Society of Irish Foresters
Annual Study Tour North Scotland
4-11 September 1999

Introduction

The Study Tour was the first visit of the Society to north Scotland. Thirty eight members flew into Glasgow airport on Saturday the 4th of September.

The tour was excellently arranged by Dr Hugh Insley, Region Manager, North Scotland Conservancy, Forest Enterprise, who pulled out all the stops for the Society.

The Highlands and Islands region was the location for the tour. It extends from Argyll in the west to Moray in the east, and includes the outer and Inner Hebrides and the Northern Isles. One half of the land area of Scotland is contained in the region. Forestry is an important land use and economic activity, along with Tourism, Agriculture and Fisheries. Tourism alone generates £600 million/annum and employs around 20,000 people.

The Highlands, of course, include Britain's highest peaks (up to 1344 m). Rainfall varies from 750 mm/annum along the Moray coast to 3200 mm in the mountains of the west. Of the 1.2 million ha of forests in Scotland (50% of the UK total) more than half are located in the Highlands and Islands area. Forest cover has increased from 5% of the land area at the turn of the century to 16% today (the overall forest cover in the UK is 10%). Cover ranges from 7% in Caithness and Sutherland to 30% in Cowal and Kintyre. The Forest Enterprise owns 276,000 ha or 46% of the total forest area .

Log consumption in the Highlands is around 850,000 m^3/annum. It is set to double over the next 20 years. This will create major new opportunities for wood processing. Currently, more than 70% of the output is processed in 25 sawmills and one board plant (OSB, at Dalcross, near Inverness). A recent report by the international consulting group, Jaakko Poyry, has highlighted the need to add value to the projected increase in wood production. One option that has been suggested is a large-scale pulp facility. The report has also highlighted the need to reduce harvesting and transport costs. Much of the road network in the Highlands is incapable of supporting sustained wood haulage. Expenditure on road maintenance has been dramatically reduced and funding for road improvement to cater for wood haulage has ceased. There are cases where mature forests cannot be harvested because of the poor condition of public road access. However, significant efforts are being made to increase the use of rail transport. The use of barge transport continues to be an option along the West Coast. Nevertheless the bulk of harvested wood will continue to be transported by road.

The Society spent a day visiting the 'Flow Country' of Caithness and Sunderland. Afforestation in the area has attracted a degree of controversy. Through the 1970s and up to the end of 1980s there was a large private planting programme on the back of a favourable tax regime, low land prices and an apparent lack of conflict with agriculture. Up to 4000 ha were planted each year. In 1988 the support regime for forestry switched from tax relief to subsidy under the Woodlands Grants Scheme. This included wider consultation and commitments to environmental guidelines and standards. A significant shift in planting patterns resulted; more broadleaves and native Scots pine were planted, open space in plantations was increased and there was a dramatic reduction in the planting of non native conifers.

Forestry provides a broad range of non-market benefits to the Highlands, but their value is difficult to quantify. However, research has indicated that the value of non-market benefits, such as recreation, biodiversity, landscape and carbon sequestration, are comparable to these of wood output.

Finally I want to record our gratitude to Dr Hugh Insley, the Forestry Commission and private sector staff for their co-operation, enthusiasm and courtesy during the Study Tour.

John Mc Loughlin, Convenor

Saturday 4th September

The tour began by setting off in a north-westerly direction along the A82, towards the first port of call, the Greenock to Donoon Ferry. Having boarded the ferry we had a pleasant crossing to Hunter's Cross in Donoon. We were met by Trevor Wilson at our hotel (about two hours later than anticipated).

Following a quick sandwich at our hotel, the Royal Marine, we began our journey to Cowal Forest District. On the way Trevor gave us a brief history of Donoon, now a quiet fishing village, but once a U.S. Navy military base. It was also renowned for boat building, an industry which is no longer in the town.

We followed along the course of the River Effic, which is famous for its salmon and sea trout. Other sites of note on our journey included Bemore Mountain Forestry Estate (over 4,300 ha) and Kilmun Arboretum, which has been used for conifer testing since 1989.

At Cowal Forest District, located between Lough Fyne on the west and Lough Lomond on the east, we were met by Russell Lamont, the Forest District Manager, who gave a brief summary of the district.

The area managed by the Forestry Commission in Cowal District is 44,100 ha, 34,400 ha of which is plantation forestry. The soils are predominately peaty and surface-water gleys with lesser areas of brown earths, iron pans and deep peats. Annual rainfall is high, up to almost 3000 mm. Sitka spruce is the main species planted (65.0%). Other coniferous species, Norway spruce, Scots pine and Douglas fir, make up the rest of the forest area, with a small (7.5%) amount of ash, birch and oak.

Throughout Cowal District there are 150 sites which are specifically managed for recreation. There are six SSSI (Sites of Special Scientific Interest, equivalent to Natural Heritage Areas in Ireland). These include Atlantic oakwoods, wetlands, animal habitats and archaeological monuments. It is also home to Argyll National Park, which is the oldest national park in Scotland.

Our first stop was at a very steep roadside clearfelling site. Sitka spruce and Douglas fir were being extracted by cable crane (Mulholland Cable King). Average tree sizes were 0.38 m^3, Sitka spruce and 0.56 m^3, Douglas fir. Production was 270 m^3 (over bark) per week over an extraction distance of 650 m. The timber was sold standing and cost £19/tonne to extract it to roadside.

