

# Annual Report and Accounts 2007–2008



# Forest Research

## Annual Report and Accounts 2007–2008

Together with the Comptroller and Auditor General's Report on the Accounts

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and Section 5 of the Exchequer and Audit Departments Act 1921

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Enquiries relating to this publication should be addressed to:

Forest Research  
Alice Holt Lodge  
Farnham  
Surrey GU10 4LH

T: 01420 22255

E: [research.info@forestry.gsi.gov.uk](mailto:research.info@forestry.gsi.gov.uk)

Contact this address if you would like to request this document in large print or other format and for information on language translations.

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# Chief Executive's Introduction

I am proud to introduce the 2007–08 Annual Report for Forest Research (FR). This report illustrates some of the work undertaken by FR over the year, presents our achievement against the Key Performance Indicators (KPIs) and details FR's accounts for the year ending 31 March 2008.

FR provides the science and advice to underpin forestry policy and practice, principally in the UK and on behalf of the Forestry Commission. In addition, FR has a range of customers from other UK organisations and the Commission of the European Communities (CEC), and our research and development work is often linked with partners and collaborators worldwide. Indeed, one benefit provided by an applied forestry research organisation is informed access to wider science.



# Chief Executive's Introduction

Forestry seeks to deliver economic, social and environmental objectives; objectives that are achieved through the application of sustainable forest management. Today, the delivery of these multiple objectives must be guided by a clear understanding of forestry's potential to contribute to the mitigation of climate change. There is a critical need for the forestry sector to adapt to climate change in order that adverse impacts are minimised and the multiple benefits of forestry continue to be provided. Much of the research presented in this report directly addresses detailed aspects of these main drivers.

The evidence base and strategies that are required to deliver forestry policy change rapidly and it is necessary for FR to be flexible in order to meet emerging research, guidance and advisory needs. FR published a **Development Strategy** in September 2006, which sets out key objectives as follows: to match FR's skills to emerging customer needs; to increase innovation, increase scientific and business excellence; to ensure a range of funding sources and improve the links with other research organisations. FR's Corporate Plan and KPIs for 2007-08 addressed the implementation of the Development Strategy and I am pleased to report that the year has seen good progress.

In the pages that follow, each of FR's five research divisions presents an overview of its achievements, followed by two technical highlights that focus in more detail on particular deliverables. **Biometrics, Surveys and Statistics Division** has highlighted the progress made on the National Inventory of Woodland and Trees and work on the determinants of photosynthesis, which forms the basis for process modelling. **Ecology Division** presents its work on climate change adaptation, which formed the basis of a publication launched by Michael Russell MSP, the Scottish Environment Minister, when he visited FR's Northern Research Station in January 2008, along with work on using molecular markers to look at genetic diversity in black poplar. The practical application of molecular biology has resulted in real progress in the identification of the pathogens responsible for damage to trees, and is also being applied in the conifer breeding programme TREENOMIX in partnership with the University of British Columbia. **Environmental and Human Sciences Division** has focused on the deliverables of the EU project EFORWOOD and on work done in the EPSRC-funded PuRE project. I am delighted that the skills of FR's **Social and Economic Research Group** of the Division continue to be in demand from a wide range of customers. The Group currently undertakes a number of projects co-funded by the FC and EU (RECOAL, SENSOR) and along with Ecology Division staff is also closely involved in the RELU programme. **Forest Management Division** has outlined one of FR's EU consortium projects, work on wind risk (STORMRISK), and also work on the impacts of whole-tree

harvesting. **Technical Development**, which is part of Forest Management Division and whose headquarters are in Ae, Dumfriesshire, celebrated its 50th birthday during the year.

**Tree Health Division** has highlighted a new online management support system for *Hylobius*, the weevil that continues to be the most damaging insect pest in British forestry. The introduction and spread of new or newly introduced pathogens remains a real threat and Tree Health Division is pivotal to an understanding of problems associated with the spread of *Phytophthora ramorum* and *P. kernoviae*.

