Progress Reports 1973–79

by the

Forestry Commission

of

GREAT BRITAIN

and the

Forestry Division

of

The Department of Agriculture for NORTHERN IRELAND

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PROGRESS REPORT 1973-79 BY THE FORESTRY COMMISSION OF GREAT BRITAIN

CHAPTER I

FORESTRY POLICY

1. Organisation and Objectives

1. The Forestry Commission of Great Britain is a Government body established under the various Forestry Acts, 1919 to 1963 (consolidated in the Forestry Act 1967). Further provisions were enacted in 1979.

2. The Forestry Commission is directly responsible to the Minister of Agriculture, Fisheries and Food in England, and to the Secretary of State for Scotland and the Secretary of State for Wales. The three Ministers act jointly in matters of common concern for forestry in the three countries.

3. The Forestry Commission is financed from the Forestry Fund which was constituted by Parliament in 1919. All sums of money received by the Forestry Commissioners in respect of the sale of timber or in exercise of their powers and duties are paid into the Forestry Fund together with an amount 'voted' annually by Parliament. All salaries, pensions and expenses incurred by the Forestry Commissioners in the exercise of their powers and the performance of their duties are paid out of the Forestry Fund. All matters relating to the Fund are regulated in such a manner as the Treasury directs by minute to be laid before Parliament.

4. The Forestry Commission's responsibilities are regarded as falling into two main areas, the Forestry Enterprise and the Forestry Authority. Separate accounts are kept for each.

The Commission's objectives as the Forestry Authority are currently defined as follows:

To advance knowledge and understanding of forestry and trees in the countryside

To develop and ensure the best use of the country's forest resources; and to promote the development of the wood-using industry and its efficiency

To undertake research relevant to the needs of forestry

To combat forest and tree pests and diseases

To advise and assist with safety and training in forestry

To encourage good forestry practice in private woodlands through advice and schemes of financial assistance and by controls on felling

The Forestry Commission as the Forestry Enterprise is required:

To develop its forests for the production of wood for industry by extending and improving the forest estate

To protect and enhance the environment

To provide recreational facilities

To stimulate and support the local economy in areas of depopulation by the development of forests, including the establishment of new plantations, and of wood-using industry

To foster a harmonious relationship between forestry and agriculture

In pursuit of the foregoing objectives, to manage the estate economically and efficiently, and to account for its activities to Ministers and Parliament

2. Policy

5. The Ministerial Statement of 24 October 1973, included in the Progress Report to the Tenth Conference, was followed by consultations between the Forestry Commission, the Government Departments concerned, the Forestry Committee of Great Britain (the accredited body representing woodland owners) and other organisations representing agriculture, landowners, planning authorities, and bodies interested in the countryside generally. These culminated in a further Ministerial statement, made by the Minister of Agriculture, Fisheries and Food, in the House of Commons on 5 July 1974, complemented by an explanatory leaflet published at the same time. This statement said:

"My Rt.Hon. Friends and I have decided to bring in new arrangements built upon the revised policy framework which was announced by the previous Administration on October 24 last and which included provision for the Forestry Commission's own operations. We attach great importance to the continued progress of forestry on these lines. In particular, we are introducing a new Dedication Scheme which has been devised after wide consultation with the interests concerned, including representatives of private forestry, planning, amenity, agricultural and other organisations. We aim to start on October 1. An explanatory leaflet has already been prepared, and copies are being placed in the Library of the House. Details of the arrangements are being notified to the European Commission.

Owners entering the Scheme will accept a continuing obligation to manage their woodlands so as to secure sound forestry practice, good land use (including effective integration with agriculture), environmental benefits and provision of such opportunities for recreation (including provision for public access) as may be appropriate. In return they will receive a basic grant of £45 per hectare (£18.21 per acre) payable after approved planting of an approved crop. For land approved for planting with hardwoods, and planted so as to establish a hardwood crop and give a predominantly hardwood appearance in the landscape over the greater part of the woodland's life, a supplementary grant of £125 per hectare (£50.59 per acre) will be payable in addition.

The Forestry Commission will consider for entry into the Scheme both existing woodlands and bare land for planting, providing it normally extends to at least one hectare (approximately 2½ acres). For the entry into the Scheme of areas of ten or more hectares (approximately 25 acres), there will be a legal instrument of dedication under which, at the time of felling, either party will be able to exercise an option to end dedication. Similar, but less formal contracts are proposed for areas of less than ten hectares. In either case a successor in title will customarily be invited to take up his predecessor's rights and obligations under a fresh agreement. Owners will be entitled to retain their existing rights and obligations by remaining under the previous Schemes, or they can transfer into the new Scheme any area which meets its requirements.

In considering applications, the Commission will consult the Agricultural Departments, local planning authorities, and other interests concerned, as appropriate, with the object of ensuring that land use, agricultural, amenity, recreation and nature conservation requirements are satisfied. They will also consult the planning and other authorities over environmental issues when considering owners' plans of operations. In handling individual grant applications and felling licensing, the Commission will endeavour, as at present, to secure the agreement of all parties concerned. However, in cases where differences of view remain, the Commission will invite the appropriate Regional Advisory Committee to assist them in the process of reconciling views; and if this further procedure fails to produce a settlement acceptable to all concerned, the Commission will refer the case to Ministers for decision. The Commission will also consult Regional Advisory Committees before commenting upon regional structure and local plans. In the meantime, steps are being taken to reconstitute the Regional Advisory Committees to include representatives of agriculture, planning and environmental interests, and the Forestry Commission will be announcing further details in due course.

The Government believe that the environmental safeguards built into this new Scheme will operate effectively, and in a manner which will command the confidence of Local Planning Authorities and, indeed, of all those having a special interest in the environment."

6. The Government is currently (June 1980) reviewing certain aspects of forestry policy and a statement is expected before the autumn.

3. Commission Policy Statements

7. The Commission's objectives, summarised in paragraph 4, were first published in its 1973-4 Annual Report. The supporting commentary was expanded in 1978 and the objectives republished in the 1978-79 Annual Report. They have also been published in a booklet, copies of which will be made available to those attending the Conference.

8. The Commission also published last year two policy statements in booklet form entitled *The Commission's Landscape Design Policy* and *The Forestry Commission and Nature Conservation,* copies of which will be available to Conference delegates.

4. The Wood Production Outlook in Britain - a Review

9. The concern throughout the world about the future availability of finite resources has emphasised the need for appraising the balance of wood demand and supply in the long term, and in particular its implications for wood production and forestry strategy in Britain, which is heavily dependent on imported supplies of wood. The Commission therefore invited a group of officials - drawn mainly from its own staff, but including representatives of the Department of Industry and the Princes Risborough Laboratory of the Building Research Establishment - to review wood production in Britain up to the middle of the next century, a timescale never attempted before. The review, entitled *The Wood Production Outlook in Britain*, was circulated as a consultative document in March 1978 in order to stimulate debate. It aroused widespread interest and constructive comments were received from over 100 individuals and organisations concerned with forestry and the environment. In general, there was broad support for the wood resource arguments and the case for expansion set out in the report, although it was recognised that decisions on the extent and rate of expansion would have to await the outcome of further discussions with agricultural and environmental interests.

5. Census of Trees and Woodlands

10. Work began on a census of trees and woodlands in the spring of 1979. One of its major objectives is to produce a clear picture of the distribution of Britain's woodlands and their potential timber production to assist in planning the expansion of existing wood-using industries and the location of new ones. It will also provide local authorities and others with information on numbers and species of trees, including non-woodland species, and their current condition, from which subsequent assessment can monitor change.

11. Data from the woodland survey will be combined with those already held for Commission woodlands and for private woodlands in the dedication schemes to produce an updated assessment of the total area of woodland in Great Britain. Summaries of the tree and woodland populations will also be provided for each county in England, for counties and larger districts in Wales and for regions, districts or groups of districts in Scotland. The survey teams started in the south of England, and will work through England and Wales to finish in Scotland by early 1982. The results should be published towards the end of 1982. Brief details of the survey methods are given in paragraph 73.

6. Private Forestry Taxation and Grants

12. Details are to be found earlier in this Report of the new Basis III Dedication Scheme which commenced on 1 October 1974. Like its predecessors, it had as its main elements an undertaking by the owner to manage his land for productive forestry under a plan of operations approved by the Forestry Commission and the provision of grant-aid for planting; the new scheme did not, however, provide for annual management grants. Up to 31 March 1979, some 80,000 hectares of land had been accepted into the new scheme. The area remaining in the Basis I and II Schemes and the Approved Woodlands Scheme, which were closed to new applications in June 1972, is 521,000 hectares.