The second stop was another steep site which was planted in spring 1999 with Norway and Sitka spruce. Deer fencing was necessary as Norway spruce is particularly susceptible to deer damage. Four species of deer occur in the area, fallow, red, roe and sika. Culling is undertaken to achieve a stocking rate of 17 deer/100 ha though this was being reduced to 12/100 ha.

From Cowall we travelled on to Benmore Estate Grounds, where our guide for the evening was Peter Baxter from the Royal Botanic Gardens, Edinburgh. In Benmore, the

first conifers, mostly Scots pine and larch were planted in the 1820s. James Duncan who owned the estate during the 1870s planted large areas of conifers. Benmore was subsequently purchased by the Younger family, who retained ownership until 1925 when it was gifted to the state for research and educational purposes. It now home to more big conifers than anywhere else in Great Britain.

Sunday 5th of September

We travelled north, passing Benmore once more and took the A82 towards Fort William. For much of our journey we travelled beside Loch Lomond and through the beautiful scenery surrounding it. Although the day was overcast the landscape, dominated by forestry and heather moorland, looked splendid. Plantations consisted of larch and spruce punctuated by the occasional oak woodland.

We arrived at Lochaber and boarded cable cars to take us up to our meeting point, Nevis Range Ski Area which is situated in the middle of the forest. We were met by John Risby, Forest District Manager, Alan Gayle, Managing Director, Nevis Range, Alan McKenzie, Forest Manager and Dr Hugh Insley, Region Manager, North Scotland, Forest Enterprise.

John Risby gave us a brief insight into Lochaber district which comprises about 3,000 ha, half of which is comprised of Sitka spruce. They are about 60 staff employed. The main features of the district are its scenery, natural habitats, bogs and native woodlands.

In common with areas we had visited earlier, Lochaber has a similarly high rainfall. Water supply and landscape management are very big issues, as are recreation, tourism and native woodland restoration. The wood harvest is, on average, 100,000 m^3/annum.

President of the Society, Tony Mannion, to left, with Scottish foresters.

Nevis Range Ski Resort was set up in 1989. In 1988, the aluminium works in Fort William closed and 1500 local people were left unemployed. Nevis Range was founded in an effort to revitalise the area. Up to 250,000 people visit the resort annually. Sixty people work there full time. This figure increases to120 during the summer. The adjoining forest area has been designated as a tourist area with biking trails provided.

Alan McKenzie outlined the forest design requirements for the Nevis Range area. All forest design involves extensive planning to fit in with the surrounding landscape. Site and physical features such as soil, vegetation and topography need to be taken into account. A plan is first prepared in sketch form. It is then evaluated and is the subject of extensive consultation (by public register). Following this process the plan is reviewed with a revised draft being submitted to the Forest Authority for approval. When

approved it is implemented and carefully monitored, followed by a five-year review. The same process is followed for felling and restocking (reforestation).

Accompanied by John Risby, we left Nevis Range and boarded the 'Maid of Glencail' ferry and made our way to a Woodland Restoration Scheme at Suanach. We stopped at a site which was afforested with spruce by the Forestry Commission Enterprise in the mid 50s. A programme was introduced in1994 to promote oak woodlands. The project involved many private sector owners in a partnership between was then established between state agencies, crofters, farmers and funders (mainly the EU). We were introduced to Tim Goucher, project manager and Colin Lavin, deer manager who gave us an insight into the project.

Colin Lavin outlined the approach to deer management in relation to culling development and monitoring. Fifteen years previously, there had been 70 wildlife rangers in Cowal District who culled 10,000 deer/annum. This was done without any understanding of the issues involved, so a research project was undertaken to develop a deer management programme. The programme indicated the necessity to have a population assessment every two years, to include fertility and mortality rates. This would give the desired population, current population, rate of change, culling levels necessary and the level of damage to be expected.

The programme has been implemented in Suanach - a deer control group has been was set up with the partners involved in the overall project. A count had been carried out, culling levels were set and have been achieved. During the cull, regular meetings took place with the public. Deer fences were maintained throughout the period. The project has been a success from both a deer management and a partnership viewpoint.

Tim Goucher outlined the development of oak woodland. Conifers and rhododendrons are being removed and grazing has been eliminated. Conditions are being developed for natural regeneration and some under-planting is being done. Most the work is done by the local community. Other ventures are being examined as part of the project. These include tourism, wood harvesting and oak sawmilling. A number of courses are being set up to establish the necessary management skills which are currently lacking in this area. These are being set up in association with the local Community Council and other training organisations. Funding is obtained mainly from the National Lottery and EU LIFE Programme.

Patricia Flanagan

Monday 6th September

The day began with a visit to Glenfinnan Estate where the manager, Alistair Gibson outlined the management of a West Highland estate. It is 3,500 ha in extent and has been owned by the Warren Family since 1974. The estate sells a small amount of wood but the main source of income is deer stalking - the current charge is Stg£300/person/day. In 1998, wood production was 1,500 m^3 and venison production was 9,540 kg. The price of venison was running at Stg£1.32/kg, whereas three years previously it was as high as Stg£3.19/kg. The drop in price is being blamed on imports from New Zealand. In 1998 400,000 New Zealand deer carcasses were imported by the EU.

