

Case Study 17

Glen Branter, Benmore, Pucks Glen and Loch Eck, Cowal

Location and ownership of woodlands

This case study deals with Forestry Commission sites in Cowal, western Scotland where a variety of mature conifer crops are to be managed/ regenerated under ATC:-

1. Glenbranter Forest, Cowal [NGR NS 100970] compartments on lower slopes and valley bottom with mature Sitka spruce crops dating from 1920-1950. Area of case-study interest is ~330ha. Some parts are consider to be PAWS sites.
2. Benmore and Pucks's Glen, Cowal [NGR NS 147852] compartments on lower slopes and valley bottom with mature mixed conifer crops (RSQ, RC, NF, DF, WH) dating from 1920-1950. Area of interest is ~220ha. Some parts are PAWS.
3. West Loch Eck, Cowal [NGR NS 133919] compartments on lower slopes and valley bottom with mature alternative conifer crops (NS, RC, NF, DF, WH, JL) dating from 1920-1950. Area of most interest is ~27ha. Some parts are PAWS.

Significance/ reasons for selection as case-study example

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

1. For western Scotland, it has an unusually long record of productive forestry with a wide range of mature conifer species, some dating back to the late 1800's. The early history of ownership by "forestry pioneers", former presence of the Benmore forestry school, continued presence of the RBGE Younger Botanic Garden at Benmore and the FC Kilmun Arboretum make this area something of a "Scottish forestry test bed", with significant recreational interests, as at Puck's Glen.
2. There are good examples here of potential for alternative silvicultural systems using natural regeneration in Sitka spruce at Glen Branter (adoption scenario 6), Douglas fir at Pucks Glen/ Benmore (adoption scenario 7) and in noble fir, western hemlock, western red cedar and coastal redwood at Lock Eck/ Benmore (adoption scenario 9). These are highly relevant to "future forestry" in Scotland.

Owner objectives for management (including adoption of ATC systems)

The Forestry Commission in Scotland manages its estates for a combination of economic timber production, conservation and recreational amenity objectives. The balance between these objective sets varies with the type of forest and its location. ATC is employed on a site specific basis by FC in support of management objectives. There is an overall policy aim to manage 20-25% of the national forest estate in Scotland towards ATC systems. At the forest areas discussed in this case-study, adoption of ATC is stimulated by a desire to perpetuate maturing crops of an unusual variety of conifer species (established 1880-1950) without clearfelling, by recruiting natural regeneration, thereby maintaining structural and species diversity and enhancing landscape, visitor and recreational amenity values. Reliance on natural regeneration is also likely to reduce the costs that would be associated with replanting.

Biophysical characteristics of the site

The Glenbranter Forest site is at 30-250 asl on a range of aspects. The climate is warm and wet [AT₅ of 1210 dd, MD of 83 mm, annual rainfall of 2510 mm]. The site is moderately exposed with a DAMS score of 14. Soils, developed over the Dalradian schist, are variably drained and of moderate fertility [ESC SMR Fresh-Very Moist, ESC SNR Poor-Medium]. Forestry access is fair/good, with some steep slopes.

The Benmore/ Puck's Glen site is at 0-130m asl on a mainly westerly aspect. The climate is warm and very moist [AT₅ of 1287 dd, MD of 94 mm, annual rainfall of 2500 mm]. The site is moderately sheltered with a DAMS score of 12. Soils are developed over the Dalradian schist and are freely-drained and of moderate fertility [ESC SMR Fresh-Moist, ESC SNR Poor-Medium]. Forestry access - steep/ awkward.

The West Loch Eck site is at 0-180 asl on a mainly easterly aspect. The climate is warm and very moist [AT₅ of 1375 dd, MD of 115 mm, annual rainfall of ~2630 mm]. The site is moderately sheltered with a DAMS score of 12. Soils are developed over the Dalradian schist and are freely-drained and of moderate fertility [ESC SMR Fresh-Moist, ESC SNR Poor-Medium]. Forestry access - fair to very steep/ unworkable.

Stand history and current composition

The stands of interest were established during the period 1880-1950, using an atypically wide variety of productive conifer species including Sitka and Norway spruces, Douglas fir, western hemlock, noble fir, grand fir, western red cedar and coastal redwood. This situation owed much to the influence of the Younger (brewing) family who owned Benmore Estate in the late 1800's and were enthusiastic tree planters and silvicultural innovators. There were also some early plantings by Sir Harry Lauder at Glen Branter prior to the early 1920's. The Forestry Commission acquired both properties in the early years of their existence and persisted with mixed coniferous planting until the 1950's in Glen Branter, along Lock Eck and at Benmore. Benmore became the Younger Botanic Garden (RBGE), focussing on conifers, and Benmore House operated as one of the famous "forestry schools" until closure in the 1960's. The Kilmun Arboretum nearby remains a focus of species trials for Scotland. Much of the first rotation conifer crop in Glen Branter was destroyed in the 1968 gale and many comparable stands along West Lock Eck were felled between 1970 and 1990. Restocking in these areas has typically been of pure spruce with volunteer hemlock. Retained mature stands have been only sporadically thinned and tend to be overstocked with tall timber and a dense understorey of hemlock regeneration in parts. Good Sitka spruce regeneration occurs in older stands at Glen Branter and there is promising regeneration of Douglas fir locally at both Pucks Glen and Benmore.