13. The introduction of Capital Transfer Tax in 1975 was largely blamed by the private sector for the sharp drop in private planting which first manifested itself in that year. As a result of continuing representations, the Government granted, in 1977 and 1978, a number of tax reliefs for woodlands changing ownership on death which have been acknowledged by private woodland interests as being of major importance. The grant rates were also raised substantially in October 1977 as part of a package of measures aimed at encouraging private forestry to play an appropriate part in the rural economy, in harmony with the needs of agriculture and the environment. Besides the increases in the grant rates, these measures included the introduction of a management grant for woodlands within the Basis III Dedication Scheme, the closure of that scheme to areas of less than 10 hectares and the re-introduction of a small woods scheme. Special measures were also introduced to encourage the rehabilitation of unproductive woodlands and the extension of the native pinewood areas in Scotland.

14. There is evidence that the improvements made over the last few years in the support arrangements for private forestry are having the desired effect of increasing confidence and restoring private planting to a reasonable level. The improvement is not yet fully shown in the private planting figures, since it takes upwards of three years for owners' planting intentions to be reflected in the statistics, but the upward trend is recognised and the Basis III applications are currently running at their highest level since the scheme was introduced in 1974.

15. A study has recently been completed into the administration of private woodlands grants and the control of tree felling with a view to simplification and staff savings. The report of the study is now being considered by the Government.

7. Forestry and the European Economic Community

16. The United Kingdom's membership of the EEC has had no major effect on forestry. There is no common forestry policy in the EEC, although certain forestry measures are possible in the context of other policies. The extent to which forestry measures are possible under the Common Agricultural Policy is, however, limited by the fact that wood and wood products are not among the products to which the policy applies. It is partly for this reason that a proposed Directive to encourage afforestation in the context of improving agricultural structures has not been pursued.

17. In December 1978, the EEC Commission presented to the Council of Ministers a Communication entitled *Forestry Policy in the European Community* which analysed the principal forestry problems in the Community. The EEC Commission suggested that the objectives and principles listed should be taken into account by Member States in the formulation of their domestic forestry policy and that the Council of Ministers should adopt a Resolution to that effect. Within Great Britain, the document was circulated to private sector organisations, trade unions and the University Forestry Departments; the views expressed are being taken into account in considering the attitude the United Kingdom should adopt on the proposals. Consideration of the Communication, the draft Council Resolution, and a draft Council Decision to set up a Forestry Committee comprising officials of each Member State, has been taking place in Brussels at official level. UK Ministers will consider the matter when a clearer picture emerges.

18. EEC Directives modifying the marketing regulations for forest reproductive material - seed, parts of plants and young plants - were implemented in Great Britain on 1 July 1977.

19. The Directive on the harmonisation of plant health controls was adopted by the EEC Council of Ministers on 21 December 1976 but there was some delay in its implementation in all Member States because of certain technical matters requiring clarification, particularly the provisions relating to the control of North American oak wood imports designed to prevent the introduction of oak wilt (see paragraph 21). Two amending Directives were adopted in March 1980 and the provisions relating to forest trees, wood and bark were brought into operation by the Forestry Commission on 1 May 1980 (see paragraph 22).

8. Plant Health

20. Despite control measures exercised by local authorities and restrictions imposed by the Forestry Commission on the movement of elm with bark, Dutch elm disease has continued to take its toll of elms in Britain. In southern England, 15½ million out of an estimated original 23 million elm trees have now been killed by the disease. There is no known method of eradicating Dutch elm disease, although its spread can be slowed by sanitation felling in the lightly affected parts of the country. In this way it is hoped that the mature elm population might be conserved for a longer period in amenity areas, particularly within towns, thus spreading the cost of felling and allowing new trees of different species to be established before the elm cover is markedly reduced. So far, the second aggressive strain has not reached Britain.

21. Public concern has been expressed about oak wilt (known only to occur in USA) and the chances of its being brought into this country on oak wood imports from North America. Although pathologically this is considered an extremely remote possibility, plant health safeguards have been introduced requiring stringent measures to be applied before shipment; the bark to be removed and an additional treatment applied - drying, disinfecting or squaring (to remove wane).

22. The regulations controlling oak imports are included in new legislation, the Import and Export of Trees, Wood and Bark (Health) (Great Britain) Order 1980, which came into force on 1 May 1980 to implement the EEC Directive mentioned in paragraph 19. A complementary Order, the Tree Pests (Great Britain) Order 1980, is designed to cope with the situation where, despite import controls, a non-indigenous pest or disease arrives and establishes a foothold in this country requiring urgent remedial action.

23. The hot dry summer of 1976 weakened many broadleaved trees, particularly beech in southern England, and some deaths occurred a year or so later. Considerable efforts were made by the Commission to give a balanced view of tree diseases and disorders to allay fears that devastating problems were likely to occur in a wide range of broadleaved trees.

24. Reports were received in 1976 of damage done to Lodgepole pine plantations by Pine beauty moth (*Panolis flammea*). The control measures taken, and their results to date, are described in paragraph 47.

9. Existing Forest Estate

25.

		Thousands of hectares
Total land area of Great Britain		22,752
Area permanently devoted to forestry		2,014
Area under forests - total		2,014
Natural forests		-
Man-made forests		2,014
State forests	875	
Private woodlands	1,139*	
Principal types of forests		
Conifer high forest		1,331
Broadleaved high forest		368
Coppice and coppice with standards		27
Unproductive woodland		288

*Of the total area of privately owned woodlands at the end of 1979, some 509,300 hectares were managed under existing dedication schemes and schemes for a further 57,100 hectares were in course of preparation. Some 35,300 hectares continued to be managed under the Approved Woodlands Scheme which was closed to new applicants in 1972.

10. Technical Aid

26. No technical aid or other services have been received.

11. Employment and Recruitment

a) Public Sector

Non-Industrial Staff

27. During the period under review the Forestry Commission's non-industrial staff decreased by 162, as shown below:

	January 1973	*December 1979*
Forest Officers	204	195
Forester Technicians	1015	922
Other Professional, Technical and Scientific	319	339
Administrative and Clerical	827	747
Totals	2365	2203

28. The significant reductions among Foresters and the Administration Group arise mainly from continuing amalgamations of smaller forests and the rationalisation of procedures, and have been achieved despite increasing harvesting programmes.

29. Entry qualifications for recruitment to Forest Officer posts have been maintained and competition has been strong. Recruitment of technically trained Foresters has fallen slightly short of the Commission's needs, but it is hoped that current plans for an additional diploma course will result in an improved supply of recruits in about three to four years time. Recruitment of staff in other disciplines has not posed major problems.

Industrial Staff

30. Since 1972 the number of forest workers directly employed by the Commission has remained constant at around 6,000, which is in sharp contrast to the decline in numbers during the late '60s and early '70s. Although new planting programmes have reduced considerably over the period and fewer men have been required for establishment and maintenance work, this has been offset by a larger labour force being required to cope with increased harvesting programmes. The indications are that the number of forest workers may increase over the next few years.

31. A great deal of emphasis has been placed on training and safety following the passing of the Health and Safety at Work etc Act 1974. Safety representatives have been appointed at almost every forest and Safety Committees set up in many areas. In addition a Forestry Safety Council was formed in 1974 with representatives from the Commission, private forestry, timber merchants, the trade unions and the Forestry Training Council; members of the Health and Safety Executive also attend the Forestry Safety Council meetings. Under its terms of reference the Council is required to promote safety by every means, and it has published some 30 Safety Guides to date covering a wide variety of forest operations.

b) Private Forestry

32. In the private sector, forestry companies and firms of forestry consultants continue to provide lively competition for the services of both forestry graduates and technician Foresters.

33. Some 23,000 people are employed in private forestry and in the wood processing industries using British timber.

CHAPTER II

FOREST MANAGEMENT

1. Seed Selection and Storage : Tree Improvement

34. The Forestry Commission administers the Forest Reproductive Material Regulations which brought into operation in Britain the EEC Directives covering the marketing of forest tree seeds and plants. The original 1973 Regulations were superseded by the 1977 Regulations, the purpose of which is to ensure that seeds, cuttings and plants of prescribed species are selected from vigorous, high-quality, healthy trees.

