

Case Study 1

Atlantic Oakwoods - Argyll, Morvern and Lochaber

Location and ownership of woodlands

This case study applies generically to quite a large number of acid semi-natural oak woodlands in the districts of Argyll and Lochaber in western Scotland. Most are ancient woodland sites, in some cases with an element of PAWS, now being progressively restored, and in some cases with SSSI designation. Specific sites where alternative silvicultural systems development work has been attempted include:-

1. Dalavich Oakwood, Loch Awe, Argyll [NM 967136]. This woodland is owned by the Forestry Commission and extends to some 80 ha.
2. Ardey and Resipole Woods, Loch Sunart, Lochaber [NM 7xx6xx]. These woodlands are owned by the Forestry Commission and by private farm estates and extend in total to some 1300 ha, although only a proportion are subject to ATC.
3. Rahoy Oakwoods, Morvern [NM 710510]. These woodlands are owned by the Ardtornish Estate and managed by the Scottish Wildlife Trust, covering ~250 ha.

Significance/ reasons for selection as case-study example

This example has been selected as a case-study in this project for two main reasons:-

1. It is one of the best examples of the use of alternative silvicultural systems (albeit on a trial scale) for the management of semi-natural broadleaved woodlands (adoption scenario 1). Atlantic oakwoods occur extensively in western Scotland, Cumbria, Wales, Devon and Cornwall and many are conservation-designated.
2. The example also well illustrates the value of developing suitable sensitive, light-weight harvesting and forwarding systems for use under alternative silviculture.

Owner objectives for management (including adoption of ATC systems)

During the 1700's and 1800's, oak woodland sites of this type were managed primarily as industrial oak coppices for the production of charcoal and tanbark. By the early 1900's this active management had ceased, with many such woods neglected, used for livestock shelter and grazing or converted to coniferous plantations (PAWS). Invasive *Rhododendron ponticum* had become established on many such sites. Over the past 30 years, priority has been placed on nature conservation of the oak woodland habitat with its important associated birds, invertebrates, lower plants and fungi.

The history of former coppice management, followed by abandonment for many decades, has left the oak woods over-stocked and artificially even-aged. The adoption of ATC techniques is aimed to improve the potential for natural regeneration in these woodlands by opening up the canopy, diversifying their stand structure and species composition, while allowing for some sustainable production of timber within the terms of SSSI designations, to supply mainly local artisanal and community markets.

Biophysical characteristics of the site

These sites are at 0-150m asl, occupying variable slopes and uneven ground. Aspect is varied, predominantly south-westerly at Sunart and Rahoy, south-easterly at Dalavich.

The climate of these sites is warm and wet [ESC AT₅ 1250-1350 dd, MD 80-110 mm, annual rainfall 2000-2300 mm] with a moderately exposed wind regime [DAMS = 12-15]. The solid geology is of either the Dalradian or Moine schist series. Soils are typically variable complexes with shallow acid brown earths on the better areas (ESC SMR Fresh; ESC SNR Poor) but wet and infertile in peaty hollows (ESC SMR Very Moist to Wet; ESC SNR Very Poor to Poor).

Terrain is generally problematic for forestry working. Sites are rough and steep with limited road and track access to many areas. The public road network is typically single-track with long haulage distances to conventional markets. Conservation designations and sensitivity of soils and natural vegetation emphasise the need for small-scale harvesting and extraction equipment, limiting pressures on the site.

Stand history and current composition

The main stocking on these sites is of native sessile or hybrid oak, which is likely to be a combination of original self-sown and mature reinforcement planted material (now indistinguishable in many cases). Most of the stands are at least 80-100 years old, with the traditional 20-25 year coppicing cycle having been abandoned in the latter half of the nineteenth century. Following that time, there has been little active management of oak. Many stands are therefore of artificially pure, even-aged and densely-stocked oaks. Other native trees are also found in association including ash, alder, birch, rowan and holly. Some sites have an understorey of hazel, which is now often of conservation significance for epiphytic lower plants. Holly is spreading as an understorey component where grazing has been reduced. A minority of stands have some mature beech and sycamore of plantation origin, dating from 1700-1900. A considerable proportion of the oak stands were partially felled and restocked with introduced conifers after 1945 (PAWS sites), with Sitka and Norway spruces and western hemlock being the most common conifer species used. *Rhododendron ponticum* is also present at a significant number of these sites, having escaped from adjoining landscape gardens, and can form a dense and invasive understorey layer. Shade-tolerant conifers regenerate readily where established, as does beech and *Rhododendron ponticum*. Other than in recent exclosures, there is typically very limited existing natural regeneration of oak due to shade and excessive deer/ sheep browsing, with only localised regeneration of ash, birch and hazel in open areas.