The new understanding and implications for policy and practice that arise from FR's work are published in FC publications, scientific journals, as well as being integrated in Decision Support Systems and through the internet. A significant element of staff time is also devoted to face-to-face communication. For example, during 2007-08 a programme of Research Update Seminars was provided, often in partnership with FC regional staff or at NRS and Alice Holt. I am pleased to report that during the year we have been able to return to our full complement of Research Liaison Officers and this has given FR the capacity for effective interaction with FC England, FC Scotland, FC Wales, the Confederation of Forest Industries (ConFor), the Arboricultural Association and a wide range of other industry stakeholders.

During 2007, the expertise and skills required to match emerging customer needs were examined by six Priority Area Working Groups. As a result of this analysis an **Urban Regeneration and Greenspace Centre** has been established to operate in a similar way to the established and successful **Biomass Energy Centre**. Since the creation of the Biomass Energy Centre we have seen an expansion of our work on woodfuel and an increased need for advice on related areas

# Chief Executive's Introduction

such as whole-tree harvesting and stump removal. All FR's research addresses climate change directly or indirectly and co-ordination of climate change research is currently through a 'Research Hub' that links directly to the FC's **Climate Change Strategy Group**. Further development of FR's Climate Change Research Hub is an important objective during 2008-09.

FR's 2007-08 target for non-FC income was not met, with approximately £1.5 million of work being undertaken during the year against a target of £2.7 million. This outcome does not reflect a decline in the effort made to win external income or, in my view, a decline in the quality of applications. A significant amount of scoping and horizon scanning was undertaken by the six Priority Area Working Groups and this has provided strategic direction to the contract bidding that is currently under way. In the past few months, a large number of funding bids were made to the EU under Framework Programme 7 and to other customers, and I am confident that the 2007-08 external income can be exceeded during 2008-09.

For the first time, FR is making real progress in its commercialisation activities. The year 2007-08 is the middle of three years of funding by the Department of Innovation, Universities and Skills under the Public Sector Research Exploitation Fund (PSRE). This has allowed us to introduce a process for development and management of the intellectual property (IP) generated by FR. We now employ an Intellectual Property Manager, have completed significant staff training on Innovation and established strong links with external professional advisors who work on IP management with other PSREs and universities.

The **Advisory Committee on Forestry Research** and the external Visiting Groups that it appoints provide independent assessment of the quality, balance and direction of FR's research programme. I would like to thank the members of the committee who, in addition to their usual role, have been directly involved in the implementation of the FR Development Strategy. I would also like to thank the members of FR's **Audit and Risk Committee** for their work in advising on the strategic processes for risk control and governance in FR.

During the year, the FC Programme Advisory Groups, which are responsible for linking FR's research programmes to FC research requirements, have been reorganised to give FC England, FC Scotland and FC Wales greater influence in the prioritisation and specification of research. This process has highlighted research requirements in the areas of climate change, woodfuel and forest resource assessment, and has resulted in major changes to FR's research programme in 2008-09.

I am delighted that Andy Moffat (Head of Environmental and Human Sciences Division) was awarded a Visiting Professorship at Reading University and that Bill Mason (Head of Forest Management Division) was awarded a Doctorate of Science based on his work on silvicultural research in support of multifunctional forest management. As already mentioned, FR has a number of strong and productive international links, and during the year new Memoranda of Understanding were signed with Scion Research in New Zealand and with the Finnish Forest Research Institute (METLA). Finally, it was a pleasure for FR staff to exhibit at the Royal Society's Summer Science Exhibition last July, together with Napier, Glasgow and Lavel Universities and FibreGen.

