

# CAMBUSBARRON COMMUNITY DEVELOPMENT TRUST DARK WOOD REPORT



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## INTRODUCTION

This document aims to advise the Cambusbarron Community Development Trust on the options for managing the section of Gillies Hill woodland known as the Dark Woods, providing an impartial and unbiased report. The report will detail the species found within the Dark Woods, its current status, area in hectares, current management proposals, and future management proposals

The woodland was surveyed during late spring and early summer of 2024, with 3 site visits. The first visit was to meet with the volunteers in May and walk the woodland. The second visit was to capture aerial photographs in June during good weather, with the inclusion of a site survey. The final visit was in July to confirm mapping items on the ground to finalise the report.



Figure 1, Dark Woods sitting above native mixed broadleaves from car park view.

## SUMMARY OF THE DARK WOODS

### SPECIES SUMMARY

The Dark Woods (1a) covers approximately 2.27 hectares of Sitka spruce (*Picea sitchensis*), planted at a density of about 1.9 meters spacing. This regimented planting method is standard for commercial conifers to achieve a final density of 2100 to 2500 stems per hectare by year 40.

The purpose of planting at a spacing of 1.9 meters is to encourage trees to grow as quickly as possible in height while also maximizing their diameter, thereby providing the best financial return at the designated felling age.

There is no online record of the planting year, but Sitka spruce has typically been planted at a spacing of 1.9 meters since the 1970s. This practice was based on the expectation that it would yield a crop of commercial timber for felling, providing a rough indication of the planting year. The estimated planting year is also evidenced by Higgs Wood shown on maps with trees from 1970's OS maps as shown in Figure 2.



Figure 2, Hagg Wood which is shown as planted with trees from 1970s OS Maps. The woodland is of a similar age to the Dark Woods and would give an indication of planting year.

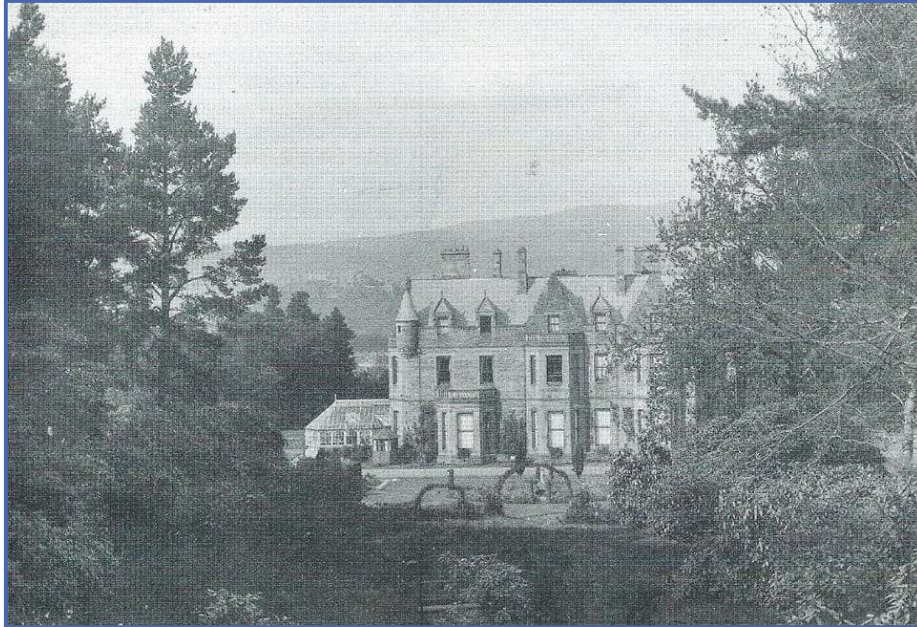


Figure 3, a photo showing Polmaise Caslte in which Scots pine is visible to the left. Scots pine was clear felled heavily in Scotland during World War 1 and 2 and the timber was used for various purposes, including trench construction, railway sleepers, shipbuilding, and pit props for coal mines.