We drove to Glen Affric to see native pinewood restoration and met Malcolm Weild, District Manager, Fort Augustus along with Tim Lauder, George Mc Larty and Sandra Paul. Glen Affric is the largest semi-natural woodland in Forest Enterprise ownership. The historical background to the destruction of the natural woodlands in Scotland was outlined

as follows. In the seventeenth century, the clan chiefs began small-scale clearance of the woodlands. However Glen Affric was spared somewhat due to its very difficult access. The defeat of the clans at the Battle of Culloden in 1746 saw the establishment of the large estates. The Highland clearances followed, sheep were introduced and the area was intensively grazed. Over time this destroyed large tracts of natural woodlands.

Attempts to restore the Glen Affric woodland began in 1960 when it became the first pine reserve in Scotland. At the time remedial treatment did not extend beyond reducing grazing numbers. In the mid 1970s the core woodland was designated an SSSI and in 1979 it was designated the Caledonian Forest Reserve which covered an area 10,645 ha. The classification does not have a legal status. In 1998 there were 70,000 visitors to the Glen Affric woodlands.

The tour moved to Teandore Woods, Torte where we were met by Rob Shaw of Scottish Woodlands Limited. He outlined the group certification process of the UK Woodland Assurance Scheme (UKWAS). It was initiated in 1998 following collaboration between the UK forest industry and the Forest Stewardship Council (FSC). It specifies requirements that forests and forest managers need to achieve to demonstrate good forest management.

The principal aim of certification is to improve forest management and enhance multiple values of forests. Independent, third party audits of the forest determine if the forest meets certain key minimum standards required for inclusion in the certification scheme. At the moment, certification is a voluntary initiative. Some segments of the retail trade such as DIY outlets are demanding wood from certified sources. The main benefits for the forest owner are improved market access and also the ability to demonstrate to interest groups that the forest is being well managed with due regard being taken of social, environmental and economic issues.

The main requirements of UKWAS were stated as:
a signed commitment to the FSC GB Standard and UKWAS;
a management plan with a vision for the development of the forest, objectives, background data, maps and necessary permissions;
the management plan to be based on soundly based decisions, requiring the collection of appropriate data from monitoring;
commercial operations should be not only well managed but also aim to introduce diversity into the woodland ecosystem;
a need for a focus on biodiversity;
forest owners and managers need to act as responsible citizens carrying out consultation with neighbours prior to activities which would impact significantly on them.

Pat O'Sullivan

Tuesday 7th September

We left Inverness and headed north to the Flow Country of Caithness and Sutherland. (The term Flow Country is a media invention derived from the Norse word *flough*, to describe a wet area.) The theme for the day was the planting that took place in the 1980s and current conservation practices that have evolved alongside forestry development.

In Northern Scotland soils are frequently dominated by peat associations. The largest and best preserved area of blanket peat in the UK is found in the Flow Country of Caithness and Sutherland. (The UK has 13% of the world's resource of blanket bog.) Afforestation has led to controversy in the area. The area attracted forestry investors

because of low land prices, a lack of conflict with agriculture and developments in soil preparation which made the planting of peatland possible. As the scale of afforestation grew concern arose about the loss of peatland habitat. This led to an effective public relations campaign. A strategy which recognised the paramount conservation importance of large parts of the Flow Country was developed and planting was subsequently located in areas where there was no conflict with nature conservation.

Many historical events such as the 1745 Jacobite rebellion, the Highland clearances, the break up of the traditional clan system and the complete depopulation of many highland glens to make way for sheep have had a major impact on the culture and land use in this area.

Forest policy and practice has evolved in recent years. In addition to its traditional contribution to the economy, forestry now provides a broad range of environmental and social benefits. Within the Highlands and Islands enterprise area 276,700 ha (46%) is owned by the Forestry Commission and managed by Forest Enterprise. The private sector continues to be dominated by extensive private estates but there is increasing ownership by NGOs such as the Royal Society for the Protection of Birds (RSPB), the John Muir Trust and the National Trust.

During the 1970s and 1980s forest expansion in the Highlands and Islands was restricted to hill land. In line with government policy this expansion has been encouraged to move 'down the hill' onto better quality land. Grant enhancements such as the Better Land Supplement' have supported this. The Grampian Forest Challenge has specifically targeted productive forestry on arable land.

In 1988 the support regime for forestry switched from tax relief to a more transparent subsidy through the Woodland Grant Scheme, which includes wider consultation and commitments to environmental guidelines and standards. This has resulted in a significant shift in planting patterns with higher levels of broadleaf and native Scots pine planting, more open space in plantations and a reduction in the planting of non-native conifers.

To gain first hand information on the consultative process and the rigorous environmental restrictions involved in establishing a Woodland Grant Scheme we visited Hope Plantation in the vicinity of Forsinard railway station. Here we were met by Mike Butler and Stuart Smith of Fountain Forestry. They explained that they began operations in the area in 1979. Sitka spruce was the main species being planted. Yield class 14 was being achieved on lower ground following the application of fertiliser. After four to five years problems arose when conservation groups highlighted that bird life was being interfered with and claimed that forestry development was destroying long established habitats. Some 370 ha were planted in the years 1985 and 1988. In 1992 two owners submitted a grant scheme application. There was much consultation until the scheme was finally approved in 1995. Great concern was expressed about the danger to the rivers Halladale and Bianoch from the planned operations.