35. Information on the compatibility of the flowering times of different clones has been used in planning new seed orchards. It was decided in 1974 to embark on a seed orchard programme which would ensure that all the Commission's seed requirements for the four principal species used would be met before the end of the century from seed orchards of progeny-tested clones.

36. Seed supplies have been maintained partly by collections at home and partly by purchases from abroad. Conversely, the Commission has had some success in selling surplus conifer seeds abroad. In 1979 a team was sent to western Canada to make collections of certain provenances of Lodgepole pine. The importation of seed of *Nothofagus* species in 1976 has allowed the setting up of trials.

37. The main development in nursery work has been the extension of the use of irrigation to improve germination and subsequent growth. The planned increase in restocking will lead to increased demands for three-year old plants.

2. Management Aspects

38. Over the period, new planting by the Forestry Commission fell steadily from 19,000 to 12,000 hectares a year, while restocking fluctuated around 3,500 hectares. Total annual planting thus fell from 23,000 to 15,000 hectares against the programme of up to 22,250 hectares a year of new planting and restocking combined set up Ministers in 1973. Eighty-five per cent of the new planting has been in Scotland, with slightly more of the balance in England than in Wales. England and Scotland have each recorded about 40 per cent of the restocking, and Wales the remaining 20 per cent.

39. The fall in the area of new planting has been largely due to the difficulty in acquiring suitable land. Improved hill sheep-farming prospects have led to a reduction in suitable land on the market and there has been competition with the private sector for what land has been available, except in 1975 and 1976 when a loss in confidence in the private sector enabled Forestry Commission acquisitions to match its new planting programme. Generally, however, the Commission has had to rely on its plantable reserves which have fallen in consequence from about 110,000 to less than 80,000 hectares. Almost all the land acquired has been in Scotland, the average price rising from £60 to £300 a hectare over the period.

40. The main species planted were:

Sitka spruce	-	54 per cent
Lodgepole pine	-	20 per cent
Larches	-	12 per cent

Broadleaved planting by the Commission has remained at 1.0 per cent to 1.25 per cent a year, ranging from about 0.5 per cent in Scotland to 5 per cent in England. Spacing at planting has remained unchanged in the range of 2.1 to 2.4 m.

41. During the period under report the area fertilised has fluctuated between 40,000 and 50,000 hectares a year. A reappraisal of fertilising policy was carried out in 1979. Prescriptions for initial fertilising (i.e. during the first six to eight years) have been made on the basis of extensive experiments, and foliar analysis has been used to assist in preparing prescriptions for aerial fertilising. There is evidence to suggest that fertilising of pole stage crops can be beneficial in some situations, but more work is needed to establish the circumstances in which it will be financially justified.

42. Losses in restocking are causing concern and ways of reducing them to a more acceptable level are being investigated.

3. Protection

a) Against Mammals and Birds

43. At the beginning of the period there was concern over the extent of bark stripping by Grey squirrels, particularly on 10-40 year old broadleaves (notably beech and sycamore) in the southern half of Britain where the Forestry Commission has more such crops than the private sector. A joint publicity campaign was undertaken with the Ministry of Agriculture to concentrate control in and around susceptible crops just before and during the four-month damage period of April-

July, and an Order was introduced permitting the controlled use of the poison Warfarin in those counties of England and Wales where Red squirrels are not present in significant numbers. As a result, damage has been reduced to an acceptable level.

44. As they develop an immunity to myxomatosis, rabbits have again posed an increasing problem, particularly on the drier east side of the country where the use of rabbit netting to protect planting areas has sometimes been necessary.

45. More attention is being given to the control of the growing populations of woodland deer, which are now a problem everywhere except in Wales. Roe deer numbers have increased with the expansion of the area of woodland habitat; the invasion of woodlands by Red deer has increased because of the reduction of their open range and a succession of mild winters. In 1977 a joint programme of research was set up with the Red Deer Commission and the Institute of Terrestrial Ecology to study census techniques, damage assessment, deer behaviour and short-term and long-term management of Red deer in woodlands.

b) Against Insects and Other Pests

46. There has been no significant change in the status of the Spruce sawfly (*Gilpinia hercyniae*), the Larch sawfly (*Cephalcia lariciphila*) and the Pine looper moth (*Bupalus piniaria*), which were mentioned in the last report, but a Larch bark beetle (*Ips cembrae*) has become established in east Scotland and Pine beauty moth (*Panolis flammea*) has destroyed substantial areas of Lodgepole pine throughout Scotland. Pine sawfly (*Neodiprion sertifer*) was a noticeable defoliator in some areas but its effects are debilitating rather than lethal. The Larch bark beetle kills weak trees and could be a serious pest if both it and the Larch sawfly become established in the same area.

47. Although Pine beauty moth is common in Britain it had not caused serious damage to plantations until 1976 when about 180 hectares of Lodgepole pine in north Scotland were severely damaged. Attempts to control the pest biologically by spraying with a bacillus preparation were unsuccessful and 240 hectares of Lodgepole pine were destroyed in 1977. In 1978, after pupal counts during the preceeding winter, 5,000 hectares in north Scotland were treated from the air with fenitrothion, after clearance under the Pesticides Safety Precautions Scheme. In 1979 further outbreaks in five more forests throughout Scotland were sprayed in the same way, and in 1980 about 1,000 hectares were treated. The treatment appears to have been successful and monitoring by the Nature Conservancy Council,

the water authorities and other interested bodies suggests that there have been no ill effects on the environment. In addition to pupal and egg counts, qualitative population monitoring with the aid of pheromones has been used. The evidence is that outbreaks are initiated only in Lodgepole pine on deep unflushed peats. There are few sites in the private sector which are likely to be susceptible to Pine beauty moth infestation, but the Commission is keeping a close watch on the situation.

c) Against Diseases Caused by Viruses, Bacteria, Fungi and Higher Plants

48. Beech bark disease, caused by the fungus *Nectria coccinea* introduced by the Felted beech coccus insect *Cryptococcus fagi*, has become the most serious disease of beech. The fact that it has led to severe damage in many 30-40 year old beech stands in southern England is causing concern because the considerable areas of beech planted after the war are now reaching that age. The disease appears to be most serious among pure beech of high yield class growing on soil of good nutrient and moisture contents.

d) Against Fire

49. Unfortunately the early promise of sodium algenate to produce 'viscous water', referred to in the previous report, did not materialise. Although technically effective, in practice the cheap dispersable powder proved to be unsuitable for field use.

50. The drought in 1976 resulted in exceptional summer fire danger during which 2,191 hectares of plantation were destroyed, more than in any year since 1942. For the first time crown fires were significant and some forests were closed to the public.

e) Storm and Other Forms of Damage

51. The summer drought in 1976 was so sustained that it caused serious losses in mature broadleaved trees in southern England during the following years, particularly in beech.

52. The third most severe windthrow in the history of British forestry occurred on 2 January 1976, when a westerly gale swept across central Wales, the Midlands and East Anglia blowing down about 900,000 cubic metres of standing timber in Forestry Commission and private forests. Harvesting resources were concentrated in the areas affected and clearing and marketing of the timber was achieved in an orderly fashion; all the windthrown timber was cleared by the end of 1977.

53. The winters of 1977/78 and 1978/79 were severe, the latter being the worst since 1962/63. Prolonged heavy snow caused damage to crops; it also allowed Red deer to gain access to fenced plantations in Scotland, but probably reduced deer numbers.

4. The Environment

a) Water

54. Recent work by the Institute of Hydrology comparing two adjacent catchments in mid-Wales, one comprising upland grassland and the other substantially forest, has drawn attention to the reduced water run-off from the forest area and the need to undertake similar studies in areas with different climatic and vegetation conditions. The need to pay attention to the effects of forest operations, particularly fertiliser application and soil disturbance, upon water quality is also recognised.

b) Tourism and Recreation

55. The Forestry Commission's recreation policy, announced in 1970/71, was set out in the Progress Report to the last Commonwealth Forestry Conference. That Report also quoted the Ministerial statement made in October 1973 which said that the Commission would give still further emphasis to providing recreational facilities. A day visitor survey in the summer of 1977 indicated that about 15 million visitors spent an average of 1¼ hours at Commission car parks during the year and that a further 9 million stopped with their cars on roadsides adjacent to Commission land - an increase of 50 per cent over the estimate in 1967. At the main Commission camping and caravan sites the number of camper nights increased from 1.10 million in 1972 to about 1.55 million in 1978.