Figure 4, example of straight form of trees in Dark Woods

Average tree height is between 20 and 25 meters, with a good, straight form. Sitka spruce is typically felled within 40 to 50 years of its initial planting due to several factors:

- Sitka spruce growth rates begin to decline around ages 20 to 30 and slow down substantially by year 40. It is generally in the owner's interest to fell at this stage to allow for prompt restocking if the crop has been planted for commercial purposes.
- Due to its rapid growth and shallow root structure, Sitka spruce can be at risk of windblow in Scotland's windy climate.

The coupe became partially windblown due to north-easterly winds from Storm Arwen in 2021. Since then, individual trees have continued to be blown down during storms, which could risk creating a domino effect in the future. The blown trees have also obstructed the paths through the Dark Woods, some of which are formal and some informal.

Sitka spruce as a species provides several environmental benefits, including carbon sequestration, wildlife habitat, soil stabilization, erosion control, and water flow management.

Some trees in the woodland have fallen due to anti-social behaviour, such as damage to the base from fire or tools.



Figure 5, eastern section of Dark Woods which has been damaged by antisocial behaviour

## COUPE DESIGN

In the 1970s and 1980s, Sitka spruce was planted in large, uniform blocks to maximise commercial returns in upland areas or on poor ground deemed unsuitable for sheep or cattle grazing. On estates and farmland, Sitka spruce has been, and continues to be, planted to create visual screens and windbreaks to shelter sheep and cattle on exposed sites.

The Dark Woods have been planted on a slope with a plateau, facing north towards Cambusbarron and Stirling. The coupe shape does not conform to the standard shape of a commercial conifer block, but has clearly been planted to fill a gap left in the woods by previous felling or an area of unused land.

Much of Gillies Hill Woodland consists of broadleaf trees. It is also possible that Sitka spruce was planted after the removal of Scots pine, or other broadleaf trees harvested for use in the World Wars.

## PREVIOUS APPLICATIONS MADE TO SCOTTISH FORESTRY

Previous applications:

- Woodland Grant Scheme 1 – Approved Restocking and or Management – 6100056 – 8/1/1990
  - A grant which provides financial assistance for restocking felled trees.
- Felling Permission – CB280569, 1/11/2013
  - A licence to carry out tree felling.
- Management Plan – Woodlands in and Around Towns – 21FGS56483 – 13/10/2022 (Provides access to grant system)
  - A official management plan which provides access to the rural payments grants system.

## TREE HEALTH SURVEYS

Scottish Forestry is currently conducting a tree health survey within the Dark Woods to determine if the Great Spruce Bark Beetle (*Dendroctonus micans*) is affecting the trees.

If the presence of the beetle is confirmed, Scottish Forestry will offer advice on tree management and may support the controlled release of *Rhizophagus grandis*, a predatory beetle that targets the Great Spruce Bark Beetle. However, *Rhizophagus grandis* does not fully eradicate the Bark Beetle, so there may be remnants for the foreseeable future.

Bark Beetle typically does not kill spruce trees in small numbers, but in large outbreaks, they can destroy the inner woody layer of the trees, which restricts their ability to receive nutrients through photosynthesis. Once dead, the tree will begin to rot and may be at risk of falling suddenly.

It should be noted that Spruce Bark Beetle typically only attacks Norway spruce, but as noted above, has recently been found on Sitka spruce. It is also known to attack Douglas fir and Larch.

It is likely that if infected, this will likely affect the marketable value of the trees in the Dark Woods.

## PREVIOUS MANAGEMENT

Cambusbarron Community Development Trust took ownership of the wood in 2019. Before this time, there was limited to no management intervention for many years.

## INTERVENTION

### INTERVENTION BY CLEARFELL

Given the age, height, and windblown status of the woodland, it is advisable to consider clear-felling the area. Otherwise, it is likely to continue experiencing blowdowns and pose a risk to the public.

As part of the clear-felling process, the leftover brush material could also be sold, which would help provide a clean slate for replanting.

If maintaining native woodland is a core objective for the community, allowing the spruce to mature could lead to the introduction of regenerating spruce trees within the native woodland. These trees may eventually outcompete the native species unless they are managed or removed.

A volume survey is recommended to determine the cubic meters and tonnes within the stand, which will provide an estimate of potential income for the community.