More details about FR's work during 2007-08 are given in the following pages. The key features of FR's continuing success in the provision of applied research, development and scientific services are: the quality and dedication of FR staff, our close working relationship with the FC and UK forestry, and our partnerships with other research organisations and universities in the UK, Europe and worldwide. I believe that our understanding of developing customer needs and our response to them are critical to our continued success. I would like to thank FR staff for their hard work in delivery to our customers and for their close involvement and work on implementation of the FR Development Strategy.



**Professor Peter Freer-Smith**

Acting Chief Executive

# Chief Executive's Introduction

## FR Corporate Plan Key Performance Indicators – Progress Report

Key Performance Indicator (KPI)	Commentary
<p>1. FR will establish Priority Area Working Groups (PAWGs) as mechanisms to develop business cases for six priority areas of research identified in the FR Development Strategy. PAWGs to report to FR CEO by June 2007. FREB to report on action to develop areas by September 2007. Implement new business targets by March 2008.</p>	<ul style="list-style-type: none"> <li>• Groups reviewed the opportunities for expansion of FR's work in six priority areas and reported on target.</li> <li>• 'Biomass Energy' and 'Urban Regeneration and Greenspace' centres established.</li> <li>• Climate Change research is led by a newly appointed Head of Climate Change Research and is co-ordinated by a strengthened Programme Advisory Group linked to the FC Climate Change Strategy Group.</li> </ul>
<p>2. FR will develop a clear framework setting out how FR intends to generate income by exploiting IP, R&amp;D contracts, knowledge transfer and asset utilisation. To report to FR CEO by August 2007.</p>	<ul style="list-style-type: none"> <li>• FR Business Development Plan was provided to the CEO during 2007.</li> <li>• FR Heads of Divisions, Research and Commercial Directors now meet monthly to co-ordinate responses to grant and contract calls, and to monitor progress with bids.</li> <li>• New business and income targets were set in FR's 2008-09 Business Plan.</li> </ul>
<p>3. FR will agree with FC Wales geographic locations and partnership mechanisms to increase its presence in Wales, building on current strengths and opportunities for the future. A proposal and implementation plan will be put to the Wales National Committee by September 2007.</p>	<ul style="list-style-type: none"> <li>• Proposal and implementation plan agreed by Wales National Committee in November 2007.</li> <li>• An FC-wide trawl to fill the post of Head of FR in Wales was unsuccessful; the post will now be advertised externally.</li> <li>• The location of FR staff in Aberystwyth is one of FR's KPIs for 2008-09.</li> </ul>
<p>4. FR will undertake an audit of staff skills to provide details of business skills, flexibility and development needs to report to FR CEO. An action plan to achieve the required staff resources will be produced by March 2008.</p>	<ul style="list-style-type: none"> <li>• Work force planning exercise, which will include the skills audit, is underway – to be completed by the end of August 2008.</li> <li>• Staff training put in place on IP, innovation and project management (PRINCE2), Essential Skills for Managers and Media Training.</li> </ul>
<p>5. FR will review its finance system. A fit for purpose system will be recommended to the FR CEO by July 2007. This will be rolled out and in operational use by March 2008.</p>	<ul style="list-style-type: none"> <li>• FR Financial and Project Management Systems reviewed and action plan agreed.</li> <li>• Much more work was required on the financial systems than had been anticipated.</li> <li>• Concluded that FC systems are the best primary data sources rather than a new system for FR; work under way to make better use of these.</li> <li>• New Finance Director appointed in January and tasked with major overhaul of systems.</li> <li>• Revised Programme Advisory Group (PAG) and Research Strategy Management Board (RSMB) structure now operating effectively. Gives increased country influence in the determination of the research programmes and specification of outputs, and greater transparency and responsiveness.</li> <li>• Closer working with FAS and James Pendlebury (as CFS Head of Research Purchasing) established and will be key to improved financial management.</li> </ul>
<p>6. FR will grow its external income from £2.4 million in 2006-07 to £2.7m in 2007-08.</p>	<ul style="list-style-type: none"> <li>• Not achieved; 2007-08 external income was approximately £1.5m.</li> </ul>



# About Forest Research

Forest Research is an agency of the Forestry Commission and is the leading UK organisation engaged in forestry and tree related research.



