allow less palatable broadleaves such as birch and alder,

as well as conifers, to become established outside the deer fenced area without plastic.

Deer pressure has also been reduced so that all tree species have established within the deer fence too. But, there is an issue with establishing palatable species such as oak and hazel because of browser pressure.

It is generally accepted that deer numbers have to be at or below seven deer per 100 hectares to prevent





excessive browsing pressure to both trees and ground vegetation. On average, 17 deer per 100ha per annum

"Intensive deer management has been carried out across the whole woodland" have been culled at Jerah over the past ten years. Prior to the planting, and as sheep were removed from the site, deer numbers were low with an initial cull of seven per 100ha, and this then quickly increased to peak at 25 per 100ha five years after planting. As the tree leaders are now mainly above browse height and the site provides more cover, the cull is reducing currently at 11 per 100ha.

Andrew added: "Fencing is a key strategy, but it has its limitations. No

fence remains 100% deer proof and there is a risk of bird strikes – hence the upper fence line has been marked with wooden batons to deter fence strikes by black grouse. We do inspect our fencing annually. Prior to planting, we recorded a single transient black grouse in the area and thought that black rouse had been lost from this part of the Ochil Hills. Having designed specific habitat improvements in the woodland design to encourage them, in recent years, the population of black grouse in Jerah has increased to twelve."



Future Plans

Jerah is now in a process of transformation to established woodland.

Whilst many of the benefits will take many more years to realise, already the local population are making good use of the network of forest roads for walking and cycling.

Over time, the amenity woodland above Menstrie will develop in to a mixed, mainly native woodland, with amazing vistas over the Forth valley.

Meanwhile, the flood risk PhD has been groundbreaking and is soon to be published. Already a major rain event in August 2020 passed without Menstrie flooding. Once the vulnerable species are safely established, plastic vole guards, tubes and spiral guards will be removed and recycled.

Restoration of the peat areas is being discussed with NatureScot and once implemented will further reduce the flood-risk to Menstrie from the 96km of agricultural drainage ditches installed in the 1950s.

The forest habitat network will be monitored and, no doubt, the use by different species will change over time, from opportunistic edge and predator species to those more specialist to woodland.



Andrew Vaughan

Andrew is Tilhill's North Scotland Regional Manager and has been closely involved with the Jerah site throughout its life.

He represents the industry on a number of panels and groups to develop guidance and policy to address the sustainability challenges faced by the forest industry and wider society.

These include woodland creation targets; cultivation practice; the carbon life-cycle; sustainable deer management; stakeholder engagement; responsible chemical/plastic use; and promotion of urban forest benefits.