Ploughing commenced in 1996, when weekly water sampling also commenced in the Bianoch river. Sampling had not ceased at the time of the visit, though it is planned to reduce it at a future date. The area was ploughed by double mouldboard plough using a shortened plough run of 80 m - the normal being 150 m. The forest was established with a fifty-fifty mixture of lodgepole pine and Sitka spruce at a stocking rate of 2,300 plants/ha. Thirty four ha of broadleaves (alder, birch, sycamore and willow) were also planted. Phosphate was applied as unground rock phosphate at 350 kg/ha, a reduction on the preferred rate 450 kg/ha. It is planned to reapply phosphate at years six, eight and 16 (this to poorer areas only). Potash will also be applied. No nitrogen has been or will be

applied.

The drainage carried out is considered the minimum required to establish a tree crop, the drains are allowed to settle before cross draining takes place. The results of the water analysis to date shows phosphorus levels to be stable again after a slight increase following the phosphate application to the crop. The Fresh Water Authority carry out analysis of samples taken from the catchment area, sampling has been reduced to monthly intervals as no adverse effects have been revealed to date, but sampling will continue.

Red and roe deer are found in this area, sika have not being sighted. Two rangers manage the deer population. There is a large population of hares which come in from the adjoining hills.

Having concluded the visit to Hope Plantation the party made the short journey to Forsinard Station RSPB Visitor Centre, where Norman Russell informed us that the area is an important haunt for bird life as it is a vast, wet, flat area. It is one of the few naturally treeless terrains in Britain - it is thought that there have been no trees here for 4,000 years. The bird population is unique to the area with a high proportion of some Britain's species such as widgeon (20%), black scoter (20%) greenshank (70%) and dunlin (35%).
The visitor centre which is situated at Forsinard railway station attracts 6,000 visitors annually. The tour party was taken on a short guided walk on the Dubh Lochan trail. The walk is alongside a pool system which has been made accessible to the public by means of a flagstone path with sturdy seats placed at intervals along it. This encourages visitors of all ages to walk the trail. Terry Keatinge of Scottish National Heritage explained that the surrounding area has qualified as a bird and habitat designation area.

The afternoon began with a journey to Westerdale, viewing on route a number of established plantations. There are 6,000 ha of these in the region managed by Fountain Forestry on behalf of clients. The plantations are divided into a number of properties. A typical property is Forsinain South, which is managed for a Danish client. It was planted in 1986/87 with Sitka spruce, following ploughing. Ground mineral phosphate was applied at establishment at 450 kg/ha. When the plantation was eight years old, a mixture of phosphate and potash was applied by helicopter at 650kg/ha. The fertiliser was applied following foliar nutrient analysis. There is no restriction on the use of helicopters for fertiliser application on sites such as the one that was visited. A yield class of 12-14 was predicted at establishment, it is currently 18.

Passing the Altnabreac plantation it was noted that the crop was not vigorous. This was attributed to nutrient deficiency as second fertilisation was overdue. Other plantations at Bhaird, Fasach and Leir were healthy and well protected by firebreaks. The well maintained road system provides for easy and swift access in the event of fire.

The increasing realisation at national and European level of the conservation value of peatlands was the topic of the final stop of the day. This was at Bad a Cheo, near Rumster, in the Dornoch Forest District of Forest Enterprise where the tour was welcomed by Chris Nixon.

Experiments at Bad a Cheo have investigated the effects of agricultural and forestry development on peatland between 1940 and 1980[1]. The broad objectives behind the experiments included the conservation of peatland habitats within the forest as part of the design

[1] During this period it became possible to successfully afforest deep peat soils through the use of drainage and ploughing technology, together with the use of fertiliser.

and management of open ground. The identification of larger open areas in extensive forests with potential for restoration of former bog habitats also featured as an objective. The property also contains Sitka spruce/lodgepole pine mixture experiments which were planted between 1968 and 1989. These have been used to study the process of peat drying due to afforestation, to assess its effects on water quality and quantity, and on the conservation of adjacent blanket bog habitats. The research has shown that forests on blanket peats dry the surrounding peatland. A buffer zone is necessary to protect areas of active bog from adjacent forest cover. The tour party, having traversed a wet and extensive area of blanket bog was shown this drying effect by Russell Anderson of the Forest Research Agency. As we entered a plantation we identified the subsidence that is taking place at its edge. Unmistakable shrinkage cracks in the peat were pointed out as was we walked further into the plantation. At a further stop outside the plantation area it was shown that the peat reached a depth of 6 m at various points. Research results also pointed to bog growth.

A realisation of the conservation value of peatlands led to a change in emphasis from the early 1980s. In addition, the designation of large tracts of Caithness and North Sutherland as SSSI led to a sharp decline in the planting of conifers on deep peats. The EU Habitats Directive (1992) recognised active blanket bog as a habitat of European significance, requiring priority for conservation. The UK Biodiversity Action Plan for blanket bogs, proposes targets for conserving and improving the quality of the remaining bogs and restoring some priority degraded areas.