56. From the start of the period covered by the present Report progress was made in implementing the recommendations of the New Forest Joint Steering Committee's report *Conservation of the New Forest*. This concentrated in particular on the establishment of car-free areas associated with day visitor sites and a change from camping in the forest at large to controlled camping in two fully-equipped sites and a number of informal, but well-designed, areas.

57. In 1974/75 the Commission formed a Forest Design Branch to assist in planning and co-ordinating the development of forest information centres and other interpretive facilities. One product has been the publication of 9 'teacher packs' primarily for the use of school parties.

58. Charges for the use of Commission roads for motor-car rallies had to be increased because of the considerable damage caused by rally cars. It was decided not to increase the limited number of rallies because of the extent to which they conflict with a basic aspect of Commission recreation policy to provide facilities for informal recreation and the enjoyment of quiet pursuits.

59. Consultants who were commissioned in 1972/73 to undertake a feasibility study into the development of low-cost tourist accommodation on Forestry Commission land concluded that nearly half the Commission's forests have the right setting and recreational potential. They considered that there were suitable sites for some 7,300 self-catering forest cabins in clusters or small villages and for 11 forest lodges offering full hotel service. Subsequent development has been restricted to a fraction of this potential, however, because of financial constraints.

60. Progress during the period in the development of the main day-visitor and overnight facilities was as follows:

	31/3/73	*31/3/79*
Camping and caravan sites*	16	35
Picnic places	250	609
Forest walks and forest nature trails**	331	622
Visitor centres	21	29
Arboreta	22	25
Forest drives	6	7
Forest cabins and holiday houses	41	167

*In addition the Forestry Commission provides:

i) special arrangements in the New Forest for camping in 17 specified enclosures;

ii) 42 sites for youth camping;

iii) five sites leased to the Caravan Club and two sites to the Camping Club of Great Britain and Northern Ireland, and

iv) facilities for caravan rallies.

**Includes five with specially graded paths for wheelchairs, one of which caters for blind visitors.

61. To assist regional authorities in Scotland to formulate strategies for sport, recreation and tourism, the Forestry Commission, the Countryside Commission for Scotland, the Scottish Tourist Board and the Scottish Sports Council sponsored a two-year research programme, known as the Scottish Tourism and Recreation Planning Studies.

c) Amenity Considerations including Landscaping

62. Ministerial statements made during the period of this Report have recognised the need to create good visual amenity and to maintain the broadleaved character of the countryside where it already exists, notably in the southern half of England. Accordingly, the Commission has placed considerable emphasis on landscape design, particularly in sensitive areas, through the services of a leading landscape consultant and two full-time Forestry Commission landscape architects. Attention has also been given to the design of engineering workshops and forest depots, as well as visitor centres.

d) Wildlife and Conservation

63. The Commission's conservation policy is designed 'to improve the forests as wildlife habitats and to integrate balanced conservation and wood production in a pattern of good land use and sound management'. This has been pursued not only at sites where conservation has been identified as of special importance but over the Commission's forest estate generally.

64. Close liaison is maintained with the Nature Conservancy Council, the Ancient Monuments Inspectorate and other interested bodies. In 1977 the Nature Conservancy Council and the Natural Environment Research Council published a Nature Conservation Review identifying 735 sites of biological importance which merited safeguarding as a key part of the nation's wildlife heritage. These sites cover nearly 1 million hectares of land and include 60,000 hectares (6 per cent) of Forestry Commission land and, in Scotland alone, some 200,000 hectares of bare land of potential interest to forestry.

65. The Forestry Commission's long standing concern for the conservation of the native pinewoods of Scotland was taken a stage further when, after a symposium in 1975, the Commission and the Nature Conservancy Council agreed upon main lines of treatment and the Commission decided to draw up management plans for its significant native pinewood sites.

66. During 1977/78 the otter was afforded statutory protection in England and Wales. Although otters have probably not been hunted on Commission land for many years, the Commission extended the protection by formally banning otter hunting on all its land in Scotland.

CHAPTER III

SERVICES TO MANAGEMENT

1. Management Services

67. In connection with the planning of facilities for informal recreation, indices of potential demand and a variety of recreational survey techniques for assessing day visits and visitor-hours have been developed.

68. Following a reconstruction of the capital of the Forestry Enterprise in 1972, its performance over the quinquennium was assessed in 1977; and in the field of annual accounting, control by cash limits has been superimposed on the existing financial control system.

2. International Plant Health Control

69. The Forestry Commission regularly reviews all aspects of plant health and, in view of the growing importance of the subject, has recently appointed a full-time plant health officer to coordinate activities in this field. Mention has already been made in paragraph 19 of the EEC Directive on plant health controls and of the legislation to implement its provisions in Great Britain. The risks associated with the possible introduction of oak wilt, a disease showing some similarities to Dutch elm disease, have been studied in great detail to ensure that appropriate measures are taken to prevent its introduction into Britain.

3. Forest Inventory and Production Forecasting

70. Forest inventory surveys are carried out by the Commission's Field Surveys Branch on a 15-year cycle to update mapping and management information. Coverage has improved over the period through the increased use of aerial survey for boundary delineation.

71. To improve production forecasting, all Forestry Commission plantations were placed on a computer data-base in 1976. Information covering location, species, age, growth potential (yield class) and area are held by individual stands or sub-compartments, which, when combined with data on volume yield, optimum thinning/felling age and volume assortment, enables volume forecasts to be

produced by forests, with summaries for higher levels of management. The data-base is updated annually by local staff, with a full revision on resurvey.

72. Mensuration work has concentrated on the improvement of growth models for use in forecasting, the provision of special models to adjust forecasts to meet local management needs, the extension and rationalisation of sample plots to cover the full species and site ranges, and the setting up of a sample plot computer data-base.

73. As mentioned in paragraphs 10 and 11, the Forestry Commission is currently undertaking a national tree census to update the now unreliable 1965 data. Information on Forestry Commission and grant-aided woodlands is already available, and the census will sample 'other' woodland and non-woodland trees using a two-stage sampling system, including aerial photography. The less intensive ground surveys will provide information on species, volume and health.

4. Education and Training

a) Universities

74. Courses leading to degrees in forestry and allied subjects continue at the Universities of Oxford, Edinburgh, Aberdeen and North Wales. The syllabuses reflect a developing interest in the related land use aspects of conservation, amenity and recreation.

b) Forester (Technician) Qualifications

75. The main technician qualification in forestry is an Ordinary National Diploma (Forestry) awarded on completion of a three-year 'sandwich' course at the Cumberland and Westmorland College of Agriculture and Forestry at Newton Rigg. A new diploma course is being considered in Scotland which would be obtainable either by part-time study or by means of a full-time 'sandwich' course.

c) Staff Training

76. The Commission's training staff provide courses at two non-residential field centres and in the training suite at the new Headquarters building in Edinburgh. Training for Forest Officers and Foresters in the Forestry Commission includes courses on management, with emphasis on financial appraisals, budgetting and cost control. Some training of private sector Foresters in costing and allied matters is also provided by the Commission. The continuing

growth in technology and of legislative requirements, particularly in the field of safety, have increased the need for specialist technical training. Two new machinery training centres have been opened to cater for the training of operators and supervisors in the use of heavy extraction machinery.

d) Training of Forest Workers

77. The training of Forestry Commission industrial workers continues to be at the work-site. Training manuals are brought up to date regularly to ensure uniformity in instructional standards. Considerable research into the application of selection testing has been carried out in collaboration with the Industrial Training Research Unit at Cambridge and there has been an encouraging correlation between the results of tests for training suitability and performance under training. A testing service for training potential will soon be available to field managers to assist in the selection of operators of chainsaws and harvesting machinery.

78. Forestry Commission staff have continued to serve on a number of committees concerned with forestry qualifications and have maintained close liaison with colleges and other establishments concerned with forestry education and training.

e) Commonwealth Forestry Institute

79. The Commonwealth Forestry Institute continues to include the Oxford University Department of Forestry, the Unit of Tropical Silviculture, the Commonwealth Forestry Bureau and the Natural Environment Research Council's Institute of Invertebrate Virology. The last named will move into a new building in 1981. Permanent accommodation is being provided in the Institute for the Secretariat of the Commonwealth Forestry Association.