Silvicultural treatments applied to date and intended future silviculture

Recent years have seen considerable efforts to remove invasive introduced species as an element of ecological restoration work on PAWS sites. A range of potential silvicultural options for sustainable management of the mature oak stands have been put forward in various published reports by George Peterken and Rick Worrell, Peter Quelch and Richard Thompson over the past decade, many under the auspices of the Sunart Oakwoods Initiative. Four key proposed approaches are (a) long-rotation oak high forest, (b) standard-rotation oak high forest, (c) coppice restoration and (d) wood pasture. These are aimed to provide the opportunity for some timber production from oak stands while diversifying their stand structure and promoting natural regeneration

of target native tree species, including oak. Such work must remain consistent with conservation designations and ensure the protection of sensitive lower plant species that may be intolerant of physical disturbance or alteration of established moisture and light environments. Trial interventions to date, especially at the Sunart and Morvern woods have consisted of selective single-tree thinning and small group felling operations in the mature oak stands, demonstrating use of light-weight forwarding equipment (compact-tractor or horse-drawn) following motor-manual fellings. These interventions are intended to develop stands towards the long/ standard-rotation oak high forest models. Earlier work at Dalavich had used larger coupe-felling and fenced natural regeneration in oak, continued as part of current PAWS restoration work.

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

Silvicultural development at many of these sites reflects *developmental category 3* (early-stage transformation) where there has been some trial silvicultural intervention in the canopy and there is also resulting recruitment of natural regeneration of target species, including oak. Other sites remain at *developmental category 4* (preliminary stage transformation/ adoption) where introduced conifers and invasive shrubs have been removed but there is as yet little natural regeneration of native trees. A few of the older demonstration sites, at Dalavich for example, might be argued to be moving towards *developmental category 2* (progressive/ mature transformation) where natural regeneration of oak and other native trees has been recruited in fenced felling coupes. It is expected that application of alternative silvicultural systems will continue to be applied, at small-scales, across the Atlantic oakwoods, but this remains strongly dependent on grant-in-aid schemes and charitable financial support initiatives.

Commentary on inventory and monitoring protocols/ demonstration potential

Monitoring on these sites has typically been for conservation objectives, including habitat condition and natural regeneration levels, most being semi-quantitative. These sites have considerable potential for demonstration of small-scale application of alternative silvicultural systems, with widespread public access, and some have already fulfilled that function on FC training and demonstration days. Further development of quantitative silvicultural monitoring would be beneficial here.

Commentary on economic and operational implications of ATC adoption

The major operational significance of these sites has been as a “test-bed” for the use of small-scale harvesting and extraction equipment under ATC systems. Some issues remain in this regard, particularly in respect of health and safety approvals. Economic timber production can never be expected to be a major focus of their management with such high conservation significance, but there are healthy local and regional artisanal markets for the small volumes of character oak produced from them so far.

Other relevant case-studies reported within the project

The most useful comparisons for this case study are with silvicultural approaches adopted in the more lowland native oak woodlands - primarily Wyre Forest and Forest of Dean (Case Study 28 - uniform shelterwood) and Salcey Forest and Bradfield Woods (Case Study 29 - restoration of coppice with standards). Due to the difficult site access and conservation sensitivities applying in the Atlantic oakwoods of western Scotland, a wider range of silvicultural methods are applied at small scales.

Photographic record



Left: former coppice oak woodland prior to any regeneration felling - the typical condition

DALAVICH OAKWOOD

Right: mature oak remaining after selective felling of PAWS conifers



Left: fenced oak regeneration coupe after 8-10 years (1984-1992) - photo Alan Stevenson, FC Scotland

DALAVICH OAKWOOD

Right: birch regeneration in fenced enclosure after PAWS felling



Left: within the fenced enclosure - dense infill of birch regeneration with some oak, beech, holly, rowan

DALAVICH OAKWOOD

Right: unfenced PAWS felling area with birch/ willow infill regen.



Left: former coppice oak woodland prior to any regeneration felling - the typical condition

SUNART/ MORVERN

Right: selective fell of timber oak - photo Sunart Oakwoods Initiative.



Left: low impact compact-tractor skidding (photo Sunart Oakwoods Initiative)

SUNART/ MORVERN

Right: low impact horse extraction (photo Sunart Oakwoods Initiative)



Left: compact-tractor forwarding work (photo Sunart Oakwoods Initiative)

SUNART/ MORVERN

Right: onsite planking of oak timber (photo Sunart Oakwoods Initiative)