Since the woodland already has a management plan, the Forestry Grant Scheme could provide financial support for restocking operations.

The clear felling of trees would require a Felling Permission to be agreed with Scottish Forestry.



Figure 6, Eastern sections which have been damaged as a result of windblow, seen by gaps in the trees.

## INTERVENTION BY THINNING / SELECTIVE THINNING

Standard thinning usually occurs at crop ages 20 and 30, with a final clear-fell between ages 50 and 60. The purpose of thinning is to provide a steady income to the woodland owner, increase stem diameter, and bring more light into the forest understory. This is typically carried out using a mechanical harvester.

Thinning aims to enhance the wind resistance of trees by reducing brown edges and increasing stability. In Scotland, thinning is generally practiced in woodlands that are sheltered, at low risk of windblow, have stable soil profiles, and are free-draining.



Figure 7, Example of thinning. Left picture pre thinning in 2021, right is post thinning in 2024.

Selective thinning is performed more frequently and involves the forester choosing a mix of both weak and strong trees to improve the woodland crop for a higher future yield. This method also allows for underplanting where appropriate. Selective thinning is often carried out with a mechanical harvester, which processes trees for removal by forwarder. Alternatively, a chainsaw operator can fell trees, but a plan must be in place for the required product lengths and timber extraction by forwarder.

For the Dark Woods, selective thinning might be an appropriate method for removing trees deemed dangerous to the public such as dead trees or windblown trees. However, this comes with the risk of felled trees becoming 'hung-up,' or stuck in nearby trees. Additionally, a plan would need to be established to ensure that felled trees are either left as stacked deadwood or extracted for sale.

A Felling Permission would be required for large-scale thinning operations. Both operations risk making the stand less stable to windthrow.

It is not recommended to consider thinning or selective thinning as it will most likely make the woodland more dangerous to the public.



Figure 8, Sitka/Larch mix clear felled. Sycamore block selectively thinned.

## NON-INTERVENTION

The approach of non-intervention is not recommended based on the crop assessment and the existing path network within the woodland. Without management, the Dark Woods is likely to continue experiencing blowdowns, creating a hazardous environment for the public, who may access the woodland despite closure signs. It is not recommended to have no intervention as the Dark Woods is likely to continue to blow over.

To address the non-intervention requirement, a Dangerous Tree Survey should be conducted by a qualified professional. Additionally, a Tree Policy Document should be created to clearly outline risk zones and the management of trees within the forest.



Figure 9, Sections of windblow within the Dark Woods



Figure 10, above image shows clearfell from 2014 and below shows restocked coupe in 2024.

## MANAGEMENT POST INTERVENTION

### CLEAR FELL

There is an opportunity to replant the woodland with either commercial conifer, native conifer, or mixed broadleaves:

- **Commercial Conifer**
  - Easy to establish.
  - Requires 3 to 5 years of maintenance.
  - Will yield a commercial crop in the future.
  - Maintains the current character of the block.
  - Provides environmental benefits, though not to the same degree as native conifer or broadleaves.
  
- **Native Conifer**
  - Slower growing and more challenging to establish.
  - Requires approximately 5 years of maintenance.
  - Best protected with deer fencing.
  - Can enhance environmental benefits by planting species favoured by red squirrels.
  - Will alter the character of the block, but can be mixed with broadleaves to blend into the landscape.
  
- **Mixed Broadleaves (native or commercial)**
  - Generally easy to establish.
  - More expensive initially.
  - Requires protection, either with tree tubes or deer fencing.
  - Offers an opportunity to increase environmental benefits.
  - Blends well with the character of the landscape.
  - Natural regeneration could be used to save money, but this needs approval from Scottish Forestry. If it fails to establish, replanting would be required.



Figure 11, The Dark Woods clearly stands out between mixed broadleaves above and below the coupe.

#### THINNING / SELECTIVE THINNING

If small clumps of trees are felled, these areas could be restocked with individual trees. However, this would require consistent management to ensure the new trees are not suppressed by larger trees and weeds.

As suggested, selective thinning is not recommended.

#### GENERAL RESTRUCTURING

There is an opportunity to create designed open areas around the path network to reduce the risk of fallen trees obstructing the tracks in the future.