80. The Departments of Forestry and of Rural Economy will formally unite in October 1980 to form a Department of Agricultural and Forest Sciences; for some years they have been teaching a joint degree. Both Departments have new professors. The amalgamation will not weaken in any way the unique association of forestry organisations within the Commonwealth Forestry Institute, but will reinforce the contribution they can make to forestry in rural development and to agroforestry, in which fields it is hoped to build up a special association with the World Bank.

81. The Unit of Tropical Silviculture has expanded its work on fast-growing plantations species for the tropics and is developing work in the silviculture of indigenous tropical forests. This is reported in more detail elsewhere in

the Conference papers. Plans for placing the Unit of Tropical Silviculture on a more permanent footing and for moderate expansion have had to be temporarily shelved as part of the retrenchment in Government expenditure.

82. The Commonwealth Forestry Bureau has continued to expand its work to try to keep pace with the growth of scientific and technical literature. *Forestry Abstracts* was split in January 1978 by putting everything relating to harvesting and utilization into *Forest Products Abstracts*. After a period of staff upheavals, strong efforts are being made to revive the Bureau's non-abstracting activities, particularly the publication of Annotated Bibliographies and Review Articles. Along with the rest of its output, the Bureau's abstracts are now available through several 'on-line' services.

5. Forest Research and Development

83. There has been a continuation of much of the research mentioned in the 1974 Report. Further work on wind stability has included wind tunnel experiments on air flow patterns over topographic models, which have been compared with corresponding measurements in the field. Further evidence has been obtained which supports the view that uninterrupted lateral rooting and an undisturbed forest canopy provide stability, and this has led to experiments on forms of ground preparation which do not involve deep, spaced plough furrows. Dutch elm disease, Beech bark disease, *Fomes annosus* and the search for effective and environmentally more acceptable pesticides, herbicides and fungicides have been the subjects of continuing research. The Forestry Commission has also continued to collaborate with the Unit of Invertebrate Virology of the Natural Environment Research Council in preliminary work on the virus control of forest pests, and especially of the noctuid moth *Panolis flammea* which has become a serious pest of Lodgepole pine in recent years. The Commission has collaborated with the Institute of Terrestrial Ecology in studying the effects of trees on various site types.

84. A new series of field experiments on pole stage fertilisation has been accompanied by studies of the nutrient balance sheet in the forest and by investigations into the physico-chemical status of phosphorus in various soil types.

85. The tree breeding research programme is resulting in the production of an increasing number of progeny-tested parent trees of both general and specific

combining ability. Methods of vegetative propagation are being developed to 'bulk up' outstanding genotypes produced in the course of the tree breeding programme.

86. As an insurance for the future, the Commission's Research and Development Division are looking at alternative species which may be used for prudent diversification or to exploit silvicultural opportunities. Part of this work is associated with the arboricultural research contracts that the Commission is undertaking for the Department of the Environment and the Department of Energy.

87. Although the spread of oak wilt to Europe is considered unlikely, a British pathologist has spent a year in the United States investigating the disease, while in Britain the Institute of Terrestrial Ecology has been studying a possible insect vector, *Scolytus intricatus*.

6. Work Study

88. Work has continued on the development of mechanised systems in all aspects of forest management and harvesting operations. In forest management the development of low ground pressure crawler tractors and lightweight ploughs for use on soft peats has been achieved. Greater emphasis has been placed on mechanising harvesting operations, especially through the introduction of small thinning processors and in the evaluation of 'compact' processors for later thinnings and for clear felling. A switch towards shortwood working with the introduction of the new generation of forwarders - which have a much improved terrain capability, reduce manual handling problems and are matched to the processors - has meant a move away from skidders and the introduction of a new system of working in many areas. Work continues on improving the productivity of cable cranes in mountainous terrain. About 25 per cent of the staff effort has been involved with work measurement, producing Standard Time Tables for use by management in rate-setting and for planning purposes.

7. Publicity and Public Relations

89. Forestry has attracted a growing interest from both the general public and the media. The Forestry Commission's information staff, the Publications Officer and Librarian are regularly involved in assisting in the production of TV documentaries on forestry and with a growing number of popular books on the

subject. Schoolchildren now make about 5,000 requests each year for material to help them with educational projects, and in addition to printed matter the Commission gives out packets of tree seed and lends wood samples. Many education authorities now produce, in co-operation with the Commission, their own teaching packs, and the Commission provides facilities for associated field studies. Forestry displays at summer agricultural shows and winter leisure exhibitions continue to prove very popular and there is a steady demand from a wide variety of organisations for film loans and lectures.

90. Public interest in forestry can, to some extent at least, be attributed to a widening popularity of wildlife studies. This is reflected in media coverage, which the Commission has been able to develop to include the commercial and economic aspects of forestry. Public concern for the environment has also markedly increased, and with it the importance of seeing that forestry and the work of foresters is fairly presented.

CHAPTER IV

HARVESTING AND MARKET PLANNING

1. Coordination of Silvicultural Practices, Access and Harvesting Techniques to Achieve the Highest Net Returns

91. Care is needed to ensure that silvicultural operations intended to enhance growth do not result in undesirable effects on the quality of sawn timber, such as a reduction in wood density or an increase in knot size. Wider spacing, thinning methods and fertiliser regimes are therefore receiving particular attention to determine their effects on the quality of timber.

92. It has been evident for some time that the onset of wind damage in plantations with a combination of shallow soils and severe exposure is associated with thinning, and that unthinned crops on such sites are more resistant. Systems of windthrow hazard classification have therefore been developed to assist in determining those areas where it is advantageous to apply non-thin regimes. Such regimes are also employed in terrains with high logging and roading costs or where slow growth rates prevail.

93. The design and development has been completed of a hydrostatic skidder with radio-controlled winches for use in early thinnings. This machine, which has an

excellent performance on difficult terrain, is now in commercial production by Roadless Traction Ltd.

94. Investigations into harvesting techniques are being concentrated on the mechanisation of felling, debranching and processing. A number of debranching machines are in operational use as well as a small number of processors. As mentioned in paragraph 88, there has been a trend toward shortwood systems of harvesting using forwarders operating on roads of low specification. While this has resulted in a general move away from skidders, their use has nevertheless been extended, as their capability has improved, into some of the more difficult terrain where it has been customary to use cable cranes.

2. The Supply and Demand for Forest Products

95. Estimates of future wood production from Commission forests, covering a period of 20 years ahead, are reviewed and extended every 5 years, the last such revision being carried out in 1977-78. On that occasion a number of modifications were made to the forecasting procedures, extending the range of modifications to standard management practices that can be incorporated in the estimates. These include crop stability in relation to the risk of windthrow, the timing of road construction, recreation planning and landscaping. Such factors, which generally, but not invariably, have the effect of deferring yield, are in turn modified where necessary to take account of market planning.

96. Forecasts for privately owned forests are reviewed by the growers' organisations in association with Commission staff. The number of owners concerned and the range of management objectives which exist prevent the same standardisation of forecasting procedures that is feasible in Commission forests. Nevertheless, the procedures used have resulted in satisfactory estimates for market planning.

97. Estimates of actual removals and forecasted production for coniferous wood are given below :

CONIFEROUS WOOD

Million cubic metres overbark

	Removals			*Forecast of production (Annual Average)*		
	1970	*1975*	*1979*	*1982/86*	*1987/91*	*1992/96*
Forestry Commission	1.5	1.5	2.1	2.9	3.6	4.6
Private forests	0.7	0.7	0.8	1.2	1.5	1.7
Total	2.2	2.2	2.9	4.1	5.1	6.3

98. No firm figures are available for hardwoods, for which sources of supplies range from high forest to scrub and hedgerows. Current removals are about 1.3 million cubic metres annually and this is not expected to change significantly. However, the census of woodlands now in progress is expected to provide up to date information on the growing stock, which was last assessed in 1965. There have been many changes since then, the most significant being the losses caused by Dutch elm disease.

99. There have been considerable fluctuations in the demand for wood during the period since the last Report which has affected all major sectors of the wood consuming industry. The effect has been most marked in the demand for wood for pulping and particle board manufacture. These fluctuations have followed the trade and demand patterns experienced throughout Europe. More recently the continuing and increasing strength of sterling against the United States and Canadian dollars has tended to strengthen the competitive position of producers in those countries. One of the consequences is that pulpwood prices in Britain have remained depressed and, indeed, have declined in real terms, reflecting a trend in Europe generally. The demand for larger diameter wood for sawmilling has been consistent and less prone to the fluctuations experienced in other markets.