## Aims and objectives

The aims and objectives of Forest Research (FR) are to assist the Forestry Commission (FC) in achieving its high-level objective.

On behalf of all three administrations, to take the lead in development and promotion of sustainable forest management and to support its achievement internationally.

### FR's Aims

To support and enhance forestry and its role in sustainable development, by providing high-quality research and development in a well-run organisation.

### FR's Objectives

- To inform and support forestry's contribution to the development and delivery of the policies of the UK government and the devolved administrations.
- To provide research, development and monitoring services relevant to UK forestry interests.
- To transfer knowledge actively and appropriately.

## Research funding

Much of FR's work is funded by the FC with Corporate and Forestry Support acting as purchaser of research and other services in support of forestry in Britain, including the particular needs of England, Scotland and Wales. In addition, FC England, Scotland and Wales purchase research, development and surveys specifically related to the forest estate in each country. In recent years FR has successfully applied for external (non-FC) funding from government departments, the European Union, UK research councils, commercial organisations, private individuals and charities. Collaborative bids with other research providers and consortium funding have become increasingly important, placing emphasis on effective partnerships.

## Activities

Research and development are essential components in delivery of the benefits of sustainable forestry in a multifunctional landscape. FR's research, surveys and related scientific services address the social, economic and environmental components of sustainability. There is a focus on providing new knowledge and practical solutions based on high-quality science. Our projects provide understanding, policy advice and guidelines on implementation of best practice (e.g. on

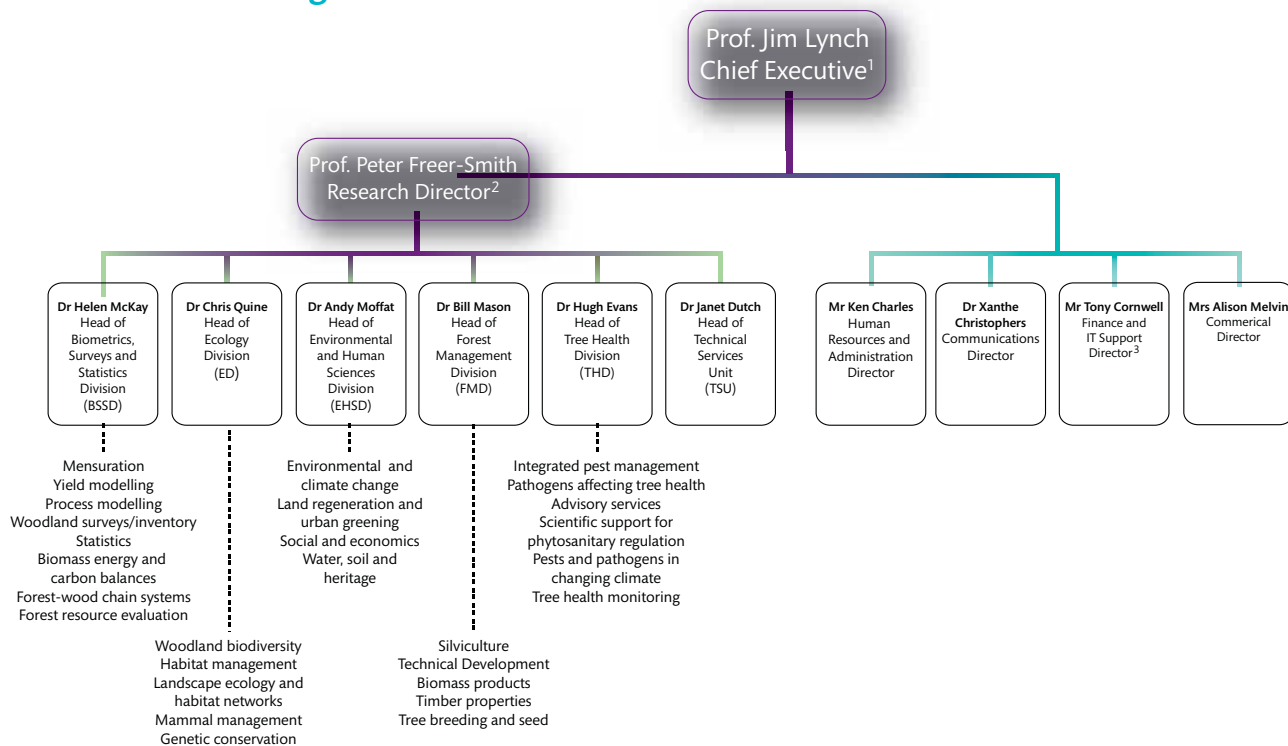
forest hydrology, continuous cover forestry, timber quality, land reclamation to woodland, and restoration of native woodlands). Much of the research is directed at increasing the biodiversity, landscape and recreational benefits of woodlands. Protection of GB woodlands from pests and diseases, and predicting the impacts of environmental change are also overarching themes. FR works closely with the FC, the Commission of the European Communities and other international organisations to ensure compliance with international agreements on the sustainable management of forests and related subjects. The Agency also carries out work on genetic conservation, tree improvement, seed testing, method studies, product evaluation, crop inventory, surveys (e.g. *The national inventory of woodland and trees*), and monitoring.

