

Creation of a Large-Scale Timber Crop near Stirling



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Case Study: Dalfoil Farm

Introduction

This case study looks at the viability, planning, preparation and implementation of a large commercial conifer forest planted in 2018 with FGS (Forestry Grant Scheme) funding on Dalfoil Farm near Stirling.

Farmed by the Christie family the enterprise comprised dairy, beef and sheep, over an area of approximately 380ha. Of this area, 177ha was moorland used for sheep grazing.

The Christies chose to investigate a commercial forestry investment to see if it would:

- improve income, on an area of limited agricultural output and value, in both the short and long term;
- aid succession planning, enabling the family farm to be split between farming and non-farming children.

Eventually they created a 130ha conifer timber crop which earned them over £108,000 in the first year through FGS grants, and will earn over £220,000 over the six year period of the forestry grant payments. In the long term, at today's prices, the timber could earn about £700/ha from thinning at year 20 (with two further thinnings), and £15,000/ha at clear-fell at year 40.



Viability

The family approached a forestry agent who initially carried out a constraints check to assess the practical and financial soundness of a forestry scheme and compare it with other potential options for the area, prior to incurring any costs. The search for Dalfoil revealed the following:

- On-site terrain suitable for future timber harvesting
- Good on-farm access with a good farm road nearly to the site
- A Scheduled Ancient Monument (cup and ring marked stones)
- Peaty gley soils with potential for areas of deep peat (peat deeper than 50cm is ineligible for afforestation)
- A SSSI (Site of Special Scientific Interest) adjacent to the site
- Watercourses on the site, which flow into a SSSI-designated river
- Site accessible by roads suitable for timber transport
- Site broadly suitable for some commercial species, primarily Sitka spruce
- Some areas of flood plain and steep banks unsuited for commercial forestry species
- Presence of red and roe deer, hares and rabbits; all of which can damage young trees
- Site located within a preferred area of the Stirling Council's Forest and Woodland Strategy (FWN), and within the fringe zone of the Central Scotland Green Network (CSGN) area.

The Christies informed their agent that the water supply for the farm and neighbouring cottage was located on the proposed site.

As none of the above represented significant barriers to a forestry proposal, an indicative six year cash-flow was drawn up, showing all the cost elements and grant income. Given the upland nature and large scale of the site, costs were included for a vegetation survey and breeding bird survey.

At this early stage the cashflow, based on an area of 150ha, indicated a net income over the six year period of the grant cash-flow of nearly £250,000, plus Basic Payment.

An important aspect for the Christies was how to finance the project. Grants are paid up to three months after the grant claim has been submitted. Fencing and gate grants can be claimed on completion of fencing; and initial planting grants, CSGN contribution and vole-guard grants on completion of planting. Contractor and supplier invoices however must be paid as the project runs and before any grant is received. The Christies arranged an overdraft with their bank, which was keen to support the project.

An early conversation with the Forestry Commission indicated they would in principle support an application for woodland creation on the site, subject to the findings of surveys. They confirmed that breeding bird, habitat and peat depth surveys would be required to inform the forest design and form part of the grant application.

The forestry agent then carried out the following:

- Undertook peat depth survey
- Arranged relevant surveys (agreed with Forestry Commission)
- Assessed fence condition around the perimeter of the site
- Designed a forest based on information from surveys and compliant with the UK Forestry Standard
- Prepared and submitted FGS grant application
- Obtained quotes from contractors and nurseries and refine cash-flow based on design

Once the grant was approved the agent organised and managed the work on the ground, following UK Forestry Standard and good and safe industry practice.

Surveys

Breeding bird surveys must take place during the bird breeding season, typically March to May; this is the only opportunity, and if missed, could delay the grant application by a year. Similarly vegetation surveys are best conducted when vegetation is flourishing, typically March to late summer.

A breeding bird survey had been carried out in April 2016 and identified the site as being poor in avian diversity, although a black grouse lek was noted beyond the northern boundary of the site.

The habitat survey, undertaken in April 2017, similarly found the moorland to be in a degraded condition and lacking floral diversity as a result of many years of muirburn and grazing.

The peat depth survey identified a number of areas within the site, totalling about 20ha, as deep peat.

The fence assessment identified that most of the existing fence line was in poor condition and would require a new deer fence,

while a number of shorter sections, mostly adjacent to improved land, were suitable for upgrading to deer fencing.

Some time was spent with a member of the family identifying the water supply, capturing the catchment area and infrastructure on GPS.