3. Short and Long Term Marketing Arrangements

100. There have been no major changes, but a number of innovations have been introduced. For sawlogs, a method of sale has been introduced which allows continuity of supply under contract over a three-year period. Such contracts are by competitive sale for one year's supply with indexed price adjustments during the rest of the contract period.

101. A scheme has been developed to encourage the amalgamation of sales from privately owned and Forestry Commission forests in order to provide larger scale lots of standing timber for sale, as well as some continuity of purchasing opportunities.

4. The Development of Markets to Achieve the Best Continuation of Products

102. Since the last Report a major expansion of pulping capacity in north-west England has been announced. This is to be integrated with the production of

paperboard and is scheduled to come on stream in 1981. In central Scotland, a medium density fibreboard plant is being constructed which is scheduled to come into production in the latter part of 1980.

103. The closure has been announced of the chemical pulp mill in northern Scotland, where pulping operations are expected to cease in mid-1980. Efforts to seek an alternative industry in the form of mechanical pulping integrated with newsprint production have not been successful so far. In the meantime, alternative arrangements are being made to market the available wood while opportunities for other developments are being sought.

104. Investment in the modernisation and expansion of capacity for softwood sawmilling has gathered considerable momentum since the last Report. There is increasing interest in the sawmilling of smaller diameter logs for lower value products and the expansion of markets for carcassing grades. Penetration of the construction market has been assisted by developments in machine stress grading and the full recognition of British timbers in grading standards and Building Regulations. A major study has been completed recently to assess the best market strategy for small diameter roundwood,and development opportunities have been identified on a regional basis. The main prospects are seen to lie in sawmilling, mechanical pulping integrated with paper production, and a number of wood-based panel products.

CHAPTER V

UTILISATION OF FOREST PRODUCTS AND FOREST PRODUCTS RESEARCH

1. Notable Changes and Developments Since 1972

a) Sawmills and Sawmilling Practices

105. During the period under review there have been many changes in sawmilling practices. Several new softwood sawmills have been built to take advantage of increasing log supplies, existing mills have been modernised or expanded, and, due to Dutch elm disease, many hardwood mills are beginning to convert softwood sawlogs. The result of all this activity is that in some regions sawlog demand currently outstrips supply.

106. Much of the expansion in sawmilling capacity has been at the small log end of the market. Several mills now use chipper-canters and chipper-canters

linked to twin-circular saws to produce pallet boards. Princes Risborough Laboratory conducted a mill survey to establish the accuracy of the early chipper-canters and ran a conference in 1974 entitled *The role of log profile chippers in the UK sawmilling industry*. Softwood sawmills are now beginning to produce significant quantities of carcassing timber and machine stress grading is being introduced into primary sawmills.

107. The majority of sawmillers are keenly aware of the need to maximise the conversion yield of saleable sawn timber obtained from sawlogs, and of the need to minimise the cost of producing the sawn timber. Princes Risborough Laboratory has developed a computer model to simulate the conversion of British softwood sawlogs, and a computer-aided conversion system suitable for installation in existing sawmills is in the final stages of development at the Laboratory.

108. Production costs are being lowered by increasing automation, reducing material handling and increasing production rates. This is being achieved by the use of through-feed machines such as twin-bandsaws and, in some cases, multiple circular saws to convert all medium and small sawlogs. Band headrigs with log carriages are, in many mills, reserved for the largest logs and frame saws have also made some inroad into the conversion of large logs.

109. The residue market is vital to the viability of sawmills, and residue prices have fluctuated widely during the review period because of the varying fortunes of the pulp and particleboard industries. The situation is stable at present and sawmills are selling virtually all their residues; in particular the thermal insulating building blocks industry is now a significant consumer of sawdust. Bark is now also being sold both for horticultural purposes and for use in animal husbandry.

110. The Forestry Commission, in conjunction with associations representing the sawmilling industry, have developed a system of log description and classification for the sale of softwood sawlogs.

b) Wood Preservation, Testing and Grading

111. During the past six years, the extension of the Pesticides Safety Precautions Scheme to wood preservatives has meant that such products can only be used in the UK if they have received prior safety clearance. This requirement has led to much research in the environmental field generally, and has greatly stimulated work on the development and testing of new, safe biocides.

112. Wood preservatives must be effective in protecting timber throughout its service life, and recent investigations have provided a greater understanding of the factors governing long-term performance. This is reflected in the publication of a number of recent British Standards, including two Codes of Practice which give detailed guidance on the selection of preservation treatments for different end-use applications. Substantial progress has also been made in the evolution of European (CEN) Standards for wood preservative testing.

113. Great interest is now being shown in remedial treatments for woodwork in buildings, and new processes for *in situ* application of preservatives have been developed and validated by research. These include pressure injection systems for joinery and the use of emulsions for treatment of roof timbers. Wood-based board materials are now receiving more attention in view of their growing range of uses. Compatibility of preservative-treated wood with other materials (metals, paints, etc) is also being examined.

114. In the field of wood finishing, British Standards have been introduced for the two most important types of joinery primer, the solvent-thinned and water-borne materials. Exterior wood stains have become widely used for cladding and are being increasingly employed for joinery, although some problems remain to be resolved. Extensive research has been carried out into the finishing of exterior plywood and this has clarified the performance requirements for textured coatings and established the benefits of overlaid board.

115. Early work which examined the effects on ring structure in spruce when growth rates are enhanced has been followed by studies on spacing crop trees to examine the effects of spacing on timber properties and crop yield, expressed as weight of dry wood substance. Maintenance of stand stocking has been shown to be important for maximum wood substance yields. It has been estimated that standing crop yields from plots of 30-40 years old Sitka spruce planted at 1.8 m spacing are 3-5 tonnes per hectare greater than from those planted at 2.4 m; when past thinnings are added, the difference can be as much as 10-12 tonnes per hectare. However, sawn wood yields are not similarly affected due to higher conversion efficiencies from larger trees in more widely-spaced stands.

116. Branch and knot sizes increase in both Sitka and Norway spruce as spacing increases. On average, this is somewhat greater for Sitka spruce, with knot diameters increasing by approximately 5 mm for a doubling in the growing space area; thus, in adjacent plots, the average diameter of the two largest knots at a height of 3 m in trees planted at 1.8 and 2.4 m and brought to the same

stand stocking at 30 years was a little over 25 and 30 mm respectively. Another aspect of spacing arises when trees are planted in a rectangular pattern instead of the more conventional square patterns. Differences in growing space within and between rows might be expected to lead to the development of a crown with an oval outline and an associated effect on stem cross-section shape. However, examination of 20-year old Sitka spruce from a single site showed no evidence of planting pattern having an effect on stem cross-section shape, although there was a greater incidence of larger knots in the rectangular plantings, with these tending to be largest where branches had grown into the space between rows.

118. Work on the machine stress grading of timber has continued and data are available to enable a number of species, including British grown, to be graded in sections up to 75 x 300 mm. Grading studies for British grown Douglas fir are under way; it seems certain that, as with imported Douglas fir, some reductions in the stress values assigned to grades may become necessary. A lower cost grading machine is now available, and another is under development, which may satisfy the lower through-put needs of UK mills, and enable them to compete more effectively in the carcassing market. One significant step has been the inclusion of stress-graded British grown Scots pine, Douglas fir, larch, Norway spruce and Sitka spruce in the permissible span tables for house carcassing in Schedule 6 of the Building Regulations (1976). For Norway spruce and Sitka spruce to be acceptable they must be machine stress graded to the M75 grade of BS 4978:1973 *Timber Grades for Structural Use*.

119. The Code of Practice for the structural use of timber CP 112:Part 2:1971 is being revised and will be issued as BS 5268. This will introduce some radical changes, perhaps the most important one as far as the home timber industry is concerned being a strength class system, which is being developed for the specification and supply of structural timber. Briefly, this means that the Code would list eight strength classes which are independent of species and grade, although consideration will obviously have to be given to ensuring that the stress values assigned to the classes lead to an efficient use of the major imported softwood species. It is anticipated that with this system the designer will simply choose a class to use in his design, and specify that the material supplied shall conform to that class. If there are no considerations other than adequate strength, the supplier will then have the option of supplying, from lists included in the Code, any one of the species and grade combinations which satisfy the requirements for that class. Provided that home-grown species are properly graded, this system should facilitate their use in structural work and enable them to compete equally on the basis of strength with imported timber.