Silvicultural treatments applied to date and intended future silviculture

There has been very limited active ATC intervention in these areas to date, with the emphasis being on natural/ accidental stand development towards irregularity. There has been some light thinning in mature Sitka spruce stands at Glen Branter, with enumeration monitoring of the growing stock and regeneration pursued as a research activity. The approach at Pucks Glen for the past 15-20 years had been to allow natural development on a minimum intervention basis along the principle of

biological retention/ old-growth emulation. Stands within the boundaries of the RBGE Benmore site are managed by what is effectively a selection system, with recent storm damage in December 2011/ January 2012 accelerating canopy opening. Active consideration is now being given by FCS to a thinning programme along West Lock Eck over the next five years to reduce basal area of mature spruce and fir stands, perpetuate these for the future and to promote advance natural regeneration of a wider variety of conifer species, where current understories tend to be hemlock dominated.

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

Due to the age of these stands and the significant development of advance regeneration of several species, they often emulate ATC *developmental category 2* (progressive/ mature transformation), although it must be recognised that this is in large measure an accidental outcome of low-intervention management. Many stands have been unthinned for many years (especially along West Lock Eck), retaining basal areas 30-45 m²/ ha and this has produced a situation where western hemlock dominates advance regeneration (arguably undesirably). In order to protect and recruit natural regeneration of Sitka spruce at Glen Branter and of Douglas fir at Benmore, selective thinning to actively restrict basal area to 25-30 m²/ ha must be sustained. The District has a policy in place to formalise and develop local ATC implementation.

Commentary on inventory and monitoring protocols/ demonstration potential

The growing stock in these three areas is monitored using the Forestry Commission's standard periodic system, assessing stocking and natural regeneration, only locally at Glen Branter by detailed enumeration methods recommended by FCIN45. All of the sites have open public access and would be suitable as self-guided ATC demonstration sites, given interpretation material (signage or portable), preferably including the results of more intensive enumeration work as for the FC ATC network. The Benmore/ Puck's Glen site has a shared heritage with the RBGE botanic garden.

Commentary on economic and operational implications of ATC adoption

These are sites where the costs of forestry operations can be expected to be higher than average due to steep slopes, difficult access and high visual landscape sensitivity. Many stands are only amenable to management using more expensive motor-manual felling and cable-crane or skidder extraction systems. However there is also potential to produce timber of rather high stem value from mature conifers including Douglas fir, Norway/ Sitka spruce and western red cedar/ coast redwood. ATC may indicate greater investment requirement for enumeration/ monitoring during the rotation.

Other relevant field examples recorded within the project

Due to the mature stands of shade-tolerant coniferous species managed under ATC in these areas (unusually for Scotland), there are obvious comparisons with Tavistock Estate and Dartington Hall (Case Study 18), Bowhill and Eildon Estates (Case Study 19), Ffrwdgrech Estate (Case Study 5), Longleat Estate (Case Study 14) and Weasenham Woods (Case Study 30). Natural regeneration of Sitka spruce at Glen Branter can be compared with Fernworthy Forest (Case Study 10) and Clocaenog.

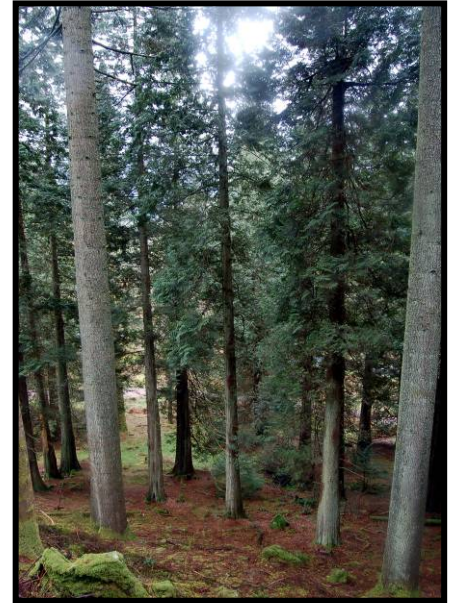
Photographic record



Left: *mature ATC stands of coast redwood and red cedar, Benmore*

PUCKS GLEN AND BENMORE

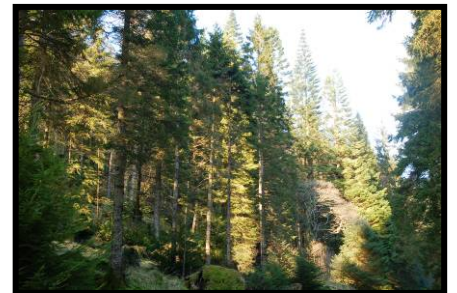
Right: *mature stands of Abies firs managed under ATC, Pucks Glen*



Left: *mature mixed conifers managed under ATC, Benmore*

PUCKS GLEN AND BENMORE

Right: *mature stands of Abies firs managed under ATC, Pucks Glen*



Left: *p1920-50's Abies fir, hemlock and Norway spruce suited to ATC*

WEST LOCK ECK

Right: *p1920-50's grand fir, spruce and larch suited to ATC working*



Left: *p1920-50's Abies fir, hemlock and Norway spruce suited to ATC*

WEST LOCH ECK

Right: *dense western hemlock regeneration under Norway spruce*



Left: *p1920's stands of Sitka spruce with drifts of natural regeneration*

GLEN BRANTER

Right: *p1920's stands of Sitka spruce with good ATC structures*



Left: *p1920's stands of Sitka spruce with drifts of natural regeneration*

GLEN BRANTER

Right: *p1920's stands of Sitka spruce with good ATC structures*