Taking all of these factors into account it was decided that the Forestry Grant Scheme's Conifer model was most appropriate for this site:

Grant	Specification	Rate/ha
Conifer model – initial planting grant (target area)	Sitka spruce 65-75% of area Other conifers 10-15% Native broadleaves 5-10% Open ground 0-10% 'Preferred' area*	£2160
Conifer model – maintenance payments (target area)	Linked to initial planting grant	£234/ha/yr x 5 yrs
CSGN contribution	Fringe zone, contribution limited to 40ha	£750
Deer fencing	Prevent red deer access	£6.80/m
Upgrade stock to deer fence	Raise stock fence to deer fence height	£3.28/m
Rabbit proofing	Fit rabbit netting to new or existing fence	£1.60/m
Fence marking	Fit bamboo canes to top half of fence to prevent bird strikes	£2.00/m
Gates	12' x 6' deer-proof gate	£172 each
Vole guards	20cm tall guard fitted to broadleaves	£0.19 each

* Allows a higher rate of grant to be paid.

Design

The design was heavily influenced by the constraints and site features, (as mentioned above). The vegetation on the site posed no constraints.

The peat depth survey identified areas of deep peat (which cannot be planted and are ineligible for grant), as well as deeper areas of eligible peat where conifer growth would be less suited. The deep peat areas were shown as unplatable in the design, reducing the area eligible for grant by 20ha, down to 130ha.

The boundary of the site was formed by the fence line on three sides (two of which are march fences), and a new line on the southern side. The positioning of the fence allowed some higher, drier hill ground to be retained for cattle as a dry refuge.

The farm's water supply is taken from the site so it was important to identify the catchment and infrastructure for this and protect it.

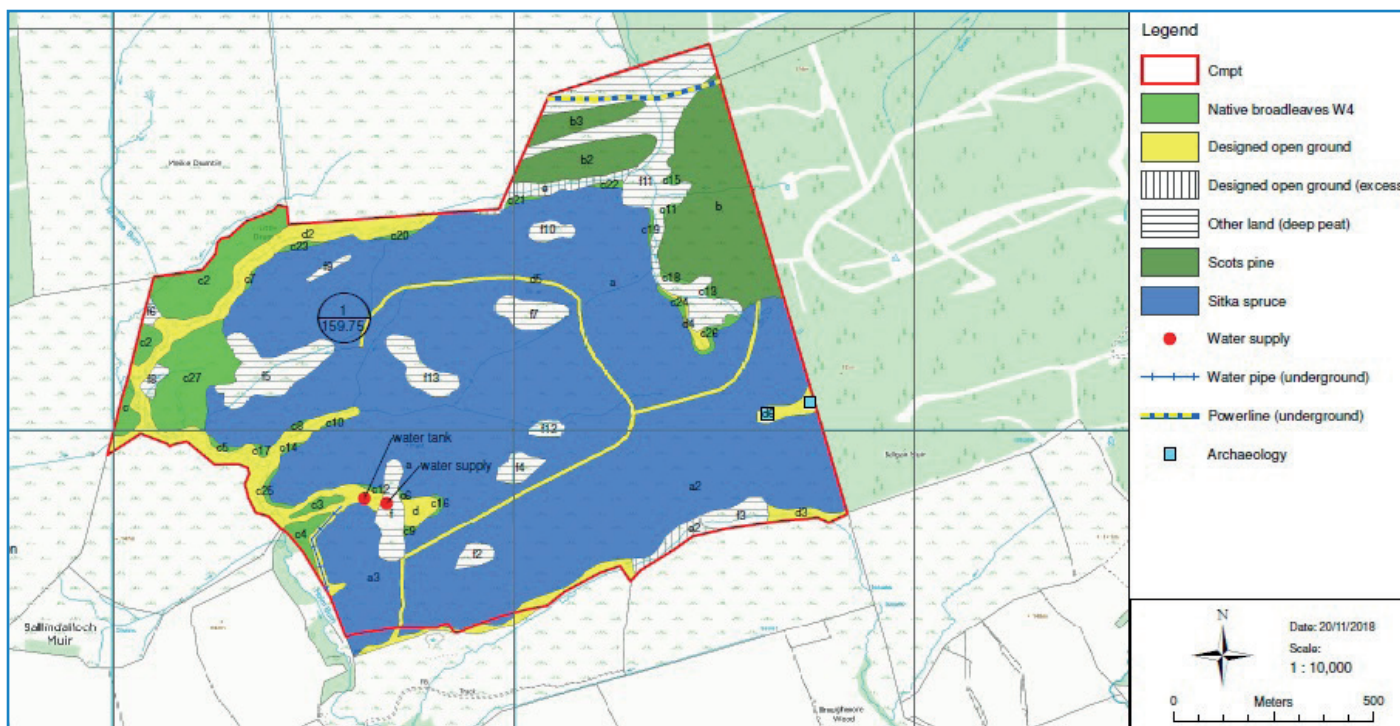
The open ground component is best used to buffer sensitive features from the tree planting. It was therefore designed along water-courses, around the drinking water supply, pipe line, and around the Scheduled Ancient Monument. Importantly, on a commercial forest of this size, open ground was also used to form an access route through the forest for maintenance and for harvesting in the future. Some open ground was also used to protect wet flushes, and to give a wavy edge to the forest instead of a straight edge.