120. It should be noted, however, that when the strength classes are finalised for the new Code some additional research may be desirable, particularly on yield studies and grading methods, to ensure that British grown timber is used with maximum efficiency and competitiveness.

121. A project has been launched to develop the use of spruce for power transmission poles, sponsored jointly by the Forestry Commission and the Electricity Council. It is directed towards establishing the performance characteristics of spruce under destructive bending tests and to improve the low permeability of the wood by spraying or immersing in water.

c) New Facilities for Research and Technological Studies

122. A new Biodeterioration building was opened at Princes Risborough Laboratory in 1976 providing purpose-built, specialist facilities for research and evaluation work on insect and fungal degrade of timber and other building materials. A new scheme for biological testing and evaluation of wood preservative products was introduced in 1979 by arrangement with the British Wood Preserving Association.

2. The Further Use of the Biomass and of the Tree

123. Substantial progress has been made in the utilization of bark. Trials with horticultural crops have established that bark from coniferous species can be used in much the same way as peat pulverised and subjected to fermentation by thermophylic bacteria. Markets have also been developed for equestrian purposes, such as gallops and dressage arenas. An Agrement Board certificate has been awarded for a bark-based building block with good sound properties and superior thermal characteristics.

3. The Role of Wood as a Source of Energy

124. Wood for use as a primary fuel has not been a major outlet. The relatively small forest resource in Britain is unlikely to provide a source of industrial energy needs. There has, however, been an increase in demand for wood for domestic fuel, and wood-burning stoves are readily available.

Appendix 1

STATISTICAL SUMMARY [a]

1.	Total land area	22,999,000 hectares
2.	Population	54,296,000
3.	Net population change (% per year 1972-79)	Static
4.	GDP per capita at factor cost	£2,180 in 1977
5.	Total forest area	2,014,000 hectares
6.	Area of productive forest under management	1,726,000 hectares
7.	Annual cut	4,070,000 cu.m. under bark
8.	Area of man-made forest	1,726,000 hectares
9.	Afforestation (planting of bare land) 1974-79 average	27,700 hectares
10.	Balance of trade in wood and wood products : net imports [b]	£2,280 millions (UK as a whole)
11.	Employment in forestry and forest industries	33,100

Notes: (a) All data refer to 1979 unless otherwise stated.

(b) Total of SITC Divisions 24, 25, 63 and 64 including wood and paper manufacturers but excluding cork and other non-wood products.

PROGRESS REPORT 1973-79 BY THE FOREST SERVICE OF THE DEPARTMENT OF AGRICULTURE FOR NORTHERN IRELAND

CHAPTER I

FOREST POLICY

1. Organisation of Forestry Authority

1. The Northern Ireland Forest Service is a Division of the Department of Agriculture and is financed from public funds.

2. Forest Policy

2. Forest Policy is set out in a White Paper *Forestry in Northern Ireland* (Cmd 550, HMSO Belfast) which was published in 1970. It can be summarised:

a) subject to 5-yearly reviews, to establish 120,000 hectares of state and privately owned forests by the end of the century on land where forestry is considered to be the most appropriate long-term land use;

b) to manage the State-owned forests with the primary aim of achieving maximum value wood production subject to a co-ordinated programme of recreational use, conservation, educational and scenic considerations, designed to provide the greatest national benefit from the forests;

c) within the targets and objectives summarised above to manage the State forests in the most efficient manner and at the lowest cost;

d) to encourage afforestation and tree planting by public and private agencies and individuals;

e) by careful market investigations and planning, and in full co-operation with private forestry and the timber trade, to ensure that the most beneficial markets from a long-term national point of view are available as and when needed for all forest produce.

3. Existing Forest Estate

3. The total land area of Northern Ireland is 1,348,000 hectares. Of 71,000 hectares of land owned, leased or managed by the Forest Service, 53,000 hectares are planted. In addition there are about 13,000 hectares of privately owned woodland.

4. About 80 per cent of all forest and 95 per cent of State Forest is coniferous.

5. There is virtually no natural forest in the country.

6. Most land acquired for afforestation had been used previously as hill grazing.

4. Technical Aid

7. No technical aid or other services have been received.

5. Employment and Recruitment

8. The following staff changes have occurred during the period under review:

	1972	*1979*
Professional and Technical Staff	125	125
Administrative and Clerical		
District Staff	15	39
Headquarters Staff	85	56
Mechanical Engineering	37	30
Permanent Labour Force		
Regular	698	510
Rural Improvement Campaign	668	638

The above figures apply to the State Forest Service only

No statistics are available for private forestry

9. Devolution of much administrative work from Headquarters to District Offices has resulted in fewer staff being required at Headquarters.

CHAPTER II

FOREST MANAGEMENT

1. Seed Selection and Storage : Tree Improvement

10. Selected strains of seed were purchased. Only rarely was seed collected locally.

11. The planting programme depended primarily on Sitka spruce *(Picea sitchensis)* and to avoid disruptions a 2-year reserve of seed was kept in cold storage.

2. Selection and Evaluation of Species for High Output Species Trials

12. No register of plus tree genetic material was maintained.

13. Only two species were considered to be of any major economic importance in Northern Ireland - Sitka spruce *(Picea sitchensis)* and Lodgepole pine *(Pinus contorta)*. Provenance trials of these species were continued.

14. More limited trials were conducted with Douglas fir *(Pseudotsuga menziesii)*, Western hemlock *(Tsuga heterophylla)* and various *Abies* species.

3. Management Aspects

15. Almost all State-owned forests have been artificially created. The standard technique in recent years for most of new planting has been to distribute phosphatic fertiliser in the form of coarse rock phosphate at about 500 kg/ha; this is followed by ploughing at a spacing of 2.0 m to 2.3 m and planting with 2 year old seedlings or 2 year plus one year transplants, usually on top of the ploughing ridge. Drainage is usually required and drains of up to 1 m deep are dug at intensities varying about 200 m per hectare; these operations are largely mechanised with low ground pressure crawler tractors and deep-draining ploughs and turfing ploughs. Fertilising of ground before planting is carried out using low ground-pressure machines fitted with fertiliser blowers and post-planting refertilising by helicopter.

16. Much of the forest is on soils with very limited rooting depth and consequently many stands are unstable. In order to minimise windthrow many stands are not being thinned.

17. Rotations of wind-stable stands are expected to be those of maximum mean annual increment but unstable stands may have rotation lengths determined by the time taken to reach a top height of about 20 m or thereabouts, beyond which height windthrow risk may become unacceptably high.

4. Protection

a) Mammals and Birds

18. Illegal grazing by sheep and cattle is a problem in certain areas and squirrels have caused significant damage in a few limited areas.

19. Bird damage was generally local and seldom severe although seed-eating birds have been a minor problem in nurseries.

b) Insects and Other Pests

20. The green spruce aphis *(Elatobium abietinum)* is endemic in Northern Ireland and can reach epidemic proportions occasionally. The last epidemic occurred in 1969 and there was extensive defoliation that year although very few deaths were reported. Height increment in 1970 was approximately half normal and it was assumed that this was related to the aphis attack. Other insect damage occurs rarely and is usually unimportant.

c) Disease

21. The fungus *Fomes annosus* was responsible for a limited amount of timber loss in the old forests. As a matter of routine all stumps were treated with a 10 per cent solution of sodium nitrite or with light creosote oil immediately after felling.

d) Fire

22. The extent of fire damage is indicated in the following table:

Year	*Area burned in hectares*	*Value £ sterling*
1972	69	25,000
1973	40	15,000
1974	234	108,000
1975	149	80,000
1976	34	17,000
1977	509	353,000
1978	243	157,000
1979	21	19,000

The very substantial increase in damage to plantations compared with that in the period 1966 to 1972 is partly related to the greater area at risk but probably mostly due to an increase of fires started maliciously.

e) Storm and Other Forms of Damage

23. A substantial amount of damage was caused by hurricane force winds during the period 1958 to 1962. Extension to the major thrown areas and scattered wind damage continued for a number of years thereafter. However, although there has been some scattered windthrow and some areas windthrown, often soon after thinning, there has been comparatively little windthrow since 1962. This may be due to the policy of not thinning stands especially susceptible to windthrow.

