

Case Study 4

Cawdor Estate/ Cawdor Forestry, Nairn

Location and ownership of woodlands

This case-study deals with two distinct areas of woodland, forming part of the Cawdor Estate and managed by Cawdor Forestry, the in-house forest management company:-

1. Moss-side Wood, by Nairn. [NGR NH 855554] is a 75ha p1920's plantation of Scots pine with significant amenity access value for local people in the Nairn area.
2. Cawdor Big Wood, Cawdor [NGR NH 841490] is an Ancient Woodland Site of some 250-300ha which combines extensive ancient semi-natural oak woodland habitat with areas of fine mature beech, larch and smaller areas of shade conifers.

Cawdor Forestry also employ alternative silvicultural systems in a number of other woodlands on the Cawdor Estate and other properties that they manage in the area.

Significance/ reasons for selection as case-study example

This example was selected as a case-study within the project for two main reasons:-

1. It provides a good illustration of how a traditional forestry estate can deploy alternative silvicultural systems as a management tool to address a range of forestry situations - here (a) regenerating a mature Scots pine plantation with high recreational usage (adoption scenario 4), (b) ancient oak woodland where natural regeneration is required (adoption scenarios 1, 2) and (c) mature stands of larch where conifer species diversification is preferable (adoption scenarios 5, 10, 11). In each case, a flexible response to securing and managing regeneration is evident, and has a high dependence on the retention of skilled professional forestry input.
2. The example, together with nearby estates, is relatively atypical for the north of Scotland region, where the majority of conifer plantations are managed on a clearfell/ restock basis and where many older oak stands are not actively managed.

Owner objectives for management (including adoption of ATC systems)

Cawdor Forestry manage the Cawdor Estate woodlands for a combination of economic timber production, conservation and amenity objectives, with the relative balance depending on the location of individual woodlands within the Estate. Alternative silvicultural systems are used, where the opportunity arises, to achieve these aims. In Moss-side Wood, use of ATC, based on emerging natural regeneration, allowed for continuation of production of valuable Scots pine timber without clearfelling, which could compromise local amenity values. Cawdor Big Wood has a longer history of ATC adoption both in terms of regenerating the semi-natural oak woodland and in terms of conifer diversification, within Mark Anderson's trials. Current management of the oak woodland and mature larch stands around it reflects that history, with the opportunity of shade-conifer regeneration under larch utilised.

Biophysical characteristics of the site

These are very much lowland sites on the southern side of the Moray Firth, at 20-30 m asl (Moss-side) and 50-150 m asl (Cawdor), occupying essentially flat ground at Moss-side Wood with some undulation and a steep-sided gorge in Cawdor Big Wood.

The climate of these sites is fairly warm and moist [ESC AT₅ ~1200 dd, MD ~120 mm, annual rainfall 600-800 mm] with a moderately sheltered wind regime [DAMS = 12-14]. The solid geology is Devonian (upper/ middle Old Red) sandstone. Their soils are typically freely-draining with low fertility [ESC SMR Moist or Fresh, ESC SNR Poor to Very Poor]. Areas with moister, more fertile soils occur at Cawdor Big Wood.

Terrain is easy throughout these sites, other than in the gorge areas at Cawdor Big Wood, with immediate egress onto minor public roads for timber movement. In Moss-side Wood, avoidance of disturbance to recreational amenity during harvesting and extraction is desirable, while the SSSI designation of parts of Cawdor Big Wood imply a need for site sensitive working, especially within the mature oak woodlands.

Stand history and current composition

Moss-side Wood - consists of p1920's plantation stands of Scots pine of superior timber form, with occasional seed trees present of other conifers including larch, Douglas fir and western hemlock. The stand now has a well-developed understorey in many areas, combining much Scots pine and birch with smaller amounts of other coniferous species, including Douglas fir and western hemlock. Some parts of the woodland retain a predominantly hardwood understorey, dominated by birches. Other Scots pine stands on the Cawdor Estate, being managed under strip shelterwood systems, were originally established in the 1930's and have little existing understorey.

Cawdor Big Wood - consists mainly of mature oak stands of open structure, believed to date from the early 1800's. Other areas carry mature European larch stands of good timber form, dating from the period 1880-1920. Smaller areas have been replanted over the years with a variety of conifers including Norway spruce, Douglas fir and western hemlock, some as part of the Anderson group trials in the 1950's and 1960's. While there is limited regeneration of oak, there is a patchy understorey of beech and shade-tolerant conifers, especially western hemlock, forming an understorey to larch. The ground vegetation within the oak woodland is mainly of dense *Luzula sylvatica*.