## Resources

The Agency has two main research stations, Alice Holt Lodge in Hampshire and the Northern Research Station on the Bush Estate south of Edinburgh. The main office of Technical Development (part of Forest Management Division) is located at Ae in Dumfriesshire with subsidiary offices in the English Midlands and Wales. The Agency also has six field stations (the Technical Support Units) from which an extensive network of field trials, sample plots and monitoring sites is assessed. Contact information is given on the inside back cover. The Agency employs 275 staff, not including visiting scientists and sandwich course students. FR has published a Corporate Plan for the period 2008–11 and copies are available to download from [www.forestresearch.gov.uk/corporateplans](http://www.forestresearch.gov.uk/corporateplans)

# About Forest Research

## Forest Research organisation 2007–08



## Advisory Committee on Forestry Research

### Chairman

#### PROFESSOR SIR DAVID J. READ, FRS

Biological Secretary and Vice-President Royal Society and Professor of Plant Sciences, University of Sheffield

### Secretary

#### PROFESSOR P. H. FREER-SMITH

Research Director and Acting Chief Executive from October 2007 Forest Research

### Members

#### PROFESSOR C. WARD-THOMPSON

Director, OPENSpace Research Centre and Research Professor of Landscape Architecture  
Edinburgh College of Art/  
Heriot-Watt University

#### PROFESSOR D. EVANS

Consultant in the field of novel crop management solutions  
Farnham, Surrey

#### PROFESSOR J. M. LYNCH

Chief Executive  
Forest Research  
(up to September 2007)

#### DR C. CAHALAN

School of Agricultural and Forest Sciences  
University of Wales Bangor

#### PROFESSOR R. CLIFT, CBE

Professor of Environmental Technology,  
Centre for Environmental Strategy  
University of Surrey

#### PROFESSOR P. JARVIS, FRS

Emeritus Professor of Forestry and  
Natural Resources  
Institute of Atmospheric and  
Environmental Sciences  
School of GeoSciences  
University of Edinburgh

#### MRS W. HARPER

Forestry Commission  
Secretary to The Forestry Commissioners  
and Head of Corporate and Forestry  
Support

#### DR J. PENDLEBURY<sup>4</sup>

Forestry Commission  
Corporate and Forestry Support

#### DR K. J. KIRBY

Forestry and Woodland Officer  
Natural England  
Peterborough

#### PROFESSOR C. A. GILLIGAN

Professor of Mathematical Biology and  
Fellow  
King's College  
Department of Plant Sciences  
University of Cambridge

#### PROFESSOR A. J. MOFFAT

Head of Environmental & Human  
Sciences Division and Acting Research  
Director from October 2007  
Forest Research

<sup>1</sup> From October 2007 to March 2008, Peter Freer-Smith was Acting Chief Executive.