## COST ANALYSIS

### INCOME FROM OPERATIONS

An estimated cost of income is shown in the below table of each felling operations.

Table 1

Operation	Area	Tonnes	Avg Price per	Income
Clear Fell @ 400 tonnes per ha	2.27	908	35	£ 31,780.00
Thinning @ 60 tonnes per ha	2.27	136.2	35	£ 4,767.00
Selective thinning @ individual stems	2.27	N/A	Likely not marketable	£ -

Before any timber sale is agreed, it is advised that a timber volume survey be carried out to give confidence in the expected potential income from the crop.

### GRANT INCOME

The below table shows an estimated of the potential grant income through the Rural Payments grant system.

Each grant comes with specific requirements which must be fulfilled to obtain the grant post planting.

Grants require creation of maps, liaison with Scottish Forestry and the application of rural payments which can in some instances cost more to apply for than the grant income itself. An estimate cost is shown in table 5.

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#### DELIVERING UK FORESTRY STANDARD WOODLAND

##### Step 1

The level of tree species diversity meets the UK Forestry Standard so that no more than 75 per cent is allocated to a single species. In woodlands of less than 10 hectares and in native woods, the above proportions may be relaxed providing the adjacent land uses provide landscape and habitat diversity (see UK Forestry Standard)

##### Step 2

To be eligible for grant, then a minimum of 10 per cent 'other species' must be present within each application/claim.

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#### DELIVERING DIVERSITY AND RESILIENCE WOODLAND

##### Step 1

The level of tree species diversity goes beyond that required by the UK Forestry Standard so that no more than 60 per cent is allocated to a single species.

##### Step 2

To be eligible for grant, then a minimum of 20 per cent 'other species' must be present within each application/claim.

Table 2

Grant	Value	Area	Amount	Total
Restocking Grant (UKFS Woodland)	Ha	2.27	£ 300.00	£ 681.00
Restocking Grant (Diversity)	Ha	2.27	£ 550.00	£ 1,248.50

## EXPENDITURE

All costs shown below exclude VAT.

### SELECTIVE THINNING AND VOLUME MEASUREMENT

If the desired approach is for selective thinning, this would require the felling of individual stems, cut into lengths and left at track side if extraction is desired. This would likely not yield an income, unless a buyer is agreed. A rough cost is shown below.

The cost for a timber volume measurement is listed below. It is highly recommended that this be undertaken to give an accurate estimate of volume per hectare of the Dark Woods to help determine the desired course of action.

Table 3

Item	Value	Amount	Cost	Total
Selective thinning cost (Chainsaw cutter)	Man day	10	£ 265.00	£ 2,650.00
Timber volume measurement	Survey	1	£ 500.00	£ 500.00

### PLANTING COSTS

The below table shows two examples of expected expenditure for a commercial conifer restock and a native broadleaved woodland. Both these costs are indicative and are subject to change following the desired approach by the community group.

Table 4

Commercial conifer restocking	Value	Amount	Cost	Total
Cultivation	Ha	2.27	£ 1,050.00	£ 2,383.50
Machine Haulage	Transport	1.00	£ 750.00	£ 750.00
Provision of trees @ 2700/ha	Per tree	6129.00	£ 0.35	£ 2,145.15
Weevil pre-treatment (optional)	Per tree	6129.00	£ 0.12	£ 735.48
Tree planting	Per tree	6129.00	£ 0.17	£ 1,041.93
			Total	£ 7,056.06

Native Broadleaf restocking with tubes and stakes	Value	Amount	Cost	Total
Cultivation (optional)	Ha	2.27	£ 1,050.00	£ 2,383.50
Machine Haulage (optional)	Transport	1.00	£ 750.00	£ 750.00
Willow)	Per tree	3632.00	£ 0.50	£ 1,816.00
Provision of 1.2m tubes and 1.35m stakes	per pair	3632.00	£ 2.10	£ 7,627.20
Tree planting with tube and stake applicaton	Per item	3632.00	£ 1.45	£ 5,266.40
			Total	£ 17,843.10

There is also the option to agree restocking by natural regeneration with Scottish Forestry. However, if the crop cannot be established within the designated time frame (usually 5 years), the woodland owner will have to carry out replanting works. Considering the immediate adjacency of broadleaf woodland, this has potential to work.