As we were leaving this area the President, Tony Mannion, reminded us of how far north we had travelled, when he directed our attention to the Orkney islands, clearly visible on the horizon.

Frank Nugent

Wednesday 8th September

We headed east towards Aberdeen on the A96, passing the Inverness CSW oriented strand board mill on our way to Culban Forest. In a well restored woodsman's house now used for group visits, Alistair Young, Forest District Manager, Forest Enterprise gave a brief introduction to Culban Forest. The forest (mainly Scots pine) is 2,876 ha in extent. The climate of the area is relatively sunny and warm for Scotland. It was acquired by the Forestry Commission between 1922 and 1931 and planted to help stabilise the extensive sand dune systems. The sand dunes and sand flats were moving inland at an average of 4.5 cm daily. Marram grass was tried initially but this method was ineffective in stabilising the dunes. This was followed by another attempt, this time using Scots pine planted through pine brash laid on the surface of the dunes (sometimes fixed down). This proved to be successful in arresting the inland progress of the dunes. Further planting took place between 1922 and 1960. The brash also proved to be effective, not only in aiding forest establishment, but also in introducing seed of native species, and insect and spider life. Culban Forest now has a large number of species normally found in native pine forests.

The forest is a commercial timber producing area with a harvesting programme of about 140,000 m^3/annum, of which about a third is thinnings. It is also an SSSI (since1973), because of the rare flora and fauna and the geomorphology of the dunes. As both a productive forest and a nature reserve open to the public, Culban Forest is managed as a multi-functional area. Roe deer occur but at a low density of 5-6 animals/100 ha and have not yet caused serious damage to the Scots pine.

A forest design plan is now the basis of the Forest Enterprise's management of the for-

est. During the development of the plan the public were consulted. The three types of environmental protection carried out at Culban are sustainable forest management, naturalness and process protection. Two of the tools used to implement environmental protection are continuous cover forestry and the gradual reduction of coupe size. At the first stop an 18 ha reforestation site had been planted with Corsican and Scots pine in 1998, one year after harvesting. Pine weevil is a problem. Planting stock is treated before dispatch from the nursery. The restocking (reforestation) manager, Andy Chadwick, pointed out the importance of stout planting stock and suggested that a natural parasite may be used in future to control pine weevil. Areas to be replanted are either lightly scarified (Stg£170/ha) or mounded (Stg£270/ha). Natural regeneration of Scots pine was evident, but it is hindered by moss cover. Various strategies were suggested to expose the mineral soil to increase seedling survival, including the introduction of pigs in specially fenced areas. This method is at the trial stage and first indications are encouraging.

One of the more unexpected problems encountered is poor drainage due to the collapse of the old drain systems through harvesting. These drains must be renewed in order to prevent lakes developing between the sand dunes. Drought damage is rare. Fertiliser is not applied. Weeding is not generally needed but broom and birch are selectively cleaned out. Local provenances of Scots pine are used as far as possible in reforestation.

The second stop was at a species trials examining the performance of a number of larch and pine species. From their performance in the trials it was evident that Corsican and Scots pine had been correctly chosen to stock most areas. We moved to a third stop where we looked at a site managed under a continuous cover regime. The decision to change to continuous cover forestry on this particular area was based upon the occurrence of natural regeneration under the existing canopy. Harvesting coupes approximately 0.2 ha in size had been opened by selective felling. The next stop was at a mature Scots pine which had been partially buried by a sand dune. The stem had been re-exposed after decades beneath the sand to show reverse tapering. Although a number of theories were proposed no conclusive explanation was given for this unusual phenomenon. Douglas fir has been planted and was regenerating well on small pockets of better soil, which are usually former agricultural areas not covered by the sands. Rhododendron is also a problem – the policy is to contain rather than to eradicate it.

Dr Jack Durand and Marie Aherne enjoying the tour

On leaving Culban we travelled on towards Aberdeen, passing through Forres village where we admired the topiary and also found out that the last witch in Scotland had been burned there! We arrived at Mosstodloch Sawmill, which is owned by James Jones & Sons Limited. The company employs 462 people directly and between 50 and 100 on contract. The annual turnover for the group is £Stg47 m. It operates at nine sites with the main office at Larbet. Seven of the nine sites

are sawmills with a total annual intake of 210,000 m^3. There is also a pallet manufacturing plant, producing 60,000 pallets/week. A new venture for the company will be the manufacture of I-beams and other engineered timber products. This venture will be based in Forres and is due to commence in late1999.

The four sawmills owned by James Jones in Northern Scotland have a combined output of 150,000 m^3 of sawnwood. All harvesting and haulage is contracted out. The mill at Mosstodloch was opened in1957. Today it processes 115,000 m^3 of wood, mainly from forests within a 50-mile radius. The minimum top diameter processed by the mill is 14 cm, the maximum butt diameter is 40 cm. Recovery is 53%. At the time of the visit 60% of production was pallet timber, 30% fencing and 10% construction timber. Newly installed kilns will result in 30% more construction grade material being produced, reducing pallet products to 30%. At Mosstodloch 80% of all wood processed is cut to order.