Silvicultural treatments applied to date and intended future silviculture

Moss-side Wood - over the past 10-15 years two or three cycles of variable density thinning in the pine overstorey have been carried out, responding to emerging natural regeneration. Work has aimed to produce viable amounts of mature timber for sale, while expanding and developing the concentrations of natural regeneration. This approximates to a group/ irregular shelterwood system. The regeneration is now well-structured and contains mostly Scots pine with an admixture of Douglas fir, larch and hemlock. The diversity of species in natural regeneration is seen as an advantage here. Future management interventions will seek to balance continued harvesting of the overstorey, while avoiding excessive felling damage to regeneration and making a start on the tending of denser patches of regeneration, developing a complex structure. A minority of the overstorey trees may be retained in perpetuity where isolated trees would be difficult to remove without damaging regeneration, or for aesthetic reasons.

Cawdor Big Wood - a variety of approaches have been employed over the years to develop alternative silviculture here. Anderson's trials in the period 1950-1970 involved establishing small, densely spaced groups of various shade conifers and hardwoods. This approach was later abandoned as progress was thought to be too slow, with groups too small and species-diverse. Subsequent respacing of these groups was not carried out as Anderson might have intended. Small coupe-felling, scarification and fenced regeneration trials were attempted in the old oak stands, from the mid-1980's, along the lines of work at Dalavich Wood (see Case Study 1). While some native hardwood regeneration has been recruited, the dense *Luzula sylvatica* vegetation poses a challenge, as does deer pressure outside fenced exclosures. Spontaneous development of a beech-fir-hemlock understorey to mature larch stands offers a valuable opportunity for these to be managed on a selection system in future.

Evaluation of current silvicultural status in terms of ATC adoption/ regeneration

The development towards alternative silvicultural systems at Moss-side Wood has reached *developmental category 2* (progressive/ mature transformation) as a result of work pursued over the past 10-15 years. The same can be said of those areas adjoining Cawdor Big Wood, where there has been spontaneous development of a shade-tolerant conifer understorey to mature premium larch stands. However within the old oak and oak-larch stands at Cawdor Big Wood, only *developmental category 3* (early-stage transformation) has been achieved to date due to the difficulties in securing natural regeneration of oak and the lack of continuity of the earlier group-wise trials. Continuation of ATC application appears highly likely in Moss-side Wood due to its established success there, and similarly in the mixed larch-hemlock stands. A range of future options are being evaluated for perpetuation of old oak in Cawdor Big Wood.

Commentary on inventory and monitoring protocols/ demonstration potential

The Moss-side Wood site is subject to periodic, semi-quantitative assessments of stocking and regeneration to guide the prescription of thinning interventions. The site has excellent (potentially self-guided) demonstration value and has already formed the basis of several organised forestry visits. Monitoring at Cawdor Big Wood is more guided by the objectives of conservation management and habitat condition, with regeneration assessments within the oak woodland. This site (including the larch/hemlock areas) also has some demonstration potential, mainly on a guided visit basis.

Commentary on economic and operational implications of ATC adoption

Cawdor Estate view the economics of woodland operations in terms of their holdings as an entirety and have an experienced forestry management team in place. Although clear-fell/ restock working remains the preferred method in some upland areas, methods employing natural regeneration wherever possible are seen to reduce restocking costs. Site conditions and estate forestry resources mean that operational economics of ATC adoption on a site-specific basis are not major factors to date.

Other relevant field examples recorded within the project

With emphasis on the management of mature pine plantations under ATC at Cawdor, the most direct comparisons are with the experiences reported for Blelack Woods and Glen Tanar Estate (Case Study 6) and Curr and Anagach Woods/ Windsor Forest (Case Study 7). Some work at Cowdray Park Estate (Case Study 8) is also relevant.

Photographic record



Left: regeneration of oak over dense Luzula ground vegetation

OAK/ BEECH

Right: irregular structure with regeneration in mature beech stands



Left: development of natural western hemlock regeneration under mature larch stands

LARCH/ HEMLOCK

Right: development of natural western hemlock regeneration under mature larch stands



Left: initiation of Scots pine regen. in Moss-side Wood, 2004

SCOTS PINE, MOSS-SIDE WD

Right: areas of Moss-side Wood with sparse birch-dominated regeneration



Left: progressive development of mixed conifer regeneration, 2012

SCOTS PINE, MOSS-SIDE WD

Right: progressive development of mixed conifer regeneration, 2012



Left: progressive development of mixed conifer regeneration, 2012

SCOTS PINE, MOSS-SIDE WD

Right: progressive development of mixed conifer regeneration, 2012



Left: trial use of strip shelterwood system in p1930's Scots pine crops

SCOTS PINE, STRIP S/WOOD

Right: trial use of strip shelterwood system in p1930's Scots pine crops