5. The Environment

a) Water

24. Afforestation and the application of nitrogenous fertilisers has been restricted by the Water Authority on certain catchments because of the possible reduction of run-off and the effect on water purity.

b) Tourism and Recreation

25. The maintenance and repair costs for all car rally routes and for some car parks were recouped by making charges.

26. In keeping with the forest policy of developing the secondary uses of State Forests to the full, advantage was taken of the Urban and Rural Improvement Campaign to develop facilities which will help members of the public to use the forests for recreational purposes. Car parks, picnic areas and signposted forest walks made up most of the work, but in addition a number of special facilities for the camper, caravaner, pony trekker and sportsman were included.

27. All provisions were designed to conform with the maintenance of the natural forest atmosphere of peace and quiet. Sixty forest areas had some such facilities and seven forests, where there is a concentration of special recreational facilities, were designated as Forest Parks. A series of guides, information leaflets and interpretation centres were provided to acquaint the visitor with the attractions of the forest and it was estimated that a million day visits were made each year.

c) Amenity Considerations Including Landscaping

28. Forest Management Staff have been made aware of the impact which the newly established forests can have on the landscape and in preparing tree planting and felling programmes this factor was kept in mind. By the careful choice of tree species and mixtures and by the avoidance of scenically unsympathetic forest and species boundaries, attempts were made to ensure that the State Forests enhanced the landscape rather than detracted from it.

d) Wildlife

29. The development of wildlife sanctuaries continued, including the provision of wild fowl and deer hides. Forty-one Forest Nature Reserves, of which 20 have National status, have been demarcated. Those of National status are managed jointly under an agreement with the Department of the Environment (Northern Ireland). A few areas are managed under similar agreements with the Royal Society for the Protection of Birds.

30. Day permit shooting continued to prove popular. Walk-up shoots for pheasant and woodcock in the mixed lowland forest areas continued. Forests with a sporting potential but which were not used for day permit shooting, were leased by competitive tender for periods up to 7 years.

31. A game farm was established in 1966 and now produces 20,000 head of game each year. Most of the birds reared were pheasants for stocking the permit shoots or for sale to shooting tenants.

32. Education in wildlife management was pursued through the medium of courses at the Forest School, lectures at various Agricultural Colleges and articles and other features in the news media.

CHAPTER III

SERVICES TO MANAGEMENT

1. Management Services

33. The Work Study Branch of the Forest Service has continued to evaluate and introduce new methods of working and to collect standard times.

34. The inventory of State Forests, based on permanent sample plots, has been updated and an inventory of private woodland, based on temporary sample plots, started and nearly completed in the period 1973-1979.

35. There are three types of plan in the Forest Service depending on the time scale. Strategic plans cover an indefinite period and are reviewed 5-yearly. Tactical plans, at all levels of management, are reviewed annually (with the addition of a year at the end of the previous plan period). Operational plans, at all levels of management, are detailed plans of work for the coming year.

36. Expenditure and income on State Forestry and grants are forecast for 5 years ahead. Detailed "estimates" are made annually and both an Appropriation Account and a Trading Account published.

2. International Plant Health Control

37. Importation of a wide range of tree species was prohibited or restricted in the period 1973-79 from countries other than Great Britain or the Republic of Ireland under Statutory Rules and Orders of Northern Ireland No.95 of 1967 and No.147 of 1969.

3. Forest Inventory and Production Forecasting

38. The State Forest inventory has been improved by the selection of additional, randomly selected sample plots and rejection of some plots not so selected. By using a computer, production forecasts, based on the inventory and the British Forestry Commission *Forest Management Tables* (HMSO London, 1971), growth models have been improved.

39. An inventory of privately owned woodland, hedgerow trees and hedges was started in 1975 and was nearly completed by the end of 1979.

4. Education and Training

40. The Forest Service school at Pomeroy has continued to provide a wide range of courses for industrial staff, both within and without the Forest Service together with occasional courses for non-industrial staff.

41. There are no facilities for career training of Foresters and District Forest Officers in Northern Ireland.

5. Forest Research and Development

42. A large part of the research resources in Northern Ireland were concentrated upon problems of nutrition of Sitka spruce *(Picea sitchensis)* on infertile climatic peats. Since 1964 the nutritional requirements have become more clearly understood. The main result has been that provided crops have adequate phosphorus, the factor which eventually limits growth is available nitrogen. It is foreseen that closure of canopy will not be achieved without at least two applications of urea after planting. Work into nitrogen requirements is continuing, together with investigations into alternative ways of overcoming nitrogen deficiency on peat, for example, by applying lime or by intensive drainage. Lodgepole pine *(Pinus contorta)* is also being planted more extensively as a possible alternative to and a less nitrogen-demanding species than Sitka spruce and work on its nutritional requirements has started.

6. Publicity and Public Relations

43. Direct contact with the public was achieved by guided forest tours and illustrated talks by members of the Forest Service staff. Interpretive centres proved popular. Besides the priced forest park guides, a series of free leaflets was designed, mainly with schools in mind, which covered various aspects of forestry. These proved valuable both in the field and in answering written enquiries. Parking season tickets were available to members of the public and holders had their own newsletter and were given an annual guided visit to a forest. Every opportunity was taken to have articles published in the Press and to take part in television and radio programmes. A close liaison was maintained with the Northern Ireland Tourist Board.

CHAPTER IV

HARVESTING AND MARKET PLANNING

1. The Co-ordination of Silvicultural Practices, and Harvesting Techniques to Achieve the Highest Net Returns

44. Subject to the often severe constraints of the site and to considerations of amenity and conservation, tree species are selected to give the highest return.

45. The establishment of racks by leaving strips unplanted to be used for extracting timber in thinning operations, has been abandoned. This is because, with the changes in extraction equipment the racks were often in the wrong positions and, on deep peat especially, tree roots do not cross the racks and thus there is little support for the extraction equipment compared with racks cut out of the stand at the time of first thinning.

46. Although stands which are thinned are generally most profitable, the risk of windthrow is considered to be so high on certain sites that, to minimise this risk, stands are not being thinned. If the risk is taken into account, this decision should not decrease the net return on the stands.

47. Apart from a low intensity of roads constructed just before planting, most roads are constructed before thinning - or in the case of unthinned stands before felling, thus delaying capital expenditure. The intensity of roads is related to the method of extraction expected to be used on the particular site.

48. Line thinning has been used on an experimental scale to reduce harvesting costs. However, the technique is being treated with caution because of the possible increased risk of windthrow.

2. The Supply and Demand for Forest Products

49. The demand for forest products in Northern Ireland has far exceeded local supply and this situation is likely to exist until, at the earliest, well into the next century.

3. Short and Long-term Marketing Agreements

50. Most timber is sold by tender or negotiation as it becomes available. There are few long-term agreements.

4. The Development of Markets to Achieve the Best Combination of Products

51. Timber processors have continued to develop their markets.

CHAPTER V

UTILISATION OF FOREST PRODUCTS AND FOREST PRODUCTS RESEARCH

1. Notable Changes and Developments Since 1972 in Forest Products Utilisation and Research

a) Sawmills and Sawmilling Practices

52. There were no major changes or developments.

b) Other Wood Processing Industries

53. There were no major changes or developments.

c) Wood Preservation, Testing and Grading

54. Strength testing of locally grown softwoods started in 1979.

d) New Facilities for Research and Technology Studies

55. No new facilities were established.

2. Further Use of the Forest Bio-mass and of the Tree

56. A trial was conducted at Loughall Horticultural Centre to assess the yield of two species of willows, *Salix aquatica* "Gigantea" and *Salix viminalis*. Annual yields of up to 24 tonnes per hectare have been recorded for plantations established in 1975.

3. Role of Wood as a Source of Energy

57. The demand for firewood has increased, but quantities available are trivial compared with the potential demand.

4. Secondary Forest Products - Utilisation and Research

58. There has been a marked increase in demand for Christmas trees, probably from Great Britain.

Appendix 1

STATISTICAL SUMMARY

Population	1972	1,527,000	
	1979	1,538,000	
Annual population change, % per year (1972-1979)		+ 0.1	
Gross domestic product	1972	£1,093	million sterling
	1977	£2,542	" "
Total land area, hectares		1,348,000	
Total forest area, hectares		66,000	
Area of productive forest under management, hectares		60,000	
Area of man-made forests, hectares		66,000	
Annual cut, cubic metres under bark (latest year available)		55,000	
Balance of trade net imports, latest year (Timber and Timber Products)		Not available	

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