After a tour of the highly automated sorting, processing and stacking stages, the tour left Mosstodloch for the Grampian Mountains passing the famous 'Christies' nurseries. On arrival at the Grampian Mountains' site we were met by Julie Snodgrass, District Forester, and Mark Reeve who is a Regional Forester in a neighbouring area. Afforestation of farmland was the theme of the visit. Areas had been planted by Forest Enterprise (200 ha) and the private sector (300 ha).

In 1993 vegetatively propagated Sitka spruce was planted at 2,500 trees/ha. Although the general plant quality was good, the plantation had been filled-in three times, because of rabbit damage. It had also been weeded three times. Problems had been experienced with twisted leaders because of the early rapid growth on good soils at high elevations.

The purchase price for the land in 1991 and 1992 was £1,100/ha, but the current price for equivalent land was £2,000/ha. Roe deer are a big problem in the Grampian area and red deer have begun to move in.

At next stop we were introduced to John Donnelly who is the project manager of the Grampian Challenge. The project's objective is to support the farming economy through diversification into other areas such as the planting of marginal land. He explained that the winners of the challenge receive 'top ups' to the available grants and premiums. The additional amounts are funded by the Forestry Commission. Annually 1,500 ha of proposed afforestation are entered into the competition. Five hundred ha will be awarded top up grants in 1999. A minimum area of 10 ha and a minimum of 66% commercial conifers are required. The project intends to support the planting of between 25,000 and 30,000 ha over a 10-year period.

In an indicative forestry strategy for Grampian, a substantial area (285,000 ha) has been designated as 'preferred' for new woodlands. Much of this is in the Buchan area. The normal afforestation grant is between £800 and £1,800/ha (average £1,200). A supplement of £600/ha for conifers and £750/ha for broadleaves is paid for the planting of better quality land. This brings the average grant to £2,500/ha where supplemented with the top-up from the Grampian Challenge. The Farm Woodland Premium Scheme offers between £160 and £300/ha/annum and is available for ten years after planting or for 15 years if more than half the area is planted with broadleaves or native Scots Pine.

Morgan Roche

Thursday 9th September

Travelling south along the A9 we left Inverness, the fastest growing city in Scotland. The countryside was a mixture of pastureland with hedgerows, interspersed with blocks of coniferous forestry, mainly Sitka spruce but comprised of lodgepole and Scots pine, and

larch. Travelling further into the Grampians the landscape gradually changed to open hill and mountain summits with pockets of native birch nearer the roadside. At Aviemore, a village heavily reliant on tourism and surrounded by a mixture of woodland and pasture land, we left the A9 and entered Glenmore Forest.

Situated within the Cairngorm Mountains Glenmore Forest is one of the most land-locked forests within the Highlands and Islands District and experiences a more continental climate than most forests in Scotland. We met our hosts and leaders, David Jardine and Jim Gillies, at the impressive Glenmore Forest Park Visitor Centre. Opened in 1948 and managed by Forest Enterprise it is Great Britain's most northerly Forest Park. It caters for all types of visitor, from families to hill walkers and offers a mix of recreational activities ranging from skiing to sailing, walking to wildlife watching. The Forest Park is to become a National Park in the coming years. This will entail management of the area taking into account the amenity aspect of the forest. From the Visitor Centre we proceeded into the forest. It was a hunting ground of the Stuart family from the 12th to the 16th centuries and the forest was left untouched. However, by the mid 1800s clearfelling of the last good stand of Scots pine was underway. The wood was floated down the river Spey to be used for ship building.

In the late 19th century more forest was felled, this time as fuel for iron smelting. The last major clearfell in the forest took place in 1914. The Forestry Commission acquired the area, comprising 1000 ha, in 1923. Trial plots were planted and successful efforts were made to reforest the area. The present day forest contains 50% Scots pine with the balance comprised of a number of other species. Remnants of the natural Caledonian pine forest are present in the forest. This is the most easterly block of native Scots pine in Scotland. The Forest Enterprise is restoring the forest to its natural state. This is a difficult task, involving the removal of all non-native species from the forest and encouraging the natural regeneration of native species. To encourage pine natural regeneration the deer population in the area was reduced to five deer/100 ha. There are some areas of good Scots pine natural regeneration but non-native species, especially Sitka spruce and western hemlock are also regenerating. This is a problem with no easy solution, contractors were being hired to uproot unwanted seedlings.

Jim Gillies explained to us the importance of the forest for wildlife conservation, being home to rare red wood ant and the even rarer capercaillie. The capercaillie is the largest member of the grouse family and is solely dependant on Scots pine as its food source. Twenty five km of deer fencing in the forest had been taken down to aid in conservation, as the capercaillie is a low flying bird which suffers high mortalities following collisions with deer fences.

