

## **Case Study 18**

### **Dunster and Tavistock Estates (with Dartington Hall), SW England**

#### **Location and ownership of woodlands**

This case study deals with woodlands on three separate private estates in the West Country where quality crops of Douglas fir, red cedar, coastal redwood and western hemlock are currently grown under alternative silvicultural systems:-

1. Crown Estate, Dunster, Somerset [NGR SS 9xx4xx] which is owned by the Crown Estate Commissioners. Area of interest is of the order 800 ha (2000 acres).
2. Tavistock Estate, Tavistock, Devon [NGR SX 4xx7xx] which is privately owned, formerly by Lord Bradford. Area of interest is of the order ~200 ha (500 acres).
3. North Wood, Dartington Hall, Totnes, Devon [NGR SX 785635] which is owned by the Dartington Hall Trust (educational charity). Area is ~40 ha (100 acres).

All of these woodlands benefit from management by a retained/ head forester. All of these sites contain a proportion of Ancient Woodland Sites, mostly now as PAWS.

#### **Significance/ reasons for selection as case-study example**

These examples were selected as case-studies in this project for two main reasons:-

1. They include some of the best surviving instances of the early post-war private adoption of alternative silvicultural systems employing group selection and restocking work in high quality, shade tolerant conifers (adoptions scenarios 7, 9 & 10) - notably by Lord Bradford & P.A. Hutt at Tavistock and W.E. Hiley at Dartington. Although there has been modification and rationalisation of working systems since inception, these sites demonstrate what can be achieved in 60 years.
2. The main species in use at these sites (Douglas fir, western red cedar, western hemlock, redwood, larch and mixed broadleaves) are typical of the productive forestry context in sheltered districts of south-west England where adoption of ATC is at its most common. With many other landowners currently initiating less formal conversions to ATC, mature examples offer valuable insights/ inspiration.

#### **Owner objectives for management (including adoption of ATC systems)**

In all of these woodlands, the objectives of management include production of quality timber for economic marketing, together with some element of landscape/ recreational amenity. At Dunster and Tavistock, economic timber production is the main aim, with a significant emphasis on landscape/ visitor amenity at Dunster, where there is a network of waymarked trails. At Dartington Hall, recreational amenity for visitors to the residential educational complex and local people is the main objective, with timber production sought in support of that where possible. All of these woodlands have used alternative silvicultural systems for some time now in mixed coniferous woodlands established 1930-1970 which are now coming ready for harvest. Reasons for adopting ATC combine economic restocking, landscape and silvicultural heritage.

### **Biophysical characteristics of the site**

The Dunster site is at 30-380m asl on a range of slopes and aspects. Most ATC activity is on the lower slopes to 200 m asl. The climate is warm and moist [AT<sub>5</sub> of ~1500 dd, MD of 113 mm, annual rainfall of ~1000 mm]. A DAMS score of 14 reflects moderate exposure. Soils are developed over Permo-Triassic sandstones and mudstones and are therefore freely-drained and of low-moderate fertility [ESC SMR Fresh, ESC SNR Medium]. Forestry access - fair/ good, with some steep ground.

The Tavistock Estate site is at 0-120 m asl on mainly westerly aspects. The climate is very warm and moist [AT<sub>5</sub> of 1863 dd, MD of 142 mm, annual rainfall of ~1330 mm]. A DAMS score of 16 reflects moderate westerly exposure of the site. Soils are developed over the Devonian old red sandstone and are therefore well-drained and of low-moderate fertility [ESC SMR Fresh, ESC SNR Medium]. Forestry access is good.

The Dartington Hall site is at 0-80 m asl on a rounded hill. The climate is very warm and slightly dry [AT<sub>5</sub> of 2010 dd, MD of 167 mm, annual rainfall of ~1270 mm]. A DAMS score of 10 reflects the sheltered locality. Soils are developed over the Devonian (Old Red) sandstone and are therefore well-drained and of low-moderate fertility [ESC SMR Fresh, ESC SNR Medium]. Forestry access is good over tracks.

### **Stand history and current composition**

Stocking at all of these sites comprises mixed-coniferous stands dating mainly from the 1950's on, but with small elements of remnant stock from the period 1920-1950, especially at Dartington Hall. The core productive species across these sites are Douglas fir, western red cedar and western hemlock, but with significant coastal redwood, Japanese larch and mixed hardwoods also being managed at Dartington Hall. A wide range of age classes are present at all of the sites, ranging from recent plantings and natural regeneration to mature Douglas fir in the 60-90 years cohort. Conventionally most young stocking at these sites has been planted, but there is an increasing amount of natural regeneration, especially of the more shade tolerant conifer species - western red cedar, western hemlock and coastal redwood. Some natural regeneration of Douglas fir has occurred at each site in more recent years. The structure of these woodlands tends towards small stands or groups of each species.