The area of flood-plain and steep banks, unsuitable for timber production due to terrain and ground conditions, and being next to a watercourse, leant itself to planting with native broadleaves. Other pockets of native broadleaves would be distributed along the edges of watercourses.

Higher, drier ground with heather was identified as being suitable to Scots pine. The remainder of the area would comprise Sitka spruce.

At the end of the design process, the proposed forest comprised the following:

- Sitka spruce: 72%
- Scots pine: 10%
- Native broadleaves: 8%
- Open ground: 10%.



Prescriptions

The works prescribed for the project comprised:

- 3,782m new deer/rabbit fencing, 2m high to exclude red deer and 1,960m upgrade stock to deer fencing, and rabbit proof
- All deer fencing fitted with bamboo canes to mark the fence to minimise black grouse strikes, since all the fencing was within 2km of a lek
- 114ha forestry ploughing (good for providing drainage; other forms of ground preparation such as mounding or scarifying, would not shed the water from, resulting in poor growth)
- 11ha hinge mounding in broadleaved areas (where drainage was less crucial)
- Planting of 298,000 bare-root trees (easier to handle in large quantities than cell-grown)

Post-design Cash-flow

Once the design was completed, quantities of the above prescriptions were established and quotes obtained from contractors and nurseries, allowing the cash-flow to be refined. The cash-flow indicates that over the six year period of forestry grant payments, a total of £222,710 would be generated as a surplus – tax free. Basic payment remains payable for twenty years, subject to final Brexit arrangements.

	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Total
Income Initial planting grant, fencing, CSGN, maintenance	£386,447	£32,589	£32,589	£32,589	£32,589	£32,589	£549,393
Expenditure Fencing, ground preparation, plants, planting, maintenance, management	£283,928	£36,779	£3,142	£1,418	£1,418	£ -	£326,683
Balance	£102,520	-£4,190	£29,448	£31,172	£31,172	£32,589	£222,710
Cumulative balance	£102,520	£98,330	£127,777	£158,949	£190,121	£222,710	

Implementation

Fencing is the first aspect of the job to be undertaken. A contractor with a converted tracked dumper was able to lay out all materials, chap posts and cross the terrain with ease. Ploughing was undertaken with two agricultural tractors with all wheels doubled up, each pulling a double-mouldboard forestry plough fitted to the three-point linkage. The ploughs were lifted out the ground every 50m or so on gradients to slow water run-off and allow sediment to settle. Plough furrows (or drains) must never connect directly with water-courses, leaving at least 5m between the end of the furrow and the water-course for water to spill out and deposit any silt before flowing into the water-course.

Drainage was less essential in the broadleaved areas and, with ground conditions being largely soft, mounding was selected as the most appropriate form of ground preparation. An excavator was used to turn over a mound of earth for each tree planted. Checking the number of mounds per hectare was crucial at this stage to ensure the minimum density of trees per hectare.

Further mounding was carried out around areas of deep peat (to avoid draining these areas), as well as some very rocky areas on the south side of the site where ploughing had been expected to be carried out, but without success.

Open drains were excavated after ploughing was completed, targeted at those areas where water was trapped extensively in the furrows.

Once ground preparation was completed planting began. Trees were ordered up in deliveries of around 80,000 trees to avoid them lying for too long before planting. Trees were led out by the contractor using a quad-bike.



Timings

The length of time required to take a large-scale proposal from inception through to completion of the planting must be understood. The time-span for Dalfoil was 24 months, comprising:

- Exploring project viability: 5 months
- Surveys, design, costings, grant application and approval: 14 months
- Fencing, ploughing, planting: 5 months.

Maintenance

Given the upland nature of the site, weed competition will be slow. As a result only one weeding was been budgeted for, only a small proportion of which was used to control some bracken.

Beating up (replacement of failed plants) is required to maintain tree numbers at the correct stocking level of 2500 trees/ha, minimum. Replacement of 5% of trees was budgeted for; after the dry summer of 2018, 6% of the trees required beating up.

Due to the peaty nature of the site, an application of fertiliser by hand has been budgeted for, but will only be used if the trees show signs of needing it