<sup>2</sup> From October 2007 to March 2008, Andy Moffat was Acting Research Director.

<sup>3</sup> From January 2008 Sandra Smith was Finance and IT Support Director.

<sup>4</sup> Dr James Pendlebury took up the post of FR Chief Executive in June 2008.

The Advisory Committee provides guidance for the Agency and the Forestry Commission on the quality and direction of FR's research. The Advisory Committee met in May 2007 for a tour of research work in East Anglia Forest District and in December 2007 at Alice Holt. Our thanks to Jim Lyon for hosting the Committee's visit to Thetford. These meetings allow Committee members to meet staff and keep up-to-date with FR's work; focus is usually on those research programmes to which Visiting Groups have been appointed in the year.

The Committee appointed and received a report from an external Visiting Group to Tree Health Division (chaired by Professor Michael Jeger, with Dr Chris Prior and Dr Hervé Jactel as members). The Visiting Group rated the research programmes of the Division on a four-point scale (A down to D) on the basis of science quality and overall relevance, delivery and progress. One programme (Phytophthora research) was rated at A for science quality, one (Scientific support for phytosanitary regulation) was B, three were at B/C and three at C. The significant amount of change in structure and management of Tree Health Division in recent years was acknowledged, and the group felt that the 'customer approach' constraints are likely to have prevented the Division from developing long-term, strategic and more innovative research. The Group commented that 'EU funding would provide the Division with degrees of freedom to broaden the scope of its research' and that 'there should be emphasis given to raising public, governmental (including internal FC) and private sector appreciation of the value of FR research outputs'. The international recognition of Tree Health Division, attested to by IUFRO and EU responsibilities and representational activities, was recognised. Five recommendations were made on the future development of programmes within the Division and across FR, and these recommendations are now being implemented. Presentation of these views to the Committee highlighted the need for a cross-divisional approach to be taken on climate change, and Committee members also emphasised the importance of high-quality peer-reviewed journal publications on which technical advice to practitioners should be based.

At its meeting of December 2007 the Committee also considered progress in implementation of FR's Development Strategy (2007–2012), and received a report on implementation of the recommendations made in the 2006 Visiting Group to Environmental and Human Sciences Division. Members of the Advisory Committee on Forestry Research are closely involved in the implementation of the FR Development Strategy through the provision of expertise on review groups and appointment and promotion boards.

# National and international links, visitors and events

Forest Research is working at the forefront of forestry science, often alongside other research organisations and academic institutions both in the UK and worldwide. We are continually striving to build collaborative relationships with similar research bodies in order to share knowledge and expertise in the interests of furthering science. Our members of staff have taken part in many events and collaborations throughout the past year. Here we outline a small selection of highlights.



# National and international links, visitors and events

## Visitors

Alice Holt and the Northern Research Station (NRS) played hosts to a number of visitors, meetings and conferences this year. Lord Selborne, Chairman of the Board of Trustees of the Royal Botanic Gardens, Kew, visited Alice Holt in September 2007. His visit included a discussion with Richard Jinks on FC's tree collections, and a meeting with Joan Webber and Sandra Denman to talk about current disease epidemics affecting UK woodlands, plantations, and urban and garden trees. In November NRS welcomed MSP Rhona Brankin to look at FR's work in Scotland. Her visit included discussions on the Forestry for People project, decision support systems for management of insect pests such as *Hylobius*, timber quality research, and habitat networks for people and biodiversity.