Depending upon the restocking approach, the community should be aware that once a woodland is turned from commercial to native woodland, it is extremely unlikely it will ever get permission to be used for commercial timber again. Many woodland owners balance their woodlands with both commercial and native trees to meet multiple objectives on the old saying that 'A woodland that pays, is a woodland that stays'.

## MANAGEMENT FEES

It is advised that the community engage with a management company to arrange, oversee and deliver works for both felling/maintenance works and for replanting.

Table 5

Management Fees	Value	Amount	Cost	Total
Organising, Marketing and monitoring of timber sale	Hours	32	£ 90.00	£ 2,880.00
Grant application + liason with Scottish Forestry	Hours	6	£ 90.00	£ 540.00
Management of operations (Selective thinning, restocking)	Percentage	Per op	30% of total	Dependant upon operation

If Pryor & Rickett Silviculture are engaged to take on the work detailed in this report, a budget would be prepared and be agreed between both parties.

Our management fee per hour would be £90, and would be a fixed amount per supervision delivery.

For overseeing restocking operations, a fee of 30% of the total value would be applied. An example of this is shown below.

Table 6

EXAMPLE				
<b>Income</b>				
Operation	Area	Tonnes	Avg Price per tonne	Income
Clear Fell @ 400 tonnes per ha	2.27	908	35	£ 31,780.00
Restocking Grant (UKFS Woodland)	Ha	2.27	£ 300.00	£ 681.00
			Total	£ 32,461.00
<b>Expenditure</b>				
Operation	Value	Amount	Cost	Total
Timber volume measurement	Survey	1	£ 500.00	£ 500.00
Grant application + liason with Scottish Forestry	Hours	6	£ 90.00	£ 540.00
Organising, Marketing and monitoring of timber sale	Hours	32	£ 90.00	£ 2,880.00
Cultivation	Ha	2.27	£ 1,050.00	£ 2,383.50
Machine Haulage	Transport	1.00	£ 750.00	£ 750.00
Provision of trees @ 2700/ha	Per tree	6129.00	£ 0.35	£ 2,145.15
Weevil pre-treatment (optional)	Per tree	6129.00	£ 0.12	£ 735.48
Tree planting	Per tree	6129.00	£ 0.17	£ 1,041.93
PRS Management Fee	Percentage	£ 10,976.06	30%	£ 3,292.82
			Total	£ 14,268.88
			<b>Net income</b>	<b>£ 18,192.12</b>

## TIME SCALES

Below is a table which gives rough time scales of each operation.

Table 7

<u>Operation</u>	<u>Time-scale</u>
Dangerous Tree survey	Less than 1 week
Volume Survey	1 day
Standing sale tender	1 month
Clear Fell	1 month
Thinning	1 month
Selective Thinning	2 weeks
Cultivation	2 weeks
Planting	2 weeks

It is recommended that felling works be carried out in the summer when the ground is most stable and that planting works occur during the winter.

## CONCLUSION

The Dark Woods is clearly a commercially planted strip of Sitka spruce that is likely beyond its standard felling age. It is recommended that some form of intervention be undertaken due to the high presence of members of the public, especially if the management objectives of the woodland include maintaining and encouraging public access.

It is recommended that the Dark Woods be clear-felled to prevent further windblow, remove dangerous trees, provide income to the community and remove the risk of falling trees from the public. A volume survey of the timber is also highly recommended to ensure confidence in the marketable timber.

If no intervention is desired, which is not recommended, the community should at least obtain a Dangerous Tree Survey to inform future management decisions.

If Pryor & Rickett Silviculture are engaged for management, the assigned manager would act as either the Landowner Representative to ensure all objectives or the community are met or as a Contract Manager to simply delivery works. Whether or not Pryor & Rickett Silviculture are engaged, it is recommended that a professional be engaged to ensure work is carried out safely and does not breach laws and legislation which could put the landowner at risk.



Figure 12, Eastern edge of Dark Woods