We moved to Faskally Forest, north of Pithlochry where we met our leader Charlie Taylor, Forest District Manager for the Tay area, to view a good example of continuous cover forestry and the management of a busy recreation facility. Situated in an area with a forestry culture and tradition, Faskally forest was the property of the Earl of Brolben in the 1600s and the Duke of Atholl from the 18th century. It was during the18th century that the Duke planted European larch on the site. The 34 ha forest consisting mainly of pine and larch was purchased by the Forestry Commission in the1950s and Faskally House was converted to a forestry training school. It was at this time that the forester Mark Anderson propounded his theory of continuous cover forestry. An intensive management plan for the forest was undertaken with a lot of the work being done by students. The plan involved felling trees in equal area plots each year over a over a 128-year conversion period. Although the training school was closed in the late 1960s the forest is still managed on a

continuous cover forestry basis, but the management plans have been scaled down over the years due to lack of manpower. Managing the forest in this way has entailed:

1. getting timber gangs used to small felling areas;
2. using 'parent extraction racks' at 20 to 25 m intervals;
3. using short pole timber extraction (in the past full pole lengths were skidded out);
4. scarifying clearfelling sites to aid natural regeneration, with some planting taking place where necessary;
5 adapting yield models to fit non-routine forest management;
6. endeavouring to receive a good return on harvested wood due to varied log size;
7. converting the forest to the original species, beech, Douglas fir and Norway spruce, with Scots pine on some of the more open areas.

A bonus of continuous cover forestry is that less weed control is needed due to the retention of an over storey.

The forest is also important from a recreational point of view. Being situated close to Pithlochry, a booming tourist centre, the forest receives between 70 and 80,000 visits a year. This entails managing the forest to cater for different uses. A carpark and walks have been provided in the forest while it continues to be managed on a continuous cover basis.

Ari van der Wel (Jr)

Friday 10th September

The beautiful morning afforded an opportunity to view forestry in the Southern Scottish Highlands area of Sterling and in particular, the Trossachs Region, known as 'Rob Roy Country'.

The Trossachs are designated an area of outstanding natural beauty. Since the early 19th century. They have had a reputation as Scotland's first and most enduring holiday region, providing sharp contrasts between Lowland and Highland landscapes as represented by it's lakes, craggy mountain tops and deep cut, forest filled glens.

Within the Region, Forestry Commission woodlands are managed by the Forest Enterprise, Aberfoyle Forest District, South Scotland Region. The high amenity value of the forests is supported by active management, underpinned by high conservation values. The terrain features a diverse cover of woodland types and tree species. These range from remnants of native broadleaved woodland to commercial coniferous forestry, occurring on a variety of habitats, from peatlands to high, exposed hillsides. There are also areas where new planting and/or natural regeneration is helping to recreate sustainable broadleaved and coniferous woodland habitats.

The theme for the day's itinerary was native woodland restoration, felling and landscape design planning, reforestation using natural regeneration and new planting methods in sensitive landscape areas, and the adoption of continuous cover forestry systems to avoid the impact of clearfells in areas of high recreational use.

Following an overnight stop and an early departure from the pleasant town of Pitlochry, we journeyed southwards, taking the scenic lake route to the Trossachs Pier Visitors Centre, located under the shadow of Ben A'an on the eastern edge of Lake Katrine, where our hosts for the morning were West of Scotland Water.

At the Lough Katrine Native Woodland Restoration Project we were met by Nick Mainprize, Forestry Commission, Perth Conservancy, George Browne, Manager, West of

Scotland Water and Chris Perkins, Environmental Consultant, West of Scotland Water. In his welcome address George Brown outlined the importance of the Lough Katrine and its catchment. It is one of a group of reservoirs which have provided water to the city of Glasgow for over 100 years. The catchment comprises 9,200 ha; it is managed by West of Scotland Water and includes a 220 ha SSSI, habitats of international importance, a National Scenic Area and a landscape with facilities enjoyed by over 180,000 visitors annually.

West of Scotland Water's prime objective is to protect the environment from erosion/run-off by providing sustainable protection forests, comprising native species such as downy birch and sessile oak. A detailed environmental statement supports an increase in native woodland cover from 8% to 11% within the catchment.

The coniferous plantations owned and managed by West of Scotland Water form the predominant landscape surrounding the lake catchment. Due to the maturity of the plantations and to avoid the onset of windthrow, a restructuring process involving the felling and removal of 22,250 m^3 was proposed by West of Scotland Water in May 1999, utilising the latest cable crane extraction techniques to reduce ground disturbance.

George Browne and Chris Perkins outlined that as part of the felling and design process, the main objective of the reforestation plan was to increase the area of native woodland by natural regeneration and/or planting. This was to create biodiverse protection woodlands which will improve the hydrology, landscape, wildlife, flora and fauna of the area.

Natural regeneration was the preferred method of establishment to ensure that the new woodlands mimic those which previously existed. Some 165 ha are to be established using this method with a further 118 ha by planting. The seed will continue to be collected from Lough Katrine's native woodlands in order to ensure a genetically pure base.

To facilitate the successful establishment in the regeneration areas it will be necessary to erect 14,500 m of deer fence and 8,450 m of stock fence over a five year period. Fence lines have been designed to reduce negative visual impact. The use of fertilisers will be minimal, used only in extreme circumstances and then subject to environmental impact assessment and foliar analysis. Use of herbicides for bracken control will be subject to contact application only.

Sheep numbers will be reduced in line with the new woodland developments. Archaeological features will be protected and managed. Woodland management, landscape, hydrology, farming, archaeology and ecology will be continuously monitored. Visitor access will be encouraged and developed via forest walks, cycleways, interpretation and improved visitor information. West of Scotland Water proposes to manage and conserve all the semi-natural woodland within the catchment over a 25-year period. This should ensure sustainable woodlands of high conservation and amenity value which will protect Lough Katrine's legendary water supply.