In March, NRS hosted the Third Annual Conference on Timber Properties Research, jointly organised with Napier University and the University of Glasgow. Alice Holt also hosted a South East England Soils Discussion Group (SEESOIL) meeting to discuss forest soils and FR's current soil research. Several FR environmental scientists gave presentations and visitors enjoyed a field trip to observe soil-associated research in Alice Holt Forest.

Members of The Russian Federal Forestry Agency undertook a UK tour in March, which included meetings with the FC's Director General Tim Rollinson, before visiting Alice Holt. They received presentations on climate change from James Morison and FC's Mark Broadmeadow, and a tour of the Alice Holt Research Forest (see photo left), including FR's forest monitoring site, organised by Matt Wilkinson, Sirwan Yamulki and Nadia Barsoum.



Left to right: Professor Peter Freer-Smith, Lord John Selborne, Professor Jim Lynch and Professor Jeff Burley



## International links

Throughout the year FR's staff have continued developing links across the globe. Continuing FR's strong links with China, Colin Edwards (pictured above on left) visited the Liaoning institute of Forest Management in Liaoning Province (between Beijing and North Korea). Colin's visit focused on helping researchers to develop alternatives to clearfell management systems for upland conifers. FR economist Gregory Valatin visited the US to look at payments schemes for ecosystem services, where landowners are paid to help provide benefits such as biodiversity conservation and carbon sequestration. Important schemes that were discussed included wetland conservation banking and carbon trading.

Further strengthening FR's ties with research institutes in New Zealand and Australia, Darren Kriticos from Scion Research in New Zealand visited FR's tree health researchers at Alice Holt in April and May 2007. He was particularly interested in biosecurity, contingency planning and the impacts of climate change, and his visit also provided an opportunity to discuss collaboration on future research projects.

Back in Europe, FR pathologist Sarah Green spent three weeks at the Norwegian Forest and Landscape Institute (FLI) in Ås, Norway,

# National and international links, visitors and events

to learn the theory and techniques of real-time polymerase chain reaction (PCR) for detection of tree disease. During her visit, Sarah worked with laboratory staff to develop a real-time PCR method to detect the bacterium (*Pseudomonas syringae* pv. *aesculi*) that causes bleeding canker of horse chestnut in the UK. The visit also brought about ongoing collaboration between FR and the Norwegian FLI.

## Events

During the year staff from most divisions took part in international conferences, seminars and meetings, taking FR's expertise and collaboration to different parts of the world.

In April 2007 Jim Lynch attended the European Forestry Institute (EFI) Board Meeting, which explored the advantages that could be generated by the development of regional offices around Europe. This could provide an important step forward for EFI and the forest research industry, owners and international forest-related organisations that it represents. Jim also discussed the role that FR might play in leading climate change activities with the EFI.

Later in April Jim joined participants from 51 different countries at the IUFRO 'Forest research management in an era of globalisation' meeting in Washington DC. This was a great opportunity to exchange views and experiences to improve management globally. Jim's lecture highlighted that 'scientists are increasingly enthusiastic to be involved in policy and can provide the essential evidence base for policy decisions... and wish now more than ever to be more involved in the creation of that policy'.

In May 2007, Peter Freer-Smith travelled to China with the Chairman, Lord Clark, the FC's Director General, Tim Rollinson, and Jonathan Taylor from International Policy to attend the first Working Group resulting from a Memorandum of Understanding between the Forestry Commission and China's State Forestry Administration. Discussions included specific research interests in silvicultural systems, plant health and protection, and climate change.

Kevin Watts, Darren Moseley and Amy Eycott represented FR at the International Association for Landscape Ecology (IALE) 25th birthday at the 7th World Congress in Wageningen, the Netherlands. Their presentations on climate change and habitat fragmentation, modelling techniques for reducing fragmentation, and applying forest habitat networks to target native woodland expansion made up part of a diverse range of topics covered.