### **Silvicultural treatments applied to date and intended future silviculture**

At Tavistock and Dartington Hall the silvicultural approach applied (with some variation) since the 1950's has depended on felling small groups of mature trees and replanting with desirable species. The working system at Tavistock implemented by Lord Bradford and head forester P.A. Hutt was a particularly sophisticated variant of the group selection approach (described in detail elsewhere). The main species favoured was Douglas fir, but red cedar and hemlock were introduced due to their greater shade-tolerance. Those species have now begun to regenerate naturally. At Dartington Hall, W.E. Hiley planted groups of these same species, together with coastal redwood and chestnut, under a sparse retained canopy of mature larch. More recently, the restocking of groups at Dartington has also included more productive hardwoods, including oak and sycamore, with a general move to hardwood stocking. At Dunster Estate the conversion of even-aged plantations of Douglas fir, western red cedar and western hemlock is rather more recent, relies more on advance natural

regeneration and is less intricate/ formalised. At all of these sites it is necessary to combine forestry work on the canopy with suitable tending of the understorey to regulate the balance between tree species and to produce stems of high value. A central issue with this type of forestry is the potential for a drift to dominance by the most shade-tolerant species - here western red cedar and western hemlock - at the expense of Douglas fir, larch and oak, which may be thought more desirable. In recent years regional markets for western red cedar have allowed more economic tending of young growth of that species, but an over-dense hemlock understorey is undesirable.

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

At all of these sites, transformation towards alternative silvicultural systems can be seen to reflect *developmental category 2* (progressive/ mature transformation) with some areas at Tavistock and Dartington Hall reaching *developmental category 1* (complete/ near complete transformation) after a period of 50-60 years of work. At Dunster Estate, a proportion of stands remain at *developmental category 3* (early stage transformation) with natural regeneration recently initiated in thinned stands. Overall, the systems applied at these sites have previously relied on group replanting, but there is increased use of natural regeneration of western red cedar and hemlock. It is almost certain that variants of ATC will continue to be applied at each of these sites. An important question is whether Douglas fir can be successfully operated under this form of forestry in competition with later-successional shade-bearing conifers such as red cedar and hemlock. In natural systems of the Pacific Northwest, retention of Douglas fir requires larger-scale disturbances by windthrow/ wildfire.

### **Commentary on inventory and monitoring protocols/ demonstration potential**

All of these woodlands are subject to some forms of periodic assessment of growing stock, increment and regeneration - this is most formalised at Tavistock due to the heritage of the sophisticated Bradford-Hutt system there. There is considerable demonstration potential at each site, especially if standardised enumerations under the FCIN45 or AFI protocols were carried out. At Dunster and Dartington Hall, there may be potential for self-guided demonstration using signage or leaflets, due to existing public access provisions. At Tavistock, pre-agreed visits would remain appropriate.

### **Commentary on economic and operational implications of ATC adoption**

These are all properties with long experience of implementing alternative silvicultural systems and there are no direct economic comparisons available with clearfell working. A body of experienced forestry contractors has developed in south-west England with suitable equipment and skills to carry out the required types of work.

### **Other relevant field examples recorded within the project**

Due to the emphasis on use of Douglas fir, red cedar and hemlock for productive forestry under ATC on these estates, there are obvious comparisons with Cirencester Park Estate (Case Study 2), Longleat (Case Study 14), Bowhill and Eildon Estates (Case Study 19), Ffrwdgrech Estate (Case Study 5) and Weasenham Woods (Case Study 30). Tavistock is of particular interest for the Bradford-Hutt working systems which has more recently been adopted at Wilderness Wood (Case Study 25).

## Photographic record



Left: natural regeneration of high quality Douglas fir

### **CROWN ESTATE (DUNSTER)**

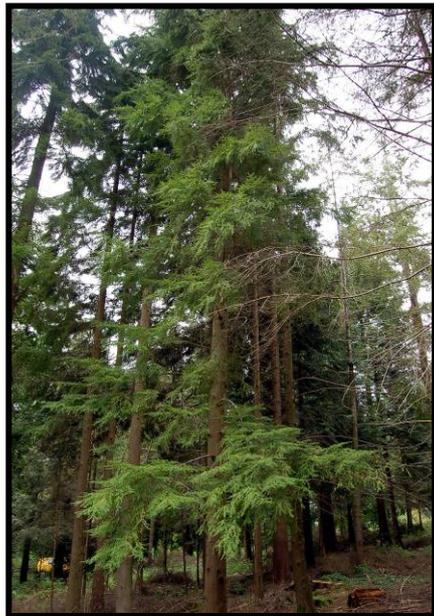
Right: operation of western red cedar under a group system



Left: thinning of fine western hemlock to promote regeneration.

### **CROWN ESTATE (DUNSTER)**

Right: natural regeneration of western red cedar in tended groups



Left: thinning of a group of western hemlock within a mixed stand

### **TAVISTOCK ESTATE**

Right: regeneration of Douglas fir under the group selection system



Left: mature coastal redwood with advance regeneration beneath

### **DARTINGTON HALL**

Right: mature coastal redwood with advance regeneration beneath



Left: regeneration of Douglas fir under the group selection system

### **DARTINGTON HALL**

Right: establishment of a hardwood group with enrichment planting