Following a briefing on the aims and objectives of the project we boarded the steamship, SS Sir Walter Scott, celebrating 100 years in service and last screw driven steamboat on Scotland's inland waters. We travelled 13 km to Stronachlachar along the lake's southern shore to view project works in progress at a number of points along the passage. In addition to the project works, the boat passage provided an opportunity to view historic sites such as Ellens Isle, Royal Cottage, Silver Strand, Factor's Island and the burial place of the Clan Mc Gregor.

Disembarking at Stronachlachar, we travelled alongside the scenic Lough Chon and Lough Ard to the Queen Elizabeth Forest Park, north of Aberfoyle. There we were met by

Peter Forde, District Forester, Environment, and Stuart Chambers, District Forester, Planning and Design. Perched high up on the Duke's Pass on the edge of the Highlands overlooking the Forth Valley, the Queen Elizabeth Forest Park (QEFP) has some of the most spectacular scenery in Scotland. Mountains and lakes, forest and open hill ground provides for a wide range of outdoor activities as well as providing varied habitats for many wildlife species. Recently declared as a National Park, the Park currently provides extensive waymarked walks and cycle trails, two touring caravan and camping sites, a self catering log cabin site and a visitor centre. Approximately 1.25 m visitors utilise the Park annually and the visitor's centre caters for 125,000 visitors/season (open from March until mid October).

Following lunch, our hosts, Peter Forde and Stuart Chambers, briefed the tour party on current management practices in the park. The Highland Fault Boundary, marking the merger of Highland and Lowland woodland and tree species, cuts through the park. As a result, current and future management planning and practices must cater for variation in woodland habitats, plus the amenity and recreational needs of the visitors. They outlined the major characteristics of the park which comprises 20,000 ha of mixed broadleaved/coniferous woodland which are managed primarily on a commercial basis by the Forest Enterprise. In addition, management has responsibility for a further 9,000 ha of woodland outside the Park boundary which includes 22 SSSI, mainly remnants of old oak woodlands planted since the 1820s. In recognition of Forest Enterprise's commitment to sustainable forest management, the strategic forest plan has as its primary objective to increase the area of native woodland. A secondary objective is to replace exotic conifers with native Scots Pine. The final objective is to replace current clearfelling systems with continuous cover systems.

Based on these objectives a strong emphasis is now placed on the preparation of felling and design plans in all of the areas to be treated. In the adoption of continuous cover forestry, felling coupes in the future will vary from 0.2 ha (minimum) to 2.0 ha (maximum). As part of the design process, reforestation plans will make provision for the introduction of native broadleaved and coniferous species.

Following the briefing session, the party was afforded the opportunity to tour the Park where a number of stops were arranged for discussion on a wide variety of topics regarding the implementation and application of sustainable forest management in the National Park.

In the course of the tour, the leaders identified that the changeover to continuous cover forestry in QEFP presents a challenge for management in the future. Based on the existing even aged structure of these largely mature and predominately mixed coniferous stands it is anticipated that the changeover will take many years to achieve. As to how best to achieve the changeover process a number of felling/selection systems are currently under investigation at QEFP. These include:

- shelterwood system, the forest regenerates under its own shelter,
- uniform system (seed tree method),
- group system,
- irregular shelterwood,
- strip systems: shelterwood strip, strip and group, wedge system,
- selection system for light demanding species.

It was acknowledged that continuous cover forestry experiments are still in the initial developmental phase. However, based on similar trials elsewhere it is anticipated that:

- natural regeneration will be difficult to manage,
- deer culling/fencing is imperative,
- soil preparation (scarifying) will be necessary,
- new planting to aid natural regeneration will be required,
- establishing young crops will take longer,
- the management level required will be more intensive;
- harvesting costs higher than for clearfelling systems.

The visit to the QEFP was most informative and pleasant owing to the enthusiastic contributions provided by the leaders in outlining sustainable forest management processes and practices in the park. It provided an apt conclusion to our Study Tour of Scotland, highlighting the fact that sustainable forest management and FSC certification is now a reality. All stakeholders should be involved in the process and the visual impact of felling and species mix must be considered. By implication, Irish timber growers and forest managers must now be prepared to embrace the challenges which sustainable forest management presents, and draw on the experience gained in the Scottish Highlands to date.

We then retired to our hotel at Drymen where we celebrated the annual dinner of the Society. The following morning we were up bright and early and headed for Glasgow for our departure to Belfast and Dublin.

Eamon Larkin

Participants

M. Aherne, T. Collins, J. Crowley, J. Doyle, A. Duffy, J. Durand, K. Ellis, C. Farmer, P. Flanagan, J. Fleming, B. Flynn, T. Gallinagh, J. Greehy, C. Hanley, G. Hipwell, E. Larkin, S. Manahan, T. Mannion,(President), T. Mc Donald, J. Mc Loughlin,(Convenor), P. Mc Closkey, K. Mc Donald, B. Monaghan, P.J. Morrissey, F. Nugent, M. O'Brien, R.Ó Cinnéide, C. O'Donovan, E. O'Keeffe, B. O'Neill, T. O'Regan, P. O'Sullivan, M. O'Sullivan, T. Purcell, M. Roche, J. Treacy, A. van der Wel Jr, T. Wilson.

The Study Tour group listent attentively to a Scottish host