In September Sirwan Yamulki took part in the 2nd International Workshop on 'Uncertainty in greenhouse gas inventories' in Laxenburg, Austria. Many countries produce these inventories, which estimate greenhouse gas levels from all sectors of the economy, but growing concerns about their accuracy has led to ongoing international collaboration to assess the issue of uncertainty.

Closer to home, in Bangor in September, Elena Vanguelova and Bruce Nicoll represented FR at the 4th international symposium on physiological processes in the roots of woody plants. Bruce ran a workshop on '3D architecture of coarse root systems - measurement and analysis', and Elena presented the results of a working group's research into bio-indicators of stress in fir tree roots.

The Offenders and Nature (O&N) Schemes, which enable offenders to work with nature conservation and forestry public agencies, benefiting participants and the environment, made further progress during the year. Claudia Carter, who is involved with research on these schemes, attended an O&N 'Dialogue Day' in London in July, and accepted on behalf of the FC a prestigious Outstanding Schemes award from the Howard League for Penal Reform in the Community (photo top right).

Between May and July, FR and the Regional FC England offices jointly organised a series of eight seminars for participants in the forestry and land-use sectors, focusing primarily on the implications of climate change for woodlands and their future management. Each seminar covered current Forest Research activity and the latest developments in forestry practice and science, and included presentations on topics of particular local interest. Questionnaires completed at the seminars were encouraging, with positive feedback and many enquiries about future events.

# National and international links, visitors and events



*Left to right:* Nick Hazlitt (FC), Julian Dormady (FC), Claudia Carter (FR) and Baroness Linklater of Butterstone (Trustee of the Esmee Fairbairn Charitable Trust and Host of the Howard League Award Ceremony, July 2007)

Early in July, FR again exhibited at the Royal Society's Summer Exhibition in London. Barry Gardiner, Alexis Achim, Elspeth Macdonald and Dave Auty, along with colleagues from Napier, Glasgow and Laval Universities and FibreGen, created an exhibit entitled 'Listen to what the trees are saying'. This highly popular demonstration (pictured below) showed how the use of modern acoustic tools can determine the stiffness of standing trees and logs, and how this information can be used to allocate wood for a particular end use. This 'acoustic advantage' was also demonstrated later in the year to members of the forestry wood-chain industry at two seminars in Dunkeld in October and November.



Even in Britain's damp climate, fire can be a threat to forests, heaths and moorland; last autumn, Ian Murgatroyd was one of the invited speakers at a group of seminars on fire suppression for fire consultants and rescue staff, organised by the Institution of Fire Engineers. Ian's presentation outlined studies into the water quantities used by different pumps and methods to suppress similar fires, and included a discussion of other fire suppression techniques used in the UK.

In December, Colin Edwards organised a one-day workshop in Grampian Region, Scotland, for foresters and conservationists to consider techniques for encouraging natural regeneration in native pinewoods, particularly in areas under deer pressure. Helen Armstrong described the effects of deer and cattle on Scots pine, Sarah Taylor talked about regeneration dynamics in pinewoods and Colin gave a presentation on 'Seventy-seven years of natural regeneration trials: results to date'. Lively discussion and site visits rounded off the day.



# National and international links, visitors and events

## National links

The national map to the left shows FR's links with an increasingly wide range of UK universities and associated scientific organisations. Many of our programmes, individual and collaborative, are funded by other government agencies, UK research councils and commercial organisations; these include Defra, SEEDA, BERR, DIUS, NERC, SNH, Natural England and the Environment Agency. We also collaborate with a wide range of universities countrywide, including: Aberdeen, Edinburgh, Napier, Stirling, Lancaster, Central Lancashire (Penrith), York, Cumbria, Leeds, Bangor, Cardiff, Cranfield, Oxford, Cambridge, Exeter, Bath, Bristol, Southampton, Bournemouth, Reading, Surrey, Southampton, Sussex